FIGO
International Federation of Gynecology and Obstetrics
the Global Voice for Women's Health

FIGO Fistula Surgery Training Manual

Standardised training curriculum and best practice guide

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A standardised training curriculum and guide to current best practice

Developed and devised by the Expert Advisory Group for FIGO's Fistula Surgery Training Initiative

Published by

FIGO
International Federation of Gynecology and Obstetrics
the Global Voice for Women's Health

In association with
The Global Library of Women's Medicine

The publication of the FIGO Fistula Surgery Training Manual has been made possible with funding support from Texas Children's Hospital and an anonymous foundation

Published by FIGO

FIGO
International Federation of Gynecology and Obstetrics
FIGO House, 10 Theed Street, London, SE1 8ST, UK
www.figo.org / figo@figo.org
Registered charity number: 1113263
Registered company number: 05498067

in association with

The Global Library of Women's Medicine
Albyfield House
Wetheral
Carlisle, CA4 8ET, UK
www.glowm.com

ISBN: 978-0-9929457-0-1

Printed and bound by CPI Anthony Rowe, Chippenham, SN14 6LH, UK

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Acknowledgements

This manual has been a global collaborative effort by expert and trainee fistula surgeons, professional health organisations and individuals committed to alleviating the suffering of women with obstetric fistula.

We would like to sincerely thank the authors of the original manual for laying the foundations, three of whom also greatly contributed to the development of this new manual (Dr Andrew Browning, Professor Sayeba Akhter and Dr Thomas Raassen).

In addition, we would like to express our gratitude to and acknowledge the commitment and hard work of the authors of this new manual. Our deepest appreciation in particular goes to Dr Andrew Browning for his significant time and contribution throughout the writing and editing process, to Dr Thomas Raassen for reviewing the final drafts and our special thanks to them both for their substantial help developing the medical illustrations.

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Introduction

The number of women living with obstetric fistula outweighs the number of fistula surgeons equipped with the knowledge and skills to provide appropriate, quality care for this very vulnerable group. Thousands of women currently living with a fistula continue to suffer needlessly because of the persisting global treatment gap.

Since 2012, the FIGO Fistula Surgery Training Initiative[1] has been building the capacity of local trainee fistula surgeons – FIGO Fellows – and multidisciplinary teams to provide life-changing surgical repairs and holistic care to substantially more women suffering from obstetric fistula in some of the world's most underserved communities.

The foundation of the Training Initiative has been the *FIGO and Partners Global Competency-Based Fistula Surgery Training Manual (2011)*. This important tool was the first standardised training curriculum for fistula surgery and has been a crucial step in the departure from more informal training methods of the past.

FIGO's pioneering project takes place through Fellows undertaking formal training placements in established training centres, followed by intermittent coaching visits by trainers in Fellows' home facilities to gradually and methodically build their skills in fistula surgery and care.

The *Global Competency-Based Fistula Surgery Training Manual* and the Training Initiative[2] have evolved into successful and impactful multipartner interventions with considerable global reach, and continue to make a vital and increasing contribution to narrowing the treatment gap.

About the New FIGO Fistula Surgery Manual

Following years of regular utilisation and extensive feedback from users, including Fellows, trainers and partners, it became evident that the *Global Competency-Based Fistula Surgery Training Manual* needed to be updated and adapted in line with the evolving and new demands of fistula surgery training.

The manual has been collated, developed and edited by the Training Initiative's Expert Advisory Group of fistula surgeons, who each contributed to the writing and development of specific sections, in close collaboration with the project team. Acknowledging that surgical techniques and practices vary, where there have been slight differences of expert opinion, consensus of the compilation team has been sought. The manual also contains a range of new surgical techniques, illustrations, references to new publications and key learning resources.

The FIGO Fistula Surgery Training Manual continues to form the foundation of the Fistula Surgery Training Initiative, but is also freely available for use by the broader fistula community. Irrespective of

[1] www.figo.org/what-we-do/obstetric-fistula/fistula-surgery-training-initiative

[2] G. Slinger, L. Trauvetter, A. Browning, A. Rane. Out of the Shadows and 6000 Reasons to Celebrate: An Update from FIGO's Fistula Surgery Training Initiative. *Int J Gynecol Obstet* (2018).

how training takes place, the manual should only be used under the close supervision of an expert fistula surgeon.

It is absolutely essential for every surgeon to ensure that patients are at the heart of their work, which includes only carrying out repairs that are within the surgical abilities of each specific surgeon, and otherwise arranging an appropriate referral.

Structure and Use of the Training Manual

To help fistula surgeons develop the knowledge and skills required to competently diagnose and treat patients, the manual covers the full spectrum of obstetric fistula care and is structured into the following sections: *1. Overview of Female Genital Fistula; 2. Preoperative Clinical Management*; *3. Attainment of Skills in Fistula Surgery*; *4. Complications of Fistula Surgery*; *5. Postoperative Care*; and *6. Audit and Research*.

Before any surgical training commences, trainee surgeons should carefully study all sections of the manual, as well as other recommended learning resources (*see* Learning Resources; page 239). Along with self-study, in-depth tuition delivered by a trainer/expert fistula surgeon is essential to ensure that the content is fully understood. This should be followed by extensive hands-on experience under the guidance of a trainer/expert fistula surgeon, enabling the trainee to develop surgical expertise.

Development and Assessment of Surgical Skills

Development of surgical skills is covered by 16 modules that have been divided across three ascending levels of competency: Level 1 to Level 3. Each surgical module includes a theoretical and practical component, covering learning objectives, general background information, preoperative assessment, surgery, complications, postoperative management and specific discharge advice. Module 17 in Level 3 is nonsurgical and focuses on the management of a fistula treatment facility.

At the end of each surgical module is a **Performance-Based Assessment** table, which is used after completion of each corresponding procedure to evaluate a trainee's ability and progress. Performance-based assessments should be carried out by the attending trainer/expert fistula surgeon, who assesses the trainee's ability against the respective criteria, either unsatisfactory, satisfactory or good. A module is passed if the trainee's skills are satisfactory or good for all listed criteria and signed off by a trainer/expert fistula surgeon.

Each surgical module contains a **Module Logbook**[3] in which trainees should record the procedures they have observed, had direct supervision for or performed independently. Every entry must be signed-off by the attending trainer/expert fistula surgeon, with details of any necessary further training.

Levels of Competency

Trainees progress through the three levels of competency by successfully completing the performance-based assessment for each module and providing evidence of having performed the minimum requisite number of procedures for that level, as outlined below. Evidence of repairs should be provided in the form of a **General Logbook**[4] meticulously kept by the trainee, verified by an assigned supervisor and available upon request as necessary.

[3] *See* FIGO Fistula Resource Hub (www.figo.org/fistula-resources) for Module Logbook template if additional pages are needed.
[4] *See* FIGO Fistula Resource Hub (www.figo.org/fistula-resources) for template.

Level 1

To be considered competent for Level 1, a trainee must successfully pass the respective performance-based assessment for all four modules in Level 1 and have performed a minimum of 50–100 repairs across all modules in Level 1.

Level 2

To be considered competent for Level 2, a trainee must successfully pass the respective performance-based assessment for all nine modules in Level 2 and have performed a minimum of 200–300 repairs across all modules in Level 2.

Level 3

As this level is highly specialised, it is most suited to trainees who spend a significant proportion of their time on fistula treatment in a high-need area, with a varied and challenging caseload. To be considered competent for Level 3, a trainee must successfully pass the respective performance-based assessment for the first three modules in Level 3 and, as there is not a minimum number of repairs, a trainer/expert fistula surgeon will use their discretion to sign off this level. Unlike the surgical modules, to be considered competent in Module 17/Level 3, trainees must demonstrate in discussion with their trainer/expert fistula surgeon a thorough understanding of running and managing a fistula treatment facility.

FIGO Certificate

While surgical competencies might be acquired independently of the FIGO Fistula Surgery Training Initiative, **only trainees enrolled in the Initiative can be awarded a FIGO Certificate**.

1. Overview of Female Genital Fistula

1.1. Definition and Epidemiology

A fistula is an abnormal communication between two epithelial surfaces, which can occur between two hollow or tubular internal organs or between an internal hollow organ and the outer epithelial layer of the body. More specifically, a genital fistula is a communication of the urethra, bladder, ureter and/or rectum with the uterus, cervix and/or vagina. Such communications are therefore genitourinary and/or rectovaginal.

Unrelieved prolonged obstructed labour is the main cause of obstetric vesicovaginal fistulas and rectovaginal fistulas.[5] Rectovaginal fistulas are rarely seen in isolation, as they tend to be concurrent with vesicovaginal fistulas in more severe cases of obstructed labour. Combined fistulas occur in 5%–10% of cases.[6]

Prolonged obstructed labour is estimated to lead to the delivery of a stillborn baby in around 90%–95% of women who have an obstetric fistula.[7] Women in neglected obstructed labour are also at risk of dying themselves, from complications such as uterine rupture, sepsis or postpartum haemorrhage. When a woman survives, the impact of unrelieved obstructed labour often leads to the development of an obstetric fistula, causing her to be incontinent of urine and/or faeces. If untreated, the injury will remain for the rest of a woman's life, causing immense suffering and isolation.

Obstetric fistula most commonly occurs in Sub-Saharan Africa and Southeast Asia.[8] Since the obstetric fistula patient population is hard to reach[9] and as the condition tends to occur mostly in countries where there is a scarcity of health facilities, many cases will remain undiagnosed and under-reported. Therefore, robust, recent and reliable incidence and prevalence rates of obstetric fistula are notoriously difficult to obtain.[10] There are many estimates of the prevalence of fistula,[11] however the most commonly quoted estimate is that around two million women suffer from obstetric fistula worldwide, with 50,000 to 100,000 new cases each year.[12]

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[5] L.L. Wall. Obstetric Vesicovaginal Fistula as an International Public-Health Problem. *Lancet* (2006).
[6] B. Hancock, A. Browning. *Practical Obstetric Fistula Surgery*. London: Royal Society of Medicine Press Ltd (2009).
[7] Wall. Obstetric Vesicovaginal Fistula as an International Public-Health Problem; M. Muleta, S. Rasmussen, T. Kiserud. Obstetric Fistula in 14,928 Ethiopian Women. *Acta Obstet Gynecol Scand* (2010).
[8] G. Slinger, L. Trautvetter. Addressing the Fistula Treatment Gap and Rising to the 2030 Challenge. *Int J Gynecol Obstet* (2020); Wall. Obstetric Vesicovaginal Fistula as an International Public-Health Problem.
[9] M.A. Lyimo, I.H. Mosha. Reasons for Delay in Seeking Treatment among Women with Obstetric Fistula in Tanzania: A Qualitative Study. *BMC Womens Health* (2019).
[10] A.S. El-Azab, H.A. Abolella, M. Farouk. Update on Vesicovaginal Fistula: A Systematic Review. *Arab J Urol* (2019); Ö. Tunçalp, V. Tripathi, E. Landry, C.K. Stanton, S. Ahmed. Measuring the Incidence and Prevalence of Obstetric Fistula: Approaches, Needs and Recommendations. *Bull World Health Organ.* (2015); C. Stanton, S.A. Holtz, S. Ahmed. Challenges in Measuring Obstetric Fistula. *Int J Gynecol Obstet* (2007).
[11] A.J. Adler, C. Ronsmans, C. Calvert, V. Filippi. Estimating the Prevalence of Obstetric Fistula: A Systematic Review and Meta-Analysis. *BMC Pregnancy Childbirth* (2013).
[12] K. Waaldijk, Y.D. Armiya'u. The Obstetric Fistula: A Major Public Health Problem Still Unsolved. *Int Urogynecol J* (1993); G. Lewis, L. De Bernis. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*. WHO (2006); UNFPA. *Second Meeting of the Working Group for the Prevention and Treatment of Obstetric Fistula* (2002).

Iatrogenic injury is the leading cause of female genital tract fistulas in high-income countries, and it is less often the sequelae of obstetric injury.[13] However, the numbers of iatrogenic fistula cases in Sub-Saharan Africa and Southeast Asia are also increasing. This increase is likely to be the result of a combination of factors, including insufficient medical and obstetric training and supervision, inappropriate labour management and decision-making, increased caesarean sections, as well as more accurate reporting of iatrogenic injuries. To further help with the latter, T.J. Raassen *et al.* have developed a useful and clear categorisation system for iatrogenic fistula with the following distinctions: *definitely iatrogenic*, *probably iatrogenic* and *likely iatrogenic*.[14] It is also important to note that, women presenting late at health facilities are also more susceptible to iatrogenic injury as maternal reproductive tract tissues are much more fragile from the prolonged, obstructed labour.

1.2. Aetiopathogenesis

Prolonged obstructed labour is the main aetiological factor for the development of genital fistula, causing an 'obstetric fistula'.

In such cases, the uterine contractions cause the foetal head or presenting part to increasingly compress the soft maternal tissues of the genital tract against the bony pelvis, mainly against the back of the pubic bones. This leads to ischaemic necrosis of the intervening soft tissues between the bladder/urethra and affected part of the genital tract. After the delivery, which usually results in a stillbirth, the necrotic tissue sloughs off, forming a direct communication between two or more anatomical structures.

The process takes place over days or weeks and results in an obstetric fistula. The most common site of injury is at the urethrovesical junction, resulting from the foetal head being deeply impacted and stuck in the maternal pelvis during cephalopelvic disproportion or malposition of the foetal head. The extent of the damage will depend on the duration of obstructed labour and the position of the foetal head or corresponding presenting part.

The longer the labour is obstructed, the more extensive the resulting injuries that affect the soft tissues of the maternal genital tract and associated nerves. Fistulas can involve the bladder base, the whole of the anterior vaginal wall and/or much of the urethra, with rectal involvement leading to a concomitant rectovaginal fistula in more severe cases.

[13] C.J. Hillary, N.I Osman, P. Hilton, C.R. Chapple. The Aetiology, Treatment, and Outcome of Urogenital Fistulae Managed in Well- and Low-Resourced Countries: A Systematic Review. *Eur Urol* (2016).
[14] N. Tasnim, K. Bangash, O. Amin, S. Luqman, H. Hina. Rising Trends in Iatrogenic Urogenital Fistula: A New Challenge. *Int J Gynecol Obstet* (2020); T.J. Raassen, C.J. Ngongo, M.M. Mahendeka. Iatrogenic Genitourinary Fistula: An 18-Year Retrospective Review of 805 Injuries. *Int Urogynecol J* (2014); J. Wright, F. Ayenachew, K.D. Ballard. The Changing Face of Obstetric Fistula Surgery in Ethiopia. *Int J Womens Health* (2016).

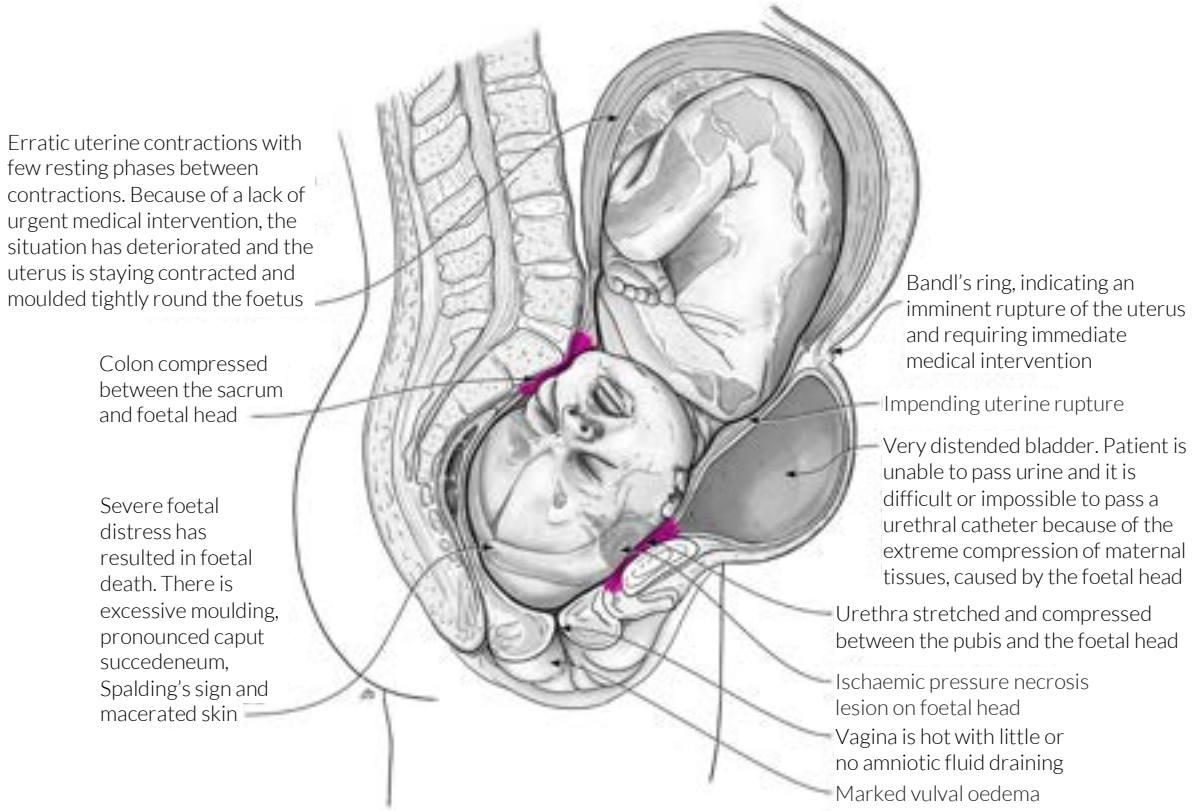


Figure 1. Maternal and foetal sequelae of prolonged obstructed labour. General maternal signs and symptoms include fever, sepsis, distress, pain, agitation and exhaustion. Due to the sustained compression of the L4–5 nerves and S1 roots, maternal footdrop is also likely to occur following delivery. Purple shading represents ischaemic necrosis of maternal tissues from the pressure of the foetal head during unrelieved obstructed labour. These purple areas are at high risk of becoming obstetric fistula(s).

1.3. Aetiological Factors

Aetiological factors of genital fistulas and related trauma are outlined under obstetric and nonobstetric causes below.

1.3.1. Obstetric Causes

It is estimated that 90.4%–92.2%[15] of female genital fistulas are related to childbirth.

1. **Obstetric Fistula**
   - Prolonged obstructed labour (most common[16])

[15] M. Maheu-Giroux, V. Filippi, S. Samadoulougou, *et al.* Prevalence of Symptoms of Vaginal Fistula in 19 Sub-Saharan Africa Countries: A Meta-Analysis of National Household Survey Data. *Lancet Global Health* (2015); T.J. Raassen, E.G. Verdaasdonk, M.E. Vierhout. Prospective Results after First-Time Surgery for Obstetric Fistulas in East African Women. *Int Urogynecol J Pelvic Floor Dysfunct* (2008); P. Hilton, A. Ward. Epidemiological and Surgical Aspects of Urogenital Fistulae: A Review of 25 Years' Experience in Southeast Nigeria. *Int Urogynecol J Pelvic Floor Dysfunct* (1998).

[16] J. Kelly, H.R. Winter. Reflections on the Knowledge Base for Obstetric Fistula. *Int J Gynecol Obstet* (2007).

2. **Perineal Tears** (included as they are usually due to birth trauma and, depending on the degree, can cause flatal and faecal incontinence, and are therefore also treated by fistula surgeons). Factors associated with an increased risk of developing perineal tears include:
   - Rapid uncontrolled vaginal delivery
   - Instrumental or assisted vaginal delivery
   - Foetal macrosomia (potential shoulder dystocia during vaginal delivery)
3. **Iatrogenic Fistula**
   - Caesarean section, with or without hysterectomy[17] (more common in patients who suffer delays, for example in accessing an appropriate health facility and/or in receiving an emergency caesarean section after arrival)
   - Instrumental or assisted, e.g. vacuum or forceps delivery
   - Destructive vaginal delivery procedures
   - Manual removal of placenta
   - Defibulation in preparation for childbirth
   - Episiotomy
   - Symphysiotomy
   - Curettage (rarely)

1.3.2. Nonobstetric Causes

1. **Iatrogenic**, e.g. caused surgically during elective gynaecological operations such as hysterectomy or through traumatic injury, e.g. in dilatation and curettage
2. **Traumatic**
   - Coital/sexual violence[18]
   - As a result of an accident
   - Female genital mutilation/cutting (FGM/C)
   - Insertion of foreign bodies
3. **Malignancy**, e.g. advanced cervical cancers
4. **Radiotherapy**
5. **Traditional intravaginal practices** like gishiri cutting, hot iron metal, insertion of products or items
6. **Inflammatory conditions**, e.g. irritable bowel syndrome, Crohn's disease
7. **Infection**
   - Tuberculosis
   - Lymphogranuloma venerum

[17] M. Mpunga Mafu, D.F. Banze, D. Nembunzu, *et al.* Frequency and Management of Non-Obstetric Fistula in the Democratic Republic of Congo: Experience from the Fistula Care Plus Project. *Trop Med Int Health* (2020).
[18] M. Onsrud, S. Sjøveian, D. Mukwege. Sexual Violence-Related Fistulas in the Democratic Republic of Congo. *Int J Gynecol Obstet* (2009); A.O. Longombe, K.M. Claude, J. Ruminjo. Fistula and Traumatic Genital Injury from Sexual Violence in a Conflict Setting in Eastern Congo: Case Studies. *Reprod Health Matters* (2008); M. Muleta, G. Williams. Postcoital Injuries Treated at the Addis Ababa Fistula Hospital, 1991–97. *Lancet* (1999).

- HIV
- Schistosomiasis

8. **Congenital** (rare), including exstrophy of the bladder (ectopia vesicae), epispadias, ectopic ureters

1.4. Risk Factors

The factors that put women and girls at increased risk[19] of developing an obstetric fistula, both directly and indirectly are:

- Lack of availability or access to safe delivery services and emergency obstetric care with trained, skilled birth attendants and medical teams.
- Poverty, illiteracy, lack of formal education and gender inequality.
- Home delivery with unskilled birth attendants and rural geographic location.
- Barriers to accessing family planning and antenatal, delivery and postnatal care.
- Small, short or stunted stature of mother.
- Rachitic maternal pelvis.

1.5. Fistula Prevention

1.5.1. Clinical Prevention

To prevent obstetric fistula it is vital to increase the availability of and access to quality maternal health services, including emergency obstetric care. This should cover the entire pregnancy and postnatal period and, critically, births should be attended by a skilled healthcare professional, with close surveillance in labour using the partogram and timely transfer of the patient to a higher-level facility in the event of obstructed labour. In the case of iatrogenic fistulas, it is essential that surgeons and other health professionals receive quality training, particularly in gynaecological and obstetric procedures, good support and adequate facility capacity.[20]

If a woman presents after prolonged obstructed labour, conservative management with bladder catheterisation may lead to spontaneous healing of a potential or fresh vesicovaginal fistula (*see* 2.2.1. Conservative Management for At-Risk and Fresh Vesicovaginal Fistula Cases; page 17). If conservative management is not successful, a trained, skilled fistula surgeon should repair the fistula as early as possible, thereby providing timely and quality treatment as well as minimising unnecessary suffering. Most fistula surgeons usually prefer to wait 3 months after the formation of a fistula before attempting a repair, to allow for healing of affected tissues.

If a fistula surgeon is not available, then the patient should be referred appropriately. It is imperative that only trained, skilled fistula surgeons provide fistula repairs, as the first attempt has the best

[19] P.M. Tebeu, J.N. Fomulu, S. Khaddaj, L. de Bernis, T. Delvaux, C.H. Rochat. Risk Factors for Obstetric Fistula: A Clinical Review. *Int Urogynecol J* (2012); L. Hawkins, R.F. Spitzer, A. Christoffersen-Deb, J. Leah, H. Mabeya. Characteristics and Surgical Success of Patients Presenting for Repair of Obstetric Fistula in Western Kenya. *Int J Gynecol Obstet* (2013); Raassen, Verdaasdonk, Vierhout. Prospective Results after First-Time Surgery for Obstetric Fistulas in East African Women; L.L. Wall, J.A. Karshima, C. Kirschner, S.D. Arrowsmith. The Obstetric Vesicovaginal Fistula: Characteristics of 899 Patients from Jos, Nigeria. *Am J Obstet Gynecol* (2004).
[20] P. Hilton. Trends in the Aetiology of Urogenital Fistula: A Case of 'Retrogressive Evolution'? *Int Urogynecol J* (2016).

chance of success.[21] Substandard repairs seriously reduce the likelihood of subsequent surgery having good outcomes.

The provision of and access to (free) family planning and birth spacing services is important, to both prevent obstetric fistula and reduce the likelihood of a recurrence in women who have had a previous repair. Women who have had an obstetric fistula, with or without repair, should have an elective caesarean section in all subsequent pregnancies. This prevents reoccurrence of an obstetric fistula and ensures good maternal and newborn health outcomes. Women who have had an iatrogenic fistula or perineal tear may be advised that in subsequent pregnancies they can attempt a vaginal delivery, which should only ever take place in a facility equipped to provide comprehensive emergency obstetric care.

1.5.2. Educational Prevention

Raising the status of women and girls and advancing gender equality is at the heart of obstetric fistula prevention. This starts with equal opportunities to access and complete free, equitable and quality primary and secondary education[22] to allow girls to reach their personal and professional potential. Receiving the same education as their male peers can enable women and girls to develop a strong sense of gender equality, awareness of their (human) rights and empower them to claim those rights.

Another essential cornerstone of fistula prevention is to improve the level of health education amongst all members of society, with particular emphasis on the need for adequate maternal and reproductive health care.[23] It is vitally important to involve those who have most of the decision-making power in the household and/or the community, including men and older people. Health education can be delivered by a range of groups and individuals, such as community health workers, sensitisation teams and fistula ambassadors, who are often former patients who have recovered from obstetric fistula.

Free and comprehensive health education should address:

- Prevention, identification and treatment of obstetric fistula.
- Comprehensive sex, reproductive and general health education, including options in the case of an unplanned pregnancy.
- The risks of unattended home deliveries (e.g. obstetric fistula, postpartum haemorrhage, maternal and neonatal mortality, etc) and the importance of giving birth in an appropriate healthcare facility, or at least having a skilled healthcare professional in attendance with the possibility of a timely transfer to a hospital.

[21] Hancock and Browning. *Practical Obstetric Fistula Surgery*.
[22] W. Rosa, ed. Appendix: Transforming Our World: The 2030 Agenda for Sustainable Development. In: *A New Era in Global Health*. Springer (2018).
[23] M.N. Wegner, J. Ruminjo, J.E. Sinclair, L. Pesso, M. Mehta. Improving Community Knowledge of Obstetric Fistula Prevention and Treatment. *Int J Gynecol Obstet* (2007).

- Options for family planning, including delaying pregnancy[24] and birth spacing.
- Making plans for safe childbirth in an adequate health facility.

1.6. Obstetric Fistula Classification Systems

To be effective, a classification system for obstetric fistula should be descriptive, indicative of the operative technique and can ideally be prognostic to help predict the surgical outcome. The system should be a reliable tool to facilitate communication and to help surgeons identify suitable cases according to their surgical ability.

In current practice, there is no universally accepted, standardised obstetric fistula classification system and several are used;[25] however, the most commonly used are those developed by Kees Waaldijk[26] and Judith Goh.[27] For ease of communication, fistula surgeons should use one system consistently for record keeping, case selection, audits and studies.

There are also some commonly used terms to describe fistulas that do not constitute a classification system but are descriptive and therefore useful for communication. The descriptions can be based on the site, size and extent of scarring of the fistula:

Site

- Urethra–vaginal: occur within 3.5 cm of the external urethral meatus.
- Juxtaurethral: most common site of a fistula and is at the urethrovesical junction.
- Midvaginal: 4 cm or more from the external urethral orifice.
- Juxtacervical: adjacent to the cervix, more common in multiparous women and post caesarean section.[28]
- Intracervical: between the bladder and the cervical canal and almost always the consequence of a caesarean section.
- Circumferential: most commonly the bladder has been completely separated from the urethra so there is a disruption in the continuity of the urinary tract. The back of the pubic bone can easily be palpated through the vagina at the site of the gap between the urethra and the bladder.
- Ureterovaginal: where one or even both ureters drain into the genital tract. These are usually iatrogenic after a caesarean section and/or hysterectomy.
- Vault: occur at the vaginal vault after an elective or emergency hysterectomy.

[24] A.O. Tsui, A.A. Creanga, S. Ahmed. The Role of Delayed Childbearing in the Prevention of Obstetric Fistulas. *Int J Gynecol Obstet* (2007).
[25] J.B. Lawson. Tropical Gynaecology: Birth-Canal Injuries. *Proc R Soc Med* (1968); Lewis G. and de Bernis L. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents.*
[26] K. Waaldijk. Surgical Classification of Obstetric Fistulas. *Int J Gynecol Obstet* (1995).
[27] J.T. Goh. A New Classification for Female Genital Tract Fistula. *Aust N Z J Obstet Gynaecol* (2004).
[28] A.M. Sih, D.M. Kopp, J.H. Tang. Association between Parity and Fistula Location in Women with Obstetric Fistula: A Multivariate Regression Analysis. *BJOG* (2016).

Size/diameter

- Tiny: admitting only a small probe.
- Small: <1.5 cm.
- Medium: 1.5–3 cm.
- Large: >3 cm, may involve loss of most of the anterior vaginal wall and a circumferential loss of the urethrovesical junction.
- Extensive: major loss of bladder and urethra with a large gap in between.

Scarring

The extent of scarring can range from minimal to extreme. In the former, the fistula margins are soft and mobile, whereas in the latter, the margins are rigid and fixed. It can also affect the lateral and posterior wall of the vagina, causing complete stenosis in extreme cases. Stenosis can affect the proximal or distal vagina or can extend throughout. The most common site is midvagina.[29]

1.6.1. Waaldijk Classification System[30]

Kees Waaldijk's classification system for vesicovaginal and rectovaginal fistulas is based on damage to the continence mechanism, 0–5 cm from the meatus, circumferential loss and size. It can be used to determine what type of operation will be needed and gives an indication of the prognosis.

Genitourinary Fistulas (Vesicovaginal Fistulas)

Classification of fistulas according to anatomic/physiologic location

Type I	Fistulas not involving the continence/closing mechanism		
Type II	Fistulas involving the continence/closing mechanism	**A** Without (sub)total urethra involvement	**a** Without circumferential defect
			b With circumferential defect
		B With (sub)total urethra involvement	**a** Without circumferential defect
			b With circumferential defect
Type III	Miscellaneous, e.g. fistulas involving the ureter and other exceptional fistulas		

Additional classification of fistulas according to size

Small	<2 cm
Medium	2–3 cm
Large	4–5 cm
Extensive	≥6 cm

[29] Hancock and Browning. *Practical Obstetric Fistula Surgery*.
[30] Waaldijk. Surgical Classification of Obstetric Fistulas.

Using the classification system to predict surgical principles

Type of fistula	Bladder/urethra direction of closure	Pubocervical fascia	Anterior vaginal wall closure
Type I	Any, use common sense	No special measures	Adapt to fistula margins
Type II Aa	Transverse	Transverse repair with or without fixation	Transverse adaptation
Type II Ab	Circumferential end-to-end	Re-fixation	Transverse adaptation
Type II Ba	Longitudinal, with transverse urethral tissue	Fixation	Flap
Type II Bb	Longitudinal, with circumferential nonurethral tissue	Re-fixation	Flap
Type III	Not applicable	Not applicable	Not applicable

Genito–Anorectal Fistulas (Rectovaginal Fistulas)

Classification of fistulas according to anatomic/physiologic location

Type I	Proximal fistulas not involving the continence/closing mechanism	**a** Without rectum stricture
		b With rectum stricture (common)
		c With circumferential defect (not common)
Type II	Distal fistulas involving the continence/closing mechanism	**a** Without sphincter ani involvement
		b With sphincter ani involvement
Type III	Miscellaneous, e.g. intestine–uterine fistulas after instrumental abortion	

Additional classification of fistulas according to size

Small	<2 cm
Medium	2–3 cm
Large	4–5 cm
Extensive	≥6 cm

Using the classification system to predict surgical principles

Type	Surgical principles
Type I a	Transverse closure of rectum
Type I b	Transverse closure of rectum with disruption of rectal stricture
Type I c	End-to-end anastomosis (after disruption of strictures); exceptionally, combined abdominovaginal approach with colostomy
Type II a	Longitudinal closure of anorectum
Type II b	Meticulous reconstruction of all the structures involved
Type III	Depends on the situation

1.6.2. Goh Classification System[31]

Judith Goh's classification system is based on the length of the urethra (types 1–4), the size of the fistula (a–c) and the extent of scarring (i–iii).

Genitourinary Fistulas (Vesicovaginal Fistulas)

Site (distance between external urinary meatus and distal edge of fistula)	
Type 1	>3.5 cm
Type 2	2.5–3.5 cm
Type 3	1.5 to just less than 2.5 cm
Type 4	<1.5 cm
Size (length of the largest diameter)	
(a)	<1.5 cm
(b)	1.5–3 cm
(c)	>3 cm
Scarring characteristics	
i	None or only mild fibrosis (around fistula and/or vagina) and/or vaginal length >6 cm with normal vaginal capacity
ii	Moderate or severe fibrosis (around fistula and/or vagina) and/or reduced vaginal length and/or reduced vaginal capacity
iii	Special consideration, e.g. radiation damage, ureteric involvement, circumferential fistula, previous repair

[31] Goh. A New Classification for Female Genital Tract Fistula.

Genito–Anorectal Fistulas (Rectovaginal Fistulas)

Site (distance between distal edge of fistula and hymen)	
Type 1	>3 cm
Type 2	2.5–3 cm
Type 3	1.5 to just less than 2.5 cm
Type 4	<1.5 cm
Size (length of the largest diameter)	
(a)	<1.5 cm
(b)	1.5–3 cm
(c)	>3 cm
Scarring characteristics	
i	None or mild fibrosis around the fistula and/or vagina, vaginal capacity >6 cm
ii	Moderate or severe fibrosis, vaginal capacity <6 cm
iii	Special consideration, e.g. radiation damage, inflammatory disease, malignancy, previous repair

1.6.3. Prognosis

Studies have been carried out using both the Waaldijk and Goh classification systems to predict outcomes.[32] Essentially, for both systems, as the fistula type increases (e.g. Waaldijk type I to type II Bb and Goh type 1ai to type 4ciii), the prognosis worsens.[33] These classification systems mostly concentrate on the fistula characteristics that affect prognosis, such as involvement and length of the urethra, the size of the fistula and the extent of scarring. These systems are similar to other classification systems, such as for cancer; nevertheless, other factors that potentially contribute to outcomes tend not to be taken into account, such as patient characteristics and comorbidities, surgeon skill, perioperative procedures and care.[34] Classification systems may also be enhanced by an explicit prognostic score, which can help with decision-making and planning repairs.[35] Scoring systems for prediction of healing and continence using a 5% interval on a scale from 5% to 95% are used by some fistula surgeons,[36] ideally, any scoring system should be used in conjunction with the classification system of choice.

[32] K. Waaldijk. The Immediate Management of Fresh Obstetric Fistulas. *Am J Obstet Gynecol* (2004); J.T. Goh, A. Browning, B. Berhan, A. Chang. Predicting the Risk of Failure of Closure of Obstetric Fistula and Residual Urinary Incontinence Using a Classification System. *Int Urogynecol J Pelvic Floor Dysfunct* (2008).
[33] V. Frajzyngier, G. Li, E. Larson, J. Ruminjo, M.A. Barone. Development and Comparison of Prognostic Scoring Systems for Surgical Closure of Genitourinary Fistula. *Am J Obstet Gynecol* (2013).
[34] Frajzyngier, *et al.* Development and Comparison of Prognostic Scoring Systems for Surgical Closure of Genitourinary Fistula.
[35] Frajzyngier, *et al.* Development and Comparison of Prognostic Scoring Systems for Surgical Closure of Genitourinary Fistula; S.D. Arrowsmith. Urinary Diversion in the Vesico-Vaginal Fistula Patient: General Considerations Regarding Feasibility, Safety, and Follow-Up. *Int J Gynecol Obstet* (2007).
[36] K. Waaldijk. Obstetric Trauma Surgery Art and Science (2018).

2. Preoperative Clinical Management

This chapter focuses on clinical management of obstetric fistula and covers patient assessment, conservative management, holistic care to treat associated conditions/comorbidities and preoperative planning. This chapter details the prerequisite steps that should be taken prior to surgery.

2.1. Patient Assessment

Patients presenting with suspected obstetric fistula are likely to have some of the symptoms and comorbidities listed below. Thorough patient history and physical examinations, according to the criteria outlined in this section, should be applied to assess the patient and make a correct diagnosis.

2.1.1. Obstructed Labour Injury Complex

Symptoms

Depending on whether the patient has a vesicovaginal fistula and/or rectovaginal fistula, the main symptom of obstetric fistula is uncontrollable continuous leakage of urine and/or stool from the vagina.

Associated Comorbidities and Consequences

A fistula severely affects a woman's reproductive system, as well as her entire health and well-being.[37] Therefore, when a fistula patient presents, it is important to investigate the presence of possible consequences and comorbidities associated with obstetric fistula.

Early Comorbidities and Consequences

- Uterine rupture.
- Sepsis.
- Ischaemic changes in pelvic organ tissues.
- Extragenital damage: gastrointestinal damage, anal sphincter damage.
- Damage to or separation of the symphysis pubis.[38]
- Fractured coccyx.
- Neurological damage, foot drop from damage of the L5/S1 spinal nerve roots.[39]
- Intrapartum foetal death.
- Foetal and neonatal complications: hypoxic ischaemic brain injury, sepsis, intracranial and intracerebral haemorrhage.

[37] S. Arrowsmith, E.C. Hamlin, L.L. Wall. Obstructed Labor Injury Complex: Obstetric Fistula Formation and the Multifaceted Morbidity of Maternal Birth Trauma in the Developing World. *Obstet Gynecol Surv* (1996).
[38] W.P. Cockshott. Pubic Changes Associated with Obstetric Vesico Vaginal Fistulae. *Clin Radiol* (1973).
[39] K. Waaldijk, T.E. Elkins. The Obstetric Fistula and Peroneal Nerve Injury: An Analysis of 947 Consecutive Patients. *Int Urogynecol J* (1994).

Delayed Comorbidities and Consequences

- Genital tract scarring leading to vaginal and/or cervical stenosis, and even haematometra.
- Sexual problems caused by vaginal stenosis or occlusion; dyspareunia, apareunia.
- Cervical incompetence, leading to an inability to carry subsequent pregnancies to term.
- Amenorrhea.
- Infertility secondary to Asherman's or Sheehan's syndrome.
- Recurrent urinary tract infections.
- Urinary dermatitis with chronic excoriation, local hyperkeratosis and secondary ulceration.
- Bladder dysfunction, neuropathic bladder.
- Renal damage from recurrent urinary tract infections or due to lower ureter stricture, which may lead to hydronephrosis and loss of renal function.
- Bladder and vaginal stones due to concentrated urine.
- Chronic pain, e.g. pelvic and/or leg pain.
- Ongoing foot drop.
- Lower limb contractures.

Rare Comorbidities and Consequences

- Uterine prolapse.
- Permanent foot drop.

Other Associated Comorbidities and Consequences

In addition to the physical comorbidities and consequences, obstetric fistula has a severe emotional, social and economic impact on the lives of women living with the condition,[40] which must also be assessed and addressed.

- Mental health issues, e.g. depression, psychological disorders, suicidal thoughts or tendencies.
- Social stigma, rejection, family separation and community exclusion.
- Malnutrition.
- Chronic anaemia.
- Severe socioeconomic implications, often resulting in deepening poverty.
- Premature death resulting from poor general health and nutritional status or renal failure.

[40] L.T. Mselle, K.M. Moland, B. Evjen-Olsen, A. Mvungi, T.W. Kohi. 'I Am Nothing': Experiences of Loss among Women Suffering from Severe Birth Injuries in Tanzania. *BMC Womens Health* (2011); K. Weston, S. Mutiso, J.W. Mwangi, Z. Qureshi, J. Beard, P. Venkat. Depression among Women with Obstetric Fistula in Kenya. *Int J Gynecol Obstet* (2011); S. Ahmed, S.A. Holtz. Social and Economic Consequences of Obstetric Fistula: Life Changed Forever? *Int J Gynecol Obstet* (2007); J.K. Barageine. *Genital Fistula among Ugandan Women: Risk Factors, Treatment Outcomes, and Experiences of Patients and Spouses* [PhD thesis]. Makerere University, Kampala and Karolinska Institute, Stockholm (2015).

2.1.2. Diagnosis

A detailed history and thorough examination are vital to confirm the diagnosis. It is important to assess the patient for number, size and exact location of fistula(s) before developing a treatment plan. Record and safely store patient information from their first contact with a healthcare professional throughout treatment, discharge and follow-up. This not only ensures continuity of care, but can also help to monitor surgical outcomes, facilitate learning and build a database of patient records, as well as carry out audits and possible research studies. Record keeping should cover the patients' personal and clinical history; physical examination; investigations and results; preoperative assessment, surgery and postoperative care; assessment of outcomes; discharge advice and follow-up appointments after discharge.

The following can be used as a reference for information that should be collected and recorded, although many facilities will already have their own protocols.

Personal and Obstetric History

1. **Patient characteristics:** Name, contact details, age, marital status and age at marriage if relevant, education, occupation, members of household and current circumstances.
2. **Symptoms:** Main problem, characteristics and duration.
3. **Obstetric history:**
   - **Gravidity and parity** including dates and sex of living and dead children.
   - **Labour duration(s)**
   - **Place(s) of delivery and person(s) who assisted**
   - **Mode(s) of delivery** (e.g. spontaneous vaginal delivery, instrumental or vacuum delivery, destructive delivery, symphysiotomy, caesarean section with or without hysterectomy).
   - **Neonatal outcome(s)** (e.g. live birth, stillbirth, early neonatal death, sex of baby).
   - **Other** (e.g. history of menses, vaginal bleeding or discharge, previous confirmed pregnancies and their evolution, inability to walk properly after delivery, when menses resumed after delivery, current and past use of contraception, other medical conditions or previous surgery).
   - **Fistula history** (e.g. details of previous fistula, repair(s), facility and outcomes) to indicate whether the present fistula is new, old or formerly unsuccessfully repaired.
   - **Previous medical history** followed by appropriate investigations (e.g. drug allergies, diabetes mellitus, hypertension, known cardiac diseases, anaemia, tuberculosis, malarial attacks, thyroid disorders).
   - **Previous surgical history** (e.g. blood transfusion, anaesthesia-related complications, type of operation(s) performed including hysterectomy, intraoperative complications, surgeon's recommendations).

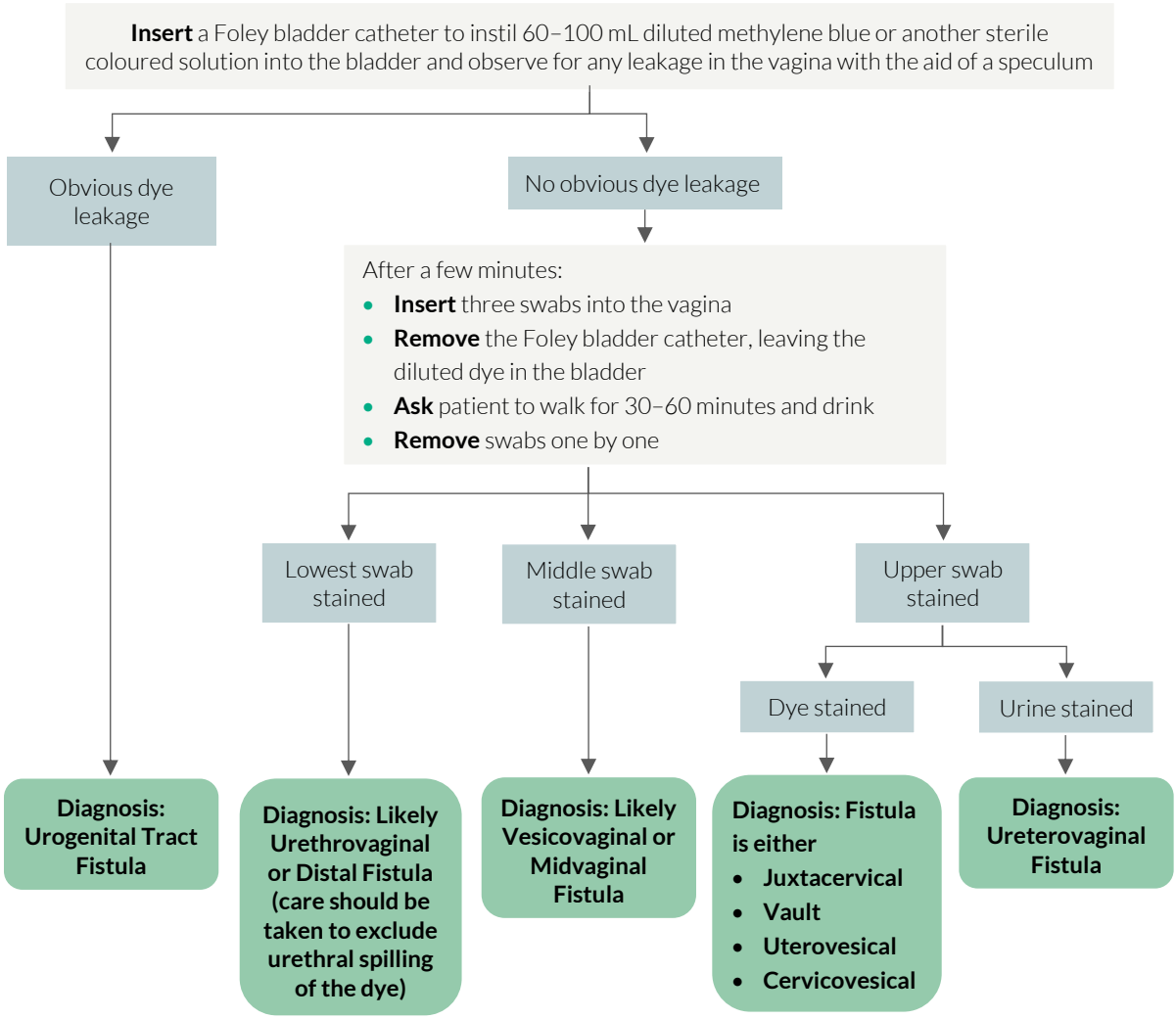
Physical Examination

After recording the patient's personal and obstetric history, a physical examination is important to diagnose, describe and classify the fistula and other morbidities relating to obstructed labour, as well as to identify previous operations or existing conditions that are not related to the fistula.

1. **General:** Nutritional status, e.g. body mass index (BMI) or mid-upper arm circumference (MUAC), mental health status.
2. **Systemic:** Review of respiratory, cardiovascular, abdominal and musculoskeletal functions.
3. **Neurological disorders caused by obstructed labour:** Foot drop (class 1–5), saddle anaesthesia, anal reflex and pudendal nerve function.
4. **Abdominal examination:** Shape of the abdomen, surgical scars, palpable mass, areas of tenderness, fluid thrill and shifting dullness, bowel sounds.
5. **Examination of external genitalia:** Ulceration and excoriation due to hyperkeratosis (i.e. urine dermatitis), bleeding, female genital cutting, perineal tears, sexually transmitted infections.
    - **Digital examination of the genital tract:** Examination facilitates the diagnosis and classification of female genital fistula and its characteristics that may affect treatment and outcomes.
    - **Patency of the reproductive tract** (vagina, uterus or cervix can be occluded by scar tissue, the cervix may be missing).
    - **Presence of vaginal stones, foreign bodies or injuries** such as gishiri cuts.
    - **Location and extent of vaginal scarring** (anterior and/or posterior), which often appears as a thick band of scar tissue on the posterior vaginal wall.
    - **Number, size, location and classification of fistula(s)** according to preferred system (*see* 1.6. Obstetric Fistula Classification Systems; page 7).
    - **Urethral length, whether the urethra is involved, if it has a total or partial circumferential defect and if it is blocked** (if it is possible to palpate the bony symphysis pubis anteriorly then the urethra has been circumferentially affected, i.e. if there is a gap from the urethra to the bladder then it is circumferential).
    - **Bladder capacity** (difficult to evaluate preoperatively, but can be assessed approximately by sounding the bladder with a metal catheter).
    - **Anal sphincter status and anal reflex** (by inspection and palpation to see if it is intact and with digital examination, asking the patient to squeeze to check for tone).
    - **Stress test** (if there is no obvious fistula, ask the patient to cough and check for signs of urinary stress incontinence; this test requires some urine in the bladder).
    - **Dye test** (permits detection of a small fistula, especially in the case of uterovaginal, cervicovaginal fistula and residual uni- and bilateral corner fistulas, which may not be detected on examination).
    - **Any other abnormality of the genital tract**.
    - **Speculum examination** helps to visualise the defect; this will however not be possible in cases of severe vaginal scarring.

Dye Test for Vesicovaginal Fistula

To diagnose a urinary tract fistula and its location, a dye test can be carried out according to the flow chart below.



Dye Test for Rectovaginal Fistula

In most cases, the diagnosis of a rectovaginal fistula is made on digital rectal and vaginal examination, also checking for rectal stenosis and/or a circumferential defect. Occasionally, if a patient complains of passing flatus or stool per the vagina but no fistula is evident, a rectal dye test is necessary. This is more likely if there is dense scarring with posterior bands so that the rectovaginal fistula is hidden in the scar.

If a dye test is necessary:

- Inject 200 mL of dye through a Foley catheter passed 10 cm into the rectum. If necessary, to prevent the dye from leaking out, either use a swab to compress the anus, or inflate the Foley catheter balloon.

- Observe the vagina for any leakage of dye. If there is no leakage, then try the swab test (*see* Dye Test for Vesicovaginal Fistula; page 16). The patient may need to wear a pad throughout to catch any anal leakage.

2.2. Conservative Management, Holistic Care and Preoperative Planning

2.2.1. Conservative Management for At-Risk and Fresh Vesicovaginal Fistula Cases

When a patient presents or is referred shortly after prolonged obstructed labour and is at risk of a fresh vesicovaginal fistula, either with or without signs of urinary incontinence, conservative management – catheterising the bladder with an indwelling Foley catheter – can promote healing and prevent the need for a surgical repair at a later stage.[41]

It is essential to note however that there is a limited timeframe in which this treatment can be effective and cure rates vary.[42] Conservative management can close around 15%–20% of simple or small vesicovaginal fistula cases,[43] and some expert fistula surgeons say success rates can be significantly higher, especially if patients are treated immediately after or within a few days of delivery.

Even if conservative management does not completely close a vesicovaginal fistula, importantly it can reduce the diameter of the fistula, thereby facilitating surgical repair subsequently. All health facilities should have a protocol in place for conservative management of at-risk and fresh vesicovaginal fistula cases and any trained staff, including medical or clinical officers, midwives and nurses can provide this critical care. It is important to note however that sometimes the Foley catheter can sit in or through the fistula, thereby keeping it open. As such, the placement of the catheter should always be checked.

Conservative Management after Prolonged Obstructed Labour for At-Risk Cases (no urinary leaking through the vagina)

All women who have suffered prolonged obstructed labour and in particular women who had a stillbirth (with or without a caesarean section), and who are likely to have ischaemic compression injuries in situ, but who are **not** yet experiencing urinary leakage from the vagina, should receive the following treatment as soon as possible after labour:[44]

- Insert an indwelling Foley catheter (size 16–18), which should be kept on free drainage and should stay in place for **14 days**.
- The patient can remain in hospital during this time but could also be discharged home if they live nearby and if communication via telephone is possible. All patients should be encouraged to drink sufficient fluids to ensure urine is clear at all times.
- Any intercurrent infections should be treated, according to local protocols.
- After removal of the Foley catheter, if the patient has no urinary leaking through the vagina in the next 24 hours and can pass urine normally, it can be assumed that the conservative management

[41] Waaldijk. The Immediate Surgical Management of Fresh Obstetric Fistulas with Catheter and/or Early Closure.
[42] M. Breen, M. Ingber. Controversies in the Management of Vesicovaginal Fistula. *Best Pract Res Clin Obstet Gynaecol* (2019).
[43] Lewis and de Bernis. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*.
[44] Lewis and de Bernis. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*. 34.

has been successful, i.e. any ischaemic injuries have healed spontaneously and a vesicovaginal fistula has therefore not formed. In this case, the patient can return home with routine predischarge advice. This should cover family planning, and for subsequent pregnancies, antenatal care and all future deliveries to take place in facilities where Emergency Obstetric Neonatal Care (EmONC) services are available.

- If on removal of the Foley catheter the patient experiences urinary leaking from the vagina, a new Foley catheter should be inserted. It is important to meticulously check the correct placement of the catheter to ensure it is not sited in the vagina or through the fistula, thereby keeping it open and the bladder kept on free drainage for a further **14 days**.
- If on removal of the Foley catheter after the second period of **14 days** the urinary leakage persists through the vagina, it can be assumed that the patient has a vesicovaginal fistula and she should be referred to a trained, skilled fistula surgeon for surgical repair. The referring facility should keep a record of the patient's contact details so that she receives appropriate support and care.

Conservative Management after Prolonged Obstructed Labour for Fresh Vesicovaginal Fistula

Conservative management for a fresh vesicovaginal fistula is most effective when it is:

- Implemented for smaller vesicovaginal fistulas.
- Started immediately or as soon as possible after prolonged obstructed labour, while the injuries are fresh, before tissue granulation takes place.

However, even if a patient presents 4–5 weeks after delivery with a recently acquired vesicovaginal fistula, conservative management should always be attempted.

For a woman who has suffered prolonged obstructed labour (with or without a caesarean section), and who **is experiencing urinary leakage from the vagina** afterwards, it can be assumed that the patient has a fresh vesicovaginal fistula. As stated above, there is a limited window of opportunity to provide conservative management for such cases.

It is therefore extremely important that the patient receives the following treatment as soon as possible after labour:

- Insert an indwelling Foley catheter (size 16–18), which should be kept on free drainage for **4–6 weeks** and should be carefully replaced with a new catheter every 10–14 days.

N.B. If the Foley catheter falls out or is found to be in the vagina, it can be assumed that the patient has extensive compression damage and resulting tissue loss, hence a large vesicovaginal fistula. In this case, the following care and hygiene measures should be offered, after which the patient should be referred to a trained, skilled fistula surgeon for assessment and surgical repair.

- The patient should remain in hospital during this time and should be encouraged to drink sufficient fluids to ensure her urine is clear at all times.

- Sitz baths with salty water should be taken twice daily by the patient, to clean the perineum and vagina.
- Under aseptic conditions, a speculum examination of the vagina should be carried out by a surgeon or health professional who has been trained in fistula care. Any necrotic tissue should be carefully excised and this debriding may need to be repeated until the vagina is healthy, with no further evidence of sloughing or necrotic lesions.
- Any intercurrent infections should be treated, and routine antibiotic prophylaxis should be given for urinary tract infections, according to local protocols.
- After **4–6 weeks**, when the Foley catheter is removed, if the patient has no urinary leaking through the vagina in the next 24 hours and is able to pass urine normally, it can be assumed that the conservative management has been successful and the vesicovaginal fistula has healed. In this case, the patient can return home with routine predischarge advice. This should cover family planning and future pregnancies, including the importance of antenatal care and delivery by elective caesarean section.
- If on removal of the Foley catheter the patient leaks urine from the vagina, a new Foley catheter should be inserted and the bladder kept on free drainage for a further **14 days**.
- If on removal of the Foley catheter after the additional period of **14 days** the urinary leakage returns through the vagina, it can be assumed that the vesicovaginal fistula is still present and the patient should be referred to a trained, skilled fistula surgeon for surgical repair. Nevertheless, it is hoped that conservative management will have reduced the diameter of the fistula, thereby making a successful surgical repair more likely subsequently. The referring facility should keep a record of the patient's contact details to ensure that she receives appropriate support and care.

If conservative management fails, there is no clear consensus on the optimal timing for fistula surgery. While some fistula surgeons prefer to operate as soon as the vagina is clear of necrotic tissue and the patient is fit for surgery, most prefer to wait for 2–3 months after the development of the fistula.[45]

2.2.2. Holistic Care to Treat Associated Conditions/Comorbidities

Patients affected by obstetric fistula inevitably suffer from multiple other debilitating comorbidities and ill-effects as a result of the prolonged, obstructed labour. If the patient is not in good general health, it is essential that any existing comorbidities that could jeopardise surgical outcomes and the patient's recovery are treated before surgery is considered. A holistic care approach that addresses the fistula and associated health problems, as well as the emotional and economic well-being of the patient, is therefore recommended in fistula treatment.[46] If possible, comprehensive, holistic care should be offered from a patient's first point of contact with health services, throughout the hospital

[45] Lewis and de Bernis. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*; Waaldijk. The Immediate Surgical Management of Fresh Obstetric Fistulas with Catheter and/or Early Closure; Raassen, Verdaasdonk, Vierhout. Prospective Results after First-Time Surgery for Obstetric Fistulas in East African Women.
[46] A.M. El Ayadi, C.E. Painter CE, A. Delamou, *et al.* Rehabilitation and Reintegration Programming Adjunct to Female Genital Fistula Surgery: A Systematic Scoping Review. *Int J Gynecol Obstet* (2020); I.M. Campbell, I.S. Asiimwe. *Nursing Care For Women With Childbirth Injuries*. Carlisle: UCIF, FIGO (2021).

stay and, ideally, it should be continued as necessary after discharge. Such services greatly enhance the patient's physical and psychological recovery, as well as her future well-being.

A holistic package of care can be delivered by dedicated professionals and/or through task shifting of trained healthcare staff, e.g. nurses. Alternatively, holistic care services can be provided by or in collaboration with local partner organisations. However, due to limited or transient resources, services may only be partially or intermittently available in fistula treatment facilities.

Treatment for Malnutrition

Treatment for malnutrition should be provided for moderately or acutely malnourished patients, as well as those who are anaemic or have other medical conditions.

Often coming from impoverished rural settings, although context specific, many fistula patients are malnourished. If they have been malnourished since childhood, some will have suffered stunting and may have poor pelvic development, leading to an increased risk of cephalopelvic disproportion and obstructed labour.[47] Malnutrition can also become more severe as a result of the deepening poverty, social isolation and depression often experienced by women with fistula.

Malnutrition may not only increase the risk of a woman developing an obstetric fistula, it can also impede good postoperative healing and recovery following surgical repair.

> It is therefore important that for a malnourished patient, fistula surgery (like all other elective surgical procedures) should be postponed until the patient is in an optimal state of health and nutrition.

To prepare the patient preoperatively, a high-protein, high-calorie diet that is rich in vitamins, and iron supplements if necessary, should be provided until the patient's weight has increased to an acceptable level. This regime should be continued postoperatively and in the recovery period.

Physiotherapy

Physiotherapy can help to address a variety of fistula-related comorbidities, including foot drop, muscle contractures and weakness, neurological damage, chronic pain, small bladder capacity, pelvic floor weakness and ongoing incontinence after surgery.[48]

Many women with obstetric fistula experience varying degrees of motor difficulty following delivery.[49] Prolonged obstructed labour can lead to peroneal nerve injury caused by compression to the lumbosacral plexus, in particular the L4–5 and S1 roots, which may result in leg muscle weakness and

[47] T. Capes, C. Ascher-Walsh, I. Abdoulaye, M. Brodman. Obstetric Fistula in Low and Middle Income Countries. *Mt Sinai J Med* (2011).
[48] Lewis and de Bernis. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*; L. Keyser, J. McKinney. *Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*. USAID, EngenderHealth, Fistula Care Plus, Mama LLC (2020).
[49] M.K. Tennfjord, M. Muleta, T. Kiserud. Musculoskeletal Sequelae in Patients with Obstetric Fistula – a Case–Control Study. *BMC Womens Health* (2014).

foot drop.[50] In very severe cases, paraplegia can develop in patients immediately after delivery, but this tends to be temporary.[51] Immobility may be compounded by saddle anaesthesia, with possible loss of anal reflex and the development of pressure sores. Lower limb muscle contractures may also develop if patients lie in the same position for an extended period of time in the hope of halting the incontinence and because of difficulty mobilising if they have foot drop. Severe contractures may need to be treated with orthopaedic surgery and significant physiotherapy prior to fistula repair.

Physiotherapy is therefore an essential component of holistic care services and can significantly improve the quality of life of fistula patients.[52] It should be started in the preoperative phase and should continue postoperatively, as effectiveness often increases with long-term application.

On admission, all women who present with an obstetric fistula (or following prolonged, obstructed labour) should be assessed to establish their individual requirements for physiotherapy.[53] A physiotherapist or other suitably trained health professional will be best placed to assess patients and prescribe the most appropriate course of treatment.[54] Individually prescribed exercises, including appropriate bladder training that can be easily replicated at home, should be included in the postoperative rehabilitation phase in hospital (*see* Bladder and Fluid Schedule; page 232), as well as in discharge advice. It is vital that patients are aware of the importance of continuing with recommended physiotherapy activities over several months or even years to assist their recovery.[55] Patient progress should be assessed and recorded throughout, preferably using specially developed assessment tools if available[56] and should be reviewed at regular intervals, including at follow-up appointments.

Psychological Care and Support

Due to the trauma of developing and living with an obstetric fistula, as well as having delivered a stillborn baby in many cases, a substantial number of patients require extensive psychological care and support.[57] Counselling should begin from the patient's first point of contact with health professionals, and should continue throughout their hospital stay and, if needed, beyond. Social workers, mental health professionals and psychologists may be needed to help the patient come to terms with the physical, emotional and social consequences of obstetric fistula and its multiple sequelae.

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[50] Hancock and Browning. *Practical Obstetric Fistula Surgery*; Waaldijk, Elkins .The Obstetric Fistula and Peroneal Nerve Injury: An Analysis of 947 Consecutive Patients.
[51] Hancock and Browning. *Practical Obstetric Fistula Surgery*.
[52] Y.J. Castille, C. Avocetien, D. Zaongo, J.M. Colas, J.O. Peabody, C.H. Rochat. One-Year Follow-up of Women Who Participated in a Physiotherapy and Health Education Program before and after Obstetric Fistula Surgery. *Int J Gynecol Obstet* (2015).
[53] Keyser and McKinney. *Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*.
[54] Keyser and McKinney. *Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*.
[55] Castille, *et al*. One-Year Follow-up of Women Who Participated in a Physiotherapy and Health Education Program Before and After Obstetric Fistula Surgery.
[56] Keyser and McKinney. *Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*.
[57] Ahmed and Holtz. Social and Economic Consequences of Obstetric Fistula: Life Changed Forever?; M.H. Watt, S.M. Wilson, K.J. Sikkema, *et al*. Development of an Intervention to Improve Mental Health for Obstetric Fistula Patients in Tanzania. *Eval Prog Plann* (2015); M.H. Watt, M.V. Mosha, A.C. Platt, *et al*. A Nurse-Delivered Mental Health Intervention for Obstetric Fistula Patients in Tanzania: Results of a Pilot Randomized Controlled Trial. *Pilot Feasibility Stud* (2017).

Psychological care should also encompass helping the patient prepare for her future, beyond the hospital and adapting back into a positive and fulfilling life in her community.

Special enhanced psychological help and hygiene support are essential for the most vulnerable patients, including those who are left with some degree of ongoing incontinence and those with injuries that are deemed incurable. It is vital to help such severely affected patients understand, manage and adapt to their situation while in hospital and after discharge, via follow-up appointments and intermittent phone calls by social support staff to check on their well-being, as done by the specialist local nongovernmental organisation, Fistula Foundation Nigeria.[58]

During hospitalisation, many patients find great solace in peer support from close contact and sharing experiences with other fistula patients, and group therapy has been shown to have a significant therapeutic effect.[59] The realisation of shared trauma can often promote profound bonding and many patients find unparalleled comfort in meeting other women who have had similar experiences (prolonged labour, stillborn baby, incontinence, social isolation and exclusion). This can lead to the development of strong social connections, which substantially contribute to patients' well-being and rehabilitation.

A suitably qualified healthcare professional should also advise patients on general health, nutrition and family planning, as this will also further aid their general and psychological well-being.

Education and Income-Generating Activities

As part of the holistic care package, some treatment facilities also offer income-generating and educational activities for women who have been affected by fistula, or they work closely with local women's groups or nongovernmental organisations that are able to provide these services. Such activities include practical skills development, which can be crucial for overcoming economic hardship, as well as for developing a sense of well-being and social inclusion.[60] While these kinds of activities are often offered to patients in the postoperative period, they can also start preoperatively, especially for patients likely to need a long hospital stay.

Some health facilities also have fistula ambassador programmes, where certain patients become ambassadors to sensitise their communities on obstetric fistula prevention and treatment, as well as to help identify other affected women.[61]

It is important to be aware that income-generating and educational activities may not suit the needs of all women, therefore participation in such programmes should be offered, but should always be optional.

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[58] Campaign to End Fistula [website]. Fistula NGO Receives Health Award in Nigeria (2012); Premium Times Nigeria [website]. How Thousands of Women Get VVF Treatment in North-West Nigeria (2018).
[59] O.A. Ojengbede, Y. Baba Y, I.O. Morhason-Bello, *et al.* Group Psychological Therapy in Obstetric Fistula Care: A Complementary Recipe for the Accompanying Mental Ill Health Morbidities? *Afr J Reprod Health* (2014).
[60] Comprehensive Community Based Rehabilitation in Tanzania [website]. Towards a Fistula-Free Generation; TERREWODE [website]. Social Reintegration; Catherine Hamlin Fistula Foundation [website]. Rehabilitation and Reintegration; R.H. Mohammad. A Community Program for Women's Health and Development: Implications for the Long-Term Care of Women with Fistulas. *Int J Gyneceol Obstet* (2007).
[61] Freedom From Fistula [website]. Fistula Ambassadors.

2.2.3. Preoperative Planning

Once a diagnosis of obstetric fistula has been made and the patient's comorbidities and other medical conditions have been identified and are being addressed, the appropriate surgical procedure should be planned and the patient suitably prepared. Detailed planning and management will help to ensure that the patient is fully fit for surgery, and that there are no contraindications that might negatively affect her well-being or surgical outcomes.

Investigations

The following investigations should be carried out, although the extent will be determined by available resources and context. Any identified issues should be treated as necessary prior to surgery.

- **Baseline observations:** Temperature, pulse, blood pressure, weight/height (or mid-upper arm circumference, MUAC).
- **Pregnancy test:** Note: if the patient is pregnant, any fistula-related surgery should be postponed until after the pregnancy.
- **Blood tests:**
  - Full blood count or haemoglobin
  - Serum glucose
  - Serology: HIV, hepatitis, syphilis
  - For certain operations, such as high/scarred rectovaginal fistula, large vesicovaginal fistulas and significant abdominal operations, blood group and cross-matching (two units) are recommended as these procedures are likely to require blood transfusions
- **Stool sample examination** for ova and parasites.
- **Consider colostomy assessment** for patients with rectovaginal fistula.

If available, the following tests can also provide useful information:

- **Renal function test.**
- **Ultrasound scan** for previously repaired fistula or after caesarean section or hysterectomy (can also detect hydroureter, hydronephrosis or stones or obstruction).
- **Cystoscopy:** while a cystoscope may not be available in the treatment facility, if there is one, as well as personnel trained in its use, a cystoscopy can be performed to confirm the side and site of injury in a ureterovaginal fistula. Sometimes there is a role in stenting the ureter in an early ureterovaginal fistula. A cystoscopy can also confirm the presence and site of a small vesicovaginal fistula and the proximity of the ureters to it. It can furthermore confirm the presence of a uterovesical fistula in cases of menuria.
- **Intravenous urogram** to assess renal excretion/function if ureteric involvement and fistula are suspected.

Surgical Approach

After the preoperative planning phase, a decision should be made regarding the most appropriate surgical approach and the patient should be informed accordingly. Depending on the type of fistula and associated injury, the surgical approach may be vaginal or abdominal and occasionally combined.

In the case of an abdominal repair, it might be good to ask the patient if she would like a tubal ligation or tubectomy (the latter will reduce the chance of ovarian carcinoma as well) in the same operation if she does not wish to have any further pregnancies.

Preparing the Patient

- Ensure the patient is fit for surgery, with no comorbidities.
- Ensure the patient has been counselled and has provided informed consent, based on previous physical findings, and therefore has realistic expectations regarding surgical outcomes.
- All patients should receive an anthelmintic such as mebendazole.
- Shave the surgical site according to local protocols and preference of the surgeon.
- Bowel preparation:
  - For urinary tract fistula cases: full bowel preparation is generally not needed preoperatively, but this practice varies and depends on the individual preference of the surgeon.
  - For rectovaginal fistula cases: the bowel should be prepared appropriately according to the preference of the surgeon, to ensure that the patient has an empty bowel before the operation. Usually, this will include a fluid diet and enemas morning and evening on the day before surgery. If the patient is breastfeeding, the diet can be changed from clear fluids to thick fluids or even a light diet.
  - The patient should be nil by mouth from midnight the night before surgery.

On the day of surgery:

- Bowel preparation: some surgeons prefer the patient to have an enema preoperatively on the day of surgery. This is more common for rectovaginal fistula cases, but is optional for vesicovaginal fistula cases (according to the preference of the surgeon).
  For all cases, the patient should always be asked to evacuate her bowel just before going to theatre. Optimal evacuation of bowel contents and enema fluids is always important as spillage regularly occurs when the anaesthesia starts taking effect and soiling of the surgical field should be prevented.
- Premedication should be administered according to the wishes of the anaesthetist and surgeon.
- Insert an intravenous cannula/drip and preload the patient before the spinal anaesthetic.

3. Attainment of Skills in Fistula Surgery

Level 1

Contents

Module 1 Perineal Tears

Learning Objectives

At the end of this module, trainees should be able to:

1. Define and identify the different degrees of perineal tear.
2. Describe the preoperative assessment, surgical steps and postoperative management for perineal tears.
3. Repair third- and fourth-degree perineal tears.
4. Outline the main complications of perineal tear surgery and their management.

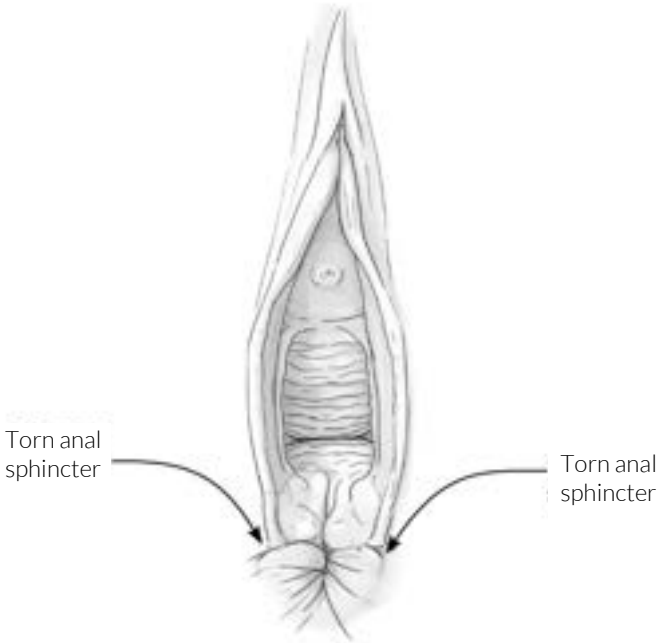

Figure 2. Fourth-degree tear frontal view.

Perineal tears occur commonly during childbirth. Tears sustained during delivery can also occur inside the vagina or other parts of the vulva, including the labia. It is very common for first-time mothers who have a vaginal delivery to experience some sort of tear, graze or episiotomy.

Perineal tears can be divided into four categories:

First degree: just through the skin of the vagina and/or perineum.
Second degree: through the skin and perineal body/levator muscles.
Third degree can be further subdivided into:
- 3a: through the skin, levator/perineal body and <50% of the external anal sphincter.
- 3b: through the skin, levator muscles/perineal body and >50% of the external anal sphincter.
- 3c: through the external and internal anal sphincter.

Fourth degree: through the skin, levator muscles/perineal body, external and internal anal sphincter and anal mucosa, and if extensive the rectal mucosa too.

Invariably the type or degree of perineal tear that presents to the fistula surgeon is a fourth-degree tear.

Preoperative Assessment

History: The typical history is not of a long, obstructed labour; instead, it is usually of a precipitous one with a live baby. The tear may or may not have been recognised at delivery and may or may not have been sutured. Unfortunately, if it was sutured, it is often sutured incorrectly, leaving the patient symptomatic. The usual symptoms are of flatal, loose stool and faecal incontinence. Rarely, the anterior skin forms a tight scar bridge over the anterior anal orifice and the patient may remain continent. The patient may also complain of a gaping vagina that she wishes to have repaired.

Diagnosis: Perineal tears usually present to a fistula unit as a chronic condition. Patients might not present until months or years after their injury occurred. Perineal tears require little investigation and can be easily diagnosed by inspection alone, aided at times by palpation. On inspection of the perineum there is an obvious defect, and the epithelium of the vagina is continuous with the epithelium of the anus, with no intervening anal sphincter and perineal body. The end of the anal sphincter may be clearly seen at the level of a dimple on the perineal skin. This usually coincides with a termination of the radial skin creases that normally radiate out from the anal margin. If a skin bridge is seen, it can be palpated between finger and thumb. No anal sphincter or perineal body will be felt between the palpating fingers.

Planning and management: When planning the surgical repair of a perineal tear, it is important that the bowel is prepared appropriately, according to the specific instructions of the surgeon, to ensure that the patient has an empty bowel before the operation. Usually this will include a fluid diet and enemas morning and night on the day before surgery, and then nil by mouth from midnight the night before the surgery. If the patient is breastfeeding, the preoperative diet can be changed from clear fluids to thick fluids or even a light diet. A colostomy is rarely required for the management of perineal tears.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

The surgical repair aims to restore the normal anatomy and physiological function.

1. Administer spinal anaesthetic, as appropriate.
2. Administer suitable prophylactic antibiotics, according to availability and preference of the surgeon. It is recommended to include 500 mg metronidazole intravenously in the prophylaxis regime. Antibiotics are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the lithotomy position.
4. After preparing and draping, ensure good exposure and infiltration for haemostasis. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if

adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.

5. Mobilise the vagina, perineal skin, anal and/or rectal mucosa, perineal body and anal sphincter.
6. Repair the bowel mucosa with two layers of interrupted sutures to the muscularis, which is inevitably the internal anal sphincter at this level.
7. Repair the external sphincter either using the end-to-end or overlapping technique. There has been a shift towards the overlapping technique over the years but there is little evidence to suggest that this is of any long-term benefit. However, it is suggested that a slowly absorbable suture is used, namely a 2-0 polydioxanone suture (PDS), if available.
8. Rebuild the perineal body. It is suggested that a slowly absorbable suture (PDS) is also used for this, but a polyglycolic acid suture is suitable if PDS is unavailable.
9. Repair the vagina and perineal skin with a faster absorbing suture, a polyglycolic acid suture is most commonly used.
10. Dress the wound with one gauze, which can be covered in iodine or petroleum jelly.
11. Insert a Foley catheter to keep the bladder on free drainage.

Key learning resource: Andrew Browning Fistula Repair Series *Episode 2 Perineal Tear Repair and Variations*.

Critical Surgical Steps

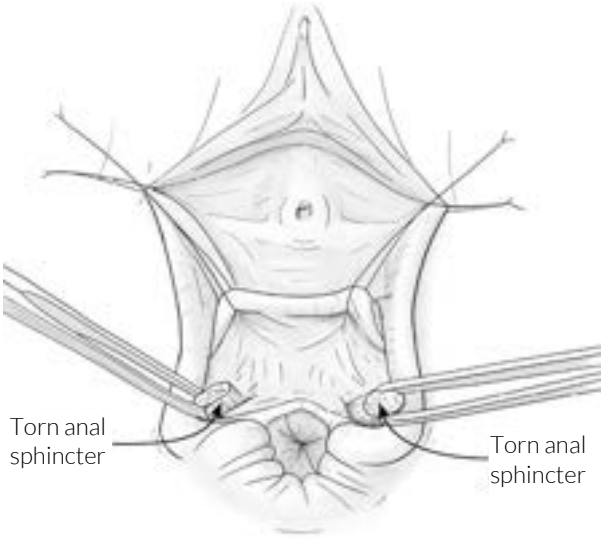

Figure 3. Dissection and grasping the end of the torn sphincter with Allis forceps.

Figure 4. Rectum/anus repaired and the sphincter sutured together.

Complications

- Owing to the risk of faecal contamination there is a high risk of infection, which can largely be prevented with good aseptic technique and the use of prophylactic antibiotics.
- A rectovaginal fistula can occur at the apex of the tear. This happens if the apex is not secured properly and subsequent stool leakage occurs.

- A further complication can occur if the anal sphincter was not identified and/or repaired correctly, or if the ends of the sphincter pull apart during the healing phase. If this occurs, the patient will report incontinence of flatus, usually loose stool, sometimes formed stool, with regular soiling. This can be identified from the history and then on examination. The perineum might appear normal in size but the skin over the anterior sphincter is smooth instead of having the radial skin creases, signalling a tense muscle underneath. If there is a rectovaginal fistula at the apex and/or the sphincter tears apart, the operation must be re-done.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation and hygiene: Postoperatively, the Foley catheter should remain in place on free drainage and be removed the following day, along with the gauze dressing. After each bowel movement, the repair site should be washed and dried to avoid stool on the wound.

Diet: Following surgical repair of a perineal tear, it is extremely important that the patient does not become constipated to avoid any straining to push hard stool past the repair, risking damage to the healing tissues and a potential breakdown. After the operation, the patient can drink on the same day and have thick fluids the day after. A light diet can be started from the second postoperative day, before reintroducing a normal diet from day 3. To ensure the patient does not become constipated, a laxative (bisacodyl) should be prescribed on the commencement of the light diet and be continued for about 1 week. Stop the laxative if the stool becomes too fluid.

Assessment of surgical outcomes: Test continence by taking history, asking for any flatal and stool incontinence as well as faecal soiling. Inspect the wound to check healing and any faecal soiling of the perineum, which can indicate anal incontinence or poor personal hygiene.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To continue pelvic floor exercises as instructed.
- That it may be possible to deliver vaginally in the future with a skilled birth attendant, such as a midwife, and with a prophylactic episiotomy. The delivery should take place in a facility where there is a medical professional trained to recognise and repair an anal sphincter injury should it recur. Some surgeons do, however, recommend an elective caesarean section for all future deliveries after a third- or fourth-degree perineal tear.

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Perineal Tears

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	**Satisfactory**	**Good**
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of perineal tear	Adequate understanding of perineal tears	Good understanding of perineal tears
12. Specific surgical steps for repair of perineal tears	Limited or incorrect knowledge of the specific surgical steps for repair of perineal tears	Correct but incomplete knowledge of the specific surgical steps for repair of perineal tears	Good knowledge of the specific surgical steps for repair of perineal tears

13. Identifying the correct tissues, with particular attention to the internal and external anal sphincters	Required prompting and/or help to identify the correct tissues	Correctly identified the tissues, but needed some help	Accurately and independently identified the tissues
14. Mobilisation of the vagina, perineal skin, anal and/or rectal mucosa, perineal body and anal sphincter	Inadequate mobilisation	Adequate mobilisation	Good mobilisation
15. Repair of perineal tear with particular attention to the internal and external anal sphincters	Required help to carry out repair	Adequate repair but needed some prompting	Good repair done independently
16. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
17. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
18. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
19. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	Pass (Y/N)	Trainer signature and date
1.		
2.		
3.		
4.		
5.		
6.		

Module Logbook – Perineal Tears

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 2 Simple Vesicovaginal Fistula

For further information, *see* 2.2.1. Conservative Management for At-Risk and Fresh Vesicovaginal Fistula Cases; page 17

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of simple vesicovaginal fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for simple vesicovaginal fistulas.
3. Repair simple vesicovaginal fistulas.
4. Outline the main complications of simple vesicovaginal fistula surgery and their management.

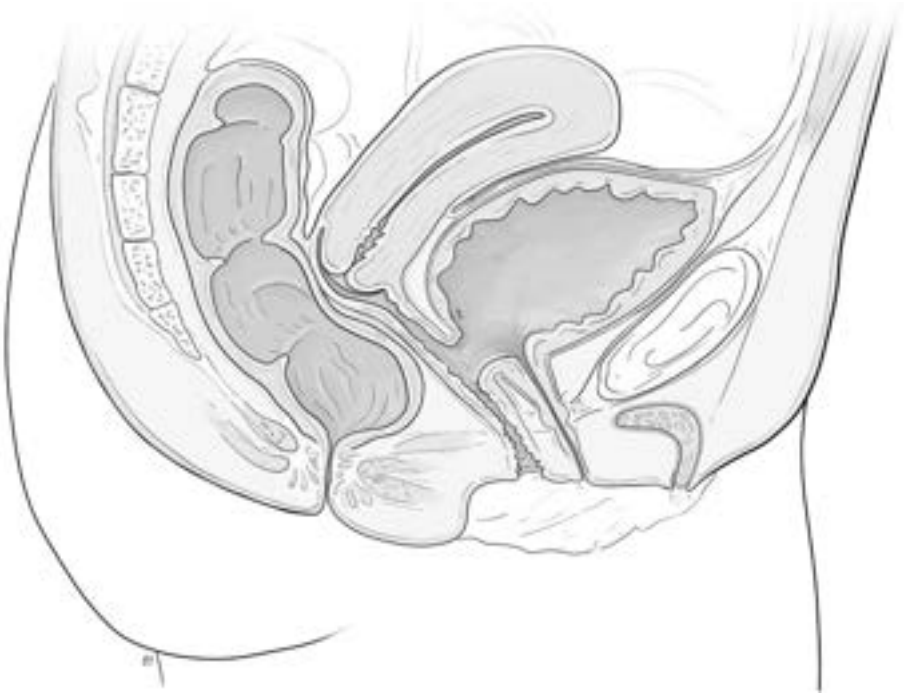

Figure 5. Cross-section of a simple vesicovaginal fistula.

An obstetric vesicovaginal fistula is a compression injury that results from prolonged, obstructed labour, causing an abnormal opening between the vagina and the bladder. While there is no universal definition of a 'simple fistula', a fistula can be considered simple when:

- It is easy to access.
- It is not circumferential.
- The ureteric orifices lie within the bladder and comfortably far from the fistula margin.
- It does not involve the continence mechanism.
- It has no or minimal scarring.

- It is less than 2 cm in diameter.
- There is no significant urinary bladder tissue loss.
- There is only one fistula.
- A repair has not already been attempted previously.

Usually, a fistula located at the base of the bladder is considered simpler to repair than urethral, vault, juxtacervical and intracervical fistulas. Although a fistula may appear simple at first, it may become evident during the repair that it is more complicated than initially thought, or vice versa. A simple fistula may result from injuries that are not severe, for example following a shorter duration of obstructed labour.

Preoperative Assessment

History: As mentioned above, simple vesicovaginal fistulas are usually the result of a prolonged, obstructed labour, often lasting more than 2 days and resulting in a stillborn baby, which is more likely to be male (male babies are usually slightly larger). In such cases, total urinary incontinence generally starts a few days after the delivery. However, very small vesicovaginal fistulas can give symptoms of stress incontinence, with intermittent leaking caused by a cough, sneeze or when the bladder is full.

Diagnosis: Almost all simple vesicovaginal fistula cases can be diagnosed with history and examination. If there is any doubt, a dye test should be performed.

Planning and management: The patient should be nil by mouth from midnight the night before surgery. Full bowel preparation is generally not needed for urinary tract fistula, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Repairing this type of fistula can be less challenging than other types, but nevertheless requires great care and delicacy. The basic principles of repair should always be followed. It is important to note that the first attempt at repair offers the patient the best chance of a successful outcome. Therefore, if a surgeon does not feel confident to close the fistula, the patient should be referred to a more experienced fistula surgeon.

The basic surgical principles are:

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, properly expose and delineate the fistula before proceeding with surgery.

5. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
6. Identify the ureters and, if lying close to the fistula margin, catheterise with ureteric catheter(s) to protect them from direct injury or ligation/inclusion within the suture.
7. Make an incision around the fistula through the vaginal epithelia and extend the incision laterally from each angle. Then, mobilise the bladder from the vagina, cervix and lateral pelvic wall. The mobility should be wide enough to ensure a tension-free closure.
8. Secure the angles of the fistula just laterally to each margin. Take adequate interrupted bites of the muscularis, ensuring that they are strong and that their size does not decrease the size of the bladder. The idea of suturing the muscularis is to invert the bladder epithelia into the bladder lumen. A 2-0 polyglycolic acid suture is most commonly used.
9. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
10. Execute tension-free closure of the vagina, avoiding pulling on the urethral meatus. A 2-0 polyglycolic acid suture is most commonly used.
11. If present, suture the episiotomy and remove labial sutures.
12. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

When a trained, skilled fistula surgeon follows the above principles, most simple fistula repairs are successful, i.e. fistula closed and patient continent of urine.

Key learning resource: Andrew Browning Fistula Repair Series *Episode 1 Basic Principles: Tricks & Traps*.

Critical Surgical Steps

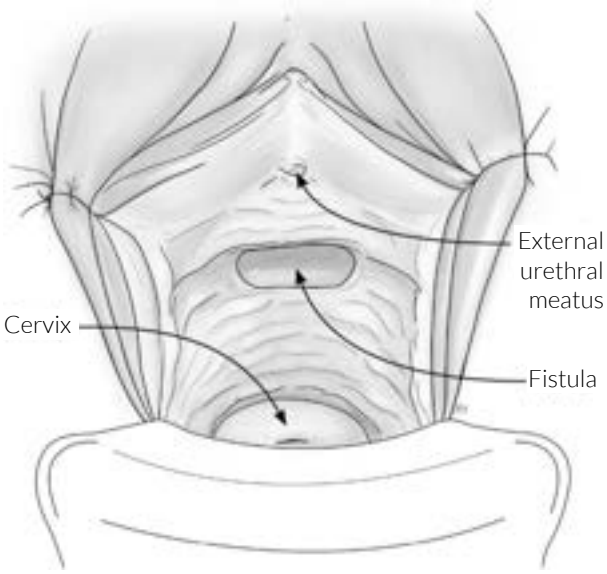

Figure 6. Vesicovaginal fistula (vaginal view).

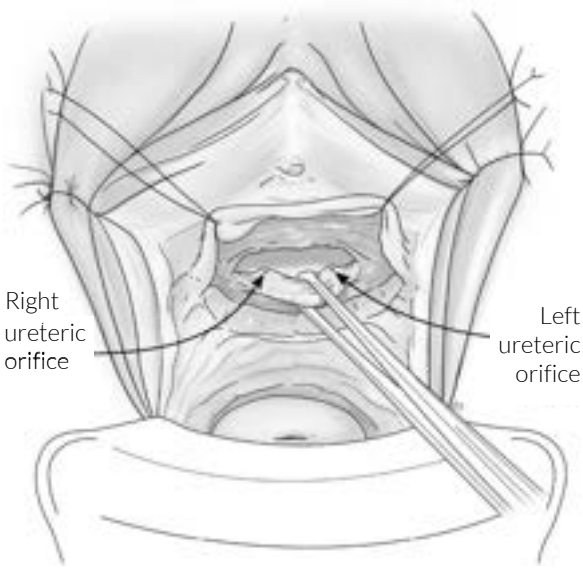

Figure 7. Identification of the ureters. If possible, this should be done before dissection occurs; however, sometimes when the ureters are deep inside they become apparent when the bladder is mobilised, making access easier.

Figure 8. Adequate mobilisation.

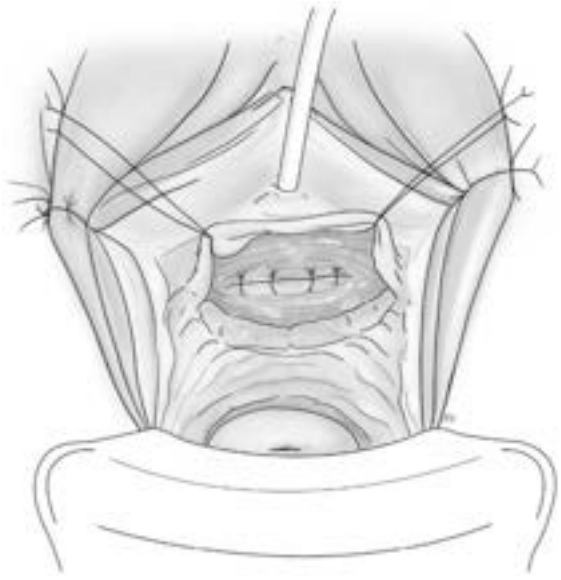

Figure 9. Repaired fistula with inserted Foley catheter.

Complications

- Accidental injury may occur to the ureter and bladder during dissection.
- Ligation or inclusion of the ureter in the suture line may lead to ureteric obstruction.
- Haematoma may form when haemostasis is not secured properly, which may result in infection and even breakdown of the repair.

- Accidentally missing unidentified fistulas may leave the patient incontinent, but routine and careful dye tests should address this problem.
- Urethral incontinence is rare following repair of a simple vesicovaginal fistula. However, if it occurs, it may require further reconstructive procedures.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place and on free drainage for 10–14 days.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Simple Vesicovaginal Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of simple vesicovaginal fistula	Adequate understanding of simple vesicovaginal fistula	Good understanding of simple vesicovaginal fistula
12. Specific surgical steps for repair of simple vesicovaginal fistula	Limited or incorrect knowledge of the specific surgical steps for repair of simple vesicovaginal fistula	Correct but incomplete knowledge of the specific surgical steps for repair of simple vesicovaginal fistula	Good knowledge of the specific surgical steps for repair of simple vesicovaginal fistula

13. Delineating the fistula	Required assistance delineating the fistula	Adequately delineated the fistula	Accurately and independently delineated the fistula
14. Identification and protection of the ureters	Required help to identify the ureters, recognise injures to the ureters and/or to catheterise	Could identify the ureters and recognise ureteric injury, but required help with catheterisation	Could identify the ureters, recognise ureteric injury and catheterised independently
15. Initial incision around the fistula and mobilisation of bladder	Required significant help with incision and/or mobilisation	Made the incision and dissection independently but with some inaccuracies	Independent and good incision on appropriate site and mobilised the bladder through proper plane
16. Closure of bladder	Required help to close the bladder without tension	Adequate closure of the bladder, but required some prompting to avoid tension on the suture line/urethra	Good closure of the bladder, angle secured and no tension on suture line/urethra
17. Intraoperative dye test	Needed prompting to perform the dye test	Required some guidance to perform the dye test and interpret the result	Performed dye test independently and correctly interpreted the result
18. Closure of vagina	Required help to close the vagina and/or had tension on the vagina and/or urethra	Appropriate closure of the vagina but needed some prompting to avoid pulling on the vagina and/or urethra	Good and independent closure of the vagina without any tension on the vagina and urethra

19. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
20. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
21. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
22. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
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Module Logbook – Simple Vesicovaginal Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 3 Simple Rectovaginal Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of simple rectovaginal fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for simple rectovaginal fistulas.
3. Repair simple rectovaginal fistulas.
4. Outline the main complications of rectovaginal fistula surgery and their management.

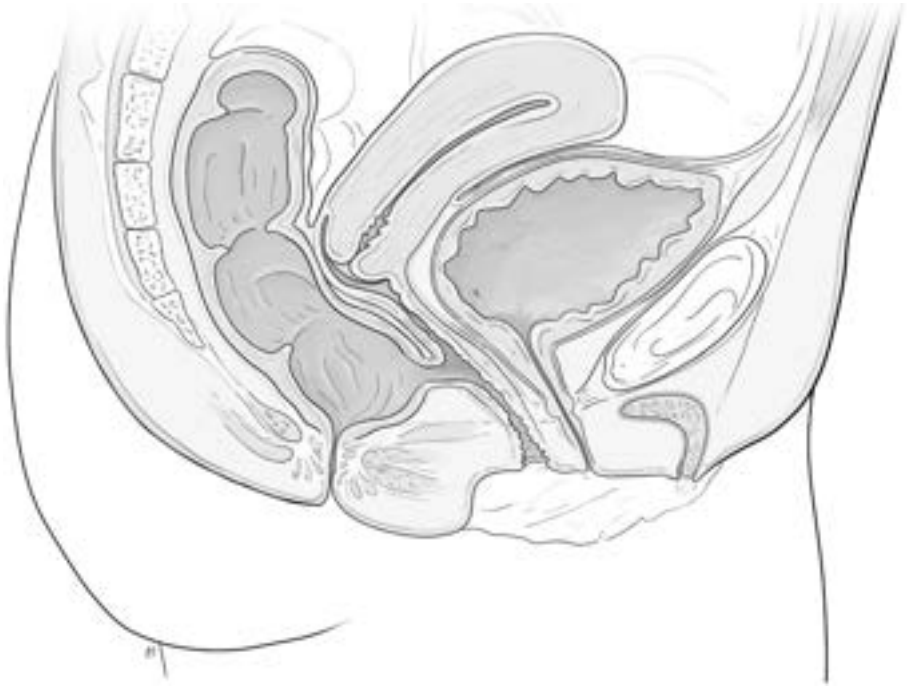

Figure 10. Cross-section of a simple rectovaginal fistula.

A rectovaginal fistula is an abnormal communication between the anterior wall of the anorectal canal and the posterior wall of the vagina. A rectovaginal fistula can be simple or complex to repair. Simple rectovaginal fistulas are generally small (<2.5 cm), midvaginal or lower fistulas, but not involving the anal sphincter, with healthy tissues and minimal or no scarring.

The incidence of rectovaginal fistula is difficult to determine because some surgeons classify perineal tears as rectovaginal fistulas. Isolated rectovaginal fistulas due to obstructed labour are very rare, and most occur in combination with a vesicovaginal fistula.[62]

[62] A. Browning, S. Whiteside. Characteristics, Management, and Outcomes of Repair of Rectovaginal Fistula among 1100 Consecutive Cases of Female Genital Tract Fistula in Ethiopia. *Int J Gynecol Obstet* (2015); Kelly and Winter. Reflections on the Knowledge Base for Obstetric Fistula.

Rectovaginal fistulas occur more commonly in isolation from nonobstructed labour causes; for example, after a perineal tear that has been repaired and which later broke at the apex, or was repaired incorrectly leaving the apex open and thus making the tear into a rectovaginal fistula.

Rectovaginal fistulas can also occur in isolation due to trauma or other nonobstetric causes, including malignancies, radiotherapy, inflammatory bowel disease, sexual trauma and surgery (iatrogenic).

A perineal tear can occur in conjunction with a rectovaginal fistula. Usually, the rectovaginal fistula is situated far above the tear with a bridge of vagina between; however, this is very rare.

Preoperative Assessment

History: Rectovaginal fistulas usually occur in conjunction with a vesicovaginal fistula, therefore the history usually includes a long labour and delivery of a stillborn child. Rectovaginal fistulas present as vaginal incontinence of faeces, liquid stool and/or flatus. If nonobstetric in aetiology, then the history could be that of a normal delivery with a tear and/or episiotomy that was not sutured well, either at the time of delivery or later. The patient may give a history of trauma or spontaneous faecal leakage if caused by a malignancy or inflammation.

Diagnosis: Rectovaginal fistulas can almost always be diagnosed with palpation as part of a basic physical examination. If there is doubt, a rectal dye test can be performed (*see* Dye Test for Rectovaginal Fistula; page 16). This is carried out in a similar way to the bladder dye test, but the Foley catheter is inserted into the anus and dye inserted. A gauze needs to be held firmly over the anus whilst doing this, as there is always spillage. Alternatively, with good lighting and exposure with a speculum, the vagina can be filled with saline and inspected for bubble formation. Perform a rectal examination to look for any rectal strictures.

Planning and management: Prior to surgical repair of a rectovaginal fistula, it is extremely important that the bowel is prepared appropriately, according to the specific instructions of the surgeon, to ensure that the patient has an empty bowel before the operation. Usually this will include a fluid diet and enemas morning and night on the day before surgery, and then nil by mouth from midnight the night before the surgery.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Most rectovaginal fistulas occur alongside a vesicovaginal fistula and both can be repaired in the same procedure. Surgeons may prefer to repair the vesicovaginal fistula first, to get the urine away from the operative field, before repairing the rectovaginal fistula.

The following principles of fistula surgery apply for a simple rectovaginal fistula:

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon, which should include 500 mg metronidazole intravenously. These are usually given immediately preoperatively, at the same time as the anaesthetic.

3. Position the patient in the exaggerated lithotomy position, similar to a vesicovaginal fistula repair but with the table slightly less tilted to ensure the rectovaginal fistula is in the operative field.
4. There can be faecal spillage through the fistula if the bowel was not prepared properly. If this occurs an enema must be done in theatre to ensure a clean operative field. If this cannot be achieved, then it is best to delay the operation until the bowel is adequately prepared.
5. After preparing and draping, examine the anal sphincter and assess its integrity.
6. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
7. Make an incision around the fistula through the vaginal epithelium and extend the incision laterally from each angle. Then, mobilise the rectum from the vagina and lateral pelvic wall. The mobility should be wide enough to ensure a tension-free closure.
8. Apply two layers of sutures to the rectum muscularis, making sure to invert the first layer.
9. Repair the rectovaginal fistula in an orientation so as not to create a stricture, which usually means repairing it transversely.
10. Perform tension-free closure of the vagina. A 2-0 polyglycolic acid suture is most commonly used.
11. If a Foley catheter has not already been inserted, insert one now to keep the bladder on free drainage.
12. If present, suture the episiotomy and remove labial sutures.
13. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation, and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Steps

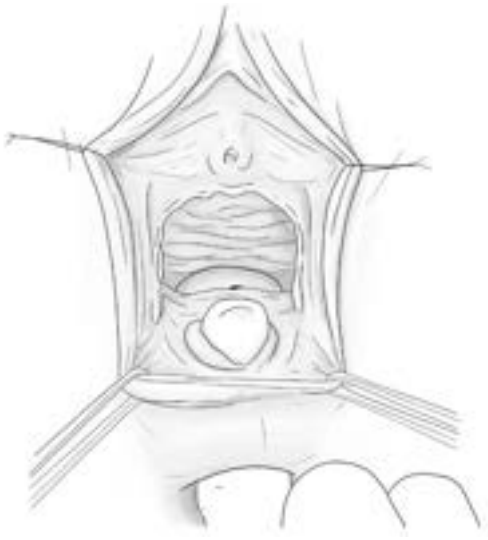

Figure 11. Digital examination of the anus drawing the rectovaginal fistula forward and into view.

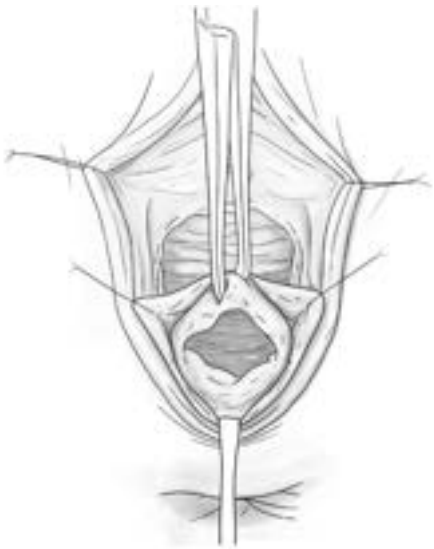

Figure 12. Dissection completed.

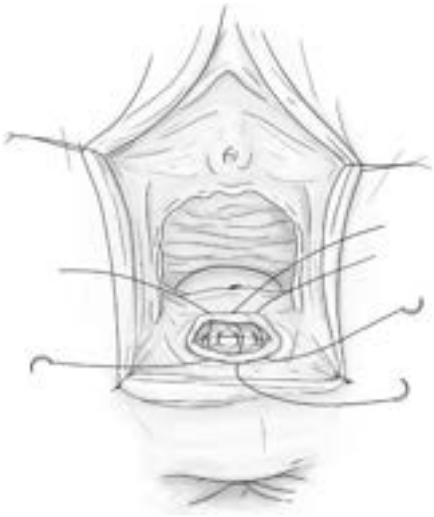

Figure 13. Rectovaginal fistula closed.

Complications

- There may be accidental injury to the rectum and vagina during dissection.
- There is a risk of missing a concurrent high rectovaginal fistula. If in doubt, a rectal dye test should always be done in theatre. If bubbles of gas are seen coming into the vagina at operation, the presence of a high rectovaginal fistula is likely.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively the Foley catheter should remain in place on free drainage. If the patient has had a concurrent vesicovaginal fistula repair, the catheter should be left in place for 10–14 days, as per the vesicovaginal fistula protocol. If the patient has a rectovaginal fistula in isolation, then the catheter can be removed when the patient is mobile, usually the next day.

Diet: Following rectovaginal fistula surgery, it is extremely important that the patient does not develop constipation to avoid any straining to push hard stool past the repair, risking damage to the healing tissues and a potential breakdown. After the operation, the patient should have intravenous rehydration until drinking normally. A light diet can be started the next day and continued for 6–7 days before reintroducing a normal diet. To ensure the patient does not become constipated a laxative (bisacodyl) should be prescribed on the commencement of the light diet and be continued for about 1 week. The laxative should be stopped if the stool becomes too fluid.

Assessment of surgical outcomes: The patient should be asked about and examined for any faecal incontinence; the presence of faeces in the vagina is usually enough to confirm a rectovaginal fistula. If in doubt, a rectal dye test should be performed (*see* Dye Test for Rectovaginal Fistula; page 16). As most rectovaginal fistula patients have a vesicovaginal fistula, this assessment is usually delayed until the Foley catheter has been removed and the rectovaginal fistula and vesicovaginal fistula can be

assessed together. However, if the patient complains of passage of stool through the vagina prior to the removal of the catheter, the patient can gently be examined earlier.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To ensure a suitable diet to avoid constipation and straining to push hard stool past the repair, particularly in the first 3 months while the tissues heal. If necessary, to take a laxative (bisacodyl) as prescribed. Note that this advice may need to be adjusted for patients with ongoing faecal incontinence.
- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal). However, if the cause of the rectovaginal fistula is a poorly repaired perineal tear or trauma, the patient may try for a carefully monitored vaginal delivery with a skilled birth attendant and a prophylactic episiotomy as necessary. This should ideally take place in a facility where there is a medical professional who is trained to recognise and repair an anal sphincter injury should it recur.

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Simple Rectovaginal Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	**Satisfactory**	**Good**
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of simple rectovaginal fistula	Adequate understanding of simple rectovaginal fistula	Good understanding of simple rectovaginal fistula
12. Specific surgical steps for repair of simple rectovaginal fistula	Limited or incorrect knowledge of the specific surgical steps for repair of simple rectovaginal fistula	Correct but incomplete knowledge of the specific surgical steps for repair of simple rectovaginal fistula	Good knowledge of the specific surgical steps for repair of simple rectovaginal fistula

13. Identifying the margins and anal sphincter	Required prompting to identify the margins and/or anal sphincter	Adequately identified the margins and/or anal sphincter	Independently identified the margins and able to rule out anal sphincter injury
14. Incisions	Required assistance to make appropriate incisions	Made appropriate incisions, but with minor errors	Made good incisions, with no errors
15. Planes and mobilisation	Required help selecting the correct planes and with mobilisation	Identified the correct planes but required some prompting with mobilisation	Independently identified correct planes and good mobilisation
16. Closure and tension	Required help with closure and/or to ensure the correct tension	Reasonable closure and tension, but required some prompting	Good closure with correct tension
17. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
18. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
19. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned

20. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
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4.		
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Module Logbook – Simple Rectovaginal Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 4 Vault Vesicovaginal Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of vault vesicovaginal fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for vault vesicovaginal fistulas.
3. Repair vault vesicovaginal fistulas.
4. Outline the main complications of vault vesicovaginal fistula surgery and their management.

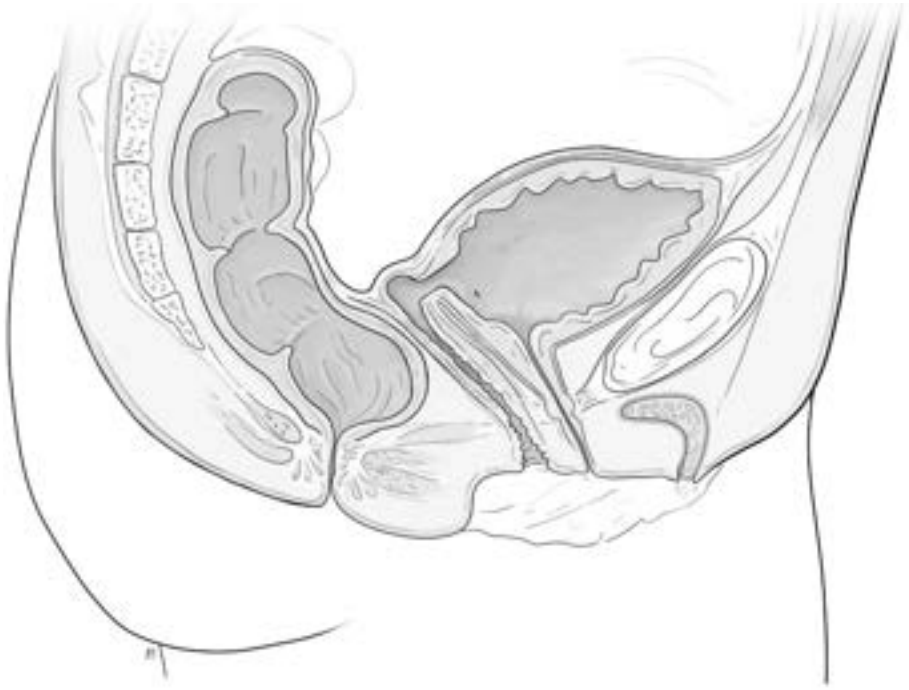

Figure 14. Cross-section of a vault vesicovaginal fistula.

A vault vesicovaginal fistula is a connection between the bladder and the apex of the vagina (vault) and it occurs after total abdominal hysterectomy, either obstetric or gynaecological.[63] It borders on the anterior edge of the vaginal scar and is almost always supratrigonal. It is mostly iatrogenic, except when the hysterectomy is performed for a ruptured uterus/ruptured bladder. In addition, a ureter may also have been involved in the iatrogenic injury so there could be a concurrent ureteric fistula.

Preoperative Assessment

History: Vault fistulas present with a history of continuous leakage of urine through the vagina shortly after a (caesarean) hysterectomy. Usually the leaking starts within a week of the operation, but sometimes it can be delayed by 2 or more weeks.

[63] Raassen *et al.* Iatrogenic Genitourinary Fistula: An 18-Year Retrospective Review of 805 Injuries.

Diagnosis: Vault fistulas are usually small and may be difficult to palpate on vaginal examination being only a few millimetres across. A speculum examination and the use of a probe is usually enough, but occasionally a dye test has to be done.

Planning and management: The patient should be nil by mouth from midnight the night before surgery. Full bowel preparation is generally not needed for urinary tract fistula, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Although high in the vagina, vault fistulas can usually be successfully repaired via the vaginal route, and a generous episiotomy will help gain access. If the vault fistula is very high and difficult to reach from the vaginal route, then it can be readily operated on via the abdominal route.

Vaginal approach

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, identify the ureters. Although vault fistulas are usually supratrigonal, and thus the ureters should be distant from the edge of the fistula, it is impossible to be sure where the ureters are and they may have been caught up in the hysterectomy that caused the fistula. It is not always possible to identify the ureters through such a small vault fistula, therefore 10 mg furosemide intravenously should be administered and careful checks made to ensure that there are no jets of urine coming from a ureter close to the edge or outside of the fistula margins. If the ureters are close to the edge, they need protecting with a ureteric catheter so that they are not cut or ligated during the procedure and, of course, if draining outside the bladder the ureter(s) will need re-implanting.
5. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
6. Make an incision around the fistula through the vaginal epithelium and extend the incision laterally from each angle. Then, mobilise the bladder from the vagina wall. The mobility should be wide enough to ensure a tension-free closure.
7. It is very common to enter the peritoneal cavity while mobilising, as it is adjacent to the vault. This is not a problem, but as the patient is in a steep Trendelenburg position, all urine and blood in the vagina will go into the peritoneal cavity. As this will be impossible to wash out, it may contribute to a paralytic ileus postoperatively. If a hole is recognised in the peritoneum, it can be closed, if possible, with a suture to minimise the amount of fluid lost into the cavity.

8. Closure of the bladder can be done in the transverse or longitudinal direction, depending on the presentation of the fistula. If closing the fistula longitudinally, ensure it is closed from proximal to distal and not vice versa.
9. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
10. Execute tension-free closure of the vagina. The fistula should be far from the urethral meatus, but there might be times when closing the vagina pulls on the meatus. This should be avoided. A 2-0 polyglycolic acid suture is most commonly used.
11. If present, suture the episiotomy and remove labial sutures.
12. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Step

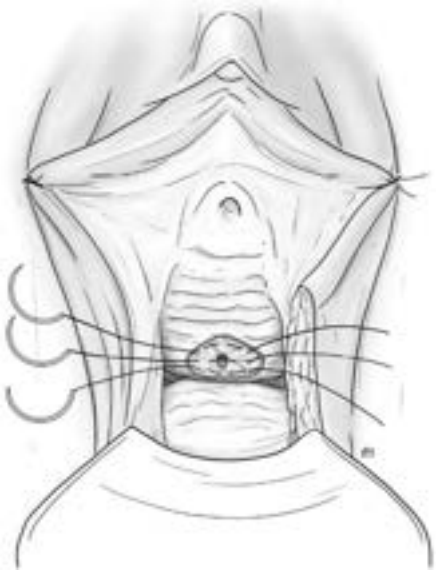

Figure 15. Fistula mobilised and sutures placed through the detrusor muscle of the bladder.

Abdominal approach

This approach is not often used, but it depends on the experience and preference of the surgeon. Occasionally the vaginal vault is very high and fixed, especially after hysterectomy in multiparous women. Care should be taken if the abdominal route is chosen as many patients have a considerable number of adhesions.

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.

3. Position the patient in a supine position.
4. Insert a Foley catheter before the operation and make sure it is draining freely.
5. Prepare and drape the patient.
6. For pelvic surgery, the surgeon stays on the left side of the woman. The abdomen is opened through a midline or Pfannenstiel incision.
7. Use two Allis clamps to pull the bladder upwards. Behind the bladder is the top of the vagina where it is attached to the bladder. It is easier to open the bladder first with a longitudinal incision in the fundus and enlarge the incision to the fistula.
8. Always make sure that both ureters are producing urine. Furosemide will help to visualise the spurting of urine. If the ureters are close to the edge of the fistula, catheterise them.
9. Subsequently, dissect the vaginal vault off the bladder using sharp dissection.
10. Close the top of the vagina with 0 or 2-0 polyglycolic acid suture.
11. The bladder can be closed with a continuous 2-0 or 3-0 polyglycolic acid suture. One layer is enough, but some surgeons might prefer a second layer. A further option is to place a flap of omentum between the vagina and bladder at the site of fistula repair, which helps healing.
12. Rinse the peritoneal cavity with warm saline and close the abdomen.
13. Leave the Foley catheter in situ to keep the bladder on free drainage.

Critical Surgical Steps

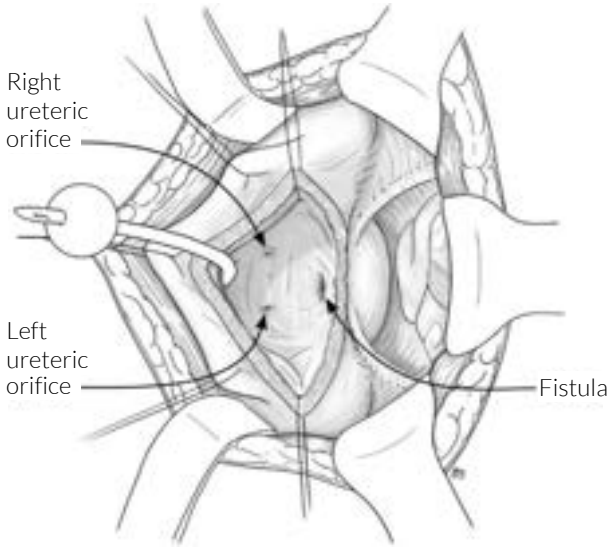

Figure 16. A vault fistula as seen via a laparotomy. A cystotomy has been done and the fistula can be seen.

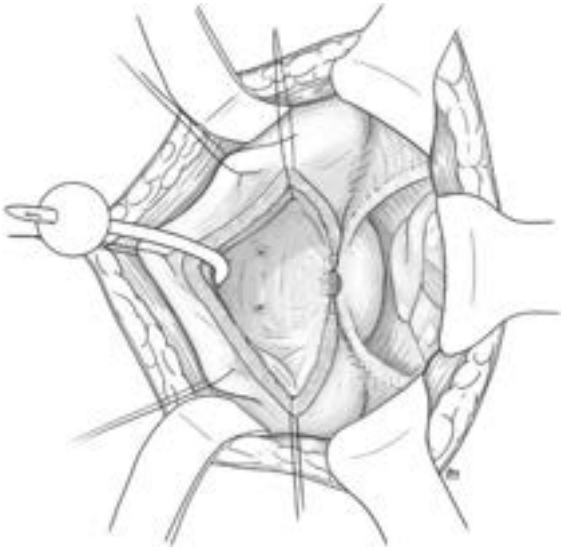

Figure 17. The cystotomy has been extended to the fistula (O'Conor method[64]). The bladder needs to be dissected off the cervix/vagina before both can be repaired.

[64] V.J. O'Conor Jr, J.K. Sokol, G.J. Bulkley, J.B. Nanninga. Suprapubic Closure of Vesicovaginal Fistula. *J Urol.* (1973).

Complications

- Ureteric injury.
- As above, the patient may get a prolonged paralytic ileus. It is important to check for underlying peritonitis.
- Visceral injury during adhesiolysis in case of abdominal surgery.
- Haemorrhage due to adhesions, especially during the abdominal approach, particularly between the bladder and the vagina.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage for 10–14 days.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To continue bladder training and pelvic floor exercises as instructed.

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Vault Vesicovaginal Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	**Satisfactory**	**Good**
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of vault vesicovaginal fistula	Adequate understanding of vault vesicovaginal fistula	Good understanding of vault vesicovaginal fistula
12. Choice of approach, i.e. vaginal or abdominal	Required guidance to choose the correct approach	Considered the appropriate approach, but was uncertain in their decision-making	Considered the approach and made a correct, informed decision

13. Specific surgical steps for repair of vault vesicovaginal fistula, as per chosen approach	Limited or incorrect knowledge of the specific surgical steps for repair of vault vesicovaginal fistula	Correct but incomplete knowledge of the specific surgical steps for repair of vault vesicovaginal fistula	Good knowledge of the specific surgical steps for repair of vault vesicovaginal fistula
14. Knowledge of the proximity of the rectum and peritoneal cavity in relation to the fistula	Limited knowledge of the pelvic anatomy in relation to the fistula	Sufficient knowledge of the pelvic anatomy in relation to the fistula	Good knowledge of the pelvic anatomy in relation to the fistula
15. Identification and protection of the ureters	Required help to identify, prevent injury to and/or catheterise the ureters, if required	Could identify the ureters and recognise ureteric injury, but needed help with catheterisation, if required	Could identify the ureters, recognise ureteric injury and catheterise independently, if required
16. Dissection and mobilisation of the fistula	Required significant help with incision and/or mobilisation	Adequate incision and mobilisation	Good incision on appropriate site and mobilised the bladder through proper plane
17. Closure of bladder	Required help to close the bladder without tension	Adequate closure of the bladder, but required some prompting to avoid tension on the suture line/urethra	Good closure of the bladder, angle secured and no tension on suture line/urethra
18. Intraoperative dye test	Required help doing the dye test	Required some guidance to do the dye test and interpret the result	Did dye test independently and correctly interpreted the result

19. For vaginal approach, closure of vagina	Required help to close the vagina and/or had tension on the vagina and/or urethra	Appropriate closure of the vagina but needed some prompting to avoid pulling on the vagina and/or urethra	Good and independent closure of the vagina without any tension on the vagina and urethra
20. For abdominal approach, closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well
21. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
22. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
23. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
24. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	Pass (Y/N)	Trainer signature and date
1.		
2.		
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Module Logbook – Vault Vesicovaginal Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Level 2

Contents

Module 5 Circumferential Vesicovaginal Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of circumferential vesicovaginal fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for circumferential vesicovaginal fistulas.
3. Repair circumferential vesicovaginal fistulas.
4. Outline the main complications of circumferential vesicovaginal fistula surgery and their management.

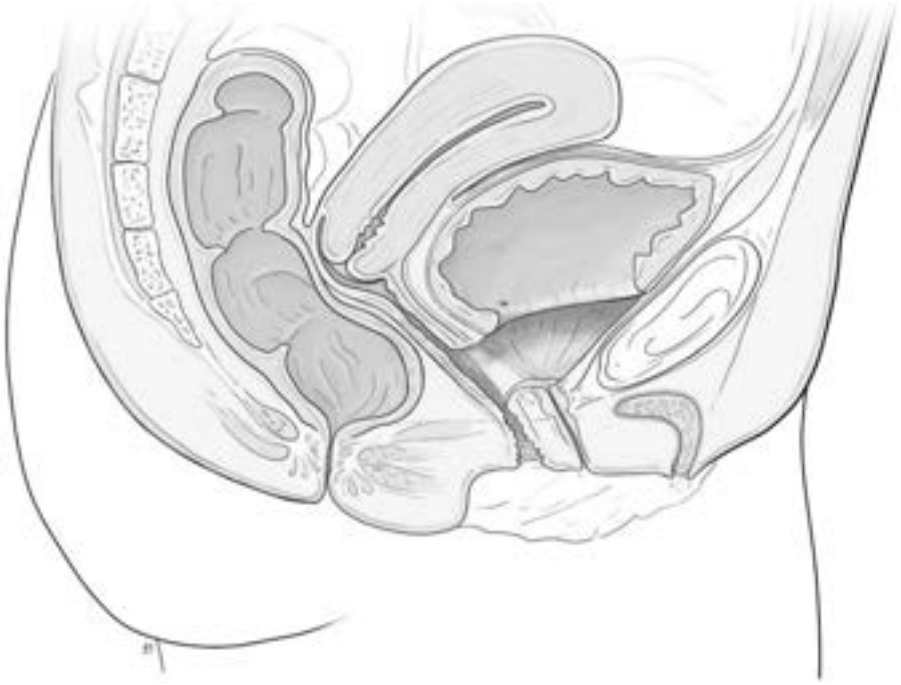

Figure 18. Cross-section of a circumferential vesicovaginal fistula.

As the name suggests, a circumferential vesicovaginal fistula is an injury that involves the whole circumference of the urethra and/or bladder. There is a gap or separation between the bladder proximally and the urethra or bladder distally, with just a thin layer of epithelium over the back of the symphysis pubis between the urethra distally and the bladder proximally.

Circumferential fistulas are more severe than noncircumferential fistulas and they are usually the result of a longer labour. They are also more commonly associated with a rectal fistula, severe vaginal scarring and almost always involve the urethra (*see* Waaldijk classification type II Ab and II Bb,[65] Goh classification type 2–4[66]), although a circumferential fistula Goh classification type 1 is possible.

[65] Waaldijk. Surgical Classification of Obstetric Fistulas.
[66] Goh. A New Classification for Female Genital Tract Fistula.

Preoperative Assessment

History: Circumferential fistulas are often the result of a long obstructed labour, with the patient experiencing total urinary incontinence. It is important to ask and check for symptoms of rectovaginal fistulas as they can occur concurrently with circumferential fistulas.

Diagnosis: Diagnosis is usually made from the patient's history and an examination. Upon examination there is usually significant scarring and the bone of the symphysis pubis can be felt between the distal urethra and the proximal bladder. A dye test may be needed if the scarring is very severe, thereby making palpation of the fistula impossible. However, a dye test may also be difficult as many circumferential fistula cases have a urethral stricture, making it impossible to pass a catheter. It is worth noting that the stricture may in fact be due to the proximal urethra and/or the bladder opening being firmly attached with scar tissue to the posterior surface of the symphysis pubis, therefore obliterating the lumen.

Planning and management: The patient should be nil by mouth from midnight the night before the surgery. Full bowel preparation is generally not needed for urinary tract fistula, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Repairing a circumferential fistula is challenging. The bladder needs to be mobilised circumferentially and anastomosed to the distal urethral remnant in a manner that maintains the length and width of the urethra.

In the past, a circumferential defect was repaired by mobilising the posterior bladder and suturing it to the bone and urethra. This method could close the circumferential fistula, but almost all patients would end up with a short incompetent urethra that leaked urine. A breakdown could also occur at the angles adjacent to the symphysis pubis, leaving a small fistula directly against the bone in the vagina, resulting in a corner fistula, which can be bilateral.

The current principles for repairing a circumferential fistula are:

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, perform an episiotomy for good access, if necessary.
5. Identify and protect the ureters as needed.
6. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if

adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.

7. Make an incision around the fistula with lateral extensions in the rugae.
8. Mobilise the vaginal wall proximal, lateral and then distal off the urethra. Take special care around the remaining urethra.
9. Dissect the anterior bladder wall off the posterior symphysis and even the abdominal wall by dissecting into the retropubic and paravesical spaces to be able to advance the bladder towards the urethra.
10. Perform a circumferential anastomosis of the bladder to the urethra by placing the first suture through the anterior bladder at 12 o'clock and then through the urethra/posterior symphysis at 6 o'clock.
11. Continue bilateral of the first suture by taking the anterior bladder to the anterior urethra/posterior symphysis on each side.
12. Complete the anastomosis from lateral and posterior bladder to lateral and posterior urethra. While doing so, adjust your bites on the bladder as the diameter of the urethra is smaller.
13. Insert the Foley catheter and inflate the balloon with 5 mL sterile fluid. Note, the Foley catheter may have been inserted at an earlier point in the operation to ensure that an appropriate diameter of the urethra is maintained. If so, ensure the Foley catheter has not been sutured into the urethra. Perform a routine dye test after repair to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
14. Perform re-fixation of the pubocervical fascia on both sides of the urethra.
15. Support the urethra with a sling when appropriate.
16. Perform tension-free repair of the vagina, a 2-0 polyglycolic acid suture is most commonly used. Flaps may be needed for this step (*see* Level 2 Module 11 Vaginal Reconstruction; page 140).
17. If present, suture the episiotomy and remove labial sutures.
18. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Even when following these principles and successfully closing the circumferential fistula, the ongoing incontinence rate is still unacceptably high, at around 47%.[67] Therefore, a second operation for ongoing incontinence is often required.

Key learning resource: Andrew Browning Fistula Repair Series *Episode 3 Circumferential Fistula Repair*.

[67] A. Browning. The Circumferential Obstetric Fistula: Characteristics, Management and Outcomes. *BJOG* (2007).

Critical Surgical Steps

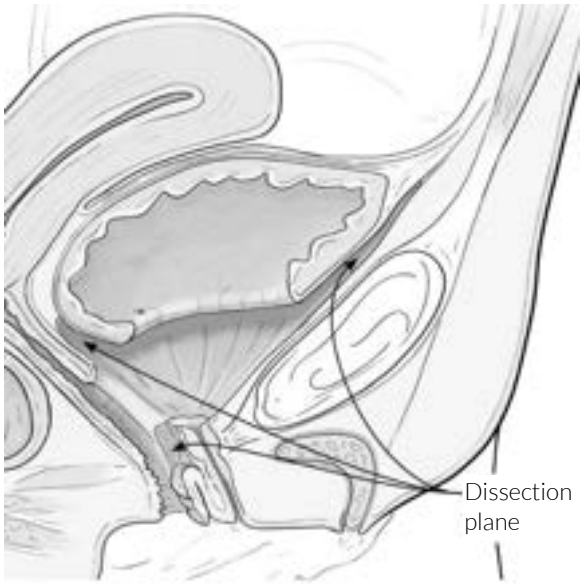

Figure 19. Mobilisation of the bladder circumferentially from the vagina and pubic bones. Distally the vagina has been reflected off the remaining urethra.

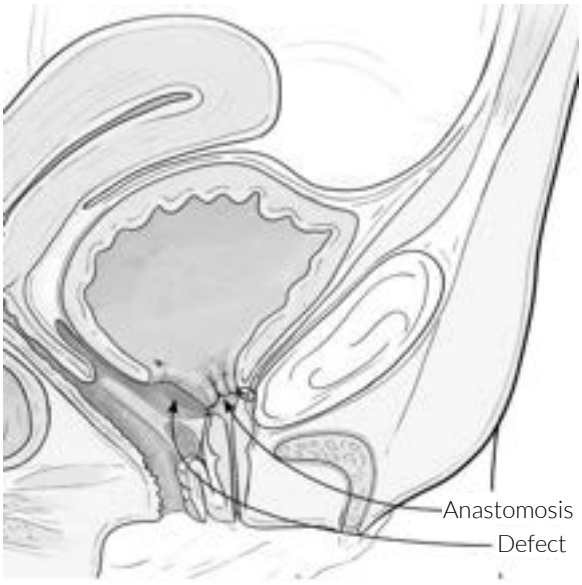

Figure 20. The bladder is anastomosed to the urethra anteriorly and laterally. Note, there was a large defect in the bladder needing an anastomosis to a small defect in the urethra. There remains a defect in the posterior bladder.

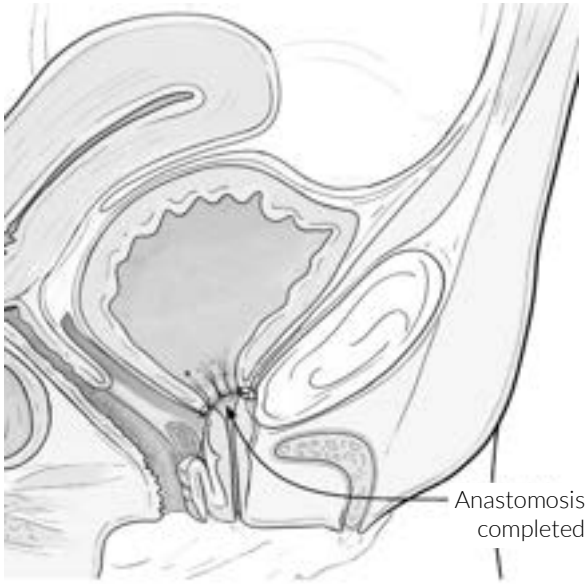

Figure 21. The remaining defect is repaired directly to the urethra.

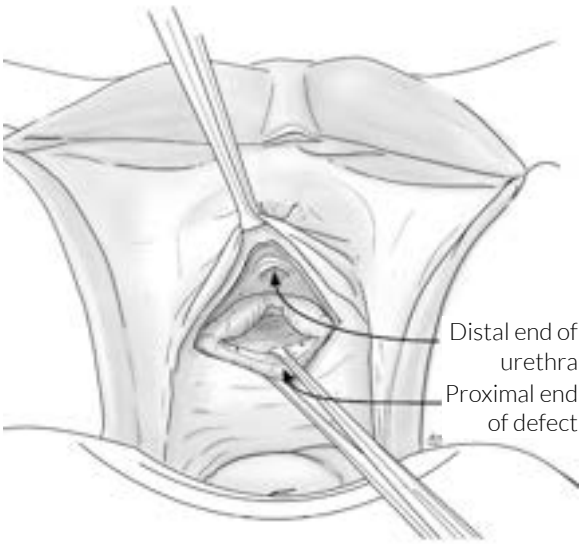

Figure 22. A circumferential defect as seen from the vagina with some vaginal dissection. The ureteric orifices are visible.

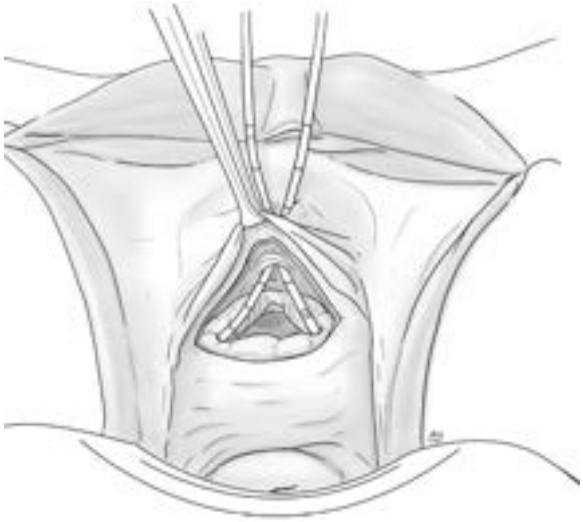

Figure 23. Catheterised ureters.

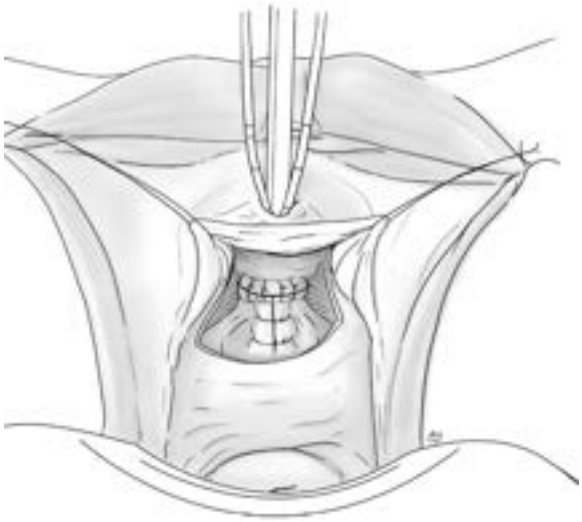

Figure 24. Ureters catheterised and the larger defect in the bladder is anastomosed to the small urethral lumen leaving a defect in the posterior bladder which, in this case, is repaired longitudinally.

Complications

- Ureteric injury.
- When the anastomosis is carried out as described above, a small number of patients will develop a urethral stricture that should be checked for at follow-up appointments.
- If just the posterior aspect is repaired, corner breakdowns may occur. These are fistulous tracts running against the lateral bones of the pelvis, which are difficult to treat.
- Ongoing incontinence.
- If flaps and grafts are used to reconstruct the vagina tension free, then sloughing of the flap can occur in a very small number of patients. Flap donor site breakdown can also happen in a very small number of patients and is more likely if the vascular supply through the pedicle and tunnel is compromised.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage for 10–14 days.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Circumferential Vesicovaginal Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding of pathology	Incomplete understanding of a circumferential fistula	Adequate understanding of a circumferential fistula	Good understanding of a circumferential fistula
12. Specific surgical steps for repair of circumferential vesicovaginal fistula	Limited or incorrect knowledge of the specific surgical steps for repair of circumferential vesicovaginal fistula	Correct but incomplete knowledge of the specific surgical steps for repair of circumferential vesicovaginal fistula	Good knowledge of the specific surgical steps for repair of circumferential vesicovaginal fistula

13. Identification and protection of the ureters	Required help to identify the ureters, recognise injures to the ureters and/or to catheterise	Could identify the ureters and recognise ureteric injury, but required help with catheterisation	Could identify the ureters, recognise ureteric injury and catheterised independently
14. Initial incision and mobilisation of bladder	Required significant help with incision and/or mobilisation	Adequate incision and mobilisation	Good incision on appropriate site and mobilised the bladder through proper plane
15. Identification of urethral loss and reconstruction	Required significant help identifying urethral loss and reconstruction	Identified urethral loss but required help to reconstruct	Identified urethral loss and was able to independently reconstruct
16. Anastomosis of bladder and urethra	Required significant help to avoid insecure anastomosis of the bladder with the urethra	Adequate anastomosis of the bladder with the urethra	Good anastomosis of the bladder with the urethra
17. Intraoperative dye test	Needed prompting to do the dye test	Required some guidance to do the dye test and interpret the result	Did dye test independently and correctly interpreted the result
18. Sling or support for urethra, if needed	Required significant help with sling or support for the urethra	Adequate sling or support for the urethra	Good sling or support for the urethra
19. Closure of the vagina	Required help to close the vagina and/or had tension on the vagina and/or urethra	Appropriate closure of the vagina but needed some prompting to avoid pulling on the vagina and/or urethra	Good and independent closure of the vagina without any tension on the vagina and urethra

20. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
21. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
22. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
23. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
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Module Logbook – Circumferential Vesicovaginal Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 6 High and Scarred Rectovaginal Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of high and scarred rectovaginal fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for high and scarred rectovaginal fistulas.
3. Repair high and scarred rectovaginal fistulas.
4. Outline the main complications of high and scarred rectovaginal fistula surgery and their management.

Figure 25. Cross-section of a high and scarred rectovaginal fistula.

High and scarred rectovaginal fistulas are technically more challenging to repair owing to difficult access and the risk of bleeding of the lateral rectal vessels. High rectovaginal fistulas are usually adjacent to the cervix. The superior margin of the rectal fistula can be split up behind the cervix, making it very difficult to reach vaginally. Fortunately, these are more uncommon than lower rectal injuries. Scarred rectovaginal fistulas can be anywhere along the posterior vaginal wall, but are caught in tight rigid scar that needs to be resected before a repair can be attempted.

Preoperative Assessment

History: High and scarred rectovaginal fistulas are usually the result of a longer obstructed labour. Labours causing significant rectovaginal fistulas tend to be longer than those causing a vesicovaginal fistula alone. The patient should be asked about and examined for both urinary incontinence (as

vesicovaginal fistulas are usually concurrent) and nerve injuries to the lower limbs, as foot drop occurs more frequently with high and scarred rectovaginal fistulas.

Diagnosis: History and examination are usually all that is needed to diagnose high and scarred rectovaginal fistulas. Sometimes a vaginal examination is not possible because the vagina is closed by scarring. A digital rectal examination will reveal the fistula and note any strictures. Occasionally the fistula can be small and not felt in the scarred tissue. A rectal dye test can be carried out in a similar way to the bladder dye test with the Foley catheter being inserted through the anus into the rectum. Place a gauze firmly over the anus with the catheter in situ to catch any dye spilling out through the anus.

Planning and management: It is important to ensure that the patient is not anaemic as high and scarred rectovaginal fistula repairs tend to cause more blood loss than simple rectovaginal fistulas, especially if dissecting in the lateral rectal planes. It is good to be cautious and have some cross-matched blood ready. The bowel should be prepared appropriately, according to the preference of the surgeon, to ensure that the patient has an empty bowel before the operation. Usually this will include a fluid diet and enemas morning and night on the day before surgery and then nil by mouth from midnight the night before the surgery. A colostomy is not often required but, if it is, a temporary loop sigmoid colostomy is a simple and effective solution. It should be done about 2–3 weeks prior to the rectovaginal fistula repair, depending on the health of the patient and the status of her tissues. Indications for a temporary diverting colostomy may include:

- Rectovaginal defects located very high and/or very large (>5 cm).
- Ongoing inflammation/infection that has failed conservative management (local cleaning and debridement).
- Previous unsuccessful rectovaginal fistula repair(s).
- Presence of possible signs of mechanical intestinal obstruction.
- Diagnosis of other incidental clinical conditions (for example, malignancies, inflammatory bowel disease, tuberculosis).

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Most rectovaginal fistulas occur alongside a vesicovaginal fistula and both can be repaired in the same procedure. Many surgeons prefer to repair the vesicovaginal fistula first, to get the urine away from the operative field. Alternatively, others prefer to 'stage' the procedure, that is repair the rectovaginal fistula first and then the bladder fistula when the rectovaginal fistula has healed.

The surgical principles are similar to all other fistula procedures, but high and scarred rectovaginal fistulas often need extra care with exposure. On the rare occasion when the proximal edge of the fistula cannot be reached vaginally, the repair may have to be approached abdominally.

Vaginal approach

1. Administer anaesthetic, as appropriate.
2. Administer suitable prophylactic antibiotics, according to availability and preference of the surgeon, which should include 500 mg metronidazole intravenously. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position, similar to a vesicovaginal fistula repair but with the table slightly less tilted to ensure that the rectovaginal fistula is in the operative field.
4. There can be faecal spillage through the fistula if the bowel was not prepared properly. If this occurs, an enema must be done in theatre to ensure a clean operative field. If this cannot be achieved, then it is best to delay the operation until the bowel is adequately prepared.
5. After preparing and draping, a generous episiotomy is recommended to greatly help with exposure.
6. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
7. The flap-splitting method should be applied to create adequate mobility of the rectum, anus and sometimes sigmoid. Because there is a stricture, scar tissue should be excised or the rectal stricture incised and/or dilated. Be careful to observe and monitor blood loss.
8. The peritoneal cavity is often opened during the procedure, but it is vitally important to try to prevent blood, urine and faeces from draining into the peritoneal cavity. Some surgeons suture the peritoneum, whereas others insert a pack, leaving a long 'tail' on the pack to prevent losing it. Take great care when doing this.
9. The rectum should be closed tension free, with interrupted sutures excluding the mucosa and usually with two layers to the muscularis. To prevent narrowing of the lumen, close the fistula in the transverse direction and check the width of the lumen by digital rectal examination, making sure a significant stricture has not been formed during the repair.
10. To prevent narrowing the lumen, close the fistula in the transverse direction and check the width of the lumen by digital rectal examination.
11. If the peritoneal cavity was entered, it needs to be closed above the repaired fistula before closing the vagina.
12. Repair the vaginal side tension free; flaps may be needed if there is substantial vaginal tissue loss. A 2-0 polyglycolic acid suture is most commonly used.
13. Always ensure that the anal sphincter is intact.
14. Insert a Foley catheter to keep the bladder on free drainage.
15. If present, suture the episiotomy and remove labial sutures.
16. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Steps

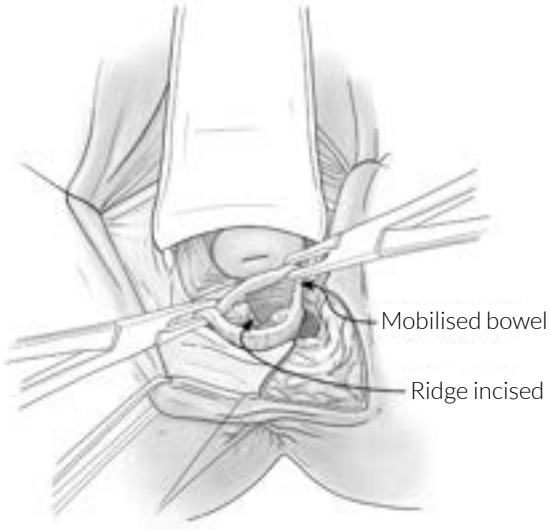

Figure 26. An episiotomy has been performed for ease of access. The vagina is reflected off the rectum and the posterior ridge of scar has been incised.

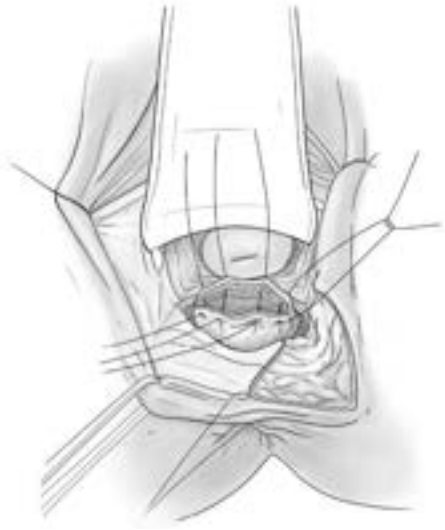

Figure 27. The anterior rectum is repaired with interrupted sutures. The sutures pass through the muscularis layer, excluding the mucosa.

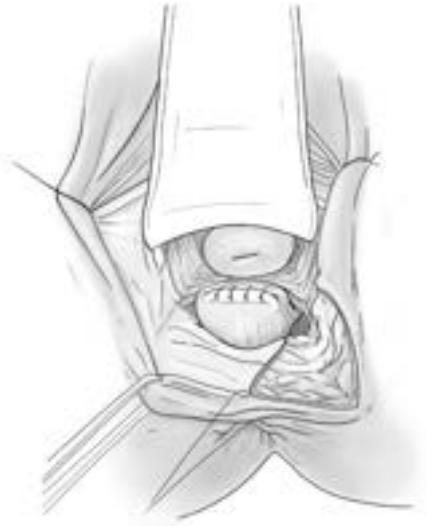

Figure 28. The rectum is repaired in two layers. Make sure the stricture is not occluding the lumen by doing a thorough rectal examination.

Abdominal approach

Sometimes the rectum is too high and fixed, especially to the sacral promontory, and cannot be safely reached by the vaginal route, although this judgement is dependent on the surgeon.

1. Administer anaesthetic, as appropriate.
2. Administer suitable prophylactic antibiotics, according to availability and preference of the surgeon, which should include 500 mg metronidazole intravenously. These are usually given immediately preoperatively, at the same time as the anaesthetic.

3. Position the patient in the supine position.
4. Insert a Foley catheter to keep the bladder on free drainage.
5. After preparing and draping, perform a laparotomy using either a midline or Pfannenstiel incision.
6. Pack the bowel.
7. Lift the uterus forward or bladder forward if a hysterectomy has been done.
8. Mobilise the plane between the vagina and rectum.
9. After reaching the fistula, the rectal scar should be excised or the stricture incised.
10. Repair the rectum in two layers transversally, feel if the lumen is wide enough and repair the defect in the vagina.
11. A flap of omentum can be placed between the rectum and vagina to promote healing.
12. Rinse the abdomen with warm saline before closure, placing a drain as necessary.
13. Always check that the anal sphincter is intact.

Critical Surgical Step

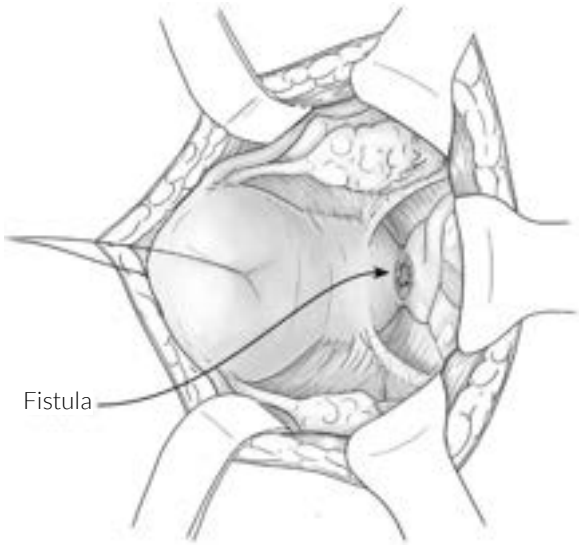

Figure 29. A high rectovaginal fistula as seen at laparotomy. The uterus is retracted with a suture to help expose the fistula.

Complications

- Bleeding.
- If a flap was used to repair the vagina, infection, breakdown or necrosis of the flap might happen.
- Rectal stricture.
- If the peritoneal cavity was opened and the contents washed into the peritoneum then the patient could develop a paralytic ileus; always be cautious of peritonitis.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: If a concurrent vesicovaginal fistula has been repaired, the catheter should be left in place for 10–14 days, as per the vesicovaginal fistula protocol. If the patient has a rectovaginal fistula in isolation, then the catheter can be removed when the patient is mobile, usually the next day.

Diet: It is extremely important that the patient does not develop constipation to avoid any straining to push hard stool past the repair, risking damage to the healing tissues and a potential breakdown. After the operation, the patient should have intravenous rehydration until drinking normally. A light diet can be started the next day and continued for 6–7 days before reintroducing a normal diet. To ensure that the patient does not become constipated, a laxative (bisacodyl) should be prescribed on the commencement of the light diet and be continued for about 1 week. The laxative should be stopped if the stool becomes too fluid. If the patient has a colostomy, a normal diet can be started straight away.

Assessment of surgical outcomes: The patient should be asked about and examined for any bowel incontinence. If in doubt, a rectal dye test should be performed (*see* Dye Test for Rectovaginal Fistula; page 16). If a colostomy is present, the patient can be readmitted 4–6 weeks after the initial operation for the colostomy to be closed. In this case, it is important to always undertake a rectal dye test first to check that the fistula is closed before scheduling the colostomy closure.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To ensure a suitable diet to avoid constipation and straining to push hard stool past the repair, particularly in the first 3 months while the tissues heal. If necessary, to take a laxative (bisacodyl) as prescribed. Note that this advice may need to be adjusted for patients with ongoing faecal incontinence.
- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – High and Scarred Rectovaginal Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of high and scarred rectovaginal fistula	Adequate understanding of high and scarred rectovaginal fistula	Good understanding of high and scarred rectovaginal fistula
12. Decision regarding vaginal/abdominal approach	Required significant guidance to choose the most suitable approach	Adequately considered the appropriate approach	Considered the most appropriate approach and made a correct, informed decision

13. Specific surgical steps for repair of high and scarred rectovaginal fistula, as per chosen approach	Limited or incorrect knowledge of the specific surgical steps for repair of high and scarred rectovaginal fistula	Correct but incomplete knowledge of the specific surgical steps for repair of high and scarred rectovaginal fistula	Good knowledge of the specific surgical steps for repair of high and scarred rectovaginal fistula
14. Identification of anal sphincter injury and knowledge of the risks of ongoing faecal/flatal incontinence	Required prompting to look for anal sphincter injury and had limited knowledge of the risks of ongoing faecal/flatal incontinence	Adequately looked for anal sphincter injury and had sufficient knowledge of the risks of ongoing faecal/flatal incontinence	Independently looked for anal sphincter injury and had good knowledge of the risks of ongoing faecal/flatal incontinence
15. Mobilisation, rectal dilatation (if required) and repair of the anterior rectal wall	Required significant help to mobilise and/or dilate the rectum and the vagina, and to repair the anterior rectal wall	Adequately mobilised and/or dilated the rectum and the vagina and, with some prompting, did a reasonable repair of the anterior rectal wall	Mobilised and/or dilated the rectum and the vagina well, and independently repaired the anterior rectal wall
16. Steps to reduce the chance of faecal/flatal incontinence	Required assistance to reduce the chance of faecal/flatal incontinence	Adequately reduced the chance of faecal/flatal incontinence	Reduced the chance of faecal/flatal incontinence well
17. For vaginal approach, repair of the vagina (considered use of flaps as appropriate)	Required help to repair the vagina without tension and, if appropriate, to adequately cover the posterior vaginal wall with a flap	Repaired the vagina satisfactorily but required prompting to prevent tension and, if appropriate, to adequately cover the posterior vaginal wall with a flap	Good tension-free repair of the vagina and, if appropriate, covered the posterior vaginal wall with a flap well
18. For abdominal approach, closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well

19. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
20. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
21. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
22. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
3.		

4.		
5.		
6.		

Module Logbook – High and/or Scarred Rectovaginal Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 7 Vesicocervical/Vesicouterine Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of vesicocervical/vesicouterine fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for vesicocervical/vesicouterine fistulas.
3. Repair vesicocervical/vesicouterine fistulas.
4. Outline the main complications of vesicocervical/vesicouterine fistula surgery and their management.

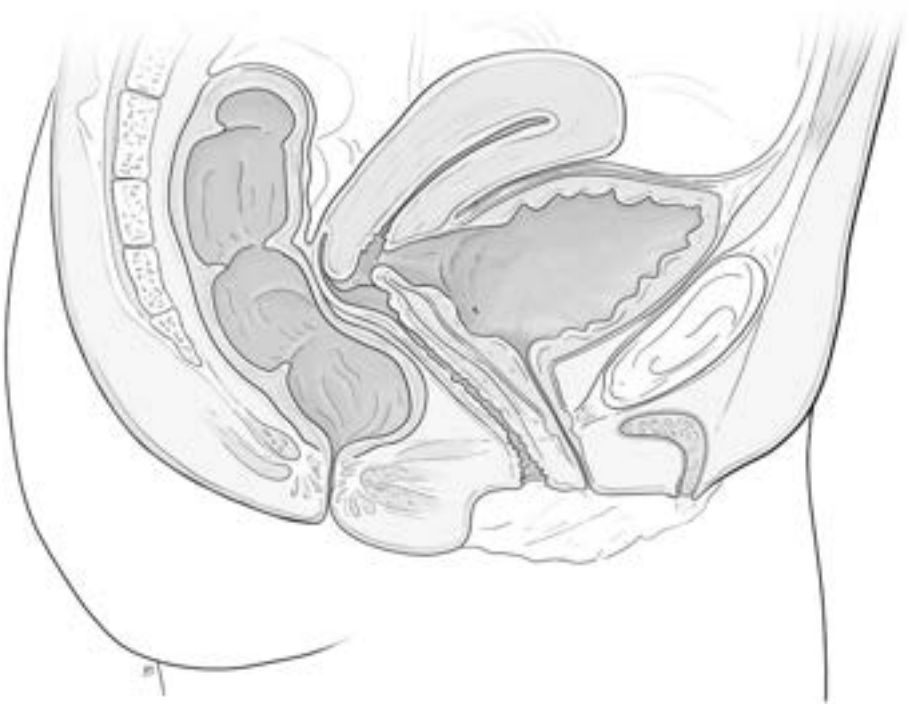

Figure 30. Cross-section of a vesicocervical/vesicouterine fistula.

Vesicocervical and vesicouterine fistulas are pathological communications between the bladder and cervix or bladder and uterus; they can also be in combination. They are almost always supratrigonal. They can be caused by an obstructed labour and ischaemic injury, but they more often occur iatrogenically during surgical procedures, in particular caesarean sections,[68] especially if the bladder is sutured into the lower segment at repair. They can also occur in the cervical stump after a subtotal hysterectomy, including after a caesarean subtotal hysterectomy. If the latter is the case, some surgeons who are trained in the procedure might decide to perform a trachelectomy of any remaining cervical tissue, which also removes a potential cancer risk.

[68] Raassen *et al.* Iatrogenic Genitourinary Fistula: An 18-Year Retrospective Review of 805 Injuries; M. Onsrud, S. Sjøveian, D. Mukwege. Cesarean Delivery-Related Fistulae in the Democratic Republic of Congo. *Int J Gynecol Obstet* (2011).

Sometimes vesicocervical and vesicouterine fistulas can present as Youssef's syndrome, i.e. menouria, haematuria with menses. Patients may be continent, have intermittent incontinence or be fully incontinent.

Preoperative Assessment

History: The patient will have a history of a caesarean section and/or subtotal hysterectomy and may have incontinence or menouria.

Diagnosis: Perform a speculum examination and dye test because the fistula might be very high and not visible. Very often the anterior lip of the cervix is missing. Note that the dye sometimes takes a long time to move through the fistula and into the vagina. If the dye test is negative, place 100 mL of dye solution into the bladder and a gauze swab in the vagina. Ask the patient to walk around for an hour, drink well and then remove the gauze. Using this technique, many dye tests are then positive. If the dye result remains negative but the patient has menouria with no incontinence, then perform a cystoscopy or hysteroscopy if available. If the patient has had a caesarean, it is also useful to carry out an ultrasound of the kidneys and ureters, which will help identify any potential damage to the ureter.

Planning and management: The patient should be nil by mouth from midnight the night before the surgery. Full bowel preparation is generally not needed for urinary tract fistula, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Depending on the surgeon's preference, the procedure can be done vaginally or abdominally. Due to restricted access, the vaginal route is sometimes too difficult and the operation may have to be done abdominally. If the patient had a caesarean 6–8 weeks previously, any sutures should be removed from the bladder/uterus/cervix vaginally, before proceeding with surgery.

Vaginal approach

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, perform an episiotomy, if necessary, to improve the access.
5. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
6. Similar to a vaginal hysterectomy, make an incision anterior to the cervix, reflect a small flap of vagina distally and retract it with sutures to bring the cervix down.

7. Mobilise and dissect the space between the cervix/uterus and bladder until the fistula can be located. Ensure the fistula can be clearly differentiated from the cervical canal.
8. Always check for the ureters as these may have been ligated or cut at the caesarean and may be at the edge or even outside the fistula. Catheterise them as necessary.
9. Repair both the bladder defect and the defect in the cervix and/or uterus with 2-0 polyglycolic acid suture. Be careful not to close the cervical canal.
10. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
11. Repair the vagina tension free, with a 2-0 polyglycolic acid suture.
12. If present, suture the episiotomy and remove labial sutures.
13. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Steps

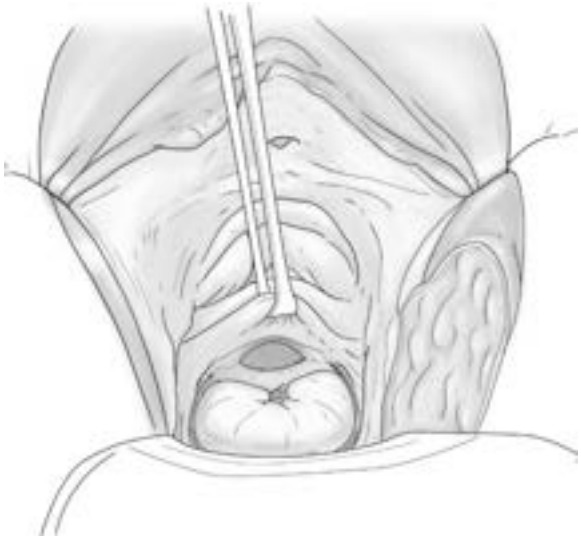

Figure 31. The intracervical fistula as seen from the vagina. Note the anterior cervix is almost missing and the cervical tissue around the fistula is almost absent.

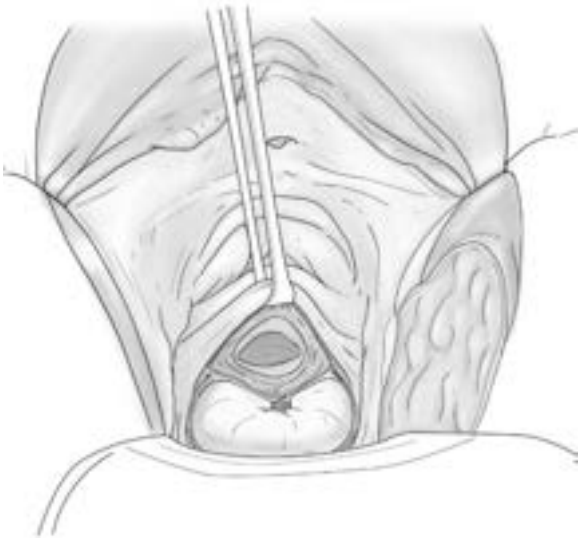

Figure 32. The fistula is mobilised off from the remaining cervix proximally and the vagina distally.

Abdominal approach

An abdominal approach might be necessary when the cervix is pulled up very high after a caesarean section. Because these types of fistula often occur in multiparous women (four births or more), it is good to discuss the possibility of tubal ligation if the woman does not want any further pregnancies.

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.

3. Position the patient in the standard supine position. For pelvic surgery the surgeon stays on the left side of the woman.
4. It is useful to have a Foley catheter inserted before the operation and make sure it is draining freely.
5. After preparing and draping, open the abdomen and release the adhesions. Place a stay suture through the fundus of the uterus and tie it up to the abdominal retractor; by doing so a clear view of the vesicouterine fold is enabled.
6. Place two Allis clamps on the bladder, incise the vesicouterine fold transversally and dissect the bladder off the lower uterine segment and cervix.
7. Incise the bladder longitudinally and extend the incision to the fistula, using sharp dissection. Very often the anterior cervix is missing and the bladder has to be dissected off the vaginal wall in the septum between bladder and vagina. Make sure both ureters are spurting. If one or both are not producing urine, a ureter reimplantation might have to be done additionally.
8. Close the vagina/cervix with 0 or 2-0 polyglycolic acid interrupted inverted sutures either longitudinal or transverse. The stay suture of the uterus might have to be released. Leave some sutures long to secure an omentum interposition later.
9. Close the bladder with a continuous 2-0 polyglycolic acid suture, without going through the mucosa. One layer is enough, but some surgeons prefer a second interrupted layer.
10. An optional interpositional graft of the peritoneum or omentum can be used.
11. Rinse the abdominal cavity with normal saline before closure.
12. Close the abdomen, placing a drain as necessary.
13. Leave the Foley catheter in situ to keep the bladder on free drainage.

Critical Surgical Steps

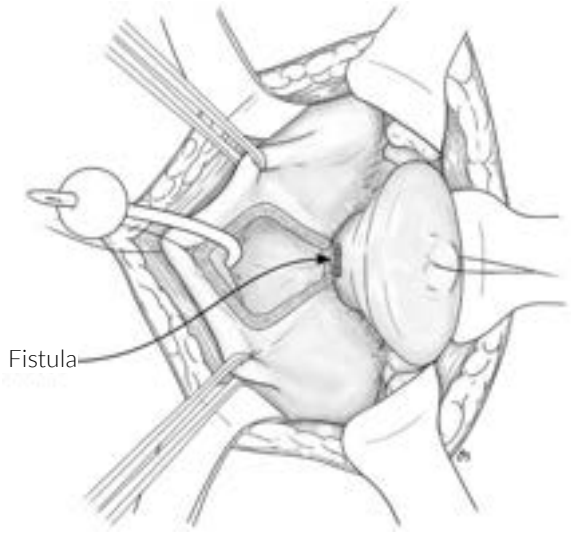

Figure 33. A vesicocervical fistula as seen at laparotomy. A cystotomy has been created and extended to the fistula. The Foley catheter has been brought out through the cystotomy.

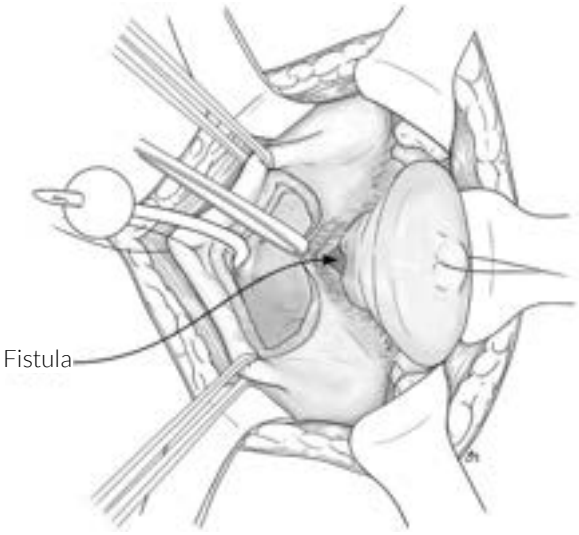

Figure 34. The bladder is mobilised off the cervix.

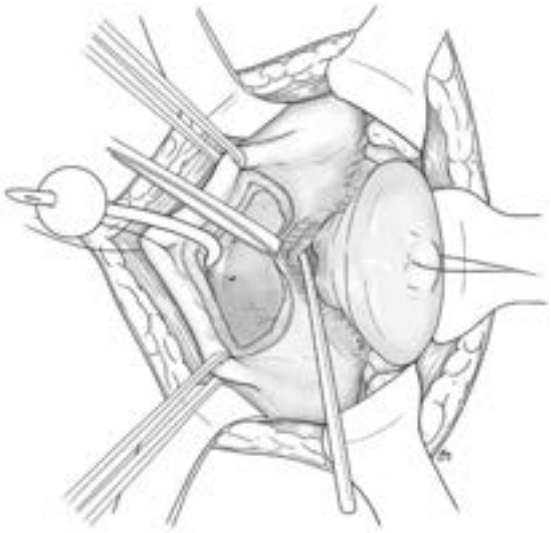

Figure 35. A probe is introduced through the defect in the cervix.

Complications

- Infection, including surgical wound infection if abdominal.
- If the abdominal approach is used, abdominal and pelvic adhesions can be present. Visceral injury and haemorrhage can occur during adhesiolysis.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage for 10–14 days.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.

If the vesicocervical/vesicouterine fistula was associated with ischaemic injury as a result of an obstetric fistula, the following points should be included in the discharge advice:

- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Vesicocervical/Vesicouterine Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of vesicocervical/ vesicouterine fistula	Adequate understanding of vesicocervical/ vesicouterine fistula	Good understanding of vesicocervical/ vesicouterine fistula
12. Preoperative planning of most suitable approach	Required considerable guidance to choose the correct approach	Required some guidance to choose the correct approach	Considered the approach and made a correct, informed decision

13. Specific surgical steps for repair of vesicocervical/ vesicouterine fistula, as per chosen approach	Limited or incorrect knowledge of the specific surgical steps for repair of vesicocervical/ vesicouterine fistula	Correct but incomplete knowledge of the specific surgical steps for repair of vesicocervical/ vesicouterine fistula	Good knowledge of the specific surgical steps for repair of vesicocervical/ vesicouterine fistula
14. Identification and protection of the ureters	Required help to identify the ureters, recognise injuries to the ureters and/or to catheterise	Could identify the ureters and recognise ureteric injury, but required help with catheterisation	Could identify the ureters, recognise ureteric injury and catheterise independently
15. Initial incision and mobilisation of bladder	Required significant help with incision and/or mobilisation	Adequate incision and mobilisation	Good incision on appropriate site and mobilised the bladder through proper plane
16. Mobilisation of bladder from uterus, cervix and vagina	Needed prompting and/or help to separate the bladder from uterus, cervix and vagina	Separated the bladder from the uterus, cervix and vagina without prompting but needed some help	Separated the bladder from the uterus, cervix and vagina independently
17. Closure of bladder	Required help to close the bladder without tension	Adequate closure of the bladder, but required some prompting to avoid tension on the suture line/urethra	Good closure of the bladder, angle secured and no tension on suture line/urethra
18. Intraoperative dye test	Required considerable help to do the dye test	Required some guidance to do the dye test and interpret the result	Did dye test independently and correctly interpreted the result

19. Repair of cervix and/or uterus, as required	Required significant help to repair cervix and/or uterus, as required	Adequately repaired cervix and/or uterus, as required	Repaired cervix and/or uterus independently and well
20. For vaginal approach, repair of the vagina	Required help to repair the vagina and/or to prevent tension on the vagina	Appropriate closure of the vagina but needed some prompting to avoid pulling on the vagina	Good and independent closure of the vagina without any tension on the vagina
21. For abdominal approach, closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well
22. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
23. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for their management
Postoperative Management			
24. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
25. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	Pass (Y/N)	Trainer signature and date
1.		
2.		
3.		
4.		
5.		
6.		

Module Logbook – Vesicocervical/Vesicouterine Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 8 Residual and Corner Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of residual and corner fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for residual and corner fistulas.
3. Repair residual and corner fistulas.
4. Outline the main complications of residual and corner fistula surgery and their management.

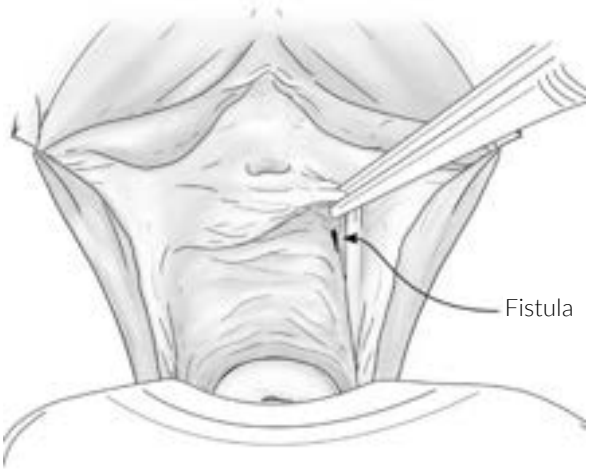

Figure 36. Frontal view showing a corner fistula against the pubic bone. This is a common fistula breakdown site.

A residual fistula is usually a small fistula that remains after repair of a previous vesicovaginal fistula in up to 15% of cases.[69] The patient experiences urinary incontinence through her vagina after the surgery due to a breakdown of the repair. This can happen immediately in the days after the operation if the surgery itself has not been successful or if there is a second missed fistula. Alternatively, it can occur later in the healing phase, more commonly 7–10 days after surgery, and sometimes is only revealed when the Foley catheter is removed. Rarely, a residual fistula can also occur at a later stage, after the patient has been discharged. If this is the case, a precipitating event, such as travelling a long journey on a bumpy bus with a full bladder, doing heavy work or having intercourse too early, is usually the cause.

Residual fistulas can be caused by insufficient dissection and closure under tension. They can occur anywhere along the length of the repaired vesicovaginal fistula. Examples of residual fistulas are:

[69] Hancock and Browning. *Practical Obstetric Fistula Surgery*. 95.

- A midline fistula after a circumferential repair with a T-anastomosis.
- The so-called corner/corner fistula after a circumferential repair. These occur against the pubic bone and are usually tucked up high behind the pubic symphysis on one or either side. These can be uni- or bilateral and are usually very small in size.
- A residual fistula near or in the cervix (Waaldijk type I, Goh type 1), where the longitudinal or horizontal closure was difficult due to the depth of the vagina. Often the surgeon will not have used an episiotomy to gain easier access to the fistula.

Preoperative Assessment

History: The patient will have a history of a previous vesicovaginal fistula and repair, with continual incontinence afterwards.

Diagnosis: These fistulas are usually very small and difficult to palpate, especially a corner fistula. A thorough speculum examination and dye test should be done and should be sufficient to identify the location of a residual or corner fistula. Based on the result of the dye test, the surgeon should decide whether to operate or to refer the patient to a more experienced surgeon. Vaginal scarring from the initial injury or the repair may make the operation more difficult. An ultrasound to determine if the ureters have been damaged is mandatory.

Planning and management: If the patient is incontinent of urine due to a fistula recurrence soon after the initial repair, then leave the Foley catheter in for 2–4 weeks as some heal secondarily. If the tissues are soft and the residual fistula is midline, then a skilled fistula surgeon might operate straight away. However, as the tissues are difficult to handle, friable and the sutures can tear, most surgeons will wait for 3 months before operating again. The patient should be nil by mouth from midnight the night before the surgery. Full bowel preparation is generally not needed for urinary tract fistula, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Residual fistula

It is important to note that this type of fistula has a higher rate of failure at the second operation.

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, ensure adequate exposure. A generous episiotomy could be of benefit; excise scar tissue if present.
5. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if

adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.

6. Be mindful of and protect the ureters by identifying them if possible and catheterising them if necessary.
7. Mobilise the bladder, vagina and cervix well to enable a tension-free closure.
8. Some scarred, poorly vascularised tissue may need to be excised to ensure healthy bladder tissue is repaired with no tension.
9. Repair the vagina tension free. A 2-0 polyglycolic acid suture is most commonly used.
10. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
11. If present, suture the episiotomy and remove labial sutures.
12. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Step

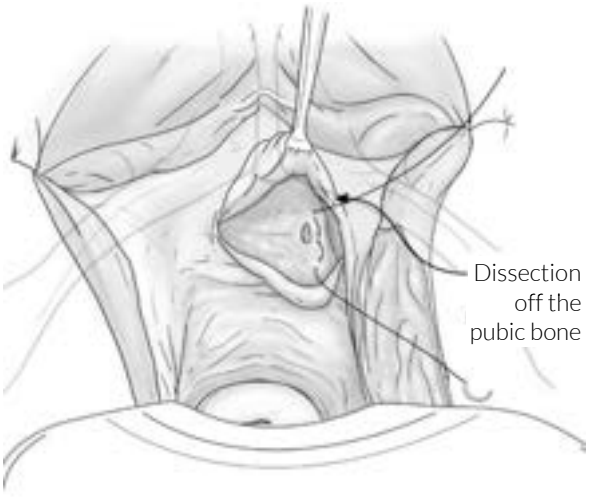

Figure 37. An episiotomy has been made for access. The vagina has been reflected and the bladder has been mobilised off from the pubic bone. The bladder can then come medially. The lateral angle suture is placed, in this case taking three bites: one distal to the angle, one just lateral to the angle and one proximally.

Corner fistulas are more difficult to close and the repair is more likely to break down. Surgical steps for unilateral and bilateral corner fistulas are described below, as well as the Martius graft procedure, if necessary.

Unilateral corner fistula

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, ensure adequate exposure. A generous episiotomy could be of benefit, especially on the affected side.
5. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
6. Repair can be done by making an oblique incision in the sulcus of the vagina and entering the paravesical space.
7. The bladder should then be pushed medially, whereby the fistula becomes visible.
8. Closure should always include attachment to the periosteum of the pubic bones, using a 2-0 polyglycolic acid suture.
9. Repair the vagina tension free; a 2-0 polyglycolic acid suture is most commonly used.
10. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
11. Consider the use of a Martius or other graft to promote healing.
12. If present, suture the episiotomy and remove labial sutures.
13. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Step

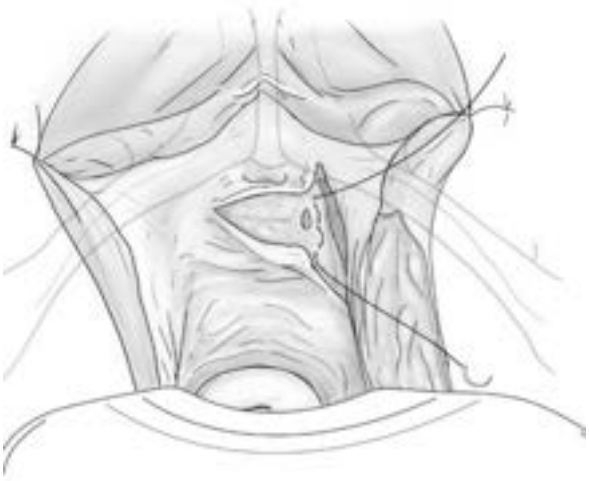

Figure 38. As in Figure 37 but here the vagina has been further reflected off the lateral walls along the sulcus against the bones. This is done proximally and distally to the fistula to help with access.

Bilateral corner fistula

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, ensure adequate exposure. A generous episiotomy could be of benefit.
5. This fistula occurs most commonly after a previous failed circumferential repair.
6. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
7. The best way to operate is to undo the whole repair by connecting the two fistulas with a horizontal incision from the left corner fistula to the right corner fistula. This usually reveals a circumferential defect and has to be repaired by a vesicourethral anastomosis. Most of the time the circumferential fistula was not properly repaired by anastomosis (for details *see* Level 2 Module 5 Circumferential Vesicovaginal Fistula; page 68). It now needs to be repaired in the same way as a formal circumferential repair.
8. Repair the vagina tension free; a 2-0 polyglycolic acid suture is most commonly used.
9. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and

exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.

10. Consider the use of a Martius or other graft to promote healing.
11. If present, suture the episiotomy and remove labial sutures.
12. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Steps

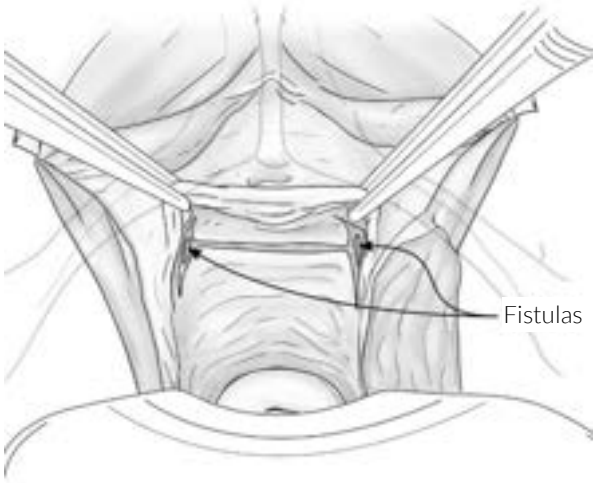

Figure 39. It is common to find bilateral corner fistulas, especially after a circumferential repair that did not secure the anterior urethra/bladder anastomosis satisfactorily. Connect the two fistulas through the vagina to mobilise both.

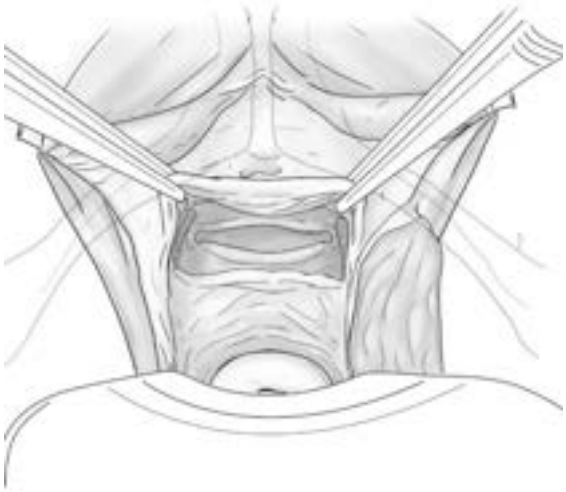

Figure 40. The vagina has been reflected and the two corner fistulas connected to make one large fistula. Often an anterior defect of an old circumferential fistula is revealed here and needs repairing. Note the lateral dissections of the bladder off the pubic bones.

For corner fistula and difficult recurrent repairs a Martius graft may be considered, which is really a flap of fat from the labia majora and not a graft; it remains attached posteriorly by a pedicle. To perform a Martius graft:

1. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
2. Incise along the length of the labia majora from the level of the clitoral hood to the posterior fourchette.
3. Expose the fat beneath and develop a flap, dissecting from anterior to posterior, leaving a wide pedicle posteriorly.
4. Tunnel the flap into the vagina between the pubis and bulbocavernosus and suture it in place over the fistula repair.

5. Repair the vagina over the flap and repair the labial wound in two layers, the first being a deep layer to the residual fat.
6. Suture a dressing in place and leave for 2 days.

Complications

- If the tissue was very fibrotic, the chances of healing may be jeopardised and a further residual fistula is possible.
- The scarring can lead to dyspareunia or even apareunia.
- Using a flap in the vagina can lead to sloughing.
- The ureter(s) may have been damaged in the previous repair(s). In case of anuria the repair must be undone immediately.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage for 10–14 days.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Residual and Corner Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of residual and/or corner fistula	Adequate understanding of residual and/or corner fistula	Good understanding of residual and/or corner fistula
12. Specific surgical steps for repair of residual and/or corner fistula	Limited or incorrect knowledge of the specific surgical steps for repair of residual and/or corner fistula	Correct but incomplete knowledge of the specific surgical steps for repair of residual and/or corner fistula	Good knowledge of the specific surgical steps for repair of residual and/or corner fistula

13. Consideration of episiotomy and excision of scar tissue	Needed prompting to consider an episiotomy and excision of scar tissues	Considered use of episiotomy and excision of scar tissue, but was uncertain in decision-making	Independently considered use of episiotomy and excision of scar tissue and, if appropriate, applied correctly
14. Mobilisation of the bladder into the paravesical space for corner fistula	Required help to mobilise the bladder into the paravesical space for corner fistula	Adequately mobilised the bladder into the paravesical space for corner fistula	Mobilised the bladder into the paravesical space for corner fistula well
15. Identification and protection of the ureters	Required help to identify the ureters, recognise injuries to the ureters and/or to catheterise	Could identify the ureters and recognise ureteric injury, but required help with catheterisation	Could identify the ureters, recognise ureteric injury and catheterised independently
16. Closure of bladder	Required help to close the bladder without tension	Adequate closure of the bladder, but required some prompting to avoid tension on the suture line/urethra	Good closure of the bladder, angle secured and no tension on the suture line/urethra
17. Intraoperative dye test	Required help to do the dye test	Required some guidance to do the dye test and interpret the result	Did the dye test independently and correctly interpreted the result
18. Consideration of possible use of Martius graft and execution	Did not consider use of Martius graft and/or required help with execution	Considered use of Martius graft and executed adequately	Considered use of Martius graft and executed correctly

19. Closure of vagina, including flaps if necessary	Required help to repair the vagina without tension and, if appropriate, to use a flap	Adequately repaired the vagina, but required prompting to prevent tension and, if appropriate, adequately used a flap	Good tension-free repair of the vagina and, if appropriate, used a flap well
20. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
21. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
22. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
23. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	Pass (Y/N)	Trainer signature and date
1.		
2.		
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Module Logbook – Residual and Corner Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 9 Ureteric Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of ureteric fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for ureteric fistulas.
3. Repair ureteric fistulas.
4. Outline the main complications of ureteric fistula surgery and their management.

Figure 41. Cross-section of a ureterovaginal fistula. The ureter was cut or tied at caesarean hysterectomy. Note the stenosis in the ureter where it connects to the vagina, and the dilatation of the ureter proximal to the stenosis.

A ureteric fistula is usually iatrogenic, caused by an accidental nick, cut or tie of the distal ureter near the cervix as it passes under the uterine vessels. The injury can occur during any pelvic surgery, but tends to happen during a caesarean, caesarean/hysterectomy or hysterectomy, more often in the emergency setting but also during elective surgery.[70] A ureteric fistula can occur in conjunction with an obstetric vesicovaginal fistula, which involves the ureterovesical junction. An iatrogenic ureteric injury can also occur with an obstructed labour, in cases where the patient develops a vesicovaginal

[70] T.J. Raassen, C.J. Ngongo, M.M. Mahendeka. Diagnosis and Management of 365 Ureteric Injuries Following Obstetric and Gynecologic Surgery in Resource-Limited Settings. *Int Urogynecol J* (2018); O. Lawal, O. Bello, I. Morhason-Bello, R. Abdus-Salam, O. Ojengbede. Our Experience with Iatrogenic Ureteric Injuries among Women Presenting to University College Hospital, Ibadan: A Call to Action on Trigger Factors. *Obstet Gynecol Int* (2019); G. Williams, S. Broughton, H. Worku, H. Tekle. Five Years Experience of Ureterovaginal Fistulae Following Obstetric or Gynecological Intervention in Ethiopia. *Afr J Urol* (2010).

fistula from the obstructed labour and then a ureteric injury occurs during the subsequent caesarean section or caesarean/hysterectomy. Lastly, ureteric injuries can also occur during vesicovaginal fistula repair especially if the ureter was not identified and protected. Most often, ureteric fistulas are unilateral, but they can be bilateral, and generally present as a ureterovaginal fistula.

Preoperative Assessment

History: Taking the patient's history is most important to make the diagnosis. The patient is likely to report that continuous urinary leaking from her vagina started after surgery and she is still able to pass urine as the uninjured ureter still fills up the bladder (if the patient does not have a concurrent vesicovaginal fistula). While patients with a vesicovaginal fistula start leaking within a few days of obstructed labour, a ureteric injury might start leaking after several weeks or even a month or more. Patients might also have experienced flank pain after surgery.

Diagnosis: Perform a speculum examination with a dye test of 60–80 mL. If no dye is seen in the vagina, sometimes clear urine coming from the top of the vagina suggests a ureterovaginal fistula. The urine might take some time to collect; therefore, if no clear urine is seen while doing the dye test, a three-swab test should be done by keeping the blue dye in the bladder and placing the swabs in the vagina. After half an hour the three swabs are removed. The first swab should not be stained but might be slightly blue because of spill from the urethra. The middle swab should not be stained but could be wet. The proximal gauze should not be stained but be wet with urine. An ultrasound of the kidneys and ureters will likely show hydronephrosis and hydroureter on the affected side. An intravenous pyelogram can show the leakage, but also occasionally a nonfunctioning kidney, depending on how long ago the ureter was injured. If the kidney is not visible on the intravenous pyelogram after 24 hours, it has been damaged beyond recovery. More often the left ureter is injured, rather than the right ureter, at a ratio of almost 2:1. The reasons are:[71]

- The left ureter lies on average 0.5 cm closer to the cervix than the right ureter.
- In pregnant African women, there is a dextrorotation of the uterus because of the large sigmoid colon, bringing the left ureter forward.
- Most operators are right-handed and are standing on the right side while doing a caesarean, making it more likely to injure the left ureter.

Planning and management: The patient should be nil by mouth from midnight the night before surgery.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Abdominal ureteric reimplantation is the most common treatment because often the injury is not recognised in time and patients present some time after the injury. Occasionally, the ureter can be reimplanted via the vaginal route. As these types of fistula can occur in multiparous women

[71] Raassen, Ngongo, Mahendeka. Iatrogenic Genitourinary Fistula: An 18-Year Retrospective Review of 805 Injuries.

(four births or more), it is good to discuss the possibility of tubal ligation if the patient does not want any further pregnancies.

Abdominal reimplantation of the ureter

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the supine position.
4. Insert a Foley catheter before the operation and make sure it is draining freely.
5. After preparing and draping, the surgical incision is usually dictated by the existing abdominal scars. Be mindful of adhesions.
6. Mobilise the bladder, perform a cystotomy and confirm the affected ureter (which is invariably dilated) by seeing a spurt of urine on the right or left inside the bladder. Perform the cystotomy transversely so that it can be repaired longitudinally to lengthen the bladder should that be needed for it to reach the ureter.
7. Identify, expose and mobilise the affected ureter, clamping, cutting and tying it as distally as is safely possible.
8. Perform a ureteroneocystostomy with a simple end-to-side anastomosis. This is sufficient and the prognosis tends to be very good.
9. If needed, create a Boari flap,[72] modified bladder flap and/or psoas hitch to enable the ureter to be implanted under no tension.
10. Use a ureteric catheter as a stent and fix it to the bladder mucosa with 4-0 polyglycolic acid suture. The ureteric catheter can exit through the bladder and abdominal wall or through the urethra.
11. No antireflux procedure or tunnelling is necessary in adults and the ureter can be implanted directly.
12. Close the bladder with continuous 2-0 polyglycolic acid in one or two layers.
13. Rinse the peritoneal cavity with warm saline and close the abdomen.
14. Leave the Foley catheter in situ to keep the bladder on free drainage.

[72] F. Hinman Jr. Bladder Flap Repair (Boari). In: *Atlas of Urologic Surgery*. Saunders (1989); P. Padmanabhan. Bladder Flap Repair (Boari). In: J.A. Smith, S.S. Howards, G.M. Preminger, R.R. Dmochowski, eds. *Hinman's Atlas of Urologic Surgery*. 4th Edition. Elsevier (2019). 293.

Critical Surgical Step

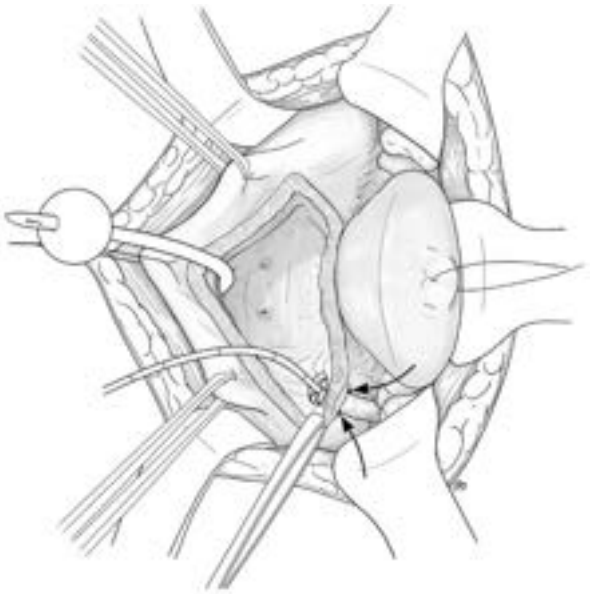

Figure 42. More commonly the ureter is implanted at laparotomy. The ureter has been mobilised and introduced through the broad ligament before implanting into the bladder via a cystotomy. It has also been fixed outside to the bladder serosa to reduce tension on the anastomosis.

Vaginal reimplantation of the ureter

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. Ensure adequate exposure because these lesions are often deep in the vagina.
5. Catheterise the ureter through the vagina. The ureteric orifice may be in a torn cervix or vaginal vault.
6. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
7. Make a transverse incision in the rugae just medial of the ureter opening and an incision around the ureter.
8. After dissection, make an incision in the bladder medial of the ureter for 1 cm.
9. Direct the ureteric catheter into the bladder and out through the urethra.
10. Close the fistula over the ureter, which is now inside the bladder. As always, ensure there is no tension on the repair.

11. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
12. If present, suture the episiotomy and remove labial sutures.
13. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Steps

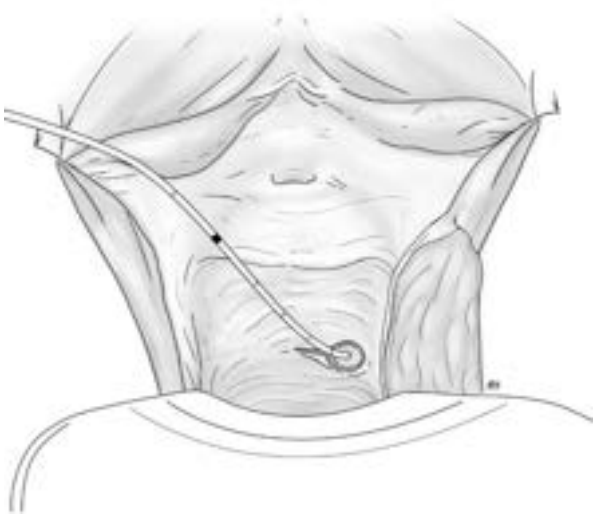

Figure 43. A ureteric fistula draining into the vaginal vault after hysterectomy. If the ureter is not too distorted and stenosed, it can be catheterised and implanted vaginally. The ureter is catheterised, and the initial vaginal incision has been made around the ureteric fistula and extended medially to help expose the bladder to make an incision in order to perform the implantation.

Figure 44. The vagina has been mobilised and the bladder entered from the vagina (cystotomy). The ureter can now be implanted. The ureteric catheter has been pulled into the bladder and out through the urethra.

Complications

- The laparotomy might be complicated by severe adhesions of the intestines secondary to the initial caesarean or hysterectomy. In a small number of patients, injuries to the intestines and mesenteric vessels will occur, mostly of the small intestines, and they must be recognised and sutured.
- The ureters can be very dilated, fibrosed and stuck to the iliac vessels. While dissecting, the ureters can be nicked or even severed and should be repaired.
- Injury to the iliac vein or artery is the most serious complication while dissecting the ureter. In case this happens, finger pressure or arterial clamps should be applied to both sides of the lesion to control the bleeding. The vessel must be sutured using a 4-0 polyglycolic acid suture.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Whether the ureteric fistula has been repaired vaginally or abdominally, postoperatively, the ureteric catheter can be removed after 8–10 days and the Foley catheter after 12–14 days. After the Foley catheter has been removed, the patient should be carefully examined for any ongoing urinary incontinence (*see* below). All patients should have their residual urine volume and how much they can pass measured. If urinary retention develops, the catheter should be reinserted and bladder training instigated, or the patient can be taught clean intermittent self-catheterisation.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.

If the ureteric fistula was associated with ischaemic injury as a result of an obstetric fistula, the following points should be included in the discharge advice:

- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal), making sure that the surgeon is aware of the ureteric implantation and potential for distorted anatomy.

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Ureteric Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of ureteric fistula	Adequate understanding of ureteric fistula	Good understanding of ureteric fistula
12. Choice of approach, i.e. vaginal or abdominal	Required guidance to choose the correct approach	Considered the appropriate approach, but was uncertain in their decision-making	Considered the approach and made a correct, informed decision

13. Specific surgical steps for repair of ureteric fistula, as per chosen approach	Limited or incorrect knowledge of the specific surgical steps for repair of ureteric fistula	Correct but incomplete knowledge of the specific surgical steps for repair of ureteric fistula	Good knowledge of the specific surgical steps for repair of ureteric fistula
14. Mobilisation of bladder	Required help to mobilise the bladder	Adequately mobilised the bladder	Mobilised the bladder well
15. Exposure and identification of affected ureter	Needed guidance to expose and identify the affected ureter	Adequately exposed and identified the affected ureter	Exposed and identified the affected ureter well
16. Mobilisation of the ureter	Needed help to mobilise the ureter	Adequately mobilised the ureter	Mobilised the ureter well
17. Application of chosen implantation method and repair of bladder	Required significant help to apply the implantation method and repair the bladder	Adequately applied the implantation method and repaired the bladder	Applied the implantation method and repaired the bladder well
18. For abdominal approach, closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well
19. For vaginal approach, intraoperative dye test	Required considerable help to do the dye test	Required some guidance to do the dye test and interpret the result	Did dye test independently and correctly interpreted the result
20. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information

Complications			
21. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
22. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
23. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
3.		
4.		

5.		
6.		

Module Logbook – Ureteric Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 10 Bladder Stones

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the common causes of bladder stones in fistula patients.
2. Describe the preoperative assessment, surgical steps and postoperative management for bladder stones.
3. Carry out removal of bladder stones.
4. Outline the main complications of surgical removal of bladder stones.

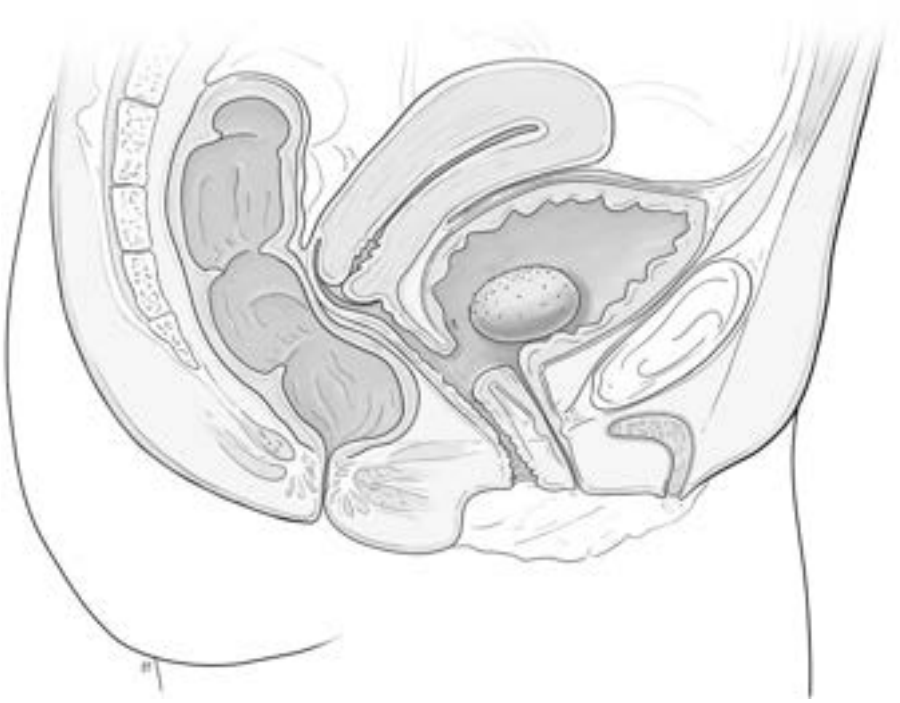

Figure 45. Cross-section showing a bladder stone with concurrent fistula. This stone could be removed vaginally through the fistula or it can be crushed with sponge-holding forceps if needed. The bladder should then be thoroughly irrigated through the fistula.

Fistula surgeons regularly come across bladder or even vaginal stones as patients often drink less fluid in an attempt to leak less urine. Concentrated urine frequently leads to development of stones in the bladder and/or vagina, and even in the urethra. Additionally, patients might place cloths, leaves, a bottle top or other materials into their vagina in an effort to stop the urinary leakage, and subsequently a stone can form around these objects. Stones can also form around nonabsorbable sutures used in a fistula repair or around artificial slings in stress procedures, where a suture was either placed inadvertently into the bladder ('sling on a string' method) or where the sling eroded through the bladder/vagina. Bladder stones and other foreign bodies should be removed in their entirety.

Preoperative Assessment

History: A carefully taken history can indicate the likely presence of a bladder stone. The patient will often complain of vaginal and/or pelvic pain, foul smelling urine and sometimes haematuria. Commonly, there is a distinctive smell and turbid urine. Other patients may be asymptomatic.

Diagnosis: Very little is needed to investigate a bladder, urethral or vaginal stone and diagnosis is made with history and examination only. It may be possible to feel a very large bladder stone with a vaginal examination. Whereas a bladder stone can be felt as a hard mass anteriorly, which is usually but not always tender, a vaginal stone can be felt on direct palpation. If a bladder stone is present, the urine is turbid and there is often haematuria, either frank or microscopic, detected on a urine stick. A urine examination will always be positive for an infection. The definitive diagnostic test can be done by probing the bladder with a metal catheter or a suitable probe, with which a hard stone can be felt. An ultrasound is rarely needed to confirm diagnosis but if a scan is carried out, most stones cast a shadow in the bladder, although some are echolucent and appear as a mass on the scan. It is also important to always rule out the presence of ureteric or renal stones in patients with bladder stones. To do this, ultrasound scans of the whole urinary system as well as X-rays can be carried out to confirm diagnosis, number of stones, their size and position. It is likely that many smaller stones will be found during the operation.

The bladder should be probed with a metal catheter at the beginning of every fistula-related procedure due to the frequency of concurrent bladder, urethral and vaginal stones in fistula patients.

Planning and management: Nearly all patients with bladder stones have a urinary tract infection and it is wise to administer adequate antibiotics before, during and after the operation, depending on what is available (this can include ampicillin, amoxycillin or cephalexin). When planning the operation, the main decision is whether to remove the stone via a small low transverse suprapubic cystotomy or, if the fistula is still present, it is possible to remove the stone vaginally. Sometimes the fistula needs to be slightly enlarged to remove the stone. Alternatively, the stone can be crushed using sponge-holding forceps introduced into the bladder via the fistula and then removed through the fistula. If removing the stone vaginally, it has traditionally been taught that infections should be treated first with subsequent fistula repair 2–3 weeks after any tissue inflammation has settled down. Nevertheless, if the fistula is small, soft and does not need much dissection, then a careful repair can be attempted and the patient catheterised for 10–14 days postoperatively. Many small and simple fistulas will close using this method, but this is unlikely to work for a larger, complex or circumferential fistula. If the fistula has already been closed, then a low suprapubic incision should be used, endeavouring to stay outside the peritoneum so there is no risk of infected urine or stone fragments entering the peritoneal cavity. Vaginal stones can sometimes be removed in the outpatient department, but if too tender then removal should take place in the lithotomy position under sedation or spinal anaesthetic.

The patient should be nil by mouth from midnight the night before the surgery. Full bowel preparation is generally not needed for bladder and vaginal stones, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

Whether stone removal is carried out vaginally or abdominally, appropriate antibiotics should be given for a few days before the operation.

If the vaginal route is most appropriate:

1. Administer anaesthetic as appropriate; a spinal anaesthetic is usually enough. For removal of bladder stones, as mentioned above, antibiotics are usually given preoperatively, intraoperatively and postoperatively.
2. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
3. After preparing and draping, the stone can usually be reached and removed vaginally through the fistula with Rampley, Allis or other suitable forceps. If the stone is too big, it can be crushed with the forceps and removed piece by piece through the fistula. The fistula may need to be enlarged, and when doing so, the incision should be made in the midline to avoid damaging the ureters.
4. Palpate the inside cavity of the urinary bladder to confirm that there are no more additional stones, or any remnant pieces from the crushed stone. If the fistula opening is not wide enough to do this, perform a bimanual digital exam.
5. Irrigate the area and the bladder well with sterile saline or other fluid.
6. Insert a Foley catheter to keep the bladder on free drainage.
7. If the fistula is nonscarred, small and in the midline, a simple repair could be attempted, noting that the tissues will be inflamed and more difficult to handle. Follow the surgical and postoperative steps as per a simple vesicovaginal fistula. However, in most cases it is better to delay the fistula repair, in which case ensure that the Foley catheter is left on free drainage to divert as much urine away from the fistula as possible.

If the suprapubic route is most appropriate:

1. Administer anaesthetic as appropriate, a spinal anaesthetic is usually adequate.
2. Administer suitable antibiotics, according to availability and the preference of the surgeon.
3. For removal of bladder stones, as mentioned above, antibiotics are usually given preoperatively, intraoperatively and postoperatively.
4. Position the patient in the supine position.
5. Insert a Foley catheter to keep the bladder on free drainage.
6. After preparing and draping, make a low transverse suprapubic incision, dissecting to the retropubic space. Care should be taken to remain extraperitoneal as there is almost always spillage of infected urine after the cystotomy and it is best if this does not enter the peritoneal cavity.
7. If the stone can be felt, cut directly down onto it. If the stone cannot be felt and it is difficult to locate the bladder, when it is small, the bladder should be filled with about 100 mL of sterile saline or water via the Foley catheter. The bladder will swell in the operating field but check by inserting a syringe and drawing back urine. This will confirm the location of the bladder and help to ensure a successful cystotomy. This can only be done if there is no fistula.

8. Remove the stone with Rampley or suitable forceps. The stone should be crushed with the forceps if it is (too) large.
9. The bladder and dissected tissues should be irrigated well with sterile saline or other fluid to remove any debris and infected material. Always check for remnants from the crushed stone as well as any additional ones.
10. The bladder is generally closed in two layers using a 2-0 polyglycolic acid suture and the tissues should be irrigated repeatedly with sterile saline or other sterile fluid as the layers are closed.
11. Close the suprapubic incision, placing a drain as necessary.
12. Leave the Foley catheter in situ to keep the bladder on free drainage.
13. Postoperatively, abdominal wound infections as well as urine infections are common, therefore antibiotics should be administered for 5–7 days following removal of the stone(s).

Critical Surgical Steps

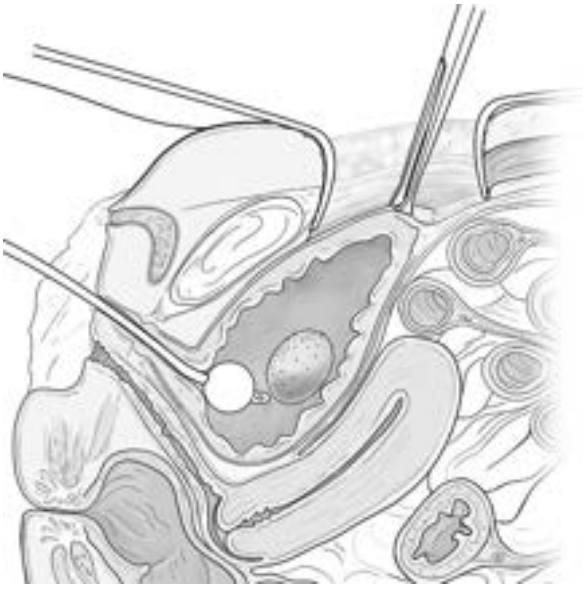

Figure 46. If a bladder stone is too large to be removed through the fistula or if there is no fistula, remove the stone by making a low transverse abdominal incision, staying in the preperitoneal space to prevent spillage into the peritoneal cavity.

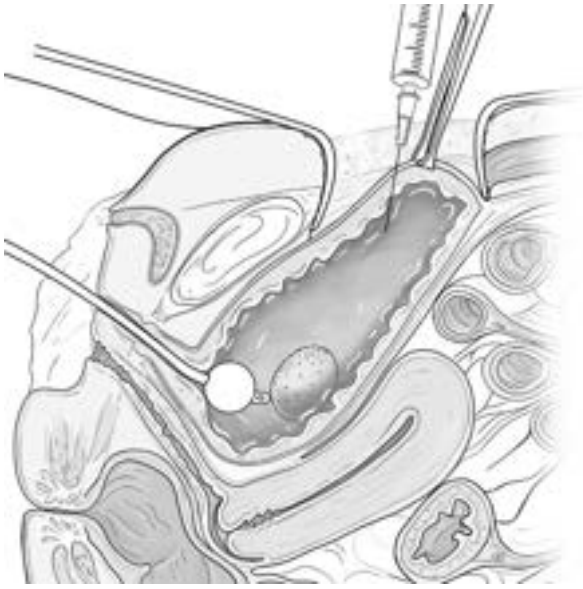

Figure 47. As it can be difficult to locate the bladder, the easiest way is to fill it through the Foley catheter. Make sure to be in the correct plane by inserting a syringe and withdrawing to identify urine. Aim the needle of the syringe into the pelvis to reduce the risk of bowel perforation.

Complications

- The most common complication is a wound infection that might need draining, dressing and continued antibiotic cover.
- A small vesicocutaneous fistula may form. It usually closes spontaneously by leaving the Foley catheter on free drainage for at least 2 weeks. If not, the fistula should be closed operatively.
- Stones can reoccur if a stone or a suture remains in the bladder, in which case, over time, a new stone often reforms around this debris.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: The Foley catheter should remain in place on free drainage for 10 days if a stone(s) was removed abdominally or if it was removed vaginally and the fistula was repaired. If a stone(s) was removed vaginally or suprapubically but the fistula was not repaired, leave the Foley catheter in place for about 10 days if it is draining urine away from the fistula (i.e. if more urine is coming via the Foley than draining into the bed via the fistula).

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: If a fistula was repaired: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- If the patient has had the bladder stone removed but still has a fistula, appropriate counselling should be provided to reassure her that the fistula will be repaired 2–4 weeks later.
- Encourage the patient to drink adequate fluids to help prevent recurrent stones.

If the bladder stone was associated with an obstetric fistula that has also been repaired, the following points should be included in the discharge advice:

- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Bladder Stones

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding of the pathology	Incomplete understanding of bladder stones	Adequate understanding of bladder stones	Good understanding of bladder stones
12. Choice of surgical route	Required guidance with choosing the surgical route	Considered the appropriate surgical route, but was uncertain in their decision-making	Independent and correct choice of surgical route

13. Specific surgical steps for removal of bladder stones, as per surgical route	Limited or incorrect knowledge of the specific surgical steps for removal of bladder stones	Correct but incomplete knowledge of the specific surgical steps for removal of bladder stones	Good knowledge of the specific surgical steps for removal of bladder stones
14. For vaginal approach, ability to remove stone through fistula	Required help to remove stone through the fistula	Adequately removed the stone through the fistula	Removed the stone through the fistula independently and well
15. For suprapubic approach, suprapubic cystostomy	Needed help to perform suprapubic cystostomy	Adequate suprapubic cystostomy	Independently performed suprapubic cystostomy
16. For suprapubic approach, identification and removal of stone	Needed prompting and/or help to identify and remove stone	Adequately identified and removed stone	Independently identified and removed stone well
17. For suprapubic approach, repair of bladder	Needed prompting and/or help to repair bladder	Needed some prompting to repair bladder	Independently and accurately repaired bladder
18. For suprapubic approach, closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well
19. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information

Complications			
20. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
21. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
22. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
3.		
4.		

5.		
6.		

Module Logbook – Bladder Stones

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 11 Vaginal Reconstruction

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the symptoms of severe vaginal stenosis.
2. Describe the preoperative assessment, surgical steps and postoperative management of vaginal reconstruction.
3. Carry out vaginal reconstructions.
4. Outline the main complications of vaginal reconstruction and their management.

Figure 48. Cross-section showing severe vaginal stenosis.

Reconstruction of the vagina is a surgical procedure to treat severe vaginal stenosis and scarring that can occur following a long obstructed labour and is therefore almost always associated with obstetric fistula. Severe vaginal stenosis is also sometimes referred to as closed vagina, scarred vagina or absent vagina. The severity ranges from having a reasonable vaginal length but with dense and constricting scarring, usually on the posterior wall, to having a complete loss of the vaginal tissue resulting in an essentially absent vagina replaced by dense scar tissue. Very severe vaginal scarring and stenosis can remain after a fistula repair and it often leaves the patient with severe urethral incontinence as the rigid scarring keeps the urethra open, preventing it from closing normally. Sometimes varying degrees of flatal and faecal incontinence are present for similar reasons. Vaginal reconstruction often has two aims: to enable normal sexual relations and to restore continence.

Preoperative Assessment

History: Patients with severe vaginal stenosis will typically report apareunia or severe dyspareunia due to mechanical obstruction. If they have not had a fistula repair already, they may give the same history as a fistula patient. Even if they have had a fistula repair, they may still be suffering from urethral incontinence.

Severe vaginal stenosis can be the cause of a range of other gynaecological health problems such as amenorrhoea, hypomenorrhoea, haematometra and pelvic pain, and can contribute to secondary infertility and urethral incontinence. Some patients are more concerned about their inability to engage in penetrative sexual intercourse than by their severe incontinence, as this can be a socially significant determinant of the patient's quality of life. As well as restoring a patient's continence, surgeons should, as far as possible, respect a patient's sexual and reproductive rights by also trying to restore their ability to engage in penetrative sexual intercourse. Ideally the reconstruction should take place at the first operation whilst repairing the fistula, but it is also commonly done as a secondary procedure. A secondary procedure is described here, but the principles can be applied to a primary repair.

Diagnosis: Diagnosis can easily be made based on vaginal examination and a history of apareunia or dyspareunia. Patients sometimes report cyclical pain and amenorrhoea, as the menses cannot drain away. It is also good to check the presence of a uterus with an ultrasound.

Planning and management: There are two treatment options for vaginal stenosis. Conservative treatment requires repeated vaginal dilatation and is only suitable for nonscarred congenital absence of the vagina. Surgical treatment involves peritoneal flaps, skin graft or skin flap procedures. It is important to ensure that the patient is aware that the skin flap and rotations can result in hair growth in the vagina, but the hair follicles can be destroyed by diathermy at a later stage and this should resolve the problem. Whichever treatment is selected, the patient should be carefully counselled, as treatment requires commitment and willingness to perform vaginal dilatation afterwards.

The patient's blood group should be checked and 1–2 units should be available. It is also prudent to prepare the bowel as it is possible to inadvertently create an iatrogenic rectovaginal fistula during the procedure. This should be done appropriately, according to the preference of the surgeon, but usually will include a fluid diet and enemas morning and night on the day before surgery, and then nil by mouth from midnight the night before the surgery.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

To surgically reconstruct the vagina, the first step is to open a space between the rectum and bladder. This needs to be done carefully as it is very easy to create a fistula when doing so. The space needs to be adequate for intercourse and, if a uterus is present, the cervix should be located. This can be very difficult and an ultrasound can be used as a guide during surgery, or the cervix can be located by a rectal examination during the procedure. Make sure gloves are changed after each rectal examination.

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon and, if the rectum is involved, add metronidazole. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, insert a Foley catheter to perform a dye test to make sure there is no fistula. Then remove the catheter but leave the dye in the bladder.
5. Infiltrate with dilute lignocaine and adrenaline for haemostasis and hydrodissection.
6. Dissect the plane between the rectum and urethra/bladder, excising scar tissue as necessary and regularly checking if you have perforated the bladder or bowel. To avert injuries to the anus/rectum, inserting one finger in the anal canal while dissecting the plane is helpful.
7. It is easy to make a hole in the bladder during dissection; if this happens, having some urine in the bladder will make any hole easier to identify.
8. Consider the most appropriate flap or graft to cover the vagina. *See* below for a selection of associated procedures.
9. Reinsert the catheter before suturing the flap or graft in place and keep the bladder on free drainage.
10. It is prudent to perform another dye test to ensure a fistula has not been missed or created during the dissection. Leave the Foley catheter in situ to keep the bladder on free drainage.
11. At the end of the procedure, insert a sterile pack into the reconstructed vagina. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

The choices of procedure are:

Singapore Flap

1. Mark the area to be cut with a pen or dye, ensuring that the size of the flap will cover the injury adequately. The flap should not be so big that it makes repairing the harvest site difficult or even impossible.
2. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
3. Cut the skin, fat and then continue to include the deep fascia of the underlying muscle. To preserve the blood supply cut the lower (inferior) skin margin only superficially into the fat.
4. Mobilise the flap keeping the pedicle inferiorly to maintain the blood supply.
5. Make a tunnel subcutaneously under the labia majora and above the inferior pubic ramus. Dissect the tunnel from both the vaginal and labial aspects. The size of the tunnel should be appropriate for the size of the flap and should accommodate two fingers at least.
6. Pull the flap into the vagina through the tunnel, marking how much skin will lie within the tunnel.

7. Remove the flap from the tunnel and excise all the skin that would be lying within the tunnel.
8. Reintroduce the flap into the vagina and suture in place. There should be no tension when pulling the flap in or suturing it in place.
9. Close flap donor site in three layers, i.e. fascia, deep dermis, subcuticular, ensuring there is not too much skin on the lateral side ('dog ear'). Note that reducing the amount of hip flexion and abduction in the patient's leg by moving the stirrups will help bring the skin edges together.
10. Insert a drain just above the muscle layer as there is a high risk of haematoma or seroma. If standard drains are not available, a drain can be made from the sterile tubing of a urine bag or giving set, or a straight plastic catheter.

Critical Surgical Steps

Figure 49. The harvest site of the Singapore flap in the groin crease leaves a wide pedicle centred just medially to the ischial tuberosity.

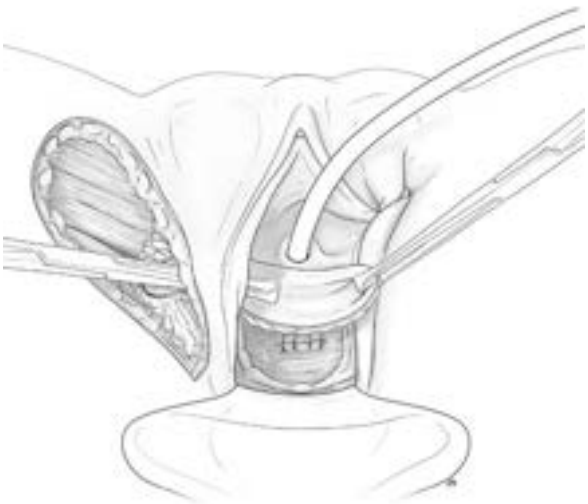

Figure 50. The flap is introduced into the vagina by a wide tunnel. Make sure to carefully excise any skin that could remain in the tunnel.

Figure 51. The flap is in place and the harvest site has been repaired.

Key learning resource: Andrew Browning Fistula Repair Series *Episode 5 Singapore Neovagina*.

Free or split-thickness free skin grafts (Abbè-McIndoe)

1. Place split skin grafts over a mould and place into the created vaginal canal with fixation of its margins to the labia.
2. Maintain vaginal patency through regular dilatation.
3. The scarring over the site where the skin graft is harvested can be a concern; therefore, the graft should be taken from a site where potential healing and scarring will not be a problem.
4. Note that inadequate vaginal length and dyspareunia are common.

Labia minora flap

1. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
2. Incise very superficially through the skin around the labia minora near its base. Do not go too close to the clitoris.
3. Raise a flap of labia minora from anterior to posterior leaving a pedicle posteriorly to maintain its blood supply.
4. Dissect between the leaves of the labia minora and spread them apart to enable it to lie flat.
5. Tunnel or rotate it into the vagina (tunnelling is usually best depending on the site you need covered).
6. Excise any skin left in the tunnel, as for the Singapore flap, being very careful not to compromise the pedicle and blood supply.
7. Suture in place and repair the donor site.

Rotational perineal and labial skin flaps

1. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
2. Harvest full-thickness flaps of the labia minora or labia majora either unilaterally or bilaterally to cover the potential vaginal space after dissection and excision of any scar.
3. Note that these flaps are not connected to a blood supply and behave like any other flaps – they can scar and contract with time. The only way to prevent this is to use a flap with a blood supply, i.e. Singapore flap.
4. Maintain vaginal patency through regular dilatation.
5. Note that if hair-bearing skin is used as the flap, then dyspareunia, sebaceous secretions and hair growth inside the reconstructed vagina can be of concern for some patients.
6. Creation of a complete vagina with these methods is technically difficult and therefore they are mostly used for partial reconstruction of a vagina.

Critical Surgical Steps

Figure 52. Labial rotation flap. A flap is raised from posterior to anterior and rotated into the vagina.

Figure 53. Flap developed.

Figure 54. Labial rotation flap sutured in place over areas of vaginal tissue loss.

Peritoneal pull-through (Davydov)

1. Perform uni- or bilateral episiotomy to get proper access to the vagina.
2. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
3. Make a transverse incision in the vaginal vault or just under the cervix.
4. Dissect deeper until you reach the peritoneum and open the peritoneum between the cervix and rectum.

5. This is the most difficult part because of scar tissue and the possibility of injuring the bladder and/or rectum. Any injuries must be repaired immediately.
6. Once you have developed enough vaginal space, cover with flaps of peritoneum. Mobilise flaps from the Douglas pouch or the vesicouterine folds.
7. Create a neovagina vault by placing purse string sutures around the peritoneum.
8. It is necessary to maintain continuous dilatation to prevent scarring and contracting of the vaginal space.
9. Note that there is also a high risk of peritoneal infection and associated complications.

Critical Surgical Steps

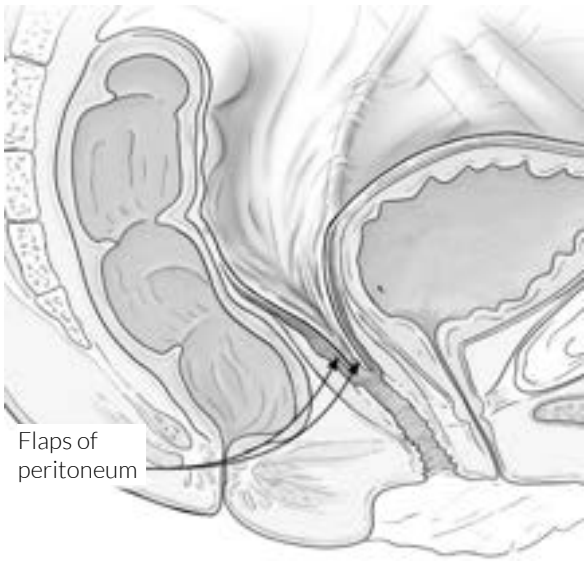

Figure 55. Creation of a neovagina using peritoneum (Davydov procedure). The Pouch of Douglas is entered vaginally. This may be difficult and it may be necessary to develop a space for the neovagina through an area of closed scar. Flaps of peritoneum are subsequently developed. Note that this patient has had a hysterectomy.

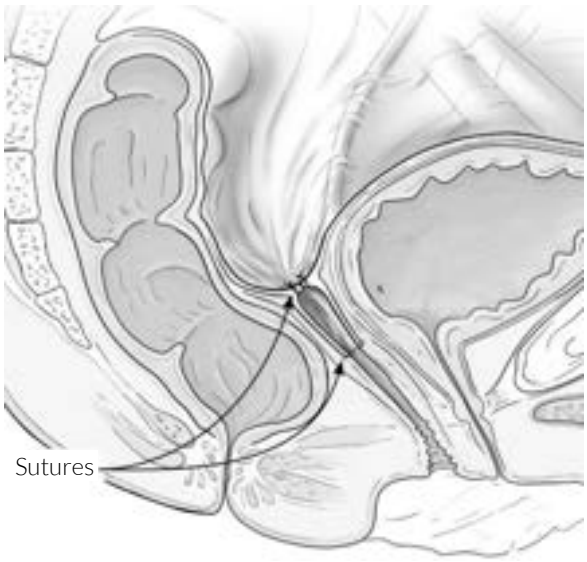

Figure 56. The peritoneum is closed off at the new vaginal vault and sutured to the remaining vagina.

Complications

- Excessive bleeding is a possibility in all of the aforementioned techniques, particularly during division of the vaginal scar, mobilisation and harvesting of grafts and flaps. Haemostasis is critical to prevent the occurrence of postoperative haematomas, as profound concealed haemorrhages can occur in the dissected deep pelvic spaces and even progress to the abdominal cavity.
- Bladder and colorectal injury should also be anticipated, checked for throughout the procedures and be repaired as soon as diagnosed.
- Look for signs of infection, e.g. peritoneal infection and anaemia.
- Stenosis can recur. To manage stenosis, examine the reconstructed vagina 3–4 weeks after surgery. If significant stenosis is evident, the patient should be taken to the operating room for excision or incision of the stenosis. It is also advisable to carry out an evaluation for vaginal patency and healing

of any graft of flap tissue about 3 weeks after the surgery and after resumption of sexual intercourse.

- Sloughing of flaps can occur in a very small number of patients.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage for 10–14 days. The pack in the reconstructed vagina should be maintained for as long as the patient is admitted, for up to 25 days, with the packing changed every 2–3 days. If the pack develops a bad odour, then leave it out for a few days and let the tissues recover before starting gentle dilatation.

Vaginal dilatation: Once the pack has been removed, the vagina should be dilated once or twice a day. This is usually done with vaginal dilators; however, if they are not available, a candle with a condom over it can be used. The patient is encouraged to insert the dilator into her vagina as far and firmly as possible (it will be uncomfortable) and hold it in place for 10 minutes and then gently remove it.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear. Assess for bowel movement, constipation and any symptoms and signs of a paralytic ileus.

Assessment of surgical outcomes: If a fistula was repaired: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- To maintain vaginal patency, continue to dilate the vagina once or twice a day for 10 minutes and/or engage in active sexual intercourse 3–4 months after reconstruction with grafts and pedicled flaps.
- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Vaginal Reconstruction

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology and need for vaginal reconstruction	Incomplete understanding of the pathology and need for vaginal reconstruction	Adequate understanding of the pathology and need for vaginal reconstruction	Good understanding of the pathology and need for vaginal reconstruction
12. Specific surgical steps for vaginal reconstruction	Very limited or incorrect knowledge of the specific surgical steps for vaginal reconstruction	Correct but incomplete knowledge of the specific surgical steps for vaginal reconstruction	Good knowledge of the specific surgical steps for vaginal reconstruction

13. Ability to divide the scar to create an appropriate rectovesical space for vaginal reconstruction	Required help to divide the vaginal scar and to avoid possible injury to the bladder or the rectum	Adequate division of the vaginal scar but needed assistance to avoid injury to the bladder or the rectum	Optimal, safely performed division of the vaginal scar
14. Consideration of the different options for reconstruction of the rectovesical space	Needed help to decide between the different options for reconstruction	Adequate consideration of the different options for reconstruction, but with some uncertainty	Considered different options for reconstruction and made a suitable choice
15. Harvest of adequate tissue to cover the rectovesical canal	Required help to harvest suitable tissue to cover the rectovesical canal	Adequate tissue harvested to cover the rectovesical canal, but needed some assistance	Adequate and healthy tissue harvested independently and well to cover the rectovesical canal
16. Fixture of mobilised tissue to cover the surfaces of the rectovesical space	Required significant guidance on correct fixture of the harvested tissue to cover the rectovesical space	Adequate fixture of the harvested tissue to cover the rectovesical space, with some assistance	Correct and independent fixture of the harvested tissue to cover the rectovesical space
17. Patency maintenance of the reconstructed vagina (vaginal packs, dilators)	Needed reminding to place vaginal dilators and/or plan for ongoing dilatation	Adequately placed vaginal dilators and/or planned for ongoing dilatation, but with some prompting	Placed vaginal dilators well during surgery and planned for ongoing dilatation without any help
18. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information

Complications			
19. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
20. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
21. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
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Module Logbook – Vaginal Reconstruction

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 12 Urethral Fistula and Reconstruction

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of urethral fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management of urethral reconstruction.
3. Reconstruct urethras and repair urethral defects.
4. Outline the main complications of urethral reconstruction and their management.

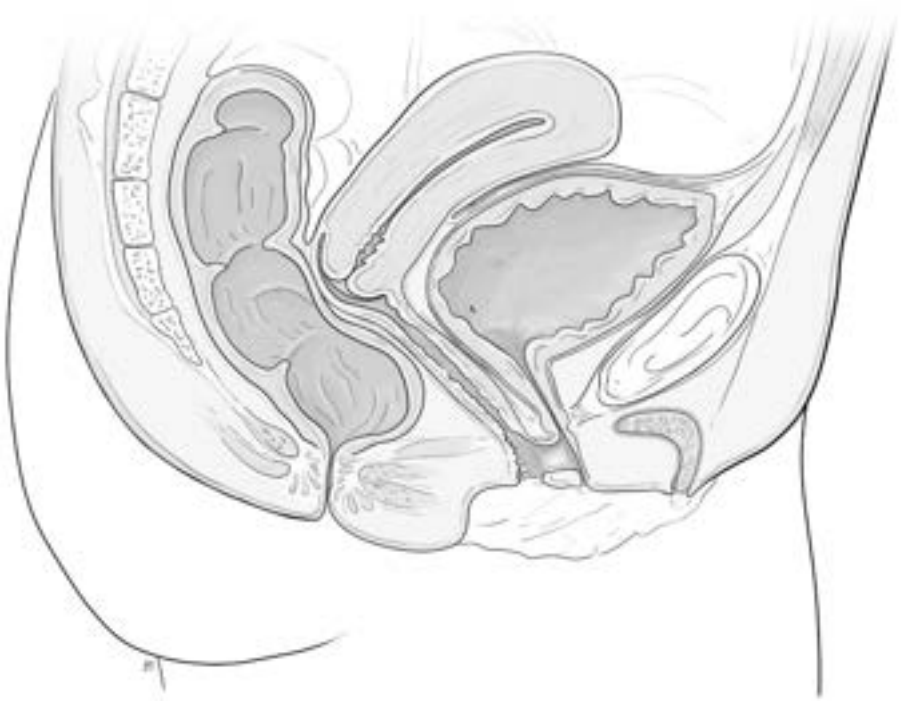

Figure 57. Cross-section showing a small distal urethral fistula.

In the past, up to 30% of fistula injuries also affected the urethra, and in up to 5% of cases there was a total loss of the urethra.[73] However, as the pattern of obstetric fistulas has changed, there are now fewer injuries of this type. Nevertheless, fistulas involving the urethra remain the most difficult to cure. It is relatively easy to achieve an anatomical closure of the fistula and reconstruction of a urethra, but if all the components of the continence mechanism have been destroyed, there is often little to no physiological function and the patient is left incontinent of urine.

[73] D. De Ridder, G.H. Badlani, A. Browning, *et al.* Fistulas in the Developing World. In: P. Abrams, L. Cardozo, S. Khoury, A. Wein, eds. *Incontinence*, 4th ed. Paris: Health Publications Ltd. UK (2009).

Urethral fistulas can be subdivided into two broad categories: those with circumferential loss of the urethra (almost all circumferential fistulas involve the urethra to some degree) and those with loss to the posterior urethra but with the anterior urethra intact.

Preoperative Assessment

History: Patients will have a history of long obstructed labour and urinary incontinence afterwards. It is rare, but sometimes urethral damage can occur when a traditional birth attendant cuts through the urethra in an attempt to do an episiotomy.

Diagnosis: Diagnosis can be done through history and examination. Upon inspection, with or without a speculum, the urethral damage can be easily identified. The defect can also be palpated vaginally, with the examining finger feeling the bone of the symphysis pubis where the urethra should be. If the patient has a circumferential fistula, there is often a urethral stricture at the distal end.

Planning and management: The patient should be nil by mouth from midnight the night before the surgery. Full bowel preparation is generally not needed for urinary tract fistula, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

The main aim of this vaginal surgery is to reconstruct the urethra or repair the urethral defect, to ensure the urethra has a normal length and width.

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
5. It is important to try to repair or reconstruct the urethra from remaining urethral tissue or bladder so that there is at least some muscle in the recreated urethra. In the case of a urethral fistula, it is helpful to repair it longitudinally if possible, to maintain the urethral length and width.
6. Where there is significant or complete urethral loss, a flap of anterior bladder can be developed, in the same way as the anterior bladder would be mobilised during a circumferential repair. This may not be possible if the bladder volume is small and a urethra may have to be created from vaginal tissue, but this tends not to work as well and is more likely to form strictures at a later stage.
7. When creating an anterior bladder flap urethra, mobilise the anterior bladder and advance it forward to the urethral remnant or, in the case of complete urethral loss, where the meatus

should lie. Suture the anterior bladder flap to the pubic bone in the midline and tubularise it over a Foley catheter.

8. Repair the remaining defect in the bladder.
9. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and exclude any additional fistulas. Leave the Foley catheter in situ to keep the bladder on free drainage.
10. The pubourethral ligament is reconstructed as an anti-incontinence mechanism, by using either a flap of pubococcygeal muscle or by harvesting fascia from the rectus sheath or fascia lata and creating a sling under the urethra to the anterior abdominal wall. There is weak evidence to suggest that using the fascial method at the initial operation leads to a higher breakdown of repair; therefore, this is more commonly used as a secondary procedure if the patient remains with ongoing incontinence after the initial repair and pubococcygeal sling.
11. Repair the vagina with no tension. This may require flaps. While repairing the vagina, perform a refixation of the pubocervical fascia to the arcus tendinous on both sides of the urethra. A 2-0 polyglycolic acid suture is most commonly used.
12. If present, suture the episiotomy and remove labial sutures.
13. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

If the fistula closure was not successful, advise on management and next steps as appropriate.

Critical Surgical Steps

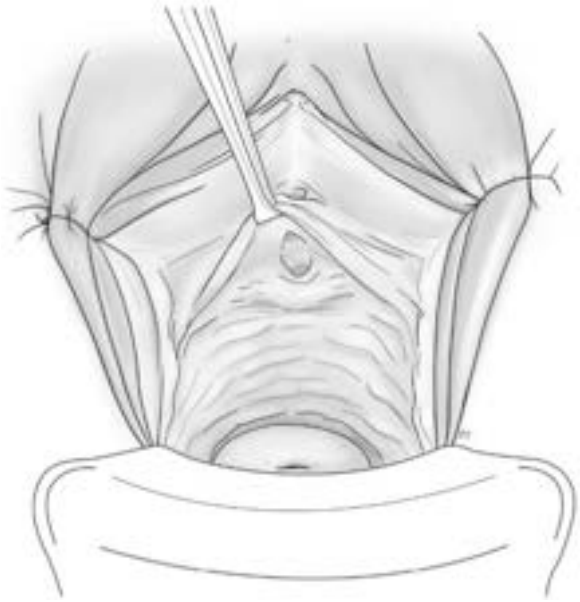

Figure 58. Small distal urethral fistula seen vaginally.

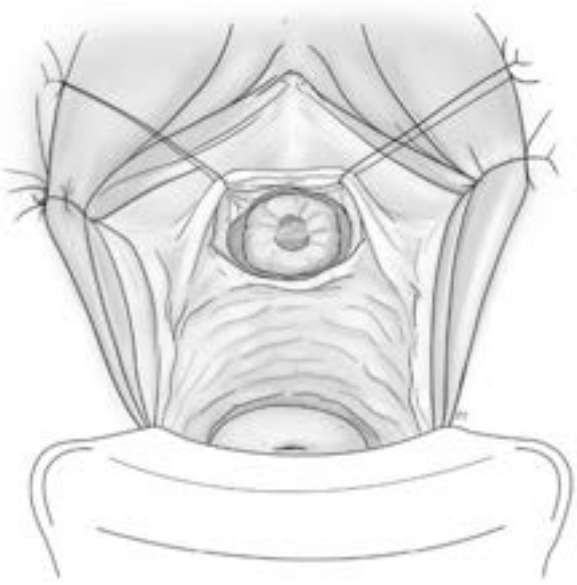

Figure 59. Carefully mobilise the vagina and urethra as the tissues can be very thin.

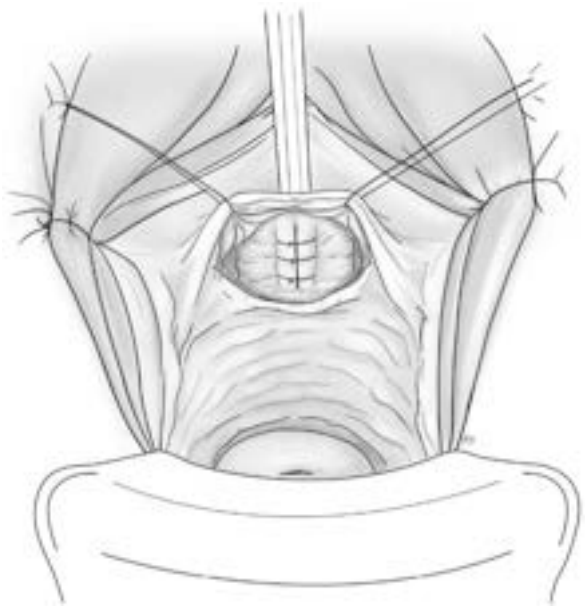

Figure 60. The fistula is repaired vertically over a Foley catheter to maintain the urethral length and width.

Complications

- Even after successful urethral repair, incontinence can be high,[74] and may continue in approximately 16%–49% of patients.[75]
- A residual fistula can persist.
- If flaps have been used, a breakdown can occur in a very small number of patients.
- Urethral strictures can develop in a small number of patients and should be checked for at follow-up appointments.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage for 7–10 days to allow sufficient time for the urethra to heal. As long as the bladder has not been impacted, the catheterisation period is slightly shorter for this type of fistula than the usual 10–14 days as it is not necessary to keep the bladder empty.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

[74] A. Browning. Risk Factors for Developing Residual Urinary Incontinence after Obstetric Fistula Repair. *BJOG* (2006).
[75] Waaldijk. The Immediate Management of Fresh Obstetric Fistulas.

Assessment of surgical outcomes: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.

If the urethral fistula and reconstruction were associated with ischaemic injury, as a result of an obstetric fistula, the following points should be included in the discharge advice:

- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Urethral Fistula and Reconstruction

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of urethral fistula	Adequate understanding of urethral fistula	Good understanding of urethral fistula
12. Specific surgical steps for repair of urethral fistula	Limited or incorrect knowledge of the specific surgical steps for repair of urethral fistula	Correct but incomplete knowledge of the specific surgical steps for repair of urethral fistula	Good knowledge of the specific surgical steps for repair of urethral fistula

13. Knowledge and choice of different surgical procedures to repair/reconstruct urethral lesion	Poor knowledge of surgical procedures to repair/reconstruct urethral lesion and made incorrect choice of procedure	Sufficient knowledge of surgical procedures to repair/reconstruct urethral lesion but made incorrect choice of procedure	Good knowledge of surgical procedures to repair/reconstruct urethral lesion and made correct choice of procedure
14. Understanding of the risk of ongoing incontinence	Limited understanding of the risk of ongoing incontinence	Partial understanding of the risk of ongoing incontinence	Complete understanding of the risk of ongoing incontinence
15. Execution of procedure and application of anti-incontinence mechanisms	Needed guidance to execute appropriate procedure and apply any anti-incontinence mechanisms	Adequately executed appropriate procedure and applied anti-incontinence mechanisms	Executed appropriate procedure and applied anti-incontinence mechanisms well
16. Consideration of possible use of vaginal flaps, if applicable	Needed prompting to consider the possible use of vaginal flaps	Considered the possible use of vaginal flaps, but needed some assistance	Independently considered the possible use of vaginal flaps
17. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
18. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for their management

Postoperative Management									
19. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned			Adequate postoperative management planned			Good postoperative management planned		
20. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes			Adequate knowledge of continence testing and assessment of outcomes			Good knowledge of continence testing and assessment of outcomes		

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
3.		
4.		
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6.		

Module Logbook – Urethral Fistula and Reconstruction

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 13 Ongoing Incontinence

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain possible causes for ongoing incontinence after fistula repair and how to reduce the risk of its occurrence.
2. Describe the preoperative assessment, surgical steps and postoperative management of ongoing incontinence.
3. Select and carry out appropriate surgical procedures to address ongoing incontinence.
4. Outline the main complications for treating ongoing incontinence and their management.

Figure 61. Cross-section showing a patient whose large fistula was closed successfully but who is still totally incontinent of urine through a wide, open urethra. Note the short anterior vaginal wall and cervix pulled down towards the introitus.

Despite a surgeon's best efforts, there are always patients who continue to have some degree of urinary incontinence despite successful fistula closure.

Factors that can lead to this are well known and include if the fistula:

- Involves the urethra (Goh type 2–4, Waaldjik type II).
- Is larger.
- Has more severe scarring.
- Has led to a reduction in bladder capacity.

There are steps that can be taken during the initial fistula closure to minimise the risk of ongoing incontinence:

- Maintain the normal length and width of the urethra.
- Support the urethra with a sling or perform refixation of the pubocervical fascia,[76] in cases where the fistula involves the urethra (Goh type 2–4 or Waaldijk type II).
- Repair the vagina without tension.

Despite carrying out these precautions, between 18%–33%[77] of patients will have some ongoing urinary incontinence postoperatively, depending on the type of fistula and methods of repair used by the surgeon. It is important to diagnose ongoing incontinence correctly. Possible causes include:

- Residual fistula.
- Stress incontinence, if fistula related, is usually due to an incompetent urethra with little to no physiological function.
- Overactive bladder.
- Combined stress incontinence and overactive bladder.
- Overflow incontinence occurs in 4%[78] of cases therefore it is crucial not to miss this.

It is important to be aware that for some patients stress incontinence resolves over time. It is common practice to teach the patient bladder training and/or pelvic floor exercises and wait for 4–6 months before attempting a second operation.

Preoperative Assessment

History: The patient will give a history of fistula and previous repair, but with ongoing postoperative urinary incontinence. The incontinence can vary from very mild (i.e. leaking when coughing or straining) to more severe (i.e. leaking when walking or even when sitting and/or lying). Indeed, it can be so severe that the patient feels as though the fistula is still present.

Diagnosis: Diagnosis can be made based on history and examination. If available, urodynamic tests can be especially helpful in determining the cause of the incontinence. Furthermore, it is important to ensure that the patient does not have a residual fistula by doing a dye test and always checking the residual urine volume. An operation for a patient with urinary retention with overflow will only make it worse. It is therefore necessary to perform a bedside cystometry to exclude overactive bladder, which in the first instance should be managed with bladder training and anticholinergics. Most patients will have stress incontinence, which can be clearly seen when examining the external urinary meatus, and

[76] R. Pope, P. Ganesh, J. Wilkinson. Pubococcygeal Sling versus Refixation of the Pubocervical Fascia in Vesicovaginal Fistula Repair: A Retrospective Review. *Obstet Gynecol Int* (2018).
[77] A. Browning. Prevention of Residual Urinary Incontinence Following Successful Repair of Obstetric Vesico-Vaginal Fistula Using a Fibro-Muscular Sling. *BJOG* (2004); Goh, *et al.* Predicting the Risk of Failure of Closure of Obstetric Fistula and Residual Urinary Incontinence Using a Classification System.
[78] M.P. Carey, J.T. Goh, M.M. Fynes, C.J. Murray. Stress Urinary Incontinence after Delayed Primary Closure of Genitourinary Fistula: A Technique for Surgical Management. *Am J Obstet Gynecol* (2002).

when asking the patient to cough a leak of urine will be visible (ensure the patient's bladder is not empty). A urinalysis should always be done to exclude a urinary tract infection.

Planning and management: Once the correct diagnosis for the cause of the ongoing incontinence has been made (i.e. a residual fistula, stress incontinence, overactive bladder, mixed incontinence or retention with overflow), the most suitable approach can be planned. The patient should be nil by mouth from midnight the night before the surgery. Full bowel preparation is generally not needed for ongoing incontinence, but the patient should be asked to evacuate her bowel just before going to theatre. However, this practice varies and depends on the individual preference of the surgeon. It is very helpful to perform a 1 hour pad test before and after the operation to get an objective measurement of any improvement.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

If an operation to treat ongoing incontinence is necessary, the principles of fistula repair apply:

1. Administer anaesthetic, as appropriate.
2. Administer suitable antibiotics, according to availability and preference of the surgeon. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After draping and preparing, measure the length of the urethra using a Foley catheter. Insert the Foley, inflate the balloon with 5 mL of fluid. Withdraw the Foley until the balloon is abutting the bladder neck. Pinch the catheter at the urinary meatus, deflate the balloon and withdraw the Foley, still holding it where you have pinched it at the meatus. Reinflate the balloon to see the length of the urethra.
5. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
6. If the urethra is short and/or wide, reconstruct the urethra to a normal length and width.[79] It is important to lengthen the urethra from the bladder and not the distal vagina and/or labia as this rarely, if ever, works.
7. Attempt to reconstruct the pubourethral ligament as an anti-incontinence mechanism by supporting the urethra with a sling of muscle or fascia.
8. Reconstruct the vagina in a way that reduces the risk of the urethra being pulled open by a tight/tense anterior vaginal wall, using a 2-0 polyglycolic acid suture.
9. If a Foley catheter has not already been inserted, insert it now and inflate the catheter balloon with 5 mL sterile fluid. Perform a routine dye test after repair to confirm successful closure and

[79] A. Browning. A New Technique for the Surgical Management of Urinary Incontinence after Obstetric Fistula Repair. *BJOG* (2006); K. Waaldijk. Obstetric Trauma Surgery Art and Science.

exclude any additional fistulas. Measure the length of the urethra again, as above, noting its new length. Replace the Foley catheter after measuring the urethra.

10. If present, suture the episiotomy and remove labial sutures.
11. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Following the principles above, a surgeon can aim for a cure rate of 70% and an improvement rate of 15%; however, the condition of some patients will remain unchanged.[80]

If the fistula closure was not successful, advise on management and next steps as appropriate. A repeat operation can help or, if this is not an option, a mechanical device such as a urethral plug or catheter and spigot released 5–6 times a day and changed monthly might bring improvement.

Critical Surgical Steps

Figure 62. The same clinical case as in Figure 61 seen vaginally. Note the retracted open urethral meatus and short, tight anterior vaginal wall with no rugae.

Figure 63. The anterior vagina was mobilised, pushing the uterus back to its normal position and the urethra has come forward. A flap should be used to fill the anterior vaginal gap and a sling of fascia to support the urethra.

[80] A. Browning. The Problem of Continuing Urinary Incontinence after Obstetric Vesicovaginal Surgery. RCOG International News (2012).

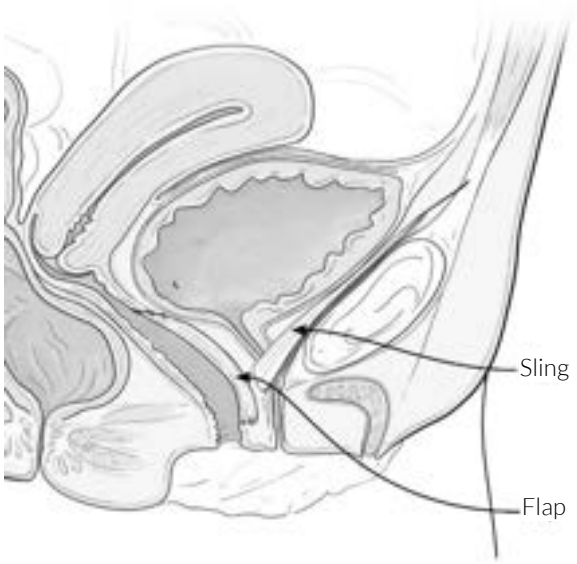

Figure 64. The anterior vagina was incised and mobilised enabling the urethra to advance forward and the uterus back. The urethra was reconstructed to achieve a normal length and width and supported with a sling. The gap in the vagina was filled with a flap.

Key learning resource: Andrew Browning Fistula Repair Series *Episode 4 Ongoing Incontinence After Fistula Repair*.

Complications

- Ongoing incontinence:
  - Always perform a dye test to check if a new fistula was created during the operation.
  - Always check the patient's residual bladder volume because some patients will develop urinary retention after a stress procedure.[81]
- Urethral stricture formation: although this is very rare with the techniques outlined above.
- If flaps and grafts are used to reconstruct the vagina, then sloughing of the flap and flap donor-site breakdown can occur in a very small number of patients. There is an increased risk of these complications if the vascular supply through the pedicle and tunnel is compromised.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage for 3–7 days.

[81] Browning. A New Technique for the Surgical Management of Urinary Incontinence after Obstetric Fistula Repair.

Diet: The patient can take a normal diet and should be encouraged to take sufficient fluids to ensure that her urine is clear.

Assessment of surgical outcomes: If a fistula was repaired: *See* 5.2. Assessment of Surgical Outcomes; page 227 and *see* 5.3. Physiotherapy for Ongoing Incontinence; page 231.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.

If the ongoing incontinence procedure was associated with ischaemic injury as a result of an obstetric fistula, the following points should be included in the discharge advice:

- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Ongoing Incontinence

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of ongoing incontinence	Adequate understanding of ongoing incontinence	Good understanding of ongoing incontinence
12. Specific surgical steps to treat ongoing incontinence	Limited or incorrect knowledge of the specific surgical steps to treat ongoing incontinence	Correct but incomplete knowledge of the specific surgical steps to treat ongoing incontinence	Good knowledge of the specific surgical steps to treat ongoing incontinence
13. Planning of appropriate procedure	Insufficiently planned the procedure	Planned the appropriate procedure adequately	Planned the appropriate procedure very well

14. Execution of procedure and application of anti-incontinence mechanisms, including slings	Required help to execute the appropriate procedure and apply anti-incontinence mechanisms	Executed the appropriate procedure, but needed help to apply anti-incontinence mechanisms adequately	Executed the appropriate procedure and applied anti-incontinence mechanisms well
15. Consideration of possible use of vaginal flaps, if applicable	Needed prompting to consider the possible use of vaginal flaps	Considered the possible use of vaginal flaps, but needed some assistance	Independently considered the possible use of vaginal flaps
16. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
17. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
18. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
19. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	Pass (Y/N)	Trainer signature and date
1.		
2.		
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Module Logbook – Ongoing Incontinence

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Level 3

Contents

Module 14 Urinary Diversion

Learning Objectives

At the end of this module, trainees should be able to:

1. Describe the reasons for considering a urinary diversion.
2. Explain the ethical concerns around urinary diversions in fistula patients, including indications, implications for the patient and viability of long-term management.
3. Describe the preoperative assessment, surgical steps and postoperative management of Mainz pouch II surgery.
4. Carry out Mainz pouch II surgery.
5. Outline the main complications of Mainz pouch II surgery and their management.

Unfortunately, some women have injuries associated with the obstetric fistula that are so severe that it is not possible to restore their continence with the surgical approaches covered in Levels 1 and 2. Most commonly, this applies to patients with complete destruction of the urethra, severe loss of bladder capacity and irreparable damage to the continence mechanism.[82]

Other causes that make repairing the injury virtually impossible include:

- Previous failed repair(s), in combination with a damaged urethra, a small bladder and severe fibrosis.
- Total incontinence following failed procedure(s) for stress incontinence.[83]

It is important that all of the following questions are answered before a diversion is performed:[84]

Are the injuries truly inoperable?

Only a very skilled, experienced fistula surgeon can make an informed judgement on whether the injuries are truly inoperable, or if a urinary diversion is necessary. Unfortunately, very few surgeons fall into this category. Therefore, many patients are not adequately assessed and undergo unnecessary urinary diversions when their obstetric fistula could have been cured and their continence restored by a more experienced surgeon.

Do patient and family fully understand the implications of a urinary diversion, including the possible benefits and risks?

It is important to remember that the patient and her family may have no prior knowledge of such procedures, perhaps making it difficult for them to understand the implications. Additional factors to take into consideration are the patient's cultural background and belief systems, which may be

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[82] Arrowsmith. Urinary Diversion in the Vesico-Vaginal Fistula Patient: General Considerations Regarding Feasibility, Safety, and Follow-Up.
[83] Hancock and Browning. *Practical Obstetric Fistula Surgery*.
[84] J. Wilkinson, R. Pope, T.J. Kammann, *et al.* The Ethical and Technical Aspects of Urinary Diversions in Low-Resource Settings: A Commentary. *BJOG* (2016); L.L. Wall, S.D. Arrowsmith, B.D. Hancock. Ethical Aspects of Urinary Diversion for Women with Irreparable Obstetric Fistulas in Developing Countries. *Int Urogynecol J Pelvic Floor Dysfunct* (2008); L.L. Wall. Ethical Issues in Vesico-Vaginal Fistula Care and Research. *Int J Gynecol Obstet* (2007).

different from the surgeon's. Hence it is crucial that patients receive specialist counselling, ideally in their own dialect, which should always include speaking to another woman who lives with a urinary diversion. It is imperative that enormous care is taken to counsel the patient and ensure that she understands the anatomy and functioning of the human body, what is involved in the operation and how the diversion will change her bodily functions, especially because a urinary diversion is irreversible. When considering the options, patients should always be reassured that they can also choose nonsurgical management of their continence problems, which may be more appropriate for them.

Only with a thorough understanding of the benefits and risks is the patient able to give informed consent, which, as with all procedures, must be obtained before surgery.

Are aftercare conditions sufficient to carry out this major surgery and ensure long-term patient safety and well-being?

To help make this decision, the following considerations require satisfactory solutions:

- Who will be responsible for long-term postoperative follow-up of the patient?
- Has the suitability of the patient's environment been taken into account? Ileal conduit patients require regular access to healthcare facilities and pharmaceutical services. If the needs of the patient have not been appropriately addressed, the patient may end up in a much more serious situation; for example, if there is a shortage of or even a lack of stoma bags available (if an ileal conduit is decided upon).
- How would patients who develop life-threatening complications be cared for if a surgeon is not available who is very experienced in the management of urinary diversions?

There are several types of urinary diversion, with each having its own benefits and risks. The patient's personal circumstances and local context should play a major role in offering the most appropriate operation. Although context specific, Mainz pouch II surgery is generally the most commonly used diversion operation in fistula patients. Alternative surgical options to the Mainz pouch II are the ileal conduit and the Mitrofanoff procedure.[85]

The Mainz pouch II operation diverts the urine into the large intestine. The procedure involves anastomosing the ureters to a pouch of sigmoid colon, with either a single or double loop of sigmoid used to make the pouch. This creates a low-pressure reservoir, thus decreasing the frequency of passing urine per the rectum and probably reducing the amount of reflux up the ureters and thus reducing the chance of ascending infections. It is important to note that ureterosigmoidostomies, where the ureters are directly implanted into the sigmoid colon, have been abandoned because of the high number of complications associated with the procedure (infections, renal failure and cancer). Although long-term follow-up is lacking in fistula patients who have undergone Mainz pouch II surgery, it is thought that these complications are less common.

[85] Hancock and Browning. *Practical Obstetric Fistula Surgery*.

Preoperative Assessment

History: The patient usually gives a history of obstetric fistula and many repair attempts but remains completely incontinent of urine.

Diagnosis: For the Mainz pouch II procedure, the patient:

- Must have an intact anal sphincter. To test the anal sphincter, place 200–300 mL of dilute blue dye into the patient's rectum via a Foley catheter, and ask her to walk around for 2–3 hours without emptying her bowel and while wearing a pad. If there is any leakage, then a Mainz II diversion is not suitable, as the patient will eventually become incontinent of urine and faeces.
- Must have well-functioning kidneys. Check for pre-existing renal impairment due to chronic ureteric obstruction. Because of the risk of acid-base disturbances, a raised creatinine or bilateral hydronephrosis would be a contraindication to a Mainz II diversion. Check the renal function, including kidneys and ureters, with an intravenous pyelogram or CT pyelogram, if available.
- Must be checked for HIV status as the procedure should be avoided if the patient is HIV positive and with low CD4 or high viral count.
- Must not have a rectovaginal fistula. Repeat the rectal dye test in theatre immediately before surgery.

Planning and management: It is essential to be sure that the patient and her attendant(s) understand exactly what is involved; that the procedure is irreversible; that after the operation, mixed urine and stool will pass through the anus; and that night-time incontinence may occur and worsen with advancing age, with increased risk of a shortened life span due to long-term complications. Preoperatively, all patients should have renal function tests and their blood group checked, and ideally one or two units should be available if needed. Prepare the entire bowel or alternatively irrigate the lower bowel with a soap and water enema. A wide rectal tube may be inserted to aid drainage (e.g. size 7 or 8 endotracheal tube) to allow irrigation through the tube if there is any remaining stool.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

The Mainz pouch II operation[86] can make the patient continent by day and at night, although some patients do experience night-time incontinence when the sphincter relaxes. Strict application of the anal sphincter test preoperatively, as described above, will help minimise this risk. The surgical principles for the Mainz pouch II are:

1. Administer a general anaesthetic.
2. Administer suitable antibiotics, according to availability and preference of the surgeon, which should include 500 mg metronidazole intravenously. These are usually given immediately preoperatively, at the same time as the anaesthetic.

[86] M. Fisch, R. Hohenfellner. Sigma-Rectum Pouch (Mainz Pouch II). *BJU Int* (2007).

3. After preparing and draping, insert a rectal tube through the anus or a large bore Foley catheter if no rectal tube is available.
4. Enter the abdomen and mobilise the sigmoid colon so that it can be lifted out of the abdomen.
5. Expose and identify the ureters.
6. Create a pouch using either a single or double loop of the sigmoid colon, suturing the posterior wall of the pouch first, leaving the anterior open to enable the ureters to be implanted.
7. Mobilise the ureters and draw both ureters into the pouch. The left ureter will need to be mobilised and passed medially through a window in the mesocolon of the sigmoid to make it reach to the new pouch. The right ureter only needs to be detached and mobilised from its drainage to the bladder in the single loop technique. In the double loop technique, it also needs to be passed through a mesocolonic window between the right and the middle loops of the pouch.
8. Catheterise the ureters after the implantation and thread the catheters down the rectal tube (or large bore Foley) and thus out through the anus. It is useful to secure the ureteric catheters to the mucosa of the pouch with a suture of 3-0 chromic gut or polyglycolic acid. Do not take a deep suture to the mucosa as the catheter will be removed at about 7–10 days. Make sure that the rectal tube is high enough to drain the pouch.
9. Close the pouch with a continuous suture reinforced by a second layer of interrupted sutures.
10. Wash, then close the abdomen, placing an abdominal drain as necessary.
11. Fix the rectal tube to the skin around the anus.

Critical Surgical Steps

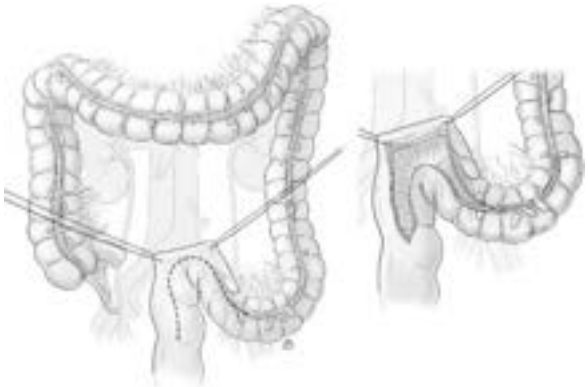

Figure 65. The single loop Mainz pouch II. The sigmoid is incised along the taenia coli.

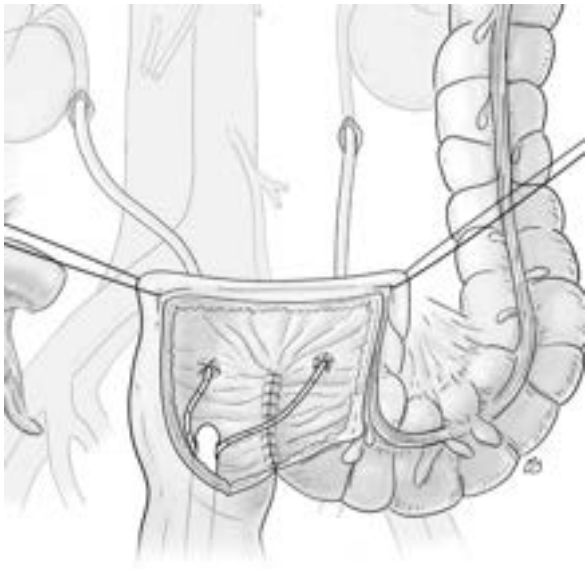

Figure 66. The posterior wall of the pouch is sutured in two layers and the ureters implanted directly left and right and catheterised. The ureteric catheters are then brought out through the rectal tube.

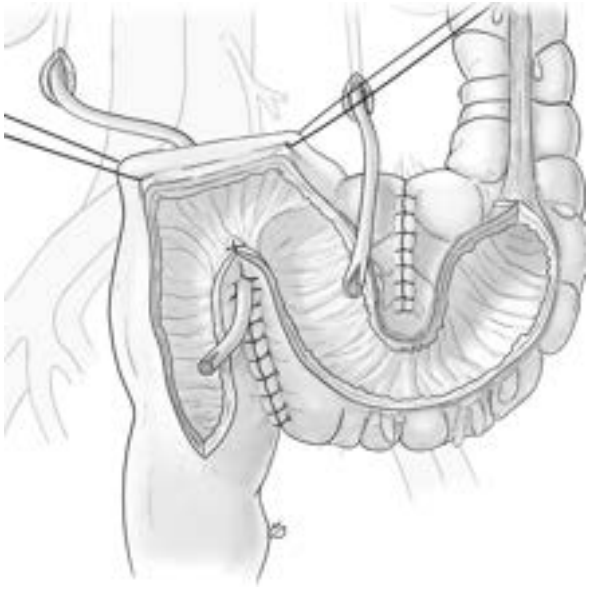

Figure 67. The double loop Mainz pouch II. A longer incision is made on the taenia coli and sutured in two separate places. The ureters are wrapped in a tunnel made along the suture line on the posterior of the pouch.

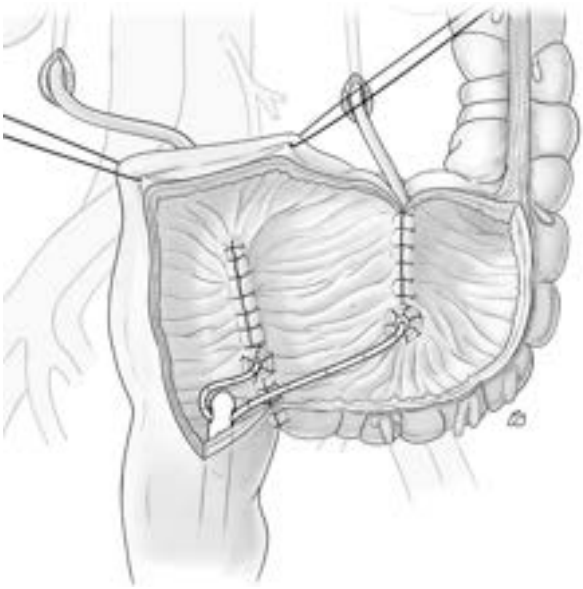

Figure 68. The ureters are now in place, wrapped in a tunnel created in the suture line. The ureteric catheters are drawn out of the anus via the rectal tube. The anterior pouch is now sutured in two layers.

Complications

- As this is major surgery there is a small but significant risk of immediate morbidity or mortality.
- Intraoperative bleeding is a risk; therefore, it is good to have prepared blood on standby.
- A urine leak intra-abdominally from the ureteric implantation site or pouch itself is one of the most severe early complications that will require a prompt reoperation.
- Postoperatively the patient may leak urine through her anus while she sleeps at night.[87] This is less if they have been assessed properly preoperatively but it can develop with advancing age. To reduce risk of night-time incontinence:
  - Patients can reduce fluid intake in the evening and/or void at night.
  - Tighten up the anal sphincter with a simple operation to plicate the sphincter, which may help for a few years.
  - Create a double loop pouch.
- Acid-base disturbances can occur because chloride and hydrogen ions that are normally excreted in the urine are now reabsorbed to some extent by the colonic mucosa. If renal function is normal, patients may not develop any problems. However, some will develop hyperchloraemic acidosis, which may be asymptomatic initially, but will ultimately lead to osteopaenia and renal failure. Pre-existing renal failure or repeated renal infection will expedite deterioration, which can be mitigated by taking regular sodium bicarbonate; therefore, early detection of electrolyte imbalance through

[87] M.A. Morgan, M.L. Polan, H.H. Melecot, B. Debru, A. Sleemi, A. Husain. Experience with a Low-Pressure Colonic Pouch (Mainz II) Urinary Diversion for Irreparable Vesicovaginal Fistula and Bladder Extrophy in East Africa. *Int Urogynecol J Pelvic Floor Dysfunct* (2009).

measurement of acid-base balance is important. Changes in sodium and potassium are late indicators of the problem. Patients should take 600 mg sodium bicarbonate twice daily or 2.5 mL each day dissolved in water and are advised to void regularly, even at night.[88]

- Renal infection caused by recurrent urinary infections and urosepsis is possible. Good surgical technique is critical when creating a low-pressure pouch as it minimises the risk of infection. Patients should be advised to always go to hospital if they become unwell.
- Obstructive nephropathy can develop if a stricture occurs at the site of implantation.
- Profound negative psychological impact on patients, especially if the procedure and its consequences were not fully understood prior to the operation, may require counselling.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: The ureteric catheters should remain in place for 7–10 days. The rectal tube is removed when the bowels are working.

Diet: The patient can have a very small volume of fluids on the first day followed by a fluid or light/soft diet for 4 days as clinically indicated. To prevent hypokalaemia, advise the patient to eat tomatoes and bananas regularly as they contain potassium.

Counselling: Already started preoperatively, regular counselling should continue postoperatively so that the patient, as well as her family and friends, have adequate support in getting used to living with the diversion. The ideal set-up is to establish a dedicated care unit for all diversions. Counselling should ideally take place with a trained professional such as a nurse in a separate private space so that the patient feels safe and comfortable to ask questions.

Assessment of surgical outcomes: In the case of a urinary diversion, it is important to check:

- How often the patient passes stool/urine per 24 hours.
- If she passes stool/urine at night.
- If she soils the bed at night and, if so, advise as appropriate.
- That she takes sodium/potassium citrate or sodium bicarbonate daily.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

Due to the long-term risks and complications associated with the Mainz pouch II operation, patients should be followed up closely, at regular intervals and over the long-term, checking for any complications, including renal and electrolyte imbalances.

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[88] Hancock and Browning. *Practical Obstetric Fistula Surgery*; Morgan, *et al.* Experience with a Low-Pressure Colonic Pouch (Mainz II) Urinary Diversion for Irreparable Vesicovaginal Fistula and Bladder Extrophy in East Africa.

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- After a urinary diversion, it is extremely important for the patient to attend postoperative appointments, returning at least annually for renal function tests and an ultrasound of the renal tract.
- The patient should be asked to return at any time if she has any problems or concerns.
- If there are signs of acidosis the patient should take 600 mg sodium bicarbonate twice daily or 2.5 mL each day dissolved in water. The patient should also be advised to eat tomatoes and bananas regularly.
- The patient should be well-informed about the risk of night-time anal incontinence as she ages and instructed on how to manage it and encouraged to return for further help as required.

It is almost inevitable that a urinary diversion will have been performed because of extensive necrotic injury, as the result of an obstetric fistula. The following critical points should therefore be included in the discharge advice:

- To continue pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Urinary Diversion

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable preoperative preparation	Correct diagnosis with suitable preoperative preparation, but with some mistakes	Correct diagnosis with suitable preoperative preparation
2. Consent	Obtained consent after prompting	Obtained consent adequately	Obtained consent appropriately
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Consideration of patient suitability for urinary diversion	Needed help to adequately consider the suitability of the patient	Considered the suitability of the patient but needed prompting to make the correct decision	Considered the suitability of the patient thoroughly and came to an appropriate decision
12. Investigations and workup	Needed considerable guidance to carry out investigations and workup, as well as to interpret results	Sufficient investigations and workup, but required help interpreting results	Good investigations and workup and accurate interpretation of results

13. Counselling of patient, and attendant(s) if applicable, on the specific procedure and consequences	Needed assistance to adequately counsel the patient and attendant(s) on the specific procedure and consequences	Satisfactorily counselled the patient and attendant(s) on the specific procedure and consequences	Thoroughly counselled the patient and attendant(s) on the specific procedure and consequences
14. Consideration of options for diversions	Needed help to fully consider the options and make a suitable decision	Considered options but needed some guidance to make a decision	Considered options well and made a suitable decision independently
15. Specific surgical steps for Mainz pouch II	Limited or incorrect knowledge of the specific surgical steps for Mainz pouch II	Correct but incomplete knowledge of the specific surgical steps for Mainz pouch II	Good knowledge of the specific surgical steps for Mainz pouch II
16. Exposure and identification of the ureters	Needed guidance to expose and identify the ureters	Adequately exposed and identified the ureters	Exposed and identified the ureters well
17. Mobilisation of the sigmoid colon and construction of pouch	Required help to mobilise the sigmoid colon and construct the pouch	Mobilised the sigmoid colon and constructed the pouch, but required some prompting	Mobilised the sigmoid colon and constructed the pouch independently and well
18. Mobilisation of the ureters	Needed help to mobilise the ureters	Adequately mobilised the ureters	Mobilised the ureters well
19. Implantation of the ureters	Needed considerable prompting and/or help to implant the ureters	Implanted the ureters, but needed some help	Implanted the ureters independently and well

20. Closure and drainage of pouch	Required help to close and drain pouch	Adequately closed and drained pouch	Closed and drained pouch well
21. Closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well
22. Planning of postoperative clinical, dietary, psychological follow-up for diversion	Needed considerable help to plan postoperative clinical, dietary, psychological follow-up for diversion	Adequate planning of clinical, dietary, psychological follow-up for diversion	Good planning of clinical, dietary, psychological follow-up for diversion
23. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
24. Understanding of potential short-term complications, including how to identify and manage them	Limited understanding of short-term complications and/or unclear of their management	Adequate understanding of short-term complications and plans for their management	Good understanding of short-term complications, with clear plans for management
25. Understanding of potential long-term complications, including anal incontinence and acid-base imbalance	Limited understanding of long-term complications and/or unclear of their management	Adequate understanding of long-term complications and plans for their management	Good understanding of long-term complications, with clear plans for management
Postoperative Management			
26. Planning of postoperative management, including diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned

27. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
3.		
4.		
5.		
6.		

Module Logbook – Urinary Diversion

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 15 Colonic Neovagina

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the symptoms of severe vaginal stenosis.
2. Describe the preoperative assessment, surgical steps and postoperative management of colonic neovagina surgery.
3. Construct colonic neovaginas.
4. Outline the main complications of colonic neovagina surgery.

Figure 69. Cross-section showing severe vaginal stenosis, haematocolpos and haematometra. Some degree of cervical tissue loss is possible.

This module is similar to Level 2 Module 11 Vaginal Reconstruction (*see* page 140) as the presentation and history are much the same. However, this module describes a more complex surgical procedure, whereby the neovagina is created from sigmoid colon. There are other approaches, for example using the ileum, but the sigmoid is more accessible and its mesentery enables it to be readily rotated on its blood supply.

Preoperative Assessment

History: Patients will typically report apareunia or severe dyspareunia after undergoing surgical treatment for obstetric fistula. Vaginal stenosis can be a cause of haematocolpos and haematometra, and patients can report cyclical pain and amenorrhoea as the menses cannot drain away. Furthermore, hypomenorrhoea and pelvic pain can also be associated with vaginal stenosis (e.g. as part of the extensive pelvic infection, subsequent secondary healing following obstructed labour and the

potential development of Asherman's syndrome). Vaginal stenosis can also contribute to secondary infertility and the urethral incontinence seen in obstetric fistula patients. It is important to be aware that some patients are more concerned about their inability to engage in penetrative sexual intercourse than their severe incontinence, as this can be a socially significant determinant in the patient's quality of life. As well as restoring a patient's continence, surgeons should, as far as possible, respect a patient's sexual and reproductive rights by also trying to restore their ability to engage in penetrative sexual intercourse, which in many contexts will play a major role in maintaining the marriage and reducing risk of future rejection.

Diagnosis: Diagnosis can easily be made from vaginal examination and history of apareunia or dyspareunia due to vaginal obstruction. At this stage, if possible, it is also advisable to check for the presence of the uterus using ultrasound. In most cases, some or all of the cervix is lost due to ischaemic injury during difficult labour. Removal of scar tissue during the repair can further compromise the volume of remaining cervical tissue. It is therefore particularly important that the surgeon makes every effort to preserve normal tissue.

Planning and management: It is essential that the patient is carefully counselled about the operation. Fertility prospects should also be discussed honestly. Having a neovagina is not an assurance that the patient can conceive in the future and this should be communicated very clearly to her. As this is major surgery, preoperatively for all patients check haemoglobin, blood group and cross matching. It is good to be cautious and have some cross-matched blood ready. The bowel should be prepared appropriately, according to the preference of the surgeon, to ensure that the patient has an empty bowel before the operation. Usually this will include a fluid diet and enemas morning and night on the day before surgery, and then nil by mouth from midnight the night before the surgery.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

For pedicled intestinal neovagina (sigmoid) surgery, both abdominal and vaginal access is required during the operation, always simultaneously.

1. Administer a general anaesthetic.
2. Administer suitable antibiotics, according to availability and preference of the surgeon, which should include a broad-spectrum antibiotic and 500 mg metronidazole intravenously. These are usually given immediately preoperatively, at the same time as the anaesthetic.
3. Position the patient with legs in stirrups to enable access to the vagina and abdomen.
4. Prepare and drape the patient.
5. Insert a Foley catheter and leave it on free drainage. Keeping the urinary bladder empty gives the surgeon more space to operate in the pelvis and helps reduce the risk of bladder injury.
6. Start developing the area between the rectum and bladder (the 'rectovesical space') to create an appropriate space for the neovagina. This is done vaginally.
7. Via the abdominal approach, identify, isolate and mobilise the required length of sigmoid on its vascular pedicle, making sure to identify the major vessels. Some of the descending colon might need to be mobilised to get the length.

8. After resection of a portion of sigmoid (still attached to its mesentery), anastomose the proximal and distal portion of the sigmoid end to end, making sure it is lateral to the mobilised neovagina segment.
9. Rotate the portion of sigmoid 180 degrees to lay the sigmoid neovaginal bowel pieces in place with no tension that can compromise its blood supply. The proximal end of the sigmoid neovagina is blinded in the absence of a uterus and suspended to the inferior longitudinal spinal ligament at the level of the sacral promontory or to the uterosacral ligaments bilaterally if they can be identified. In the presence of the uterus, it is technically much easier to secure the cervix to the (what was) distal end of the sigmoid that has now been rotated 180 degrees so that it sits proximally.
10. Then pass the 'distal' end to the perineum. Always maintain the mesenteric side of the sigmoid bowel piece as the anterior vaginal wall and the antimesenteric side of the sigmoid bowel piece as the posterior wall of the neovagina.
11. The mobilised distal end of the sigmoid piece is brought down to the perineum with no tension to perform coloperineal skin approximation.
12. Wash the peritoneal cavity with warm saline and close the abdomen, placing a drain, as necessary.

Critical Surgical Steps

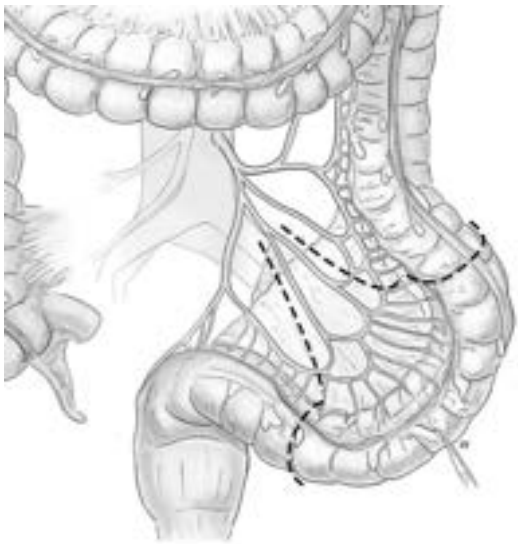

Figure 70. A segment of sigmoid is excised, keeping it on its mesenteric blood supply.

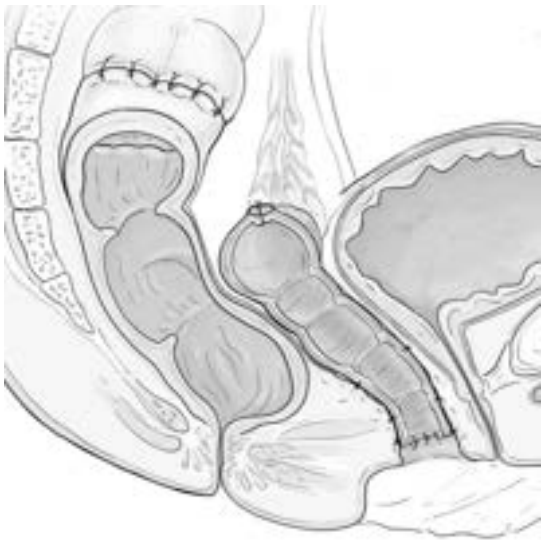

Figure 71. The sigmoid neovaginal pedicle is introduced into the space developed between the bladder and the rectum, and the sigmoid is closed with an end-to-end anastomosis. In the absence of the uterus and cervix, the proximal stump is closed, and the other side fixed to vaginal introitus.

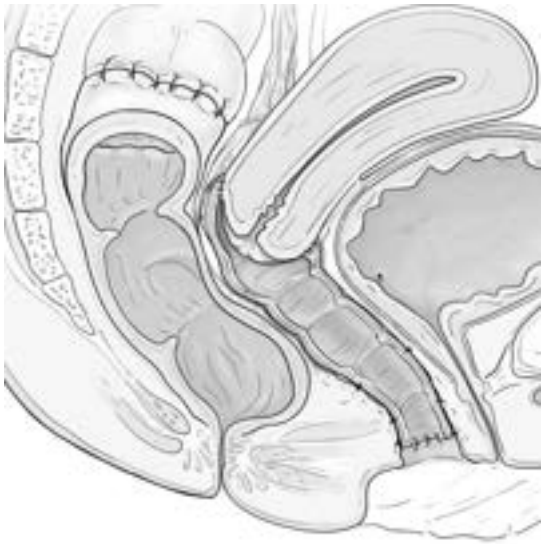

Figure 72. The sigmoid neovaginal pedicle is introduced into the space developed between the bladder and the rectum, and the sigmoid is closed with an end-to-end anastomosis. In the presence of the uterus and cervix, the sigmoid pedicle is attached to the cervical/uterine tissue, and the other side fixed to vaginal introitus.

Complications

- As this is major surgery, there is a small but significant risk of immediate morbidity or mortality. The patient needs to be counselled carefully about the risks.
- There is a risk of intraoperative and immediate postoperative bleeding, so it is good to have some blood on standby.
- In the short term there is a risk of an anastomotic leak from the sigmoid colon.
- The sigmoid neovagina can slough.
- Over the longer term the presence of mucous bowel secretion can be a concern for weeks to months after the procedure.
- Introital stenosis and colonic mucosal prolapse can occur.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage and can be removed when the patient is mobile, usually the next day.

Diet: The patient can take a normal diet as clinically indicated after bowel surgery and should be encouraged to take sufficient fluids to ensure that her urine is clear. Assess for bowel movement and any symptoms or signs of paralytic ileus.

Assessment of surgical outcomes: If a fistula was repaired: *See* 5.2. Assessment of Surgical Outcomes; page 227.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- 3 to 4 months after surgery, it is advisable to assess the patient before she resumes intercourse. Active sexual intercourse is then important to maintain vaginal patency. Once intercourse has resumed, ask about reproductive/sexual health at follow-ups.

If the colonic neovagina procedure was associated (as is very likely) with ischaemic injury, as a result of an obstetric fistula, the following points should be included in the discharge advice:

- To continue bladder training and pelvic floor exercises as instructed, and motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Colonic Neovagina

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding of the indications for colonic neovagina	Incomplete understanding of the indications for colonic neovagina	Adequate understanding of the indications for colonic neovagina	Good understanding of the indications for colonic neovagina
12. Specific surgical steps to construct a colonic neovagina	Limited or incorrect knowledge of the specific surgical steps to construct a colonic neovagina	Correct but incomplete knowledge of the specific surgical steps to construct a colonic neovagina	Good knowledge of the specific surgical steps to construct a colonic neovagina

13. Ability to divide the vaginal scar to create an appropriate rectovesical space for the neovagina	Required help to divide the vaginal scar and to avoid possible injury to the bladder or the rectum	Satisfactorily divided the vaginal scar but required assistance to avoid injury	Successfully divided the vaginal scar, with no injury to the bladder or rectum
14. Identification and mobilisation of the sigmoid and descending colon	Required help to identify and mobilise the sigmoid and descending colon	Satisfactorily identified and mobilised the sigmoid and descending colon, but required some help	Identified and mobilised the sigmoid and descending colon well
15. Identification of the inferior mesenteric, left colic and superior haemorrhoidal arteries supplying the sigmoid colon	Required guidance to identify the inferior mesenteric, left colic and superior haemorrhoidal arteries supplying the sigmoid colon	Adequately identified the inferior mesenteric, left colic and superior haemorrhoidal arteries supplying the sigmoid colon	Properly identified the inferior mesenteric, left colic and superior haemorrhoidal arteries supplying the sigmoid colon
16. Isolation of the sigmoid loop for neovagina and rotation into ante peristaltic position	Required help to isolate sigmoid loop for neovagina, with blood supply, and rotated into ante peristaltic position	Adequately isolated suitable sigmoid loop for neovagina, with good blood supply, and rotated into ante peristaltic position	Isolated suitable sigmoid loop for neovagina, with good blood supply, and rotated into ante peristaltic position very well
17. End-to-end colonic anastomosis lateral to the neovagina segment	Needed assistance to anastomose the bowel	Adequately anastomosed the bowel	Anastomosed the bowel well

18. Placement of sutures proximally between the colonic wall and cervix (or, if no uterus identified, close this end and suspend it to uterosacral ligaments) and suturing the distal end of the colonic neovagina to the introitus	Required prompting to place sutures appropriately on both ends of the sigmoid neovagina and, if cervix present, to maintain drainage of the cervix	Adequately placed sutures on both ends of the neovagina and, if cervix present, maintained drainage of the cervix	Placed sutures suitably and well on both ends of the colonic neovagina and, if cervix present, maintained drainage of the cervix
19. Suspension to the anterior longitudinal spinal ligament at the level of the promontory	Required help to suspend to the anterior longitudinal spinal ligament at the level of the promontory	Adequately suspended to the anterior longitudinal spinal ligament at the level of the promontory	Suspended to the anterior longitudinal spinal ligament at the level of the promontory well
20. Closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well
21. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
22. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
23. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned

24. Knowledge of assessment of outcomes	Limited knowledge of assessment of outcomes	Adequate knowledge of assessment of outcomes	Good knowledge of assessment of outcomes

Comments per PBA	**Pass (Y/N)**	**Trainer signature and date**
1.		
2.		
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Module Logbook – Colonic Neovagina

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 16 Circumferential/Stenosed Rectovaginal Fistula

Learning Objectives

At the end of this module, trainees should be able to:

1. Explain the features of circumferential/stenosed rectovaginal fistulas.
2. Describe the preoperative assessment, surgical steps and postoperative management for circumferential/stenosed rectovaginal fistulas.
3. Repair circumferential/stenosed rectovaginal fistulas.
4. Outline the main complications of circumferential/stenosed rectovaginal fistula surgery and their management.

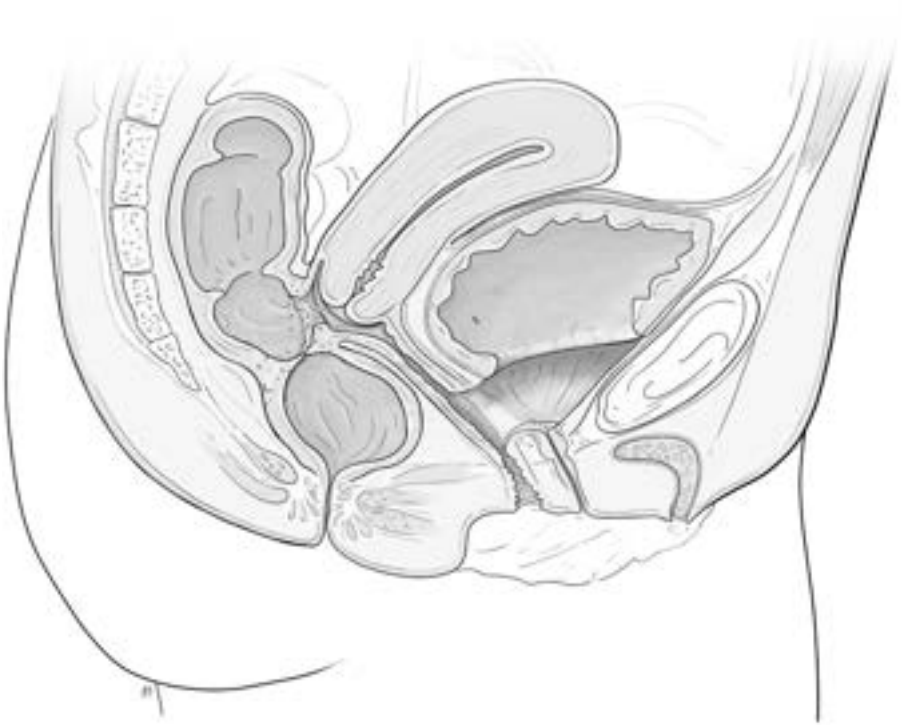

Figure 73. Cross-section of a circumferential/stenosed rectovaginal fistula. The distal rectum and anus are cut off from the proximal rectum and sigmoid by scar tissue. A circumferential vesicovaginal fistula is also present.

High, scarred rectovaginal fistula and circumferential rectovaginal fistula (which are usually high and scarred) are difficult to repair, although the prognosis is usually good. These types of fistula almost always occur with a difficult, circumferential vesicovaginal fistula. The operation can be extensive and some surgeons like to do the procedures in stages, whereby the rectovaginal fistula is repaired first and then the vesicovaginal fistula is repaired later once the patient has recovered.

Preoperative Assessment

History: As with Level 2 Module 6 (*see* page 80), high, scarred and circumferential rectovaginal fistulas are usually the result of a longer obstructed labour. Labours causing significant rectovaginal

fistulas tend to be at least 1 day longer than those causing a vesicovaginal fistula alone. Patients have almost always delivered a stillborn child. Ask about and examine for urinary incontinence as vesicovaginal fistulas are usually concurrent, therefore the patient will have leakage from the vagina of both urine and faeces. In addition, ask and examine for nerve injuries to the lower limbs as foot drop occurs more frequently with these types of rectovaginal fistulas.

Diagnosis: Diagnosis is made by taking a history, plus a vaginal and rectal examination. It is important to note if a rectal stricture is present, usually at the proximal edge of the fistula. In addition, check the patency and function of the anal sphincter as a tear through the sphincter may have occurred during the delivery. Also check for the anal reflex and tone.

Planning and management: Many surgeons would consider a diverting colostomy here, the easiest being the loop sigmoid colostomy. It is vital that the patient is properly counselled about the operation, its consequences and risks; it is also advisable, if possible, that she is offered the opportunity to talk to another patient who has had the surgery. If the surgery is abdominovaginal, also discuss the possibility of a tubal ligation or hysterectomy with the patient if she does not want more children. This might be needed if the uterus and rectum, and even sigmoid, are stuck firmly in the pelvis, making access impossible without first removing the uterus. It is recommended to check the patient's blood group and have blood prepared, as many patients are anaemic. As patients can be malnourished, they may need nutritional supplementation and if there is nerve injury and/or foot drop, they may well need additional help with mobilisation and motor rehabilitation. If the patient is not having a diverting colostomy, the bowel should be prepared appropriately, according to the preference of the surgeon, to ensure that the patient has an empty bowel before the operation. Usually this will include a fluid diet and enemas morning and night on the day before surgery. If the patient has a concurrent vesicovaginal fistula, treatment might be staged, in which case, once the rectovaginal fistula has healed and the colostomy has been closed (4–6 weeks after the initial surgery), the patient can return for the vesicovaginal fistula repair.

For further information, *see* 2. Preoperative Clinical Management; page 12

Surgery

The surgical principles are similar to all fistula procedures, but these often need extra care with exposure. Most surgeons will repair these injuries from the vaginal route, but sometimes a combined vaginal and abdominal approach is used.

To close a high, scarred and circumferential rectovaginal fistula, advancement flaps are usually used to close the injury. However, because not many of the flaps have a blood supply, there is a limit to the size and number of flaps that can be taken from one site before the blood supply to the distal edge of the flap is compromised. This can lead to necrosis along the flap edge and a subsequent repair breakdown.

Vaginal approach

1. Administer anaesthetic, as appropriate.
2. Administer suitable perioperative antibiotics, which should include 500 mg metronidazole intravenously as well as a usual prophylactic antibiotic, according to local availability and preference of the surgeon.
3. Position the patient in the exaggerated lithotomy position with her buttocks considerably over the edge of the operating table and in a steep Trendelenburg position.
4. After preparing and draping, a generous episiotomy may help greatly with exposure. Hydrodissection (either sterile saline or a mix of lignocaine and adrenaline) is carried out by some but not all surgeons. If it is done correctly, it will open the planes for easier dissection and, if adrenaline is used, also reduce blood loss. It is important to infiltrate in the right plane: do not blindly instil saline in all the tissues in the operating field and in incorrect planes.
5. Use the flap-splitting method to create adequate mobility of the rectum, and sometimes sigmoid and anus. Some scar tissue may need to be excised.
6. If the defect is circumferential, the mobilisation of the bowel needs to be fully circumferential and the sigmoid advanced to the proximal part of the distal rectum. Usually mobilising the defect in this way will excise a stricture.
7. Perform tension-free closure of the bowel with interrupted sutures using 2-0 polyglycolic acid and excluding the mucosa. Usually two layers to the muscularis, but only one layer is possible on the posterior sigmoid/rectum anastomosis in the case of a circumferential defect. Care should be taken not to recreate a stricture during the repair, making sure the anastomosis is done in the correct orientation and not restricting the lumen. This is done most safely by first anastomosing the posterior wall of the bowel in the midline, then continue the anastomosis in a step-wise fashion, taking a suture either side of the one in the midline and slowly coming to the anterior bowel and eventually meeting in the midline. Do the second layer where possible.
8. The peritoneal cavity is often opened during the procedure, but it is vitally important to try to prevent blood, urine and possibly faeces (if a temporary colostomy has not been performed) from draining into the peritoneal cavity. Some surgeons suture the peritoneum, whereas others insert a pack into the peritoneal cavity, leaving a long 'tail' on the pack to prevent losing it. Great care should be taken when doing this.
9. Repair the vaginal side tension free; a 2-0 polyglycolic acid suture is most commonly used. Flaps may be needed if there has been considerable vaginal tissue loss.
10. Always check that the anal sphincter is intact.
11. Insert a Foley catheter to keep the bladder on free drainage.
12. If present, suture the episiotomy and remove labial stay sutures.
13. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Steps

Figure 74. The two ends of the rectum have been mobilised and scar excised. Note the concurrent vesicovaginal fistula.

Figure 75. The posterior wall of the rectum is anastomosed first, suturing the muscularis excluding the mucosa.

Abdominovaginal approach

If the bowel distal to the fistula is at least 10 cm deep and the fistula cannot be repaired vaginally, perform a laparotomy. Push a rectal tube up as high as possible through the anus to help find the distal loop.

1. Administer anaesthetic, as appropriate.
2. Administer suitable perioperative antibiotics, which should include 500 mg metronidazole intravenously as well as a usual prophylactic antibiotic, according to local availability and preference of the surgeon.
3. Position the patient in the supine position.
4. After preparing and draping, perform a midline laparotomy.
5. Pull the uterus up and distal after placing a stay suture through the fundus. There might be firm adhesions in the rectouterine pouch.
6. Make a transverse incision in the peritoneal fold and dissect between the rectum and the cervix. Identify the left ureter. If the rectal tube can be felt, it will be easier to continue sharp dissection. Perform a careful bilateral dissection of the rectum.
7. Make a transverse incision over the tube in the distal loop. The rectum is now open as well as the top of the vagina anterior to the rectum.
8. Excise scar as needed and free both ends of the rectum.
9. Dissect the distal loop further off the vagina over at least 1 cm.

10. Start the anastomosis by placing two stay sutures (2-0 polyglycolic acid) submucosal from proximal to distal at 3 and 9 o'clock. Do not tie them.
11. Now place all sutures with good submucosal bites in between for the posterior part of the anastomosis and then tie them. Do the same for the anterior wall of the sigmoid and rectum and then tie them.
12. Do a second layer of inverting sutures and feel if the anastomosis is wide enough for the faeces to pass.
13. Rinse the peritoneal cavity with warm saline before closure.
14. If the rectal stump is too deep and it is not possible to dissect it, do a pull through. Place two stay sutures through the proximal loop on both sides and push them through the distal loop. The sigmoid might have to be mobilised first, even beyond the splenic flexure.
15. Close the peritoneal cavity above the anastomosis and approximate the posterior vaginal wall.
16. Repair the vaginal side tension free; a 2-0 polyglycolic acid suture is most commonly used. Flaps may be needed if there has been considerable vaginal tissue loss.
17. Before closing the abdomen, consider performing a defunctioning colostomy.
18. Repair the abdomen and place a drain as necessary.
19. Always check that the anal sphincter is intact.
20. Insert a Foley catheter to keep the bladder on free drainage.
21. Insert a sterile vaginal pack to reduce the risk of bleeding and haematoma formation and remove the next day. The pack is usually made of gauze and soaked in iodine or petroleum jelly. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Critical Surgical Step

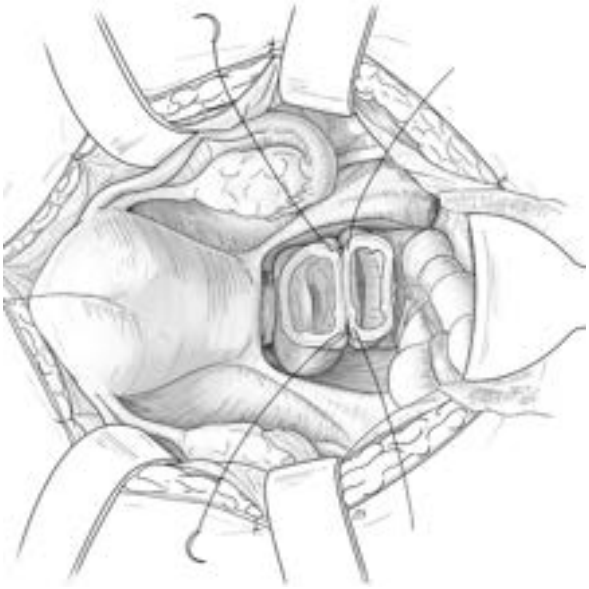

Figure 76. View at laparotomy. The proximal and distal ends of the rectum/sigmoid are mobilised. The posterior wall of the bowel anastomosis is repaired first.

Complications

- Bleeding and infections.
- Breakdown of the procedure.
- Rectal stricture.
- If the peritoneal cavity was opened and contents washed into the peritoneum the patient could develop a paralytic ileus as well as peritonitis.

For further information, *see* 4. Complications of Fistula Surgery; page 221

Postoperative Management

Catheterisation: Postoperatively, the Foley catheter should remain in place on free drainage. If the patient has had a concurrent vesicovaginal fistula repaired, the catheter should be left in place for 10–14 days, as per the vesicovaginal fistula protocol. If the patient has a rectovaginal fistula in isolation, then the Foley catheter can be removed when the patient is mobile and the pack has been taken out, usually the next day.

Diet: If the patient has a colostomy there is no reason to delay the introduction of diet.

If the patient does not have a colostomy it is important that the patient does not become constipated to avoid straining to push hard stool past the repair, risking damage to the healing tissues and a potential breakdown. After the operation, the patient should have intravenous rehydration until she is drinking. A light diet can be started the next day and continued for 6–7 days before reintroducing a normal diet. To ensure that the patient does not become constipated, a laxative (bisacodyl) should be prescribed on the commencement of the light diet and this should be continued for about 1 week. The laxative should be stopped if the stool becomes too fluid.

Assessment of surgical outcomes: The patient should be asked about and examined for any bowel incontinence. If in doubt, a rectal dye test should be performed (*see* Dye Test for Rectovaginal Fistula; page 16).

Closure of colostomy: If the patient has a colostomy, it is recommended to close the colostomy at 6 weeks, after making sure that the rectovaginal fistula has been successfully repaired. Do not close the colostomy if the rectovaginal fistula is still present.

For further information, *see* 5. Postoperative Care; page 226

Specific Discharge Advice

The following specific advice should be communicated to the patient (and her attendant(s) as appropriate) prior to discharge:

- The importance of attending postoperative follow-up appointments.
- If the patient is going home with a colostomy then she should be taught how to change colostomy bags and a sufficient supply of bags must be provided.

- To ensure a high-fibre diet to avoid constipation and straining to push hard stool past the repair. This is particularly important while the tissues heal in the first 3 months after the operation. If necessary, to take a laxative (bisacodyl) as prescribed. Note that this advice may need to be adjusted for patients with ongoing faecal incontinence.

It is almost inevitable that a circumferential/stenosed rectovaginal fistula procedure will have been performed because of extensive necrotic injury, as the result of an obstetric fistula. The following critical points should therefore be included in the discharge advice:

- To continue bladder training and pelvic floor exercises as instructed, and also motor rehabilitation exercises if foot drop is still present.
- To ensure delivery by elective caesarean section in all subsequent pregnancies (if the patient has not had a hysterectomy or is not postmenopausal).

For further information, *see* 5.4. Predischarge Advice; page 233

Performance-Based Assessment – Circumferential/Stenosed Rectovaginal Fistula

The Performance-Based Assessment is used for each module to assess trainees' skills and progress. It must be **completed, signed and dated by the trainer**.

	Unsatisfactory	Satisfactory	Good
General			
1. Planning and preparation	Incorrect diagnosis with unsuitable investigations and preoperative preparation	Correct diagnosis with suitable investigations and preoperative preparation, but with some mistakes	Correct diagnosis with suitable investigations and preoperative preparation
2. Counselling and consent	Insufficient counselling and obtained consent after prompting	Adequate counselling and did obtain consent	Counselled the patient well and obtained consent
3. Standard surgical steps	Required considerable guidance to follow the standard surgical steps	Required some help following the standard surgical steps	Followed the standard surgical steps independently and well
4. Flow of operation and forward planning	Stopped/hesitated regularly with insufficient forward planning	Adequate progression, but with some hesitation in forward planning	Smooth progression and good forward planning
5. Knowledge and handling of instruments	Handled instruments poorly and required significant help choosing instruments	Required occasional help with handling and choosing instruments	Handled instruments well and chose appropriate instruments
6. Respect for tissue	Poor respect for tissues and/or required help finding appropriate tissue planes	Adequate respect for tissues and found appropriate tissue planes	Good respect for tissues and found appropriate tissue planes with ease

7. Suturing and knotting	Placed sutures inaccurately or repeatedly removed and replaced the needle in the tissues to get correct placements. Loose and insecure knotting	Adequate placing of sutures and knotting	Placed sutures accurately and knotted well
8. Technical use of assistants	Did not use assistants appropriately	Used assistants appropriately most of the time	Used assistants appropriately all of the time
9. Relations with patient and surgical team	Inadequate communication with and respect for patient and surgical team	Good communication with and respect for patient and surgical team most of the time	Excellent communication with and respect for patient and surgical team
10. Insight and attitude	Limited understanding of own strengths and weaknesses	Intermediate understanding of own strengths and weaknesses	Good understanding of own strengths and weaknesses
Procedure-specific			
11. Understanding the pathology	Incomplete understanding of circumferential/ stenosed rectovaginal fistula	Adequate understanding of circumferential/ stenosed rectovaginal fistula	Good understanding of circumferential/ stenosed rectovaginal fistula
12. Decision regarding vaginal or abdominovaginal approach	Required guidance to choose the correct approach	Considered the appropriate approach, but was uncertain in their decision-making	Considered the approach and made a correct, informed decision

13. Specific surgical steps for repair of circumferential/ stenosed rectovaginal fistula, as per chosen approach	Limited or incorrect knowledge of the specific surgical steps for repair of circumferential/ stenosed rectovaginal fistula	Correct but incomplete knowledge of the specific surgical steps for repair of circumferential/ stenosed rectovaginal fistula	Good knowledge of the specific surgical steps for repair of circumferential/ stenosed rectovaginal fistula
14. Identification of anal sphincter injury and knowledge of the risks of ongoing faecal/flatal incontinence	Required prompting to look for anal sphincter injury and had limited knowledge of the risks of ongoing faecal/flatal incontinence	Adequately looked for anal sphincter injury and had sufficient knowledge of the risks of ongoing faecal/flatal incontinence	Independently looked for anal sphincter injury and had good knowledge of the risks of ongoing faecal/flatal incontinence
15. Mobilisation, rectal dilatation (as required) and repair of the anterior rectal wall, if not a circumferential defect	Required significant help to mobilise and dilate the rectum and the vagina, and to repair the anterior rectal wall	Adequately mobilised the rectum and the vagina, and repaired the anterior rectal wall	Good mobilisation of the rectum and the vagina, and repair of the anterior rectal wall
16. Circumferential mobilisation of both ends of the rectum, if defect is circumferential	Required significant help to mobilise both ends of the rectum and the vagina for repair	Adequately mobilised both ends of the rectum and/or the vagina for repair	Good mobilisation of both ends of the rectum and the vagina for optimal repair
17. Surgical anastomosis of mobilised ends of the rectum	Required significant help to anastomose the ends of the rectum	Anastomosed the ends of the rectum adequately	Anastomosed the ends of the rectum well
18. Steps to reduce the chance of faecal/flatal incontinence	Required assistance to reduce the chance of faecal/flatal incontinence	Adequately reduced the chance of faecal/flatal incontinence	Reduced the chance of faecal/flatal incontinence well

19. Repair of vagina with no tension and covering of the rectal wall	Required help to repair the vagina without tension and to adequately cover the rectal wall	Adequately repaired the vagina, but required prompting to prevent tension, and adequately covered the rectal wall	Good tension-free repair of the vagina and covered the rectal wall
20. Defunctioning colostomy	Required help to decide where and how to do the colostomy	Adequately placed and performed the colostomy	Good choice of place and performed the colostomy well
21. For abdominovaginal approach, closure of abdomen	Required help to close the abdomen	Adequately closed the abdomen	Closed the abdomen well
22. Documentation of the procedure	Insufficient written documentation	Sufficient documentation, but with some omissions	Clear, comprehensive documentation, with all necessary information
Complications			
23. Understanding of potential complications, including how to identify and manage them	Limited understanding of complications and/or unclear of their management	Adequate understanding of complications and plans for their management	Good understanding of complications, with clear plans for management
Postoperative Management			
24. Planning of postoperative management, including catheterisation and diet	Inadequate postoperative management planned	Adequate postoperative management planned	Good postoperative management planned
25. Knowledge of continence testing and assessment of outcomes	Limited knowledge of continence testing and assessment of outcomes	Adequate knowledge of continence testing and assessment of outcomes	Good knowledge of continence testing and assessment of outcomes

Comments per PBA	Pass (Y/N)	Trainer signature and date
1.		
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Module Logbook – Circumferential/Stenosed Rectovaginal Fistula

The Module Logbook is a record of surgeries observed and performed by the trainee and must be compiled by the trainee **with a trainer present**.

Date	Description of case	Type – Observation or assisted – Direct supervision – Independent practice	If applicable, PBA pass (Y/N)	Comments	Trainer signature

Module 17 Management of a Fistula Treatment Facility

Learning Objectives

At the end of this module, trainees should have a clear understanding of:

1. The key considerations to help identify the need for fistula treatment services.
2. The different models for the provision of fistula care, including advantages and disadvantages of each type.
3. What are considered core services and what are considered additional specialised services in fistula treatment.
4. How to maintain fistula care provision.

This module outlines the key considerations involved in setting up fistula services, whether in the form of a fistula camp, an integrated fistula unit or a specialised stand-alone treatment facility. It provides an overview of how to determine the need for fistula care services, the considerations of the different models of fistula care provision, as well as key information about setting up and maintaining fistula care services.

Determining the Need to Provide Fistula Treatment Services

Challenges in establishing the prevalence of obstetric fistula

Before setting up a fistula treatment service, it is essential to estimate the burden of disease in the area. This can be a challenge in itself as obstetric fistula remains a neglected public health issue and available datasets are often unreliable. Published estimates on the incidence and prevalence tend to be statistical conclusions, based only on indicators, as women and girls with obstetric fistula often hide from society and are a notoriously hard-to-reach population. It can be helpful to speak to existing hospitals, health centres and health professionals, including community health workers, to ascertain the fistula patient caseload. Nevertheless, this may not give a true reflection of the reality as healthcare providers sometimes send fistula patients home, advising them that treatment is not possible. Consequently, other patients with similar symptoms will hear about this and also refrain from seeking help.

Local health system considerations

Countries with high numbers of women with obstetric fistula inevitably have high rates of maternal (and neonatal) mortality and morbidity. Intertwined with other complex issues, such as socioeconomic and gender inequalities, high rates of maternal mortality and morbidity stem directly from a lack of access to comprehensive maternal health services, including skilled birth attendants and emergency obstetric care. A correlation can therefore be drawn between poor maternal health indicators and the presence of obstetric fistula patients.

Healthcare systems in these situations are usually underfinanced and therefore healthcare providers are challenged by a lack of resources and equipment. By the nature of the setting there will be few, if any, resources available for fistula patients. It is important to remember that one of the most prohibitive barriers for fistula patients accessing care is the financial cost, which includes costs for patient transport, treatment, medicines and food. Failure to address this critical barrier is likely to

result in low patient numbers and a fistula treatment service in such a setting will almost certainly not reach its full potential.

Understanding existing service provision and key partners

Bearing all of the above in mind, it is still crucial to collect all available data and to identify a site where the need is greatest. It is important to remember that although fistula services are generally scarce, a variety of initiatives, mainly led by national and international nongovernmental organisations, have already been established to help fistula patients in some affected contexts. Thus, before embarking on a new project, it is essential to find out what programmes already exist in the proposed area. As resources for the treatment of fistula patients remain limited, it is imperative that precious funds are used efficiently and that unnecessary competition between projects is avoided. An initial assessment will therefore help to decide whether to establish a new facility, to complement existing activities or, perhaps, if resources would be better directed elsewhere. Working with local, regional and national/international organisations and government bodies is essential to navigate the legalities, particularly for registrations, and to coordinate between stakeholders. Sound Memoranda of Understanding need to be put in place to ensure transparent and trusted working relationships.

Putting the patient at the heart of the decision-making process

When establishing a new fistula care service, the entire decision-making process should focus on patient-centred care, including local context, customs and beliefs. Facilities should aim to provide a holistic package of interventions to improve patients' quality of life, including their physical, psychological, social, cultural and economic well-being. This requires an in-depth understanding of the full extent of challenges that fistula patients face on a daily basis in the given area. Furthermore, effectiveness and overall success will depend on whether the interventions address the patients' full range of pathologies. Fistula facilities are also extremely well placed to advocate, network and promote women's and girls' health and rights.

Choosing a Model for the Provision of Fistula Care

After identifying a location, the model for fistula treatment needs to be decided. Each model has advantages and disadvantages in terms of the amount of resources required, ease of implementation and quality of services from the perspective of patient-centred care.[89]

Fistula campaigns/camps

In fistula campaigns/camps[90] a surgeon or sometimes a team visits a (often remote) location to perform a number of fistula surgeries in a short period of time.

[89] L.L. Wall. Where Should Obstetric Vesico-Vaginal Fistulas Be Repaired: At the District General Hospital or a Specialized Fistula Center? *Int J Gynecol Obstet* (2007); R. Maroyi, L. Keyser, L. Hosterman, A. Notia, D. Mukwege. The Mobile Surgical Outreach Program for Management of Patients with Genital Fistula in the Democratic Republic of Congo. *Int J Gynecol Obstet* (2020).
[90] K. Ramsey, Z. Iliyasu, L. Idoko. Fistula Fortnight: Innovative Partnership Brings Mass Treatment and Public Awareness towards Ending Obstetric Fistula. *Int J Gynecol Obstet* (2007).

Advantages:

- Can be scheduled as frequently as resources allow.
- Is an opportunity to train local staff through short bursts of surgery.
- Provision of essential components of holistic treatment, such as physiotherapy and reintegration, can be planned and shared with either the host facility or other local governmental or nongovernmental organisations that have dedicated resources and the required skills for these services.
- Can be a good indicator of the need in an area. If the camps are successful, with increasing patient numbers as the word spreads, it may be worth further exploring the location and, if suitable, considering a permanent unit instead.

Disadvantages:

- The main limitation is the number of patients the host facility can recruit and the number of available beds.
- As visiting surgeons/teams may be rare, patients in suboptimal condition (e.g. those with moderate or acute malnutrition) may be scheduled for surgery regardless, rather than postponing the procedure until the patient is in optimal health.
- Patient follow-up by the visiting surgeon and teams is usually limited or not possible.
- Quality of postoperative care (and addressing complications) may be inadequate by unskilled local health providers, especially after an expert surgeon and team have left.
- Provision of additional services other than surgical treatment can be a challenge.
- Requires cooperation and collaboration by the host facility, authorities and multiple partners, including Community Health and Outreach Workers for patient recruitment.

Integrated fistula treatment units

These units can be part of a general hospital or other health facility, and should ideally be in the form of dedicated rooms/beds within obstetric and gynaecological wards or separate wings in general and teaching hospitals.

Advantages:

- Ideal for a regular but often limited number of surgeries.
- Can easily utilise and collaborate with other established hospital services, e.g. maternity unit, theatre and laboratory services.
- Holistic care can be provided if the institution has suitable services and available resources.
- As above, it can be a good gauge of whether a permanent service is needed before committing to the considerable expense of establishing a dedicated unit.

Disadvantages:

- Challenges can arise when surgeons and/or other staff have conflicting responsibilities, and theatre time for fistula surgeries competes with other elective procedures and emergencies.

- Patients are often only treated when time and resources allow.
- Patients may have extended waiting times in the facility before they receive a surgical repair.
- Fluctuating funding flows to collaborating partners, e.g. for patient identification, which can jeopardise and halt activities if funding is suddenly reduced or stopped.

Specialised and dedicated fistula treatment facilities

These facilities and hospitals can be stand-alone, self-sufficient buildings or built within the grounds of an existing general hospital.

Advantages:

- Has its own dedicated staff, ward(s) and theatre(s).
- Can provide integrated holistic care, including all those mentioned above, plus counsellors, physiotherapy and rehabilitation specialists, as well as psychosocial and nutrition support staff.
- No competition for resources, theatre and staff time.
- Can provide more specialised clinical care and complex procedures.
- High caseload gives an ideal opportunity to provide tailored patient-centred care and undertaking of research to strengthen the evidence base and continuously improve practices.
- A dedicated unit with high patient numbers also provides an ideal environment for specialised training, including of fistula surgeons and holistic care teams.

Disadvantages:

- Requires the most financial resources.
- Only cost-effective if there is a large patient caseload.
- If it is not possible to integrate with existing facilities, all services required by or beneficial to fistula patients may need to be newly set up, e.g. physiotherapy, maternity waiting home.

Setting up an Obstetric Fistula Treatment Facility

Depending on available space, services can be accommodated and enclosed within the same building or, alternatively, established as separate buildings belonging to the same treatment facility. If a nearby general hospital already provides some of the necessary services, then provision of care may be shared. However, the hospital staff in collaborating units will need to be trained in the special needs of obstetric fistula patients.

Outlined below are the recommended integrated clinical services that a comprehensive obstetric fistula treatment facility should ideally provide.

Core services

Reception, registration and medical records system: The reception should be a welcoming place for patients to be introduced to the hospital environment. Many will be far from their home setting, anxious and disorientated. It is therefore critically important that this first contact with the treatment facility is a welcoming, reassuring and positive experience for fistula patients. The reception area can also be used for health education, for example through posters and other materials. Establishing a

simple and efficient medical registration system is vitally important for good record keeping, patient care and follow-up.

Outpatient area: The outpatient area should include an examination room with good lighting, an examination couch and essential supplies for gynaecological examinations, including bedside cystometry to evaluate bladder function.

Preoperative preparation ward/room: For this area, good lighting, regular cleaning and ventilation are important. The preoperative preparation area is used to prepare patients for general surgical procedures, including bowel preparation, nutritional rehabilitation and treatment of other medical conditions. It is useful to have an isolation room(s) for patients with active infections, with some provisions for physically incapacitated and/or mentally unstable patients.

Laboratory services: Basic routine lab investigations are essential, with the capacity to test blood and blood products, including for HIV and hepatitis B, and to provide transfusions. The lab should also provide culture and sensitivity testing of different specimens. If the facility is going to treat severe and complex, acute and chronic urological and lower gastrointestinal complications, as well as carry out advanced surgeries, then capability for serological tests for organ functions and electrolyte measurements will be required.

Operating theatre: A dedicated operating theatre should have good sources of lighting, appropriate tilting operating tables with the necessary accessories for gynaecological and urological procedures, specialised surgical instruments for fistula surgery and a variety of catheters, drainage tubes and vaginal packing supplies. At least one anaesthesia machine and an autoclave should be present. If resources allow, having a cystoscope, laparotomy sets and electrosurgical units will significantly improve the quality of surgical interventions.

Pharmacy: The onsite pharmacy should be set up with a system to plan, procure, store and dispense supplies. As well as routine medicines and consumables, the need for additional medical supplies and equipment, such as colostomy bags, should be considered.

Postoperative ward: A postoperative ward should include recovery units near to the operating room, which can sometimes also be used as intensive care wings. The ward itself should be a quiet, friendly environment where patients can rest and recover.

Maternity waiting and postcaesarean section ward: If resources allow, offering elective caesarean sections is essential to prevent former patients from developing an obstetric fistula again (and hopefully having positive health outcomes for mother and baby). To provide this service, it is necessary to have a maternity waiting and postcaesarean section ward, which is separate from the treatment ward for:

- Former fistula patients who return pregnant to wait for and recover from elective caesarean(s).
- Breastfeeding fistula patients awaiting repair. It is worth noting that as most women with an obstetric fistula will have had a stillborn baby, it is rare to see an untreated fistula patient breastfeeding the baby from the same pregnancy, however this can and does occasionally occur. Women may also have a successful delivery after the one in which a fistula occurred.

Physiotherapy: A skilled physiotherapist or specialist nurse can help with motor rehabilitation of fistula patients who have suffered neurological damage during prolonged labour, giving rise to conditions such as foot drop, or further associated problems like disuse atrophy and contractures of the lower limbs. Physiotherapists can also help the patient with pelvic floor rehabilitation, postrepair bladder training (to increase bladder capacity) and some incontinence management.

Psychosocial support: Counselling should be offered as a core service, where possible, by trained psychosocial support staff to help the patient and any family members understand and come to terms with her condition. Many women with obstetric fistula suffer significant mental health problems because of their condition, the loss of their child and their ensuing rejection and isolation. This may range from anxiety and mood swings, to depression, post-traumatic stress disorder, psychosis and suicidal tendencies/attempts. Addressing the emotional sequelae and psychiatric disorders relating to childbirth injuries is essential. It is also vitally important to provide ongoing help to women with incurable injuries – the most vulnerable of fistula patients – by teaching coping mechanisms and providing hygiene support to enable affected women to have a manageable quality of life. Peer support from other fistula patients can also have a big positive impact on patients' mental well-being and recovery.

Additional specialised services

As well as the core clinical services described above, to provide comprehensive holistic care to obstetric fistula patients with multiple health issues and/or socioeconomic challenges, the following additional services can also be offered:

Radiology: Routine ultrasound scanning services are helpful for baseline renal status and to identify stones and other foreign bodies in the genitourinary system. Ultrasounds can also detect pregnancies and diagnose complications following fistula surgery, including peritoneal collections and ureteric involvement. Contrast studies of the renal system are essential for specific indications and patients with complex injuries.

Incontinence clinic: A significant number of postrepair patients are likely to remain with various degrees of urinary and/or flatal/faecal incontinence after repair. The cause of residual incontinence can vary and include stress incontinence, overactive bladder, mixed incontinence, retention with overflow and residual fistula. Treatment needs to be tailored to each individual woman. After full investigations, the first line of management is usually conservative, medical, hygiene support and, if that fails, then a surgical procedure if the pathology indicates this.

Stoma clinic: Temporary and permanent urinary and/or faecal diversions, either as part of a staged surgery or as an irreversible treatment option, will significantly change a patient's life. It is essential to ensure that patients understand the procedure and its consequences and crucial that the patient gives informed consent before the surgery is carried out. The lifelong clinical follow-up of permanent diversions requires significant technical support by a trained provider, with well-organised processes in place to manage the planning and dispensing of essential supplies. Stoma clinics are costly owing to the resources and expertise they require.

Education and income-generating activities: Many centres have started to incorporate different types of occupational therapy, such as literacy and numeracy classes, appropriate arts and crafts and other skills, which may be used to generate an income by the patient once she returns home, as well as for the treatment facility during her treatment. These activities not only make good use of patients' hospital stay, but are also beneficial for patients' mental health, development, personal economic well-being and also help them build new relationships. There are many nongovernmental organisations who work in the community with fistula patients to help with reintegration, psychological support and networking to find patients requiring medical treatment.

Maintaining the Services of the Treatment Unit

Administration and finances

Thorough administrative management of the hospital plays a key role in the delivery and continuation of high-quality and cost-efficient services. Administrative staff need to work closely with the medical team to carefully and strategically develop structures and secure the availability of supplies to deliver the best possible care, always putting the needs of patients first. The whole team should work towards good and trusted working relationships, making holistic fistula service delivery a reality.

As the facility develops, there is likely to be an increased need for funding to cover the running costs. A good reputation and maintaining excellent donor relations can contribute to reliable, long-term or even increased funding. It is imperative to gain donors' trust, to work in a transparent, accountable and reliable manner, and to meet donors' requirements. Some centres have also been able to supplement running costs by selling patients' handicrafts.

Service improvement and staff development

Continued audit and research will help to refine and improve services, and knowledge sharing with similar facilities can also be greatly beneficial. Facility staff should be given the opportunity to develop professionally, which can be facilitated through ongoing medical education, mentoring, attending conferences, as well as hosting and participating in workshops.

Patient mobilisation, sensitisation and outreach

As a facility develops and becomes established, the number of patients is likely to increase and services should adjust to meet the increasing demand, which may include offering more complex surgery. At the same time, to ensure ongoing activities, an active sensitisation and outreach programme will also be needed to help locate and refer patients and, depending on the local need, outreach teams may have to go further afield with time. Several innovative approaches[91] to reach women with fistula have proved to be very effective, including engaging previously treated patients as ambassadors, educating and involving local/religious community leaders and utilising technology,

[91] A.R. Seim, *et al.* Pilot Community-Mobilization Program Reduces Maternal and Perinatal Mortality and Prevents Obstetric Fistula in Niger. *Int J Gynecol Obstet* (2014); Wegner, *et al.* Improving Community Knowledge of Obstetric Fistula Prevention and Treatment; Comprehensive Community-Based Rehabilitation in Tanzania. Towards a Fistula-Free Generation.

including mobile phones and the radio. Local, regional and national networks may also be able to offer guidance and assistance and partner collaboration is therefore critical.[92]

Becoming a FIGO Training Centre

Once the treatment facility has become established with highly skilled surgeons and staff, a high patient caseload and reliable funding, the option of becoming a FIGO training centre can be considered. Prerequisites include that facilities conduct at least 300 fistula repair surgeries per year, that the ward/unit is led by a full-time fistula surgeon, who is a FIGO Trainer (or will undergo accreditation to become a FIGO Trainer), that staff are open to implement the necessary changes to become a training centre, as well as surgeons and teams being committed and able to conduct trainings. As there is a severe shortage of quality training centres worldwide, FIGO provides support to facilities interested in becoming training centres and to surgeons wanting to become trainers.

Optional Task – Develop Proposal for Fistula Treatment Facility

Develop a funding proposal and/or business plan[93] for a future fistula treatment facility, bearing in mind the points covered in this module. Discuss the plan with a trainer/expert fistula surgeon for their feedback and suggestions.

[92] Slinger and Trautvetter. Addressing the Fistula Treatment Gap and Rising to the 2030 Challenge.
[93] A template can be found on the FIGO Fistula Resource Hub (www.figo.org/fistula-resources).

4. Complications of Fistula Surgery

As with any type of surgery, there are several complications to consider intraoperatively during the different stages of fistula surgery, as well as during the immediate and late postoperative periods. Outlined below is an overview of the key complications, divided into intraoperative, immediate postoperative and late postoperative periods, listed in alphabetical order.

4.1. Intraoperative Complications

Anaesthetic complications: Hypotension is usually transient and can be corrected with intravenous fluids or vasopressors. Rarely, the patient will develop an ascending spinal block. If the patient does have a respiratory arrest, ventilation is needed until breathing starts.

Bleeding: Haemorrhage is a potential risk in any operation but can be minimised by infiltrating the operative site with a mixture of adrenaline and lignocaine before the operation starts. If available, tranexamic acid can also be used. It is important to pay attention to any arterial bleeding points by tying them off. When operating in the vagina, a figure-of-8 suture is the most secure, and firm packing of the vagina is sometimes needed to reduce bleeding. The pack is usually made of gauze and soaked in iodine or petroleum jelly and, in some instances, adrenaline. It should not stick and should be firm enough to reduce bleeding, but not too firm to cause pain or tissue damage.

Contamination by bowel contents: This is reasonably common and can be prevented with adequate bowel preparation. Most surgeons prefer to keep patients nil by mouth from midnight the night before the operation. There are varying options for bowel preparation for rectovaginal fistulas and perineal tears.[94] Most commonly, the patient is kept on a fluid only diet the day before the operation, with water enemas the morning and night of the day before surgery. Despite this preparation, there may still be faecal contamination. It is sometimes necessary to stop the operation and perform an enema to clean the bowel. If this is the case, the operative field must be thoroughly irrigated and washed with antiseptic solution. In some cases, the surgery may need to be postponed to ensure suitable preparation of the bowel.

Iatrogenic injury: As it is quite easy to injure the adjacent organs, surgeons should always be aware of their operative location, in particular relating to the ureters, bowel and bladder. Accidental injury may occur to the ureter and bladder during dissection. It is extremely important to recognise when an injury occurs and to repair it promptly during the procedure, where possible.

4.2. Immediate Postoperative Complications

Anaesthetic complications: Spinal headaches are common and can be treated by lying the patient flat, administering analgesia, an epidural blood patch and caffeine – many patients feel better after drinking a cup of tea. Rarely, with spinal anaesthesia, the patient can sustain nerve damage to her lower limbs. If this occurs it is important to identify the cause, e.g. haematoma, abscess of the spinal

[94] M. Breen. *Manual of Obstetric Fistula Surgery*. Carlisle: The Foundation for the Global Library of Women's Medicine (2019).

canal or direct injury to the spinal cord, in which case the patient should be rapidly referred to a neurosurgical specialist, if available.

Anuria: To prevent anuria, ensure the ureters are identified at the time of the operation. Ligation or inclusion of the ureter in the suture line may lead to ureteric obstruction. If the ureteric orifices are less than 2 cm from the fistula margin, they should be catheterised with ureteric catheters during the operation to reduce the risk of injury. If no urine is draining via the Foley catheter and the ureters were not catheterised (and the patient is not shocked), administer furosemide and increase intravenous fluids. If there is still no sign of urine, the patient should be rapidly returned to theatre for the surgeon to undo the repair, after which, urine should start leaking again and the patient can be considered out of danger. A decision should then be taken either not to continue with the operation at that time, in which case the patient can be sent back to the ward, or to continue the operation after catheterising the ureters.

It is most important to check that the patient is not in shock. This should be the first potential cause of anuria to exclude when a patient is reviewed and, if present, should be corrected urgently through conventional measures.

The patient should also be given adequate fluids intra- and postoperatively to ensure adequate urine output. It is critical to check that the catheters are not blocked. This is less important for the ureteric catheters, as the urine often passes around them along the ureter, but it is very important to make sure that the Foley catheter is not blocked. This not only causes great discomfort from a full bladder, but the pressure can break the fistula repair.

Blocked bladder catheter: This is an emergency as the bladder can fill quickly, over-distend and, as a result, burst the fistula repair. Regularly check that the urethral catheter is draining well, that the tubing is not kinked and that the urine bag/collection bucket is below the level of the bladder so that the catheter can drain correctly. If any signs of blockage occur, irrigate the catheter immediately with 10–20 mL of sterile fluid to flush out any blockage. Great care should be taken not to over-distend the bladder while doing this. Alternatively, replace the catheter immediately.

Deep vein thrombosis and pulmonary embolism: These are rare conditions but need preventive strategies like good hydration, physiotherapy whilst in bed and early postoperative mobilisation. If the patient is at high risk then consider anticoagulants and compression stockings if they are available.

Haematuria: This is perhaps the most common complication and can be prevented by meticulously closing the detrusor muscle, leaving no exposed bleeding points from the muscle opening into the bladder. If haematuria occurs it can be treated with good irrigation of the bladder and a high oral fluid intake, intravenously if needed. Flush the catheter with a syringe of saline (*see* **Blocked bladder catheter** above) and draw back to retrieve any clots. Tranexamic acid can help reduce bleeding.

Haematoma: Haematomas can occur anywhere in the operative site and can be prevented by meticulous haemostasis during the operation. Despite this they can still occur. Most haematomas are self-limiting and will resolve in time. If they are large, and certainly if they are getting larger, then haematoma need draining and any active bleeding points ligated or coagulated.

Haemorrhage: To prevent haemorrhage, pay meticulous care to haemostasis during the operation.

- If haemorrhage is mild and the patient is haemodynamically stable, she should be observed closely.
- If haemorrhage is moderate and the patient is haemodynamically stable, examine the source of bleeding under good lighting.
- If general oozing of blood from the vagina occurs, pack the vagina with/without adrenaline on the pack.
- If there is active bleeding, take the patient back to theatre rapidly to investigate and address the source of bleeding.
- If bleeding is heavy and the patient is or is not haemodynamically stable, begin resuscitative measures and take the patient back to theatre immediately, to evacuate clots and suture any active bleeding points.

Secondary haemorrhage can occur more than 24 hours and up to 7 days after surgery, which can be due to infection eroding into blood vessels. This is usually managed conservatively, by packing the vagina and treating the infection, and in rare circumstances requires ligation of affected blood vessels in theatre.

Infection: To avoid infections use an aseptic technique, administer prophylactic antibiotics with induction of anaesthesia and operate only on healthy tissues during surgery. To manage any infections, swab and culture any wound discharges, culture urine, carry out fever workup (blood count, swabs and cultures as appropriate), treat with appropriate antibiotics and clean operation wounds aseptically. *See also* **Contamination by bowel contents** in *4.1 Intraoperative Complications* (*see* page 221).

Leakage (faecal): When repairing a vesicovaginal fistula there is a risk of missing a concurrent high rectovaginal fistula. If in doubt, a rectal dye test should always be performed in theatre. If bubbles of gas are seen coming into the vagina at operation, the presence of a high rectovaginal fistula is likely.

Leakage (urinary): This can stem from a breakdown of repair, from around the Foley catheter, a ureter outside the bladder or a missed fistula. A gentle dye test will reveal if there is a breakdown of the fistula or if the urine is coming around the catheter. Appropriate treatment depends on the cause. If a repair breakdown occurs, leave the Foley catheter in place for a longer period of time (i.e. for longer than the usual 10–14 days postoperatively). To keep the urine away from the repair site in the bladder, some healthcare professionals prefer to nurse the patient prone in the immediate postoperative days. If urinary leakage occurs from around the Foley catheter, place under observation, as this is likely to indicate that the patient will have stress incontinence after removal of the catheter. Other causes will mean that the patient has to undergo further surgery. *See also* **Urethral incontinence after catheter removal** below and refer to *5.2. Assessment of Surgical Outcomes* (*see* page 227).

4.3. Late Postoperative Complications

Apareunia: Occurs when the vagina is completely occluded with scar tissue. This can be prevented by performing vaginal reconstruction at the first operation. However, in the most severe cases, creating a complete neovagina from peritoneum or colon at a secondary operation might be the best option.

Bladder stones: Stones may form on a suture inside the bladder. To prevent postoperative stone formation, use dissolvable sutures such as polyglycolic acid 2-0, place the sutures extramucosal and encourage high fluid intake. To treat bladder stones, crush and remove cystoscopically if available and if not, perform a cystotomy.

Dyspareunia: Prevention includes cutting or excising scar tissue from the vagina and good mucosal coverage, vaginal dilatation and artificial lubrication. The use of Martius graft to prevent dyspareunia is debated.

Haematometra: This can occur if the outflow tract of the menses is occluded by scar. To avoid haematometra, surgically open the vagina/cervix at operation, ensuring good epithelial coverage and stenting the cervical os using a Foley catheter or an intrauterine device with strings in the cervical canal. Remove the stent after approximately 2–4 weeks. If the patient is not planning a pregnancy then menstruation can be temporarily, if not permanently, halted with the use of different contraceptive methods such as continuous contraceptive pill, injectable progesterone or even a hysterectomy if requested.

Repair breakdown: Can be prevented with meticulous operative techniques and attentive nursing care. If suspected, perform a dye test to confirm breakdown and to rule out stress incontinence, which can be so severe that the patient feels as if the fistula is still present. If a breakdown is diagnosed soon after catheter removal, consider reinserting the catheter and leaving it on prolonged drainage, if this has not already been done. Observe over the next 7 days whether urinary leaking is decreasing through the vagina and increasing through the Foley catheter. If so, the indwelling catheter should remain in place until no further leaking through the vagina occurs. Once there is no more leaking through the vagina, the indwelling catheter should stay in place for 7 additional days. Perform another dye test to confirm repair closure. If, throughout the initial 7 days, wetness is increasing or staying the same through the vagina and decreasing through the Foley catheter, then remove the Foley catheter and conclude that the repair has broken down. Consider repeat operation in 3 months' time and counsel the patient, offering ongoing hygiene and emotional support.

Secondary infertility/amenorrhoea: This can have multiple causes. To prevent cryptomenorrhoea ensure that the vagina is kept patent with vaginal reconstructive techniques if needed. Other causes, such as Sheehan's syndrome, resulting from prolonged shock during the long labour can be prevented with early access to emergency obstetric care, otherwise, lifelong hormone replacement therapy is required. Asherman's syndrome can result from either the presence of urine in the uterine cavity and or repeated infections of the endometrium. It can be treated using an operative hysteroscopy to remove uterine adhesions and sequential hormonal therapy with high-dose oestrogen to prevent reformation of adhesions and to nourish the fragile endometrial crypts. Infertility/amenorrhoea can also be caused by low body mass index and, if so, the patient should be encouraged and supported to increase her body weight.

Urethral Incontinence after Removal of Foley Catheter

Urethral incontinence should be investigated and the cause identified. Causes include:

- **Detrusor overactivity:** Unfortunately, there are no known preventative methods. Recommended treatment includes anticholinergics with bladder training, although anticholinergics have not been shown to be effective for detrusor overactivity after fistula repair. If there are no anticholinergics available, the patient should be taught bladder training (*see* Bladder and Fluid Schedule; page 232).
- **Stress incontinence:** This can be prevented by maintaining the length and width of the urethra during the fistula repair, supporting the damaged urethra with a sling, by refixation of the pubocervical fascia to the arcus tendineus on both sides of the urethra and ensuring the vagina is repaired tension free. Urethral incontinence is more common if the bladder neck and urethra are affected by the fistulous injury. Pelvic floor exercises should be taught to all patients, with particular attention to those with stress incontinence. If urinary incontinence is ongoing, further reconstructive procedures may be required.
- **Urinary retention with overflow:** Urinary retention with overflow is more common after stress incontinence operations than after fistula repairs[95] and there are no known preventative methods. If urinary retention with overflow is not treated it can lead to urinary stasis, bladder stones, urinary tract infections and overflow incontinence. To treat, teach clean intermittent self-catheterisation three times a day until the patient is emptying her bladder completely or the residual volume is less than 100 mL and less than 50% of the voided amount.[96]

Urethral strictures: Meticulous repair of urethral fistulas will reduce the chance of a patient developing urethral strictures. If they occur they can be treated with excision/dilatation. Strictures tend to reoccur, but reoccurrence can be prevented by teaching the patient to perform clean self-catheterisation, through which she can self-dilate the stricture 2–3 times a week. If the urinary incontinence persists, a urethral plug (if available) will make the patient continent for short intervals and prevent the stricture from reforming.

Vaginal strictures: These can be prevented with excision of scar tissue during the operation and good epithelial coverage of the injury with vaginal flaps and sometimes with labial, groin crease and/or gluteal flaps (*see* Vaginal Reconstruction, page 140). Treat vaginal strictures by surgically opening the vagina with excision of scar tissue as well as vaginal dilatation after the operation.

[95] Browning. Risk Factors for Developing Residual Urinary Incontinence after Obstetric Fistula Repair.

[96] Some surgeons also treat initially by reinserting the Foley catheter and instigating bladder training with the Foley catheter and spigot. The catheter is blocked and released every 2 hours for 2 days (usually left on free drainage overnight). The catheter is then removed and the trial of void repeated. It is necessary to be strict with this procedure, as it is important not to over-distend the bladder and thereby risk rupturing the repair. There is little documented evidence, but anecdotal experience shows that this technique can be beneficial for patients with urinary retention with overflow.

5. Postoperative Care

5.1. Postoperative Management

Meticulous postoperative care is critical for fistula patients' well-being and surgical outcomes.[97] It is therefore vitally important that the team members responsible for this phase are skilled and knowledgeable about monitoring fistula patients and their specific needs. Particular attention should be given to catheterisation and hygiene, diet and continence testing.

5.1.1. Immediate Postoperative Management

- Take the patient's vital signs and monitor general condition.
- Ensure that appropriate antiemetic and analgesic drugs are provided postoperatively, as required. Usually nonsteroidal anti-inflammatory drugs (NSAIDs) and paracetamol are sufficient. However, sometimes narcotics can be added, especially if a large episiotomy or abdominal surgery has been performed.

Note that narcotics cause constipation, which should be avoided in rectovaginal fistula patients.

- Observe the patient for excessive postoperative bleeding.
- Ensure correct drainage through the bladder catheter and that connecting tubes are not twisted, kinked or compressed.
- Provide the patient with sufficient hydration through intravenous fluids to ensure that the urine is completely clear at all times.
- Monitor and record fluid input and output.
- Monitor and record any signs of urinary or faecal incontinence, e.g. on the patient's bed sheets.
- Vulval toilet (lightly splash with clean water and pat dry) 8-hourly, and as required.

5.1.2. Subsequent Postoperative Management

- Continue to monitor the patient's vital signs and condition as indicated and as per local protocols.
- Intravenous fluids can be discontinued when the patient is tolerating mixed fluids orally, usually within the first 12–24 hours postoperatively.
- Ambulate the patient from the first postoperative day.
- If present, remove the vaginal pack 24–72 hours postoperatively, according to surgeon preference.
- Perform daily vulval toilet (lightly splash with clean water and pat dry) after pack removal.

5.1.3. Specific Postoperative Management for Vesicovaginal Fistula

Catheterisation and hygiene: Postoperatively, the ureteric catheter(s) can be left in situ for 3–10 days depending on the proximity of the ureteric orifice to the margin of the fistula. The Foley catheter should remain in place, on free drainage for 10–14 days. Check daily that the patient is 'dry,

[97] Campbell and Asiimwe. *Nursing Care For Women With Childbirth Injuries*.

drinking and draining', i.e. the bed is dry, the patient is drinking enough water to ensure a flow of clear urine and the Foley catheter is draining and not blocked. Once the patient is mobile, bucket baths or showers, if available, are recommended to keep the vulval area clean and dry.

Diet: The patient can take a normal diet the day after the operation, providing she is clinically well to do so. In addition, she should be encouraged to continue taking sufficient oral fluids to ensure that her urine is clear at all times.

5.1.4. Specific Postoperative Management for Rectovaginal Fistula

Catheterisation and hygiene: Postoperatively the Foley catheter should remain in place on free drainage. If the patient has had a concurrent vesicovaginal fistula repair, the catheter should be left in place for 10–14 days, as per the vesicovaginal fistula protocol. If the patient has a rectovaginal fistula in isolation, then the catheter can be removed when the patient is mobile, usually the next day; remove the vaginal pack at the same time. Once mobile, bucket baths or showers are recommended to keep the vulvoanal area clean and dry.

Diet: It is important to reduce the risk of the patient developing constipation and straining to push hard stool past the repair, risking damage to the healing tissues and a potential breakdown. After the operation, the patient should have intravenous rehydration until tolerating mixed fluids orally. A light diet can be started the next day and continued for 6–7 days before reintroducing a normal diet. To ensure that the patient does not become constipated, a laxative (e.g. bisacodyl) should be prescribed on the commencement of the light diet and should be continued for about 1 week. If the stool becomes too fluid, the laxative should be stopped.

5.1.5. Specific Postoperative Management for Abdominal Fistula Repair

- If a laparotomy was done or an operation was performed under general anaesthesia, observe the patient's vital signs every 30 minutes until she is fully awake. Subsequently, these observations should be done every 4 hours.
- Oral fluids can be introduced the day after surgery, according to the patient's condition.
- For further routine care, *see 5.1.1. Immediate Postoperative Management* (page 226).
- On the first and subsequent days in the immediate postoperative period, check the abdomen for possible distension and pain. Listen for bowel sounds and enquire if the woman has passed flatus. If so and if bowel sounds are present, she can start taking oral fluids. Continue intravenous fluids for 1 more day.
- Mobilise the patient as soon as possible, normally the day after the procedure.
- On the second postoperative day, if the patient's condition is stable, the intravenous fluids can be discontinued and a light diet can de started, according to the hospital's protocol.
- Continue to monitor the patient's vital signs and condition as indicated and as per local protocols.

5.2. Assessment of Surgical Outcomes

Following surgery, it is critically important to meticulously assess repair outcomes using a standardised protocol based on evidence and best practices of expert fistula surgeons, as presented in

this section. Accurately assessing outcomes is a vital component of postoperative care to ensure that after surgery cases with ongoing challenges, including those with continuing incontinence or repair breakdown, receive a correct, timely diagnosis and appropriate, high-quality treatment.

Careful documentation plays a key part in this process, as does a trusting patient–doctor relationship in which the patient feels able to express any concerns or unresolved issues that might otherwise be difficult to observe. It is essential to be cautious when assessing surgical outcomes, as patients may not give an accurate response when asked about incontinence. This may occur because they wish to please medical staff with a positive reply, especially if the treatment was free. It is therefore crucial to clinically and objectively assess each patient, rather than relying purely on their answers.

Determining the results of surgery should include an assessment of whether the fistula has been closed successfully and whether the patient is continent. Outcomes can be broadly classified as:

- Fistula closed and patient continent.
- Fistula closed and patient incontinent.
- Fistula not closed and patient incontinent.

5.2.1. Assessing Outcomes Following Vesicovaginal Fistula Repair

To standardise best practice in assessing surgical outcomes following a vesicovaginal fistula repair, FIGO's Expert Advisory Group of fistula surgeons and the FIGO Fistula Surgery Training Initiative team have developed the protocol below, as well as the accompanying flow chart on page 230.[98]

A vesicovaginal fistula repair can be confirmed as successful, i.e. fistula closed and patient continent, if:

- ✓ The **dye test is negative** prior to removal of the Foley catheter (normally, between 10–14 days postoperatively).
- ✓ After the Foley catheter has been removed, the **postvoid residual volume of urine is less than 100 mL and less than 50% of the voided amount**.
- ✓ The **pad is dry** the day after the Foley catheter has been removed.

Carry Out Dye Test

Perform a dye test (*see* Dye Test for Vesicovaginal Fistula; page 16) 10–14 days postoperatively, before removing the Foley catheter.

- If the dye test is positive, **leave** the Foley catheter in place for **7 more days**. During this time, **observe** if the patient is leaking any urine while walking, sitting and/or lying in bed. **Consider** nursing the patient in a prone position when in bed.
  - If wetness is absent, **leave** the Foley catheter in place until the patient has been dry for **7 days**. If wetness is decreasing, **consider leaving** the Foley catheter in place for up to 4 weeks until the patient is dry, then **keep** in situ for **7 additional days**. After the patient has been dry for 7 days with the Foley catheter in place, repeat the dye test.

[98] The flow chart is available to download in various formats on the FIGO Resource Hub (www.figo.org/fistula-resources), so that it can be displayed and consulted in the clinical settings of fistula units.

- If wetness is increasing or staying the same and the amount of urine in the drainage bag/bucket is decreasing or staying the same, then the fistula is unlikely to close with further bladder catheterisation. **Remove** the Foley catheter.
  - ❖ **Outcome: Conclude that the fistula is not closed/repair broken and the patient is incontinent of urine.** As the repair has not been successful, a repeat operation should be **scheduled**, usually in 3 months' time. An unsuccessful repair can be very disappointing for the patient. Patients should therefore be **carefully counselled**, with appropriate hygiene and ongoing emotional support.

- If the dye test is negative, **remove** the Foley catheter and **measure** postvoid residual volume.

Measure Postvoid Residual Volume

Ask the patient to drink sufficient fluids to ensure that her urine is clear. Throughout the next 24–48 hours, **measure** and **record** the patient's voided volume and postvoid residual volume of urine 3 times (even if the patient is wet). If the residual volume is borderline and does not fit into the categories below, the patient should continue measuring residual volume a few more times.

- If postvoid residual volume is greater than 100 mL or greater than 50% of voided amount:
  - ❖ **Outcome: Conclude that the fistula is closed but that the patient has urinary retention. Teach** clean intermittent self-catheterisation 3 times a day until the patient is emptying her bladder completely or the residual volume is less than 100 mL and less than 50% of the voided amount. At this point, **carry out** a pad test.
- If postvoid residual volume is less than 100 mL and less than 50% of the voided amount:
  - The day after the Foley catheter has been removed, **carry out** a pad test.

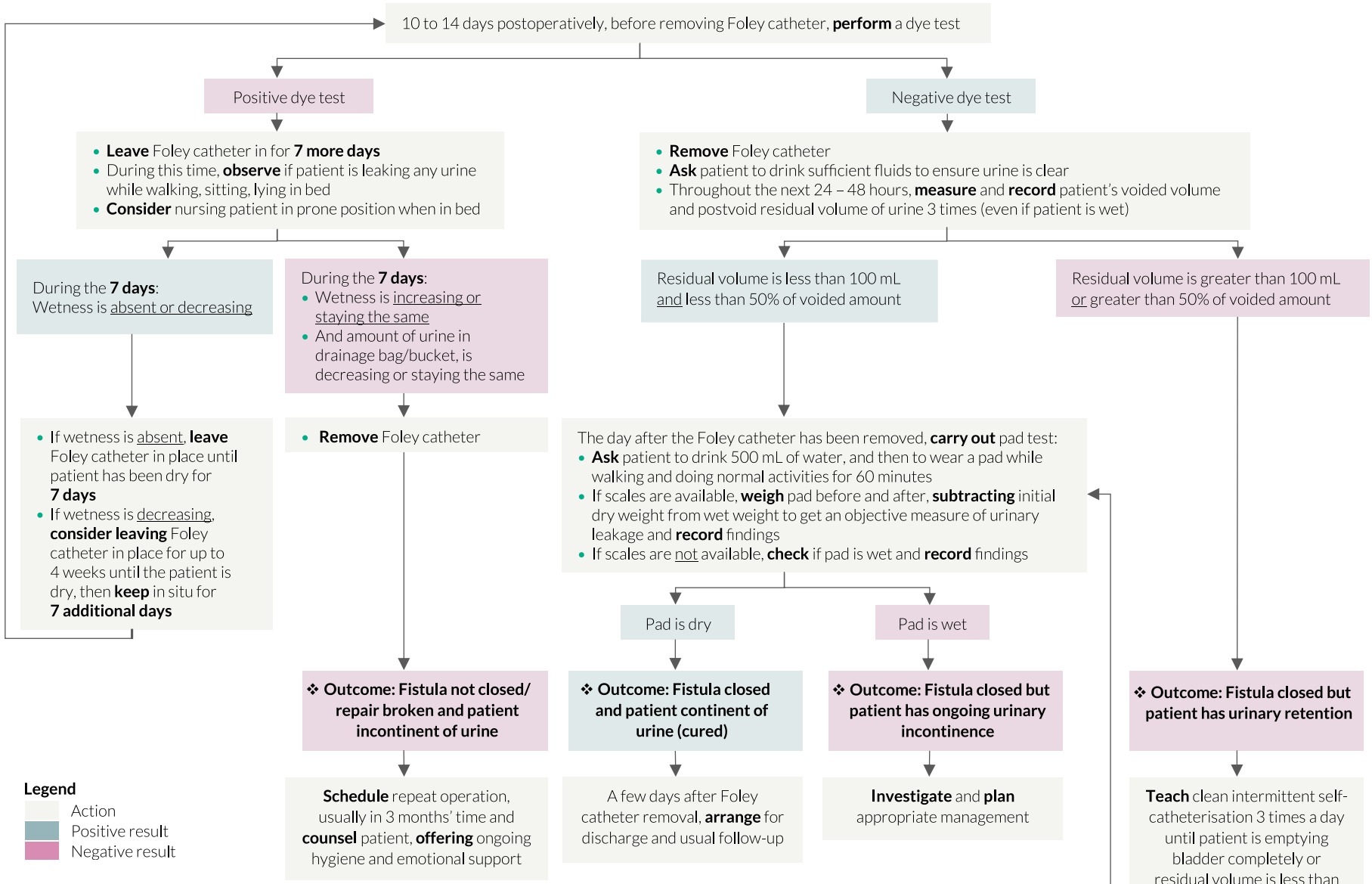
Carry Out a Pad Test

This is a useful standardised technique to obtain an objective assessment and measurement of urinary leakage.

Ask the patient to drink 500 mL of water, and then to wear a pad while walking and doing normal activities for 60 minutes. If a simple kitchen scale is available, **weigh** the pad before and after, **subtracting** the initial dry weight from the wet weight. If a scale is not available, **check** if the pad is wet. **Ensure** that all findings are recorded.

- If the pad is wet:
  - ❖ **Outcome: Conclude that the fistula is closed but the patient has ongoing urinary incontinence. Investigate** and **plan** appropriate management.
- If the pad is dry:
  - ❖ **Outcome: Conclude that the fistula is closed and the patient is continent of urine (cured).** A few days after removal of the Foley catheter, **arrange** for discharge and usual follow-up, as long as there are no medical contraindications.

Assessing Outcomes Following Vesicovaginal Fistula Repair



From the surgical perspective, a vesicovaginal fistula repair can be confirmed as successful if:

- ✓ The **dye test is negative** prior to removal of the Foley catheter (normally, between 10-14 days postoperatively).
- ✓ After the Foley catheter has been removed, the **postvoid residual volume of urine is less than 100 mL and less than 50% of the voided amount**.
- ✓ The **pad is dry** the day after the Foley catheter has been removed.

5.2.2. Assessing Outcomes Following Rectovaginal Fistula Repair

If the patient had a concurrent vesicovaginal fistula then outcomes should be assessed after Foley catheter removal, 10–14 days after surgery. If the patient had a rectovaginal fistula in isolation, repair outcomes should be assessed once she is passing stool normally, 4–5 days after surgery. Following surgery for a rectovaginal fistula, the patient should be asked about and examined for any bowel incontinence. The presence of faeces in the vagina is usually enough to confirm a rectovaginal fistula. If in doubt, a rectal dye test should be performed (*see* Dye Test for Rectovaginal Fistula; page 16). As most rectovaginal fistula patients have a concurrent vesicovaginal fistula, this assessment is usually delayed until the Foley catheter has been removed, so that the rectovaginal fistula and vesicovaginal fistula can be assessed together. However, if the patient complains of passage of stool through the vagina prior to the removal of the Foley catheter, a gentle examination can be undertaken earlier.

5.3. Physiotherapy for Ongoing Incontinence

Ongoing Urinary Incontinence

Despite a successful fistula closure, depending on the nature and extent of the original injury, postoperatively it is estimated that 15%–33% of women will continue to experience varying degrees of urinary incontinence.[99] Physiotherapy can reduce or even cure this.[100] Identifying the cause of the ongoing incontinence will inform the most appropriate course of treatment. The most common types are:[101]

- Stress incontinence caused by increased pressure on the bladder (e.g. coughing, laughing, exercise or lifting).
- Urge (or urgency) and urge incontinence caused by an overactive bladder, which is usually accompanied by urinary frequency.
- A combination of both stress and urge incontinence.
- Overflow incontinence caused by retention of urine.

Physiotherapy for ongoing incontinence is likely to include regular pelvic floor exercises[102] and/or a bladder re-education programme. The latter, 'bladder training', is used to gradually increase the volume of a small and/or scarred bladder so that the patient is able to hold urine in greater quantities and for longer periods of time, without discomfort or leaking, before needing to pass urine. It is also the first line of conservative management for urge and urge incontinence.

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[99] Keyser and McKinney. *Implementing Physical Rehablitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*. 45.
[100] L. Keyser, J. McKinney, C. Salmon, C. Furaha, R. Kinsindja, N. Benfield. Analysis of a Pilot Program to Implement Physical Therapy for Women with Gynecologic Fistula in the Democratic Republic of Congo. *Int J Gynecol Obstet* (2014); Y.J. Castille, C. Avocetien, D. Zaongo, J.M. Colas, J.O. Peabody, C.H. Rochat CH. Impact of a Program of Physiotherapy and Health Education on the Outcome of Obstetric Fistula Surgery. *Int J Gynecol Obstet* (2014).
[101] Lewis and de Bernis. *Obstetric Fistula: Guiding Principles for Clinical Management and Programme Development Documents*.
[102] Keyser and McKinney. *Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*. 106–19.

Keyser and McKinney[103] recommend that all patients are placed on a bladder and fluid schedule after catheter removal, although it is important to tailor this to the needs of each patient.

Bladder and Fluid Schedule

Table 1. Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers.[104]

Timed or planned voids (timed urination)
A voiding schedule might be beneficial for patients with urgency, increased/decreased urinary frequency and those who do not have a regular urge to urinate. • Immediately after the catheter is removed, the patient should use the toilet every hour, even if there is no urge to do so. This does not need to be continued at night, unless she has an urge to urinate. • After 5–7 days, voiding times should be increased by 15 minutes each week, i.e. week 1 = 60 minutes, week 2 = 75 minutes, week 3 = 90 minutes. • By doing this, the patient may train to void every 2–4 hours.
Fluid schedule
• It is important that patients stay hydrated by drinking enough water or fluids regularly throughout the day. Patients should track their water intake and are often advised to drink 2–3 litres of water per day or 250 mL each hour.[105] • The fluid schedule can be timed with the voiding schedule, by encouraging patients to drink a cup of water after going to the toilet. • Patients should decrease water intake 2 hours before going to sleep to prevent nocturia or nocturnal enuresis.
Triple voiding
This technique may help patients with incomplete voiding or residual urine remaining in the bladder after urination. • When patients have the urge to urinate, they are advised to try to empty their bladder three times within 10–15 minutes. After initially emptying the bladder as much as possible, the patient should move around and then try voiding again after 3–5 minutes. This should then be repeated for a third time.

Ongoing Faecal Incontinence

Ongoing faecal incontinence after surgery may be due to a deficient internal anal sphincter, which can be difficult to treat, and patients therefore benefit from a multidisciplinary approach, including physiotherapists, dietitians and gynaecologists. However, if such a team is not available, task shifting

[103] Keyser and McKinney. Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers. 102–3.
[104] Keyser and McKinney. *Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*. 102–3.
[105] FIGO recommends that the patient should drink sufficient fluid to ensure her urine is clear at all times.

amongst existing staff can be very beneficial, for example training nurses in pelvic floor rehabilitation. Generally, treatment should include pelvic floor exercises[106] and pain management. Dietary manipulation to bulk up stools can also contribute to reducing ongoing faecal incontinence, but this should only be done once the tissues have healed, ideally 3 months post repair.

5.4. Predischarge Advice

The period around discharge is a crucial phase in the recovery journey of a fistula patient. As well as carrying out all of the necessary postoperative health checks to ensure that the patient is ready for discharge, comprehensive advice should be offered to ensure a successful transition, including self-management on leaving the hospital, family planning and follow-up.

Information and advice should be carefully communicated to all patients and to their accompanying companions (as appropriate), and is particularly important for those who have had an obstetric fistula. This time should also be used to plan follow-up visits. The topics below should be thoroughly covered in predischarge discussions with the patient and should be tailored according to the injury, type and aetiology of fistula or other reconstructive surgeries described in this manual.

Self-management

- For patients who had a vesicovaginal fistula, to ensure adequate fluid intake to make certain that urine continues to be clear at all times and to void frequently, or as recommended if following a bladder training regime.
- For patients who had a rectovaginal fistula or perineal tear, to ensure a suitable diet to avoid constipation and straining to push hard stool past the repair, particularly in the first 3 months while the tissues heal. If necessary, to take a laxative (bisacodyl) as prescribed. Note that this advice may need to be adjusted for patients with ongoing faecal incontinence.
- To continue recommended physiotherapy activities, including motor rehabilitation, ambulation, bladder training and pelvic floor exercises, as instructed.
- To avoid heavy lifting and heavy work for 3 months.
- To abstain from sexual intercourse for 3–6 months to prevent repair breakdown, and ideally to avoid a pregnancy for 1 year (if the patient has not had a hysterectomy and is not postmenopausal).
- Occurrence and management of sexual problems, for example vaginal stenosis.
- How to prevent the development of a subsequent obstetric fistula.

Family planning, future pregnancies and fertility (for patients who have not had a hysterectomy and are not postmenopausal)

- Information on family planning and a suitable method of contraception offered.
- Information about possible infertility as a result of the fistula.

[106] Keyser and McKinney. *Implementing Physical Rehabilitation Services into Comprehensive Fistula and Maternity Care: A Training Guide for Health Care Workers*. 106–19.

For all women who still have or have had an obstetric fistula (whether the repair was successful, partially successful, unsuccessful or if no repair was done), to ensure delivery by elective caesarean section in all subsequent pregnancies.

Communication and Support

- Contact details of the repair facility (and/or key staff members) should be routinely given to patients in case of any further incontinence, postoperative problems or for future pregnancies.
- Contact details for further support and counselling should always be given in case additional emotional and social support is needed.
- Some facilities may discuss whether the patient is interested in raising awareness about obstetric fistula within her community to prevent and/or help other women with the condition by referring them to appropriate treatment centres.

Follow-up Appointments and Journey Home

- Follow-up appointments should be arranged at 3, 6 and 12 months postoperatively and clearly explained to the patient before discharge.
- The importance of keeping follow-up appointments should be emphasised and any potential barriers that could affect follow-up addressed, e.g. by providing financial support for travel to and from hospital.

After surgery, many facilities also arrange transport for patients to return home at no additional cost. It is critically important that the patient is advised to request regular toilet stops on the way home to avoid overdistension of the bladder and potential breakdown of a vesicovaginal fistula repair.

- All operative and postoperative details should be recorded on a discharge card, which the patient should be advised to keep safe and to present to health teams in all future pregnancies.

6. Audit and Research

This chapter provides information about the key components required for clinical audit and conducting robust research. Clinical audit is now mandatory in many contexts and research, although optional, can contribute to the existing evidence base and advance clinical practice.

6.1. Audit

Clinical audit is an essential aspect of good clinical governance with regards to improving and maintaining high clinical standards and patient safety. Clinical audit should form an intrinsic part of clinical activity and should be conducted at regular intervals to monitor clinical practice and performance. In recent times, good practice in clinical audit has shifted from a purely profession-centred perspective towards a patient-centred approach. As such, clinical audits aim to improve the quality of patient care and outcomes by systematically reviewing the standard of care against agreed criteria and consequently implementing changes to clinical practice.[107]

Clinical audits should follow a systematic process,[108] but may vary depending on the location, terminology and steps. The five key stages are outlined below.

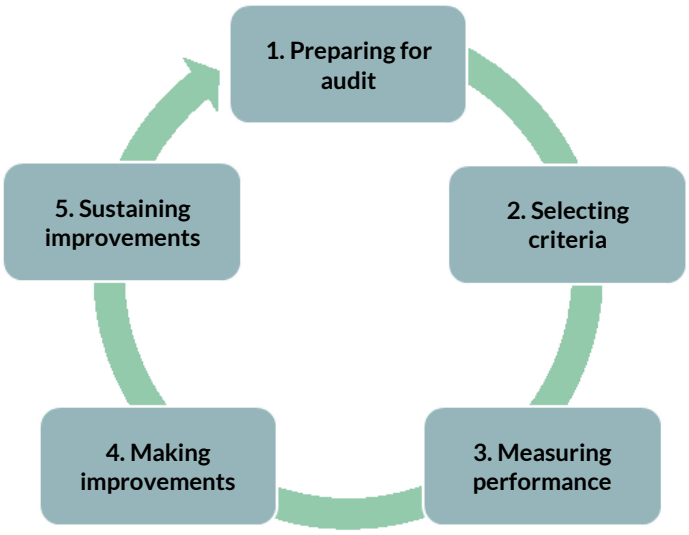

Figure 77. Chronological steps involved in a systematic clinical audit.

1. Preparing for audit: The first step is to identify an issue that requires improvement. Complaints or critical incidents can be useful to help identify problems. Thorough and honest clinical record keeping will aid this process.

2. Selecting criteria: Audit criteria establish measurable outcomes and standards prescribe the level of care for each of the audit criteria to meet. Both audit criteria and standards should always be

[107] National Institute for Clinical Excellence. *Principles for Best Practice in Clinical Audit*. Abingdon: Radcliffe Medical Press (2002).
[108] National Institute for Clinical Excellence. *Principles for Best Practice in Clinical Audit*. Abingdon: Radcliffe Medical Press (2002).

objective, set in advance, based on the best available evidence and feasible in relation to the local context.[109]

3. Measuring performance: It is essential to clearly identify the information sources, data collection techniques and participants (e.g. patients and healthcare professionals) required to accurately establish current standards. Information gathered should cover a sufficient period of time, so that patterns can be identified and monitored. Ethics and patient confidentiality must be respected throughout the data collection process. Analyse the collected data and compare performance with the preidentified criteria and standards. The comparison will identify areas for improvement in clinical care and outcomes and should guide the implementation of changes.

4. Making improvements: An action plan to implement the necessary changes will need to be developed and should be outcome oriented, time bound, realistic and objective. It is good practice for the action plan to be agreed at all levels before sign-off and implementation.

5. Sustaining improvements: Ensuring any improvements are sustained is essential and, therefore, every clinical audit should include plans to monitor and to maintain changes, e.g. through re-audits.

6.2. Research

As with any medical subspecialty, robust and up-to-date research is needed to develop knowledge, new surgical techniques and improve practices and patient outcomes. In the field of obstetric fistula, the pool of new research remains limited and it is therefore recommended that surgeons carry out their own studies and try to publish in order to increase the evidence base.[110] Even if research projects are not published, the process can help improve surgeons' own practices and results. Prior to initiating a research project, a systematic review of the literature related to the topic is necessary to understand the existing evidence and to identify gaps.

Research participants are of vital importance and the researchers have a duty of care to protect participants and their rights. To protect patient participants and to preserve the integrity of the research, it is vitally important to adhere to generally accepted research ethics as well as the institutional ethical guidelines.

There are a few key principles to help conduct ethical research:[111]

Socioclinical value: The aim of the research should be directed towards improving ways of managing or caring for patients to justify exposing participants to the risk and burden of research.

Risk–benefit ratio: The risks and discomfort associated with the research should be mitigated as far as possible and, overall, the benefits should outweigh the risks.

[109] W. Graham, P. Wagaarachchi, G. Penney, A. McCaw-Binns, K.Y. Antwi, M.H. Hall. Criteria for Clinical Audit of the Quality of Hospital-Based Obstetric Care in Developing Countries. *Bull World Health Organ* (2000).
[110] R. Pope and M. Beddow. A Review of Surgical Procedures to Repair Obstetric Fistula. *Int J Gynecol Obstet* (2020).
[111] E.J. Emanuel. What Makes Clinical Research Ethical? *JAMA* (2000).

Ethics approval: All research involving people requires ethical approval by a relevant and qualified ethics committee. This process protects both researchers and participants. If not ethically approved, then modifications will need to be made to the study design.

Validity: The research should be based on reasonable and realistic goals and the methods should be valid, clear and feasible. The research should always be conducted within the ethical limits. Thorough and robust data analysis is key to any research validity. If the researcher does not possess this skill set then it is advisable to collaborate with skilled data analysts. It is of vital importance to make data available, as well as to adequately store, share and reuse it to avail the true potential of the research.

Participant selection and respect: Participant selection should be relevant and unbiased, and participants should have enough details to make informed autonomous decisions. The participants' privacy and confidentiality need to be respected at all times and they should be allowed to withdraw from the study at any time. They should also be provided with appropriate support in case they experience adverse reactions or unexpected effects. Participants should also be informed of the research results.

6.3. Research Methods

A variety of research methods can be used for auditing and research purposes and should be selected based on their suitability to meet the research objectives.

Quantitative Methods

Quantitative methods focus on collecting numerical data through, for example, polls, questionnaires and surveys, which may be carried out in person, via phone or email, on paper or using freely available software, e.g. SurveyMonkey, Google Forms and SurveyPlanet. [112] The data are usually analysed using Excel (Microsoft) or more sophisticated statistical software, e.g. SPSS, R, STATA. [113] Quantitative research often uses larger sample sizes to generalise the results across a population and/or to test a hypothesis or particular intervention, i.e. that a particular treatment is effective or not. The latter is especially relevant when conducting randomised controlled trials.

Quantitative research has the advantage that it follows established standards and can be replicated and compared with other studies. It is generally seen as more objective as it reduces the risk of researcher bias and breaches of participant confidentiality. However, quantitative methods are limited in their capacity for more in-depth investigation and explanation of the reasons behind unexpected results.

Qualitative Methods

Qualitative research investigates the nature of reality, with a focus on processes and meanings and recognition of the relationship between the researcher and participants. Qualitative data can be collected using a variety of creative methods, most commonly in-depth, semistructured or

[112] SurveyMonkey. www.surveymonkey.co.uk. Accessed November 5, 2020; Google Forms. www.google.co.uk/forms/about. Accessed November 5, 2020; surveyplanet. www.surveyplanet.com. Accessed November 5, 2002.
[113] IBM SPSS software. www.ibm.com/analytics/spss-statistics-software. Accessed November 5, 2020; The R Project for Statistical Computing. www.r-project.org. Accessed November 5, 2020; STATA software. www.stata.com. Accessed November 5, 2020.

unstructured interviews and focus groups, either face to face, via email or telephone. During analysis, the researcher seeks to identify emergent themes to inform findings, which can be done by hand or using software, e.g. ATLAS.ti, NVivo.[114] Due to the relatively small sample sizes often used in qualitative research, in most cases the research should be treated as a case study and findings cannot be generalised to a wider population.

Qualitative methods have the advantage of collecting in-depth data, enabling more detailed responses to research topics, and allowing for unexpected results. However, they tend to be time-consuming and resource heavy.

Mixed Methods Research

This approach combines both quantitative and qualitative methods within a single piece of research to capitalise on strengths and minimise weaknesses of each approach, thereby enhancing the validity and reliability of the research.

Publication of Research

For clinicians interested in conducting research who have developed a good understanding of research methodologies and analysis, publishing research might be a possibility. The existing body of literature in the field of obstetric fistula is extremely limited, therefore well-conducted new research is needed to improve clinical practice and fistula patient care.

When seeking to publish a journal article, it is important to find a scientific journal that is suitable for the research topic, peer reviewed, well-regarded and has a relatively wide reach. Each journal will have author guidelines that must be carefully followed. It is generally prohibited to submit an article to more than one journal at a given time.

The journal might request that the author revises the article after peer review before the article is accepted and then published. If the article is rejected in the first instance, it might be possible to rectify the issues and resubmit depending on individual journal policy. In both scenarios, it is vital for authors to be responsive, to maintain good relations with the editors and it is good practice to accept invitations to participate in peer review of others' research.

Alternatively, there are often opportunities to present research at appropriate conferences and meetings. Authors are usually asked to submit an abstract for either an oral or poster presentation, which will be reviewed and accepted or rejected by an organising committee.

[114] ATLAS.ti. www.atlasti.com. Accessed November 11, 2020; NVivo. www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home. Accessed November 5, 2020.

Learning Resources

FIGO Fistula Resource Hub

For a comprehensive list of learning resources, which is updated regularly to include all the latest publications, please visit the FIGO Fistula Resource Hub on www.figo.org/fistula-resources.

Fistula Surgery Books

Breen M. (2019). *Manual of Obstetric Fistula Surgery*. Carlisle: The Foundation for the Global Library of Women's Medicine.*

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Waaldijk K. (2015). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: Sphincter Ani Rupture, Cut-thru Trauma*. Limburg: Printmarkt.

Waaldijk K. (2016). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: Functional Pelvis Anatomy in the Female*. Limburg: Printmarkt.

Waaldijk K. (2018). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: Corpus Intrapelvinum, Connective Tissue Body of Pelvis with Endopelvis Diaphragm*. Limburg: Printmarkt.

Waaldijk K. (2018). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: Yankan Gishiri Fistula, Kees Continent Urethra Reconstruction*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 028 Kees Ic Stool Fistulas*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 027 Kees Ib Stool Fistulas*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 026 Kees Ia Stool Fistulas*. Limburg: Printmarkt.

* free to access.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 025 Kees Stool Fistula Classification*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 024 Kees I Urine Fistulas*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 023 Kees IIbb Urine Fistulas*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 022 Kees IIba Urine Fistulas*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: 021 Kees IIab Urine Fistulas*. Limburg: Printmarkt.

Waaldijk K. (2020). *Obstetric Trauma Surgery, Art and Science, Setting Standards by Evidence-based Practice: Postpartum Hypotonic Bladder, Postpartum Urine Retention with Overflow Incontinence*. Limburg: Printmarkt.

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Nursing and Related Books

Drew LB, Ruder B, Schwartz DA. (2022). *A Multidisciplinary Approach to Obstetric Fistula in Africa – Public Health, Anthropological, and Medical Perspectives*. Cham: Springer Nature Switzerland AG.

Campbell IM, Asiimwe IS. (2021). *Nursing Care for Women with Childbirth Injuries*. Edinburgh: Uganda Childbirth Injury Fund; London: International Federation of Gynecology and Obstetrics.*

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  - Special Issue: Obstetric Fistula: Where We Currently Stand (2020). Volume 148, Issue S1.*
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* free to access.

† free to access but online registration necessary.

Surgical Training Videos available on Global Library of Women's Medicine (GLOWM)*

- Breen, Michael (2021)
  - Discussion on Gracilis Muscle Flaps and Skin Flaps in Fistula Repair.
  - Mini-Singapore Flap for Vaginal Reconstruction – With Commentary.
  - Singapore Flap for Vaginal Reconstruction in a Case of Vesicovaginal Fistula.
- Browning, Andrew: Fistula Repair Series (2018)
  - *Episode 1 Basic Principles: Tricks & Traps*.
  - *Episode 2 Perineal Tear Repair and Variations*.
  - *Episode 3 Circumferential Fistula Repair*.
  - *Episode 4 Ongoing Incontinence After Fistula Repair*.
  - *Episode 5 Singapore Neovagina*.

Websites*

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- International Society of Obstetric Fistula Surgeons (ISOFS)
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FIGO is a professional organisation that brings together more than 130 obstetrical and gynaecological associations from all over the world. FIGO's vision is that women of the world achieve the highest possible standards of physical, mental, reproductive and sexual health and wellbeing throughout their lives.

FIGO leads on global programme activities, with a particular focus on sub-Saharan Africa and South East Asia. One such programme is the Fistula Surgery Training Initiative, a pioneering project to train more fistula surgeons and multidisciplinary teams from fistula-affected countries so that significantly more women receive high-quality fistula care.

This manual, compiled by experts in the field, serves as a standardised training resource for the Fistula Surgery Training Initiative, as well as for the wider fistula community. The manual aims to equip surgeons with the knowledge and skills required to provide specialised surgical and holistic care for women affected by obstetric fistula.

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ISBN 978-0-9929457-0-1
Registered charity number 1113263
Registered company number 05498067