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.

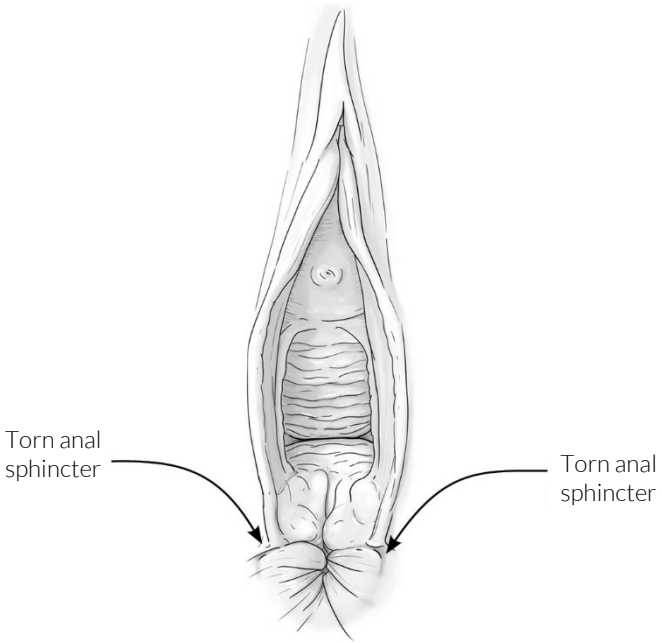

Figure 2. Fourth-degree tear frontal view.

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

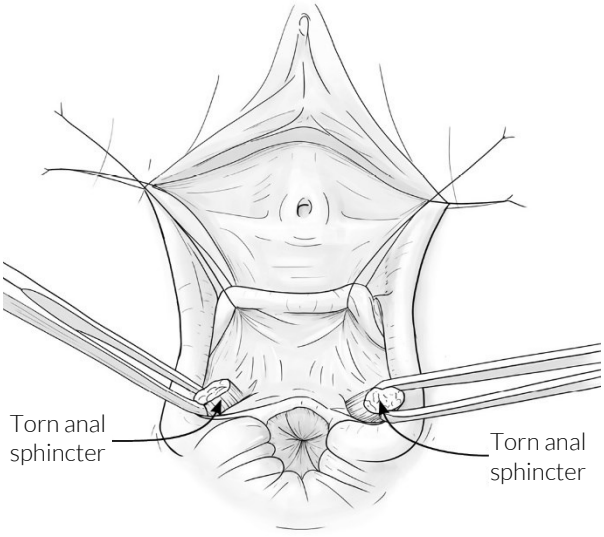

Figure 3. Dissection and grasping the end of the torn sphincter with Allis forceps.

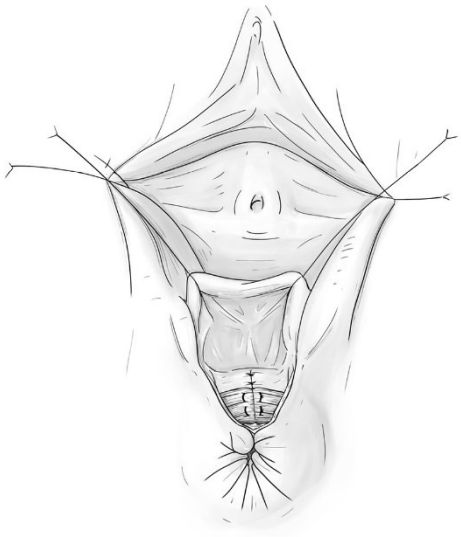

Figure 4. Rectum/anus repaired and the sphincter sutured together.

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
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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.

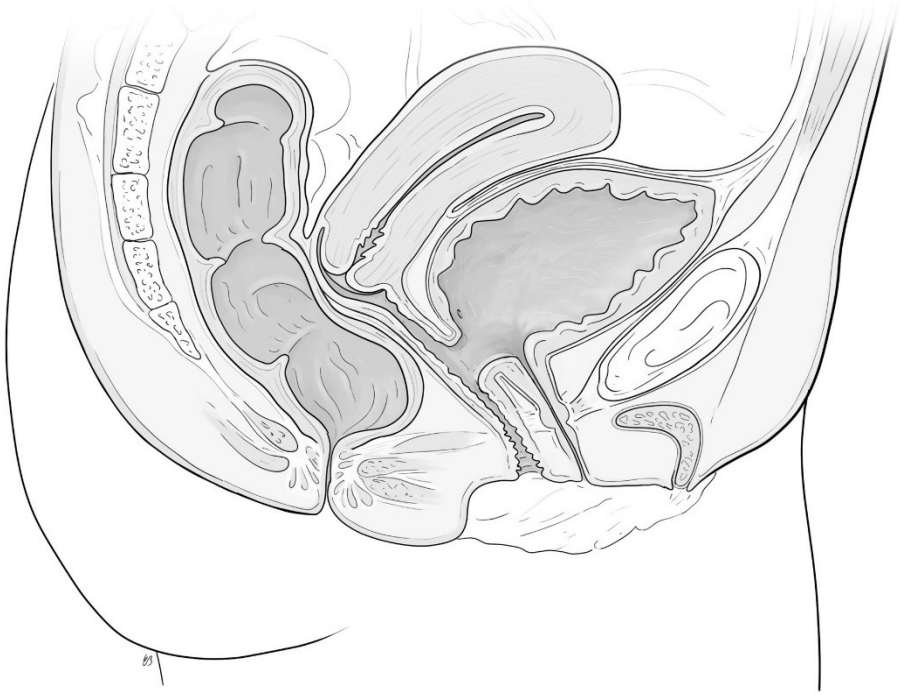

Figure 5. Cross-section of a simple vesicovaginal fistula.

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

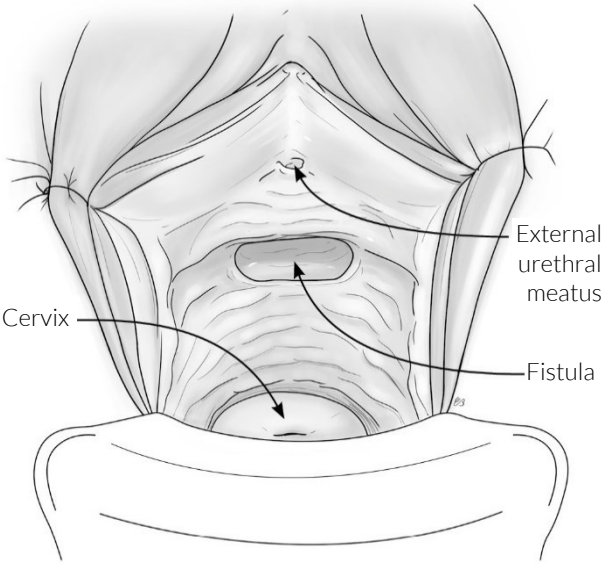

Figure 6. Vesicovaginal fistula (vaginal view).

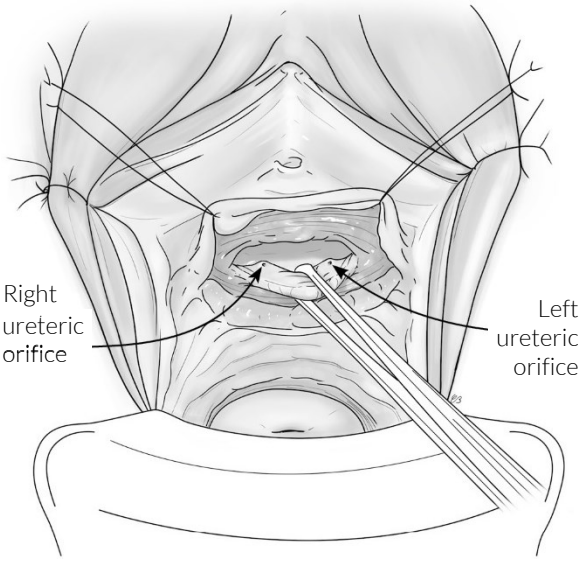

Figure 7. Identification of the ureters. If possible, this should be done before dissection occurs; however, sometimes when the ureters are deep inside they become apparent when the bladder is mobilised, making access easier.

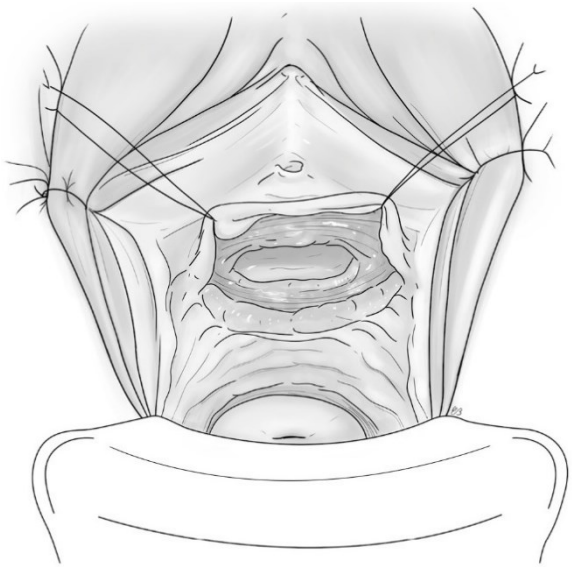

Figure 8. Adequate mobilisation.

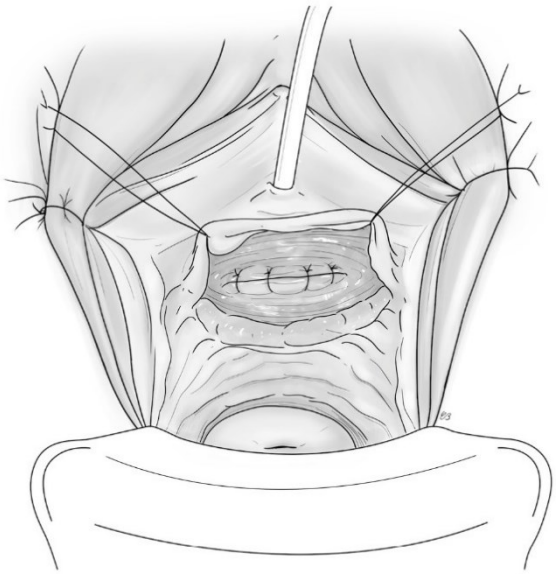

Figure 9. Repaired fistula with inserted Foley catheter.

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.

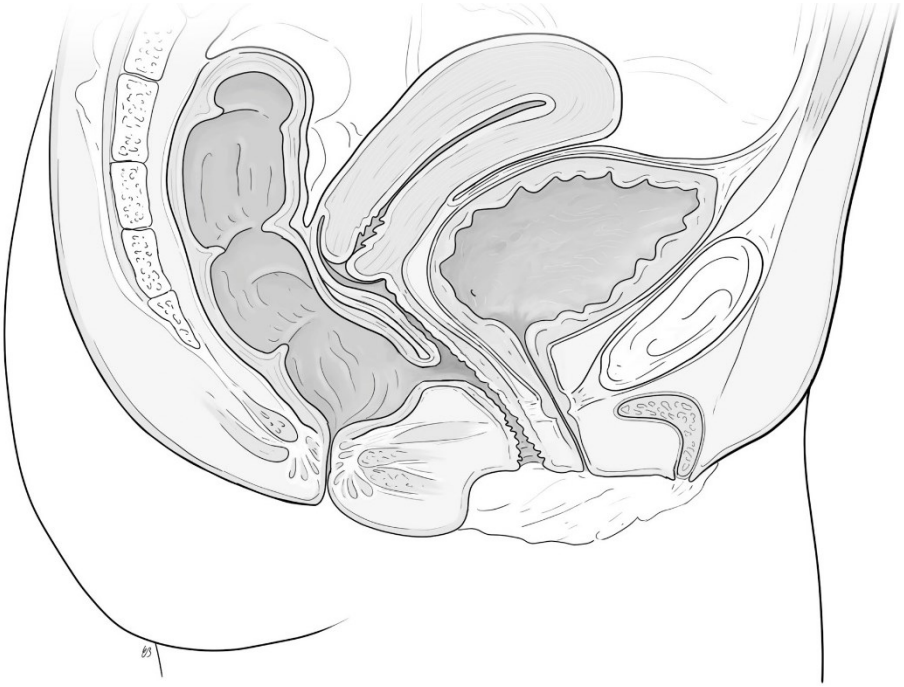

Figure 10. Cross-section of a simple rectovaginal fistula.

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

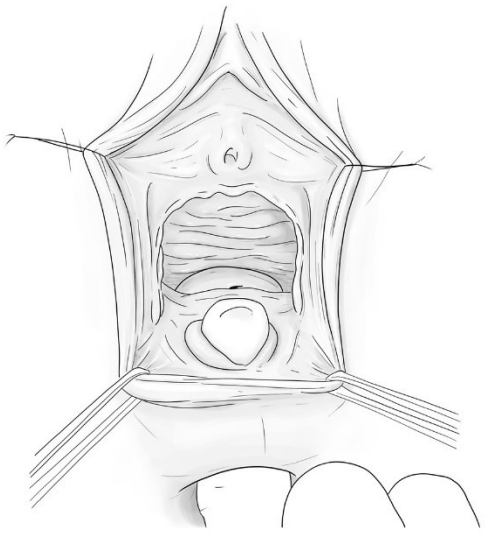

Figure 11. Digital examination of the anus drawing the rectovaginal fistula forward and into view.

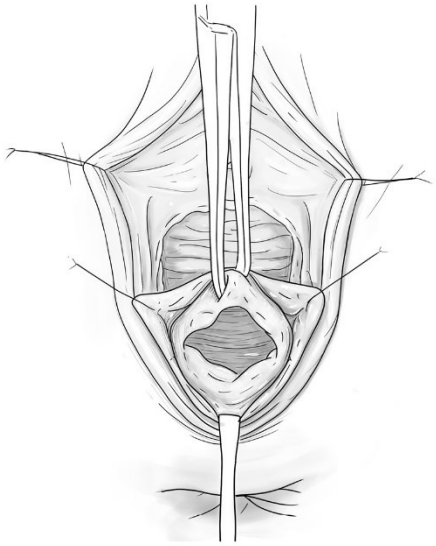

Figure 12. Dissection completed.

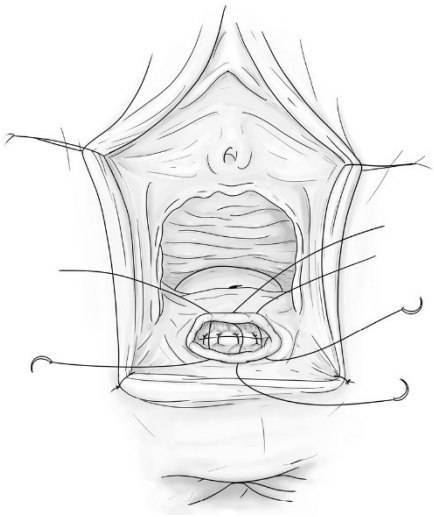

Figure 13. Rectovaginal fistula closed.

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.		
3.		
4.		
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6.		

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.

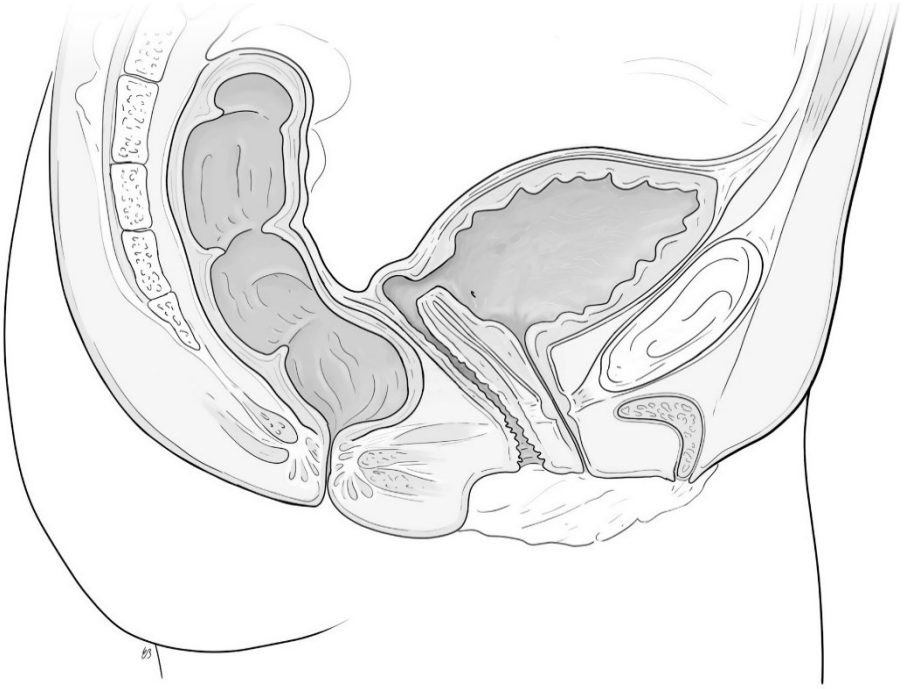

Figure 14. Cross-section of a vault vesicovaginal fistula.

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

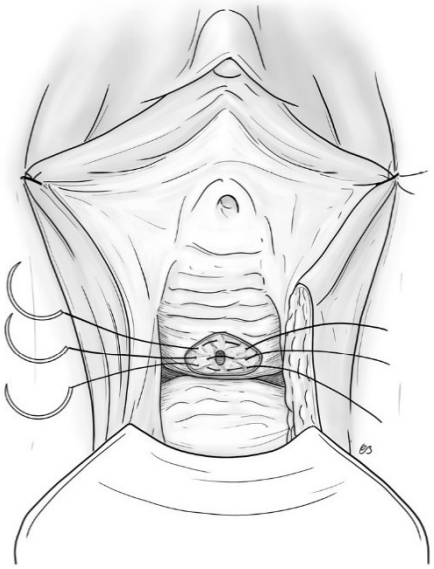

Figure 15. Fistula mobilised and sutures placed through the detrusor muscle of the bladder.

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

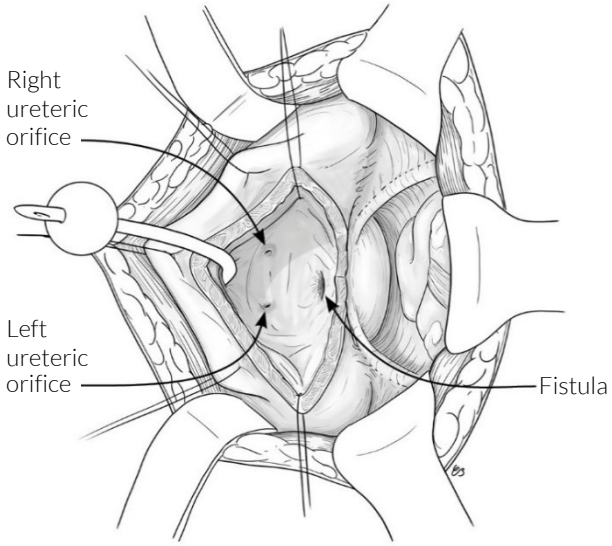

Figure 16. A vault fistula as seen via a laparotomy. A cystotomy has been done and the fistula can be seen.

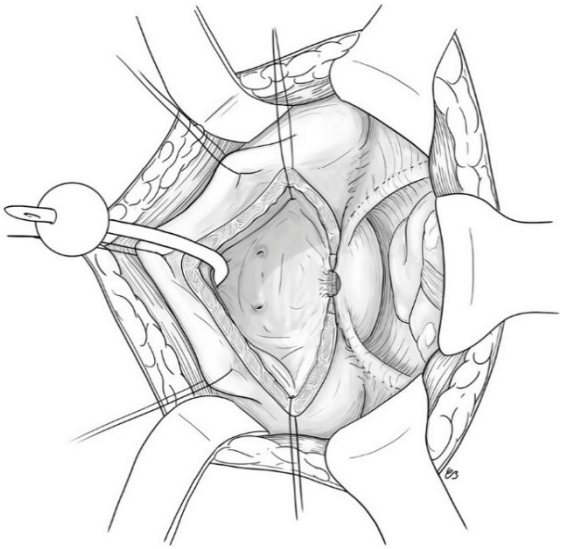

Figure 17. The cystotomy has been extended to the fistula (O'Conor method[64]). The bladder needs to be dissected off the cervix/vagina before both can be repaired.

[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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6.		

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.

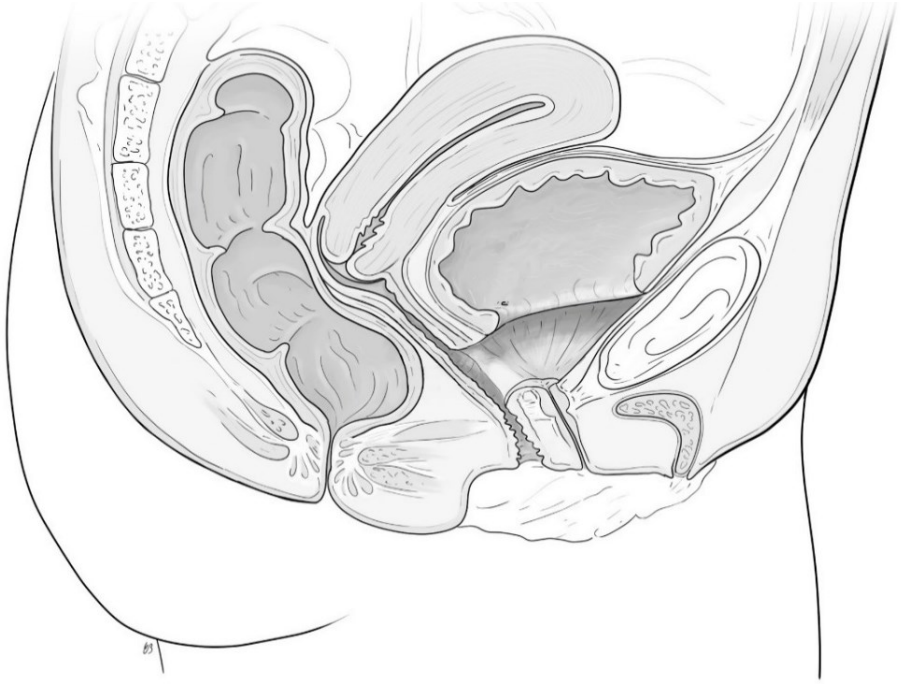

Figure 18. Cross-section of a circumferential vesicovaginal fistula.

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

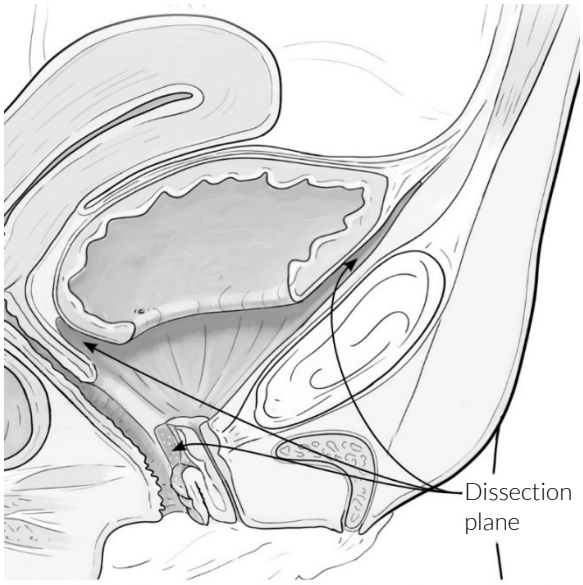

Figure 19. Mobilisation of the bladder circumferentially from the vagina and pubic bones. Distally the vagina has been reflected off the remaining urethra.

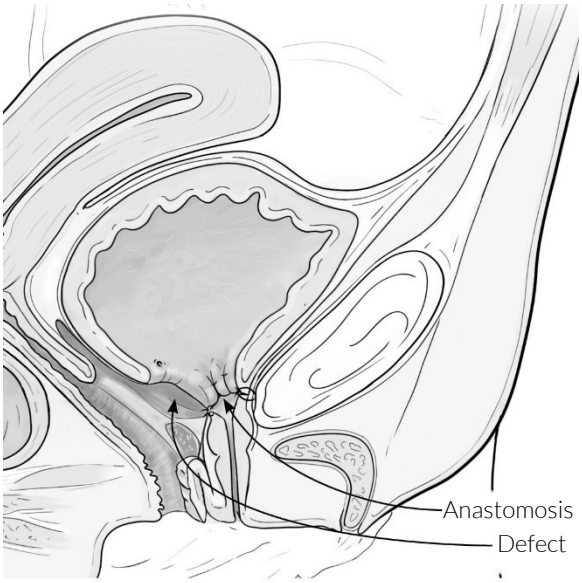

Figure 20. The bladder is anastomosed to the urethra anteriorly and laterally. Note, there was a large defect in the bladder needing an anastomosis to a small defect in the urethra. There remains a defect in the posterior bladder.

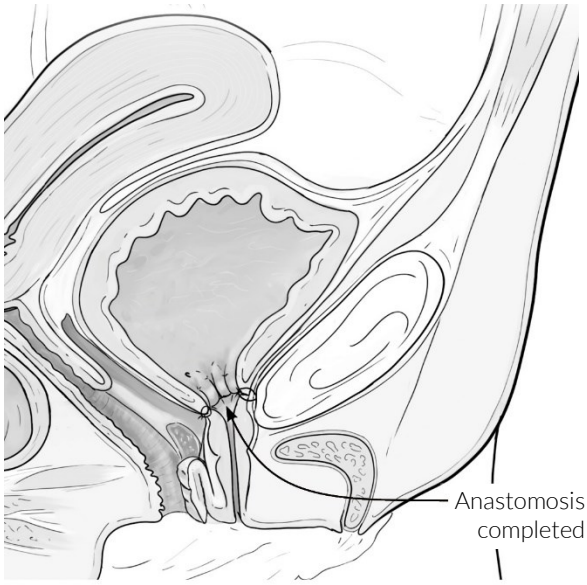

Figure 21. The remaining defect is repaired directly to the urethra.

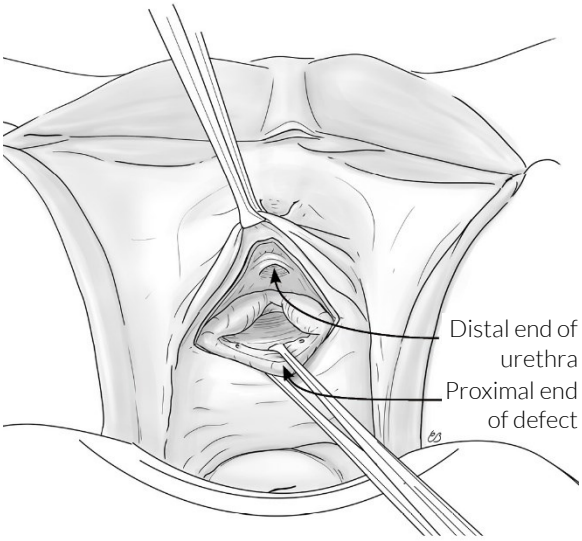

Figure 22. A circumferential defect as seen from the vagina with some vaginal dissection. The ureteric orifices are visible.

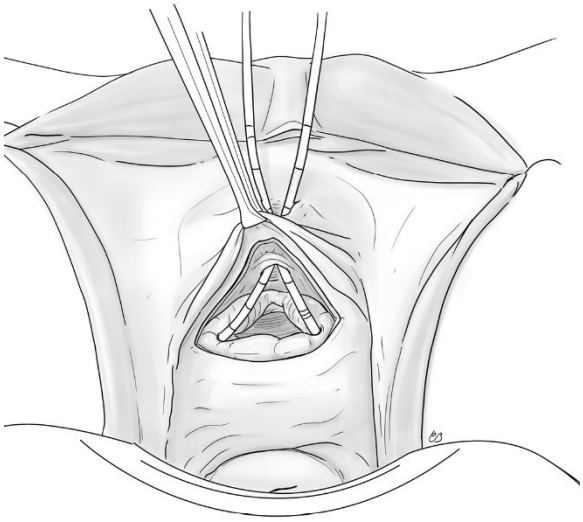

Figure 23. Catheterised ureters.

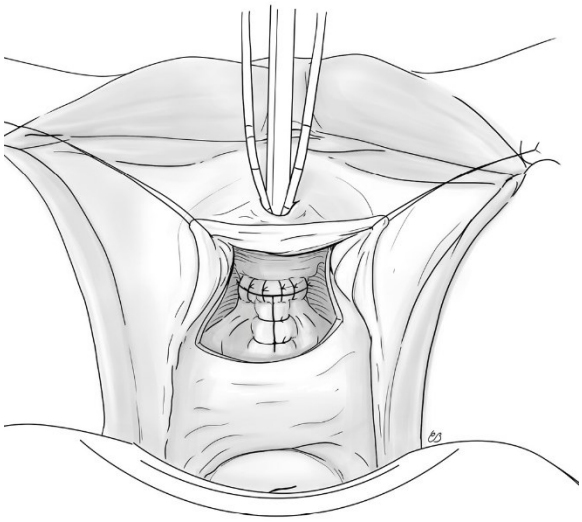

Figure 24. Ureters catheterised and the larger defect in the bladder is anastomosed to the small urethral lumen leaving a defect in the posterior bladder which, in this case, is repaired longitudinally.

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.		
2.		
3.		

4.		
5.		
6.		

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.

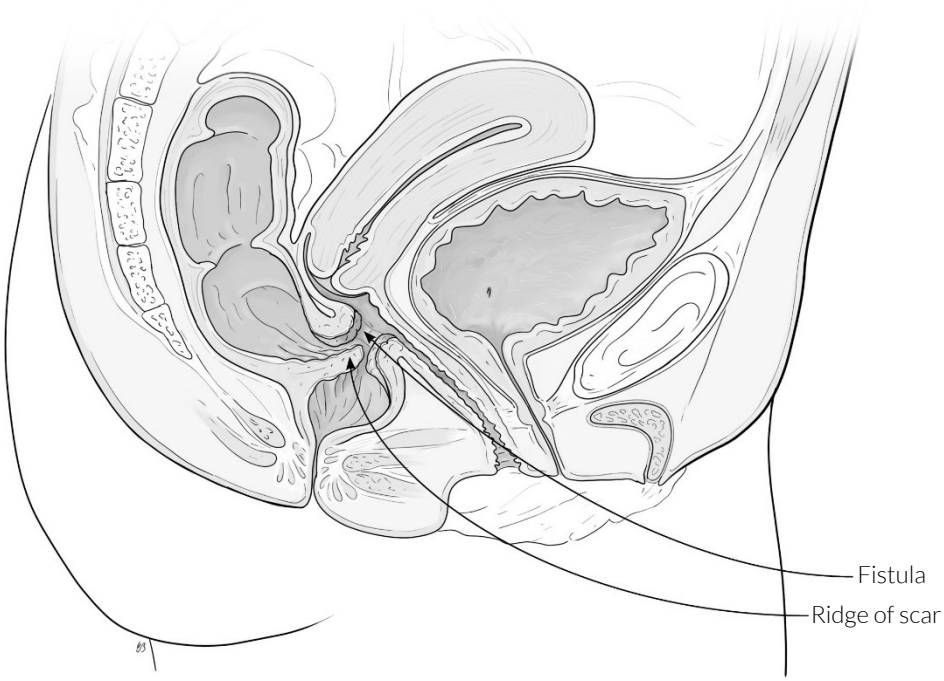

Figure 25. Cross-section of a high and scarred rectovaginal fistula.

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

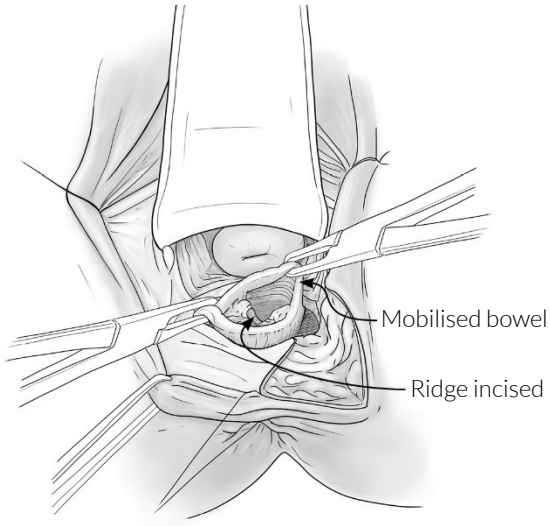

Figure 26. An episiotomy has been performed for ease of access. The vagina is reflected off the rectum and the posterior ridge of scar has been incised.

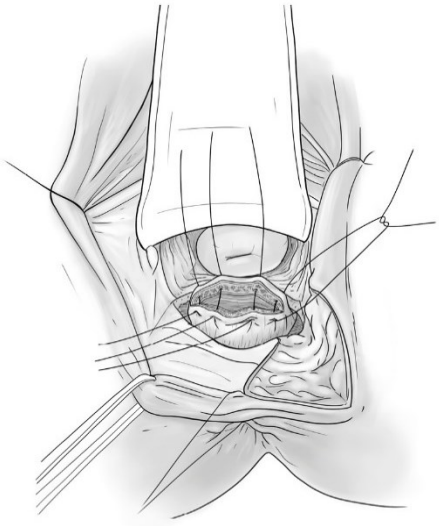

Figure 27. The anterior rectum is repaired with interrupted sutures. The sutures pass through the muscularis layer, excluding the mucosa.

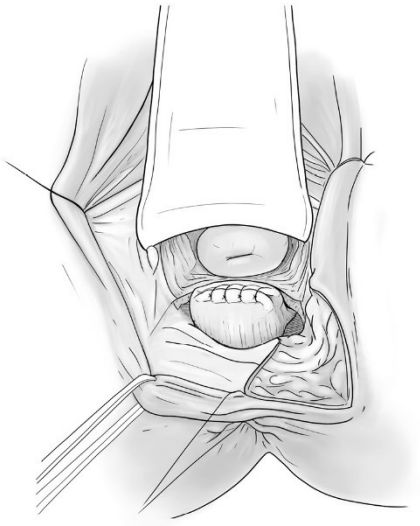

Figure 28. The rectum is repaired in two layers. Make sure the stricture is not occluding the lumen by doing a thorough rectal examination.

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

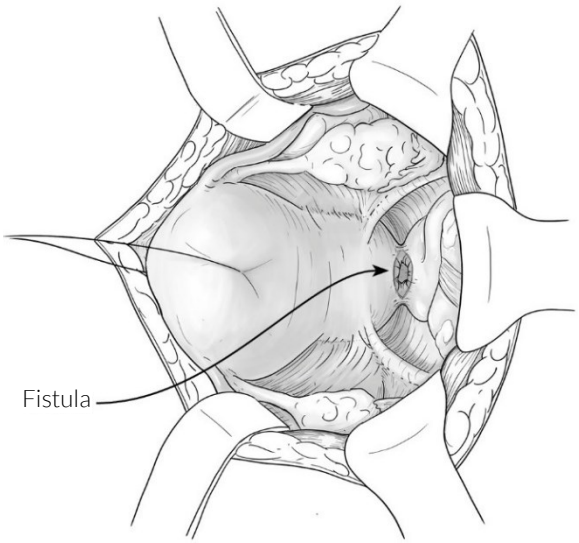

Figure 29. A high rectovaginal fistula as seen at laparotomy. The uterus is retracted with a suture to help expose the fistula.

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.		
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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.

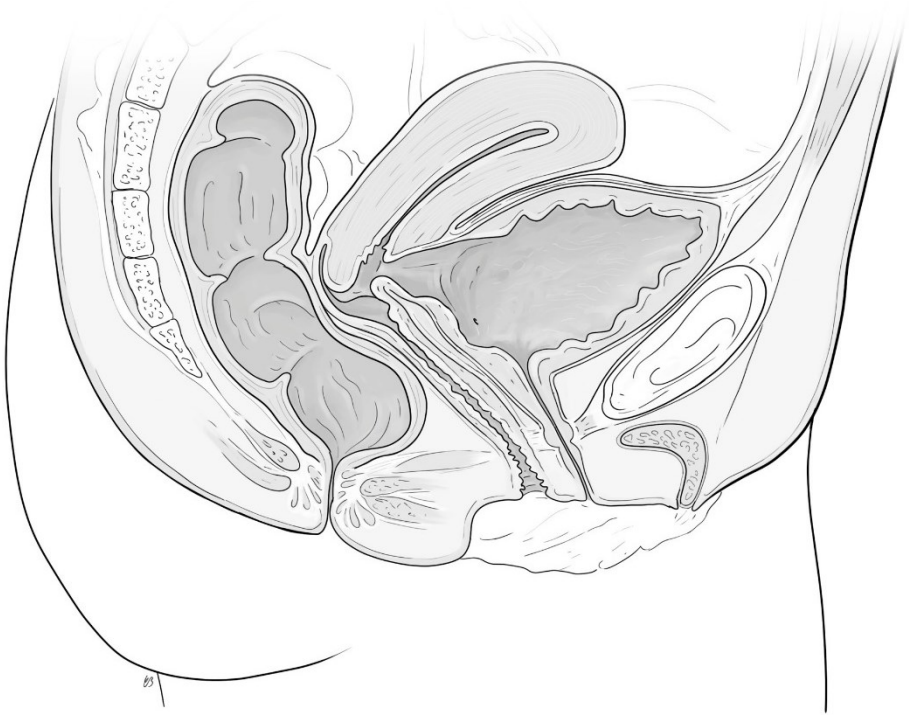

Figure 30. Cross-section of a vesicocervical/vesicouterine fistula.

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

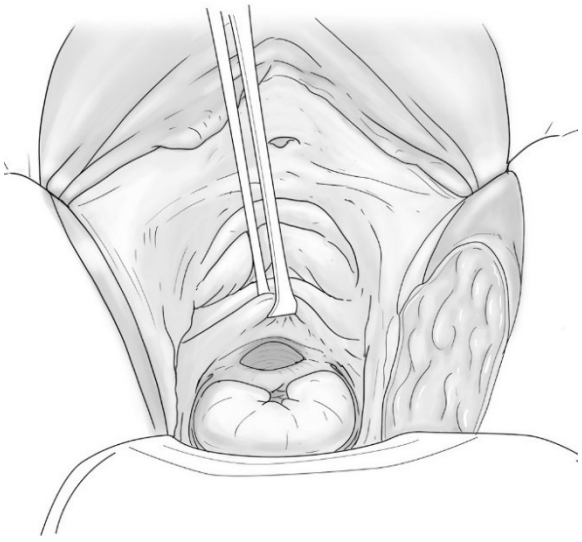

Figure 31. The intracervical fistula as seen from the vagina. Note the anterior cervix is almost missing and the cervical tissue around the fistula is almost absent.

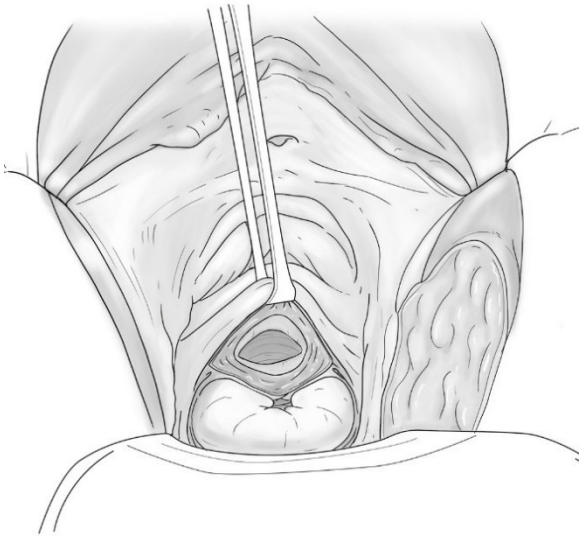

Figure 32. The fistula is mobilised off from the remaining cervix proximally and the vagina distally.

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

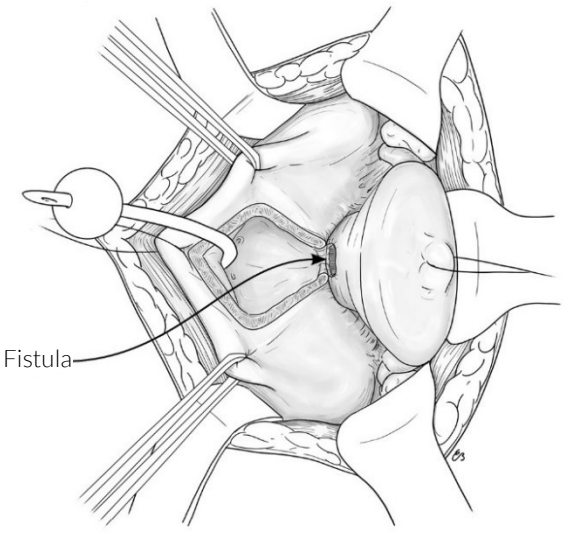

Figure 33. A vesicocervical fistula as seen at laparotomy. A cystotomy has been created and extended to the fistula. The Foley catheter has been brought out through the cystotomy.

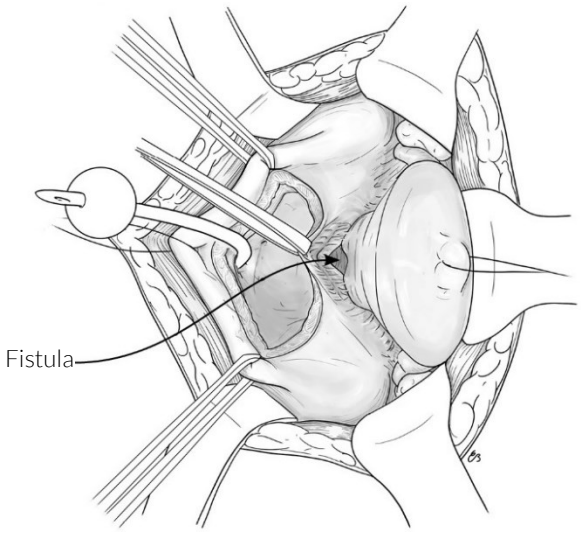

Figure 34. The bladder is mobilised off the cervix.

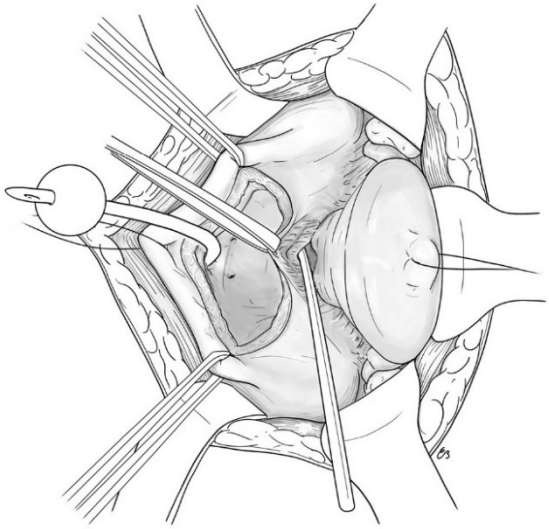

Figure 35. A probe is introduced through the defect in the cervix.

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.		
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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.

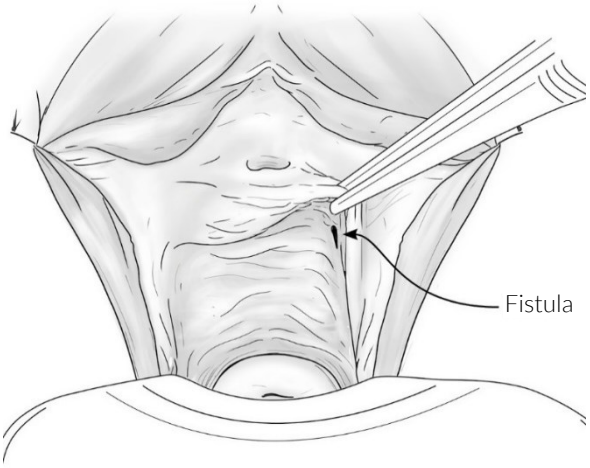

Figure 36. Frontal view showing a corner fistula against the pubic bone. This is a common fistula breakdown site.

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

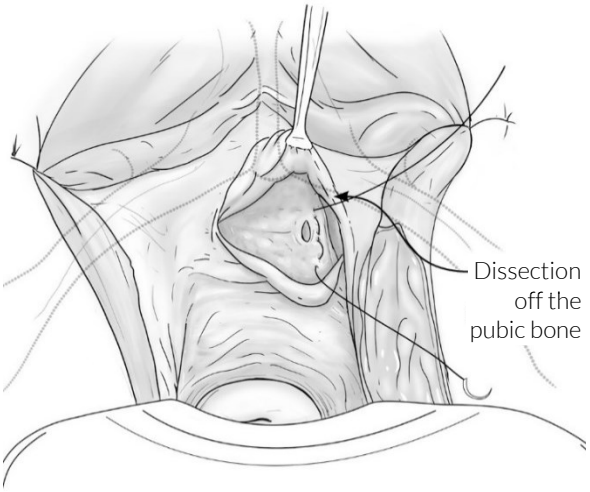

Figure 37. An episiotomy has been made for access. The vagina has been reflected and the bladder has been mobilised off from the pubic bone. The bladder can then come medially. The lateral angle suture is placed, in this case taking three bites: one distal to the angle, one just lateral to the angle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

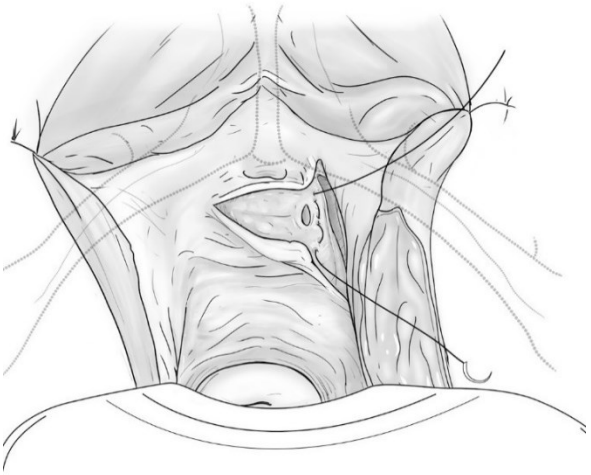

Figure 38. As in Figure 37 but here the vagina has been further reflected off the lateral walls along the sulcus against the bones. This is done proximally and distally to the fistula to help with access.

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

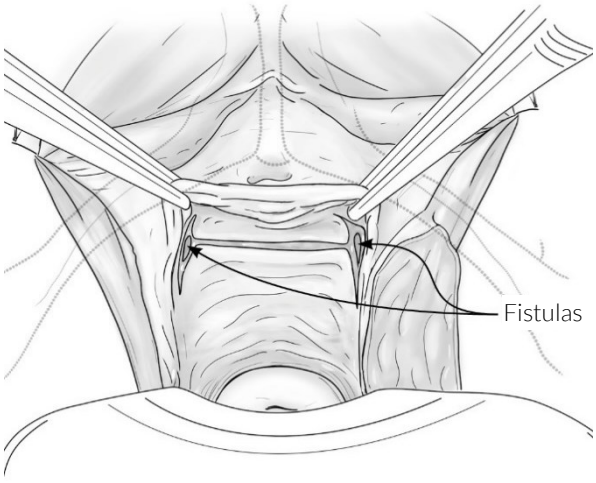

Figure 39. It is common to find bilateral corner fistulas, especially after a circumferential repair that did not secure the anterior urethra/bladder anastomosis satisfactorily. Connect the two fistulas through the vagina to mobilise both.

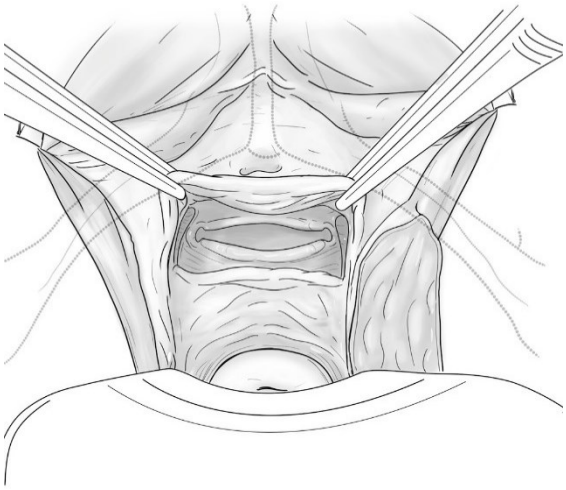

Figure 40. The vagina has been reflected and the two corner fistulas connected to make one large fistula. Often an anterior defect of an old circumferential fistula is revealed here and needs repairing. Note the lateral dissections of the bladder off the pubic bones.

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.		
3.		
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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.

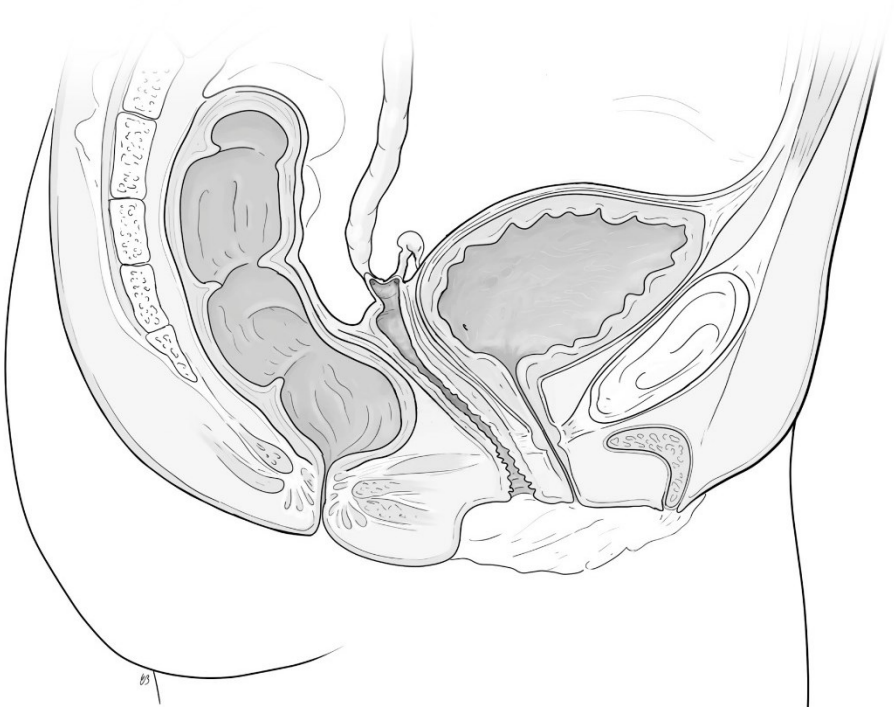

Figure 41. Cross-section of a ureterovaginal fistula. The ureter was cut or tied at caesarean hysterectomy. Note the stenosis in the ureter where it connects to the vagina, and the dilatation of the ureter proximal to the stenosis.

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

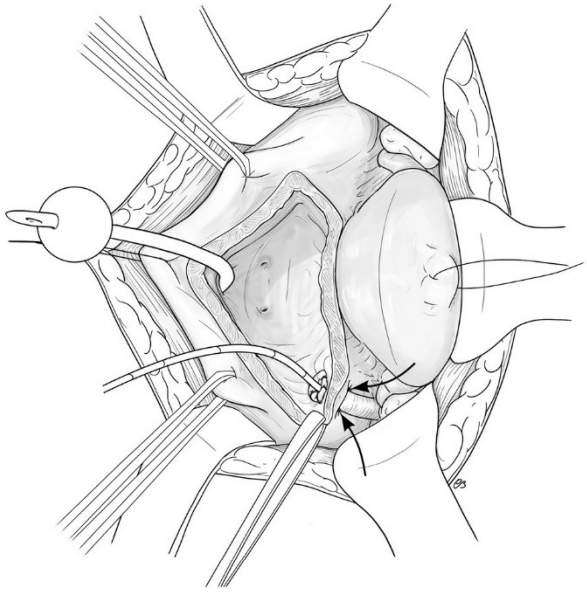

Figure 42. More commonly the ureter is implanted at laparotomy. The ureter has been mobilised and introduced through the broad ligament before implanting into the bladder via a cystotomy. It has also been fixed outside to the bladder serosa to reduce tension on the anastomosis.

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

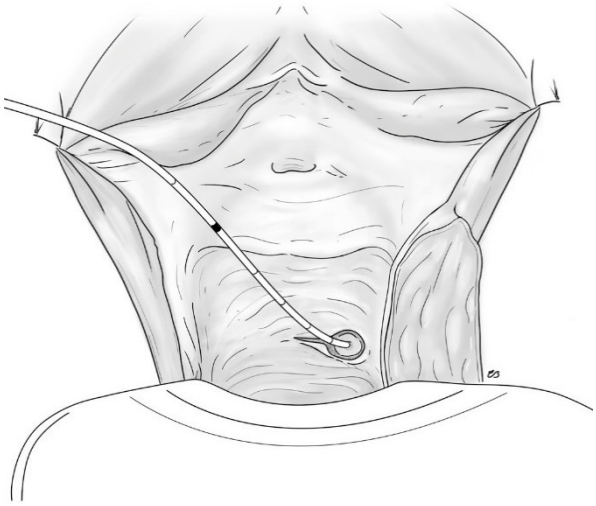

Figure 43. A ureteric fistula draining into the vaginal vault after hysterectomy. If the ureter is not too distorted and stenosed, it can be catheterised and implanted vaginally. The ureter is catheterised, and the initial vaginal incision has been made around the ureteric fistula and extended medially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

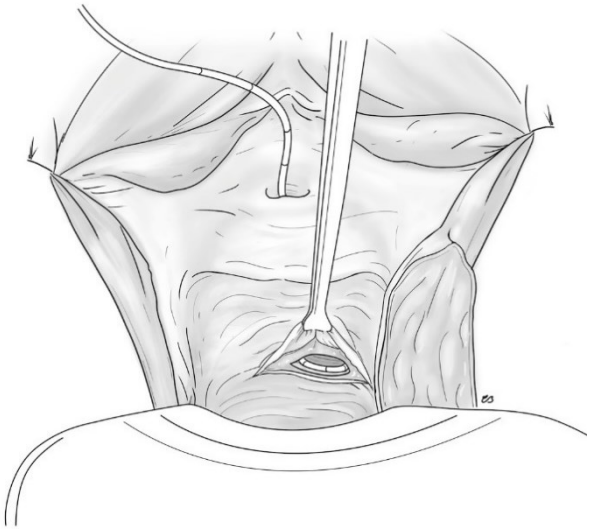

Figure 44. The vagina has been mobilised and the bladder entered from the vagina (cystotomy). The ureter can now be implanted. The ureteric catheter has been pulled into the bladder and out through the urethra.

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.

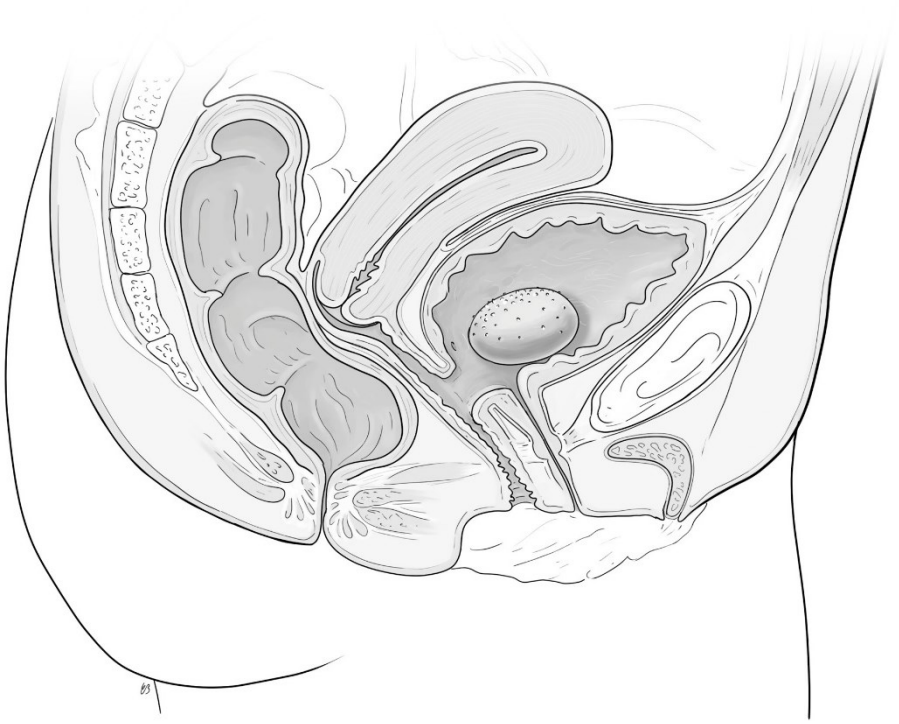

Figure 45. Cross-section showing a bladder stone with concurrent fistula. This stone could be removed vaginally through the fistula or it can be crushed with sponge-holding forceps if needed. The bladder should then be thoroughly irrigated through the fistula.

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

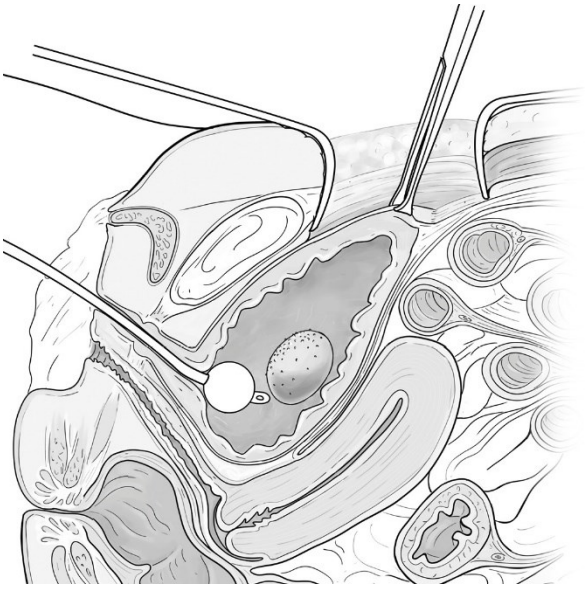

Figure 46. If a bladder stone is too large to be removed through the fistula or if there is no fistula, remove the stone by making a low transverse abdominal incision, staying in the preperitoneal space to prevent spillage into the peritoneal cavity.

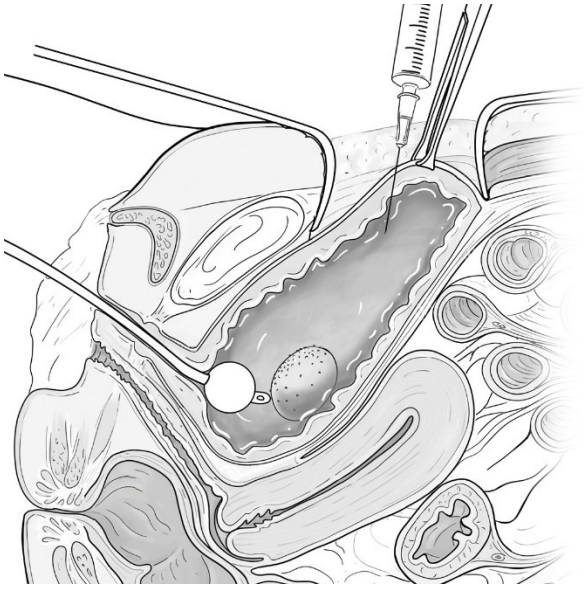

Figure 47. As it can be difficult to locate the bladder, the easiest way is to fill it through the Foley catheter. Make sure to be in the correct plane by inserting a syringe and withdrawing to identify urine. Aim the needle of the syringe into the pelvis to reduce the risk of bowel perforation.

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.

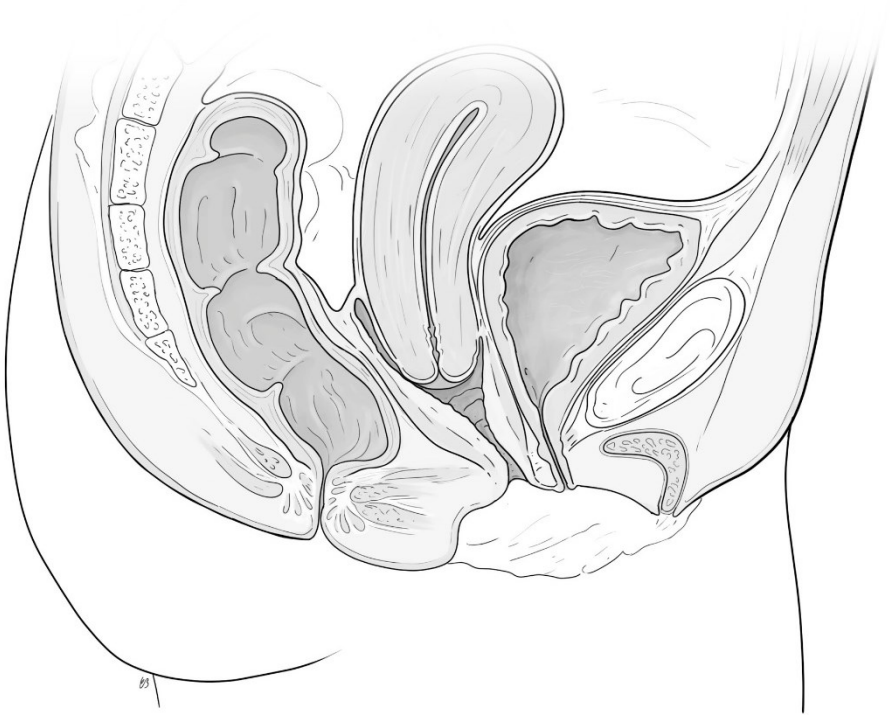

Figure 48. Cross-section showing severe vaginal stenosis.

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

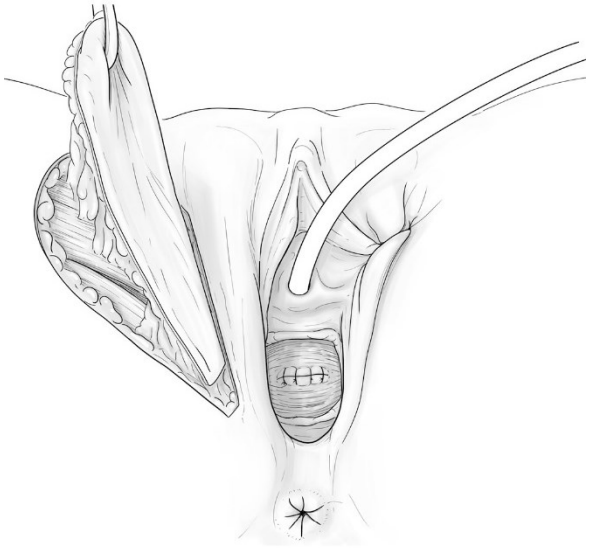

Figure 49. The harvest site of the Singapore flap in the groin crease leaves a wide pedicle centred just medially to the ischial tuberosity.

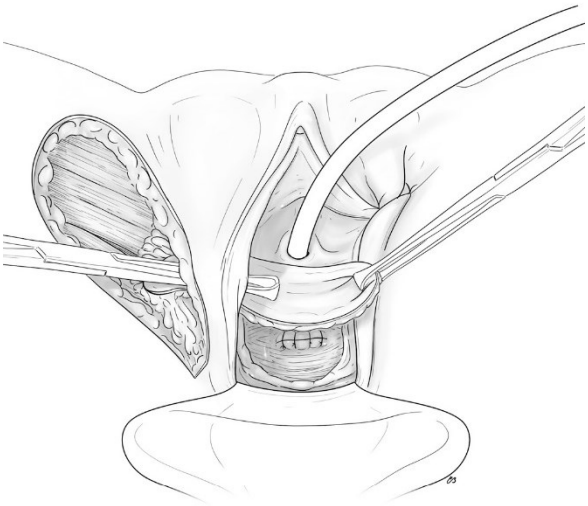

Figure 50. The flap is introduced into the vagina by a wide tunnel. Make sure to carefully excise any skin that could remain in the tunnel.

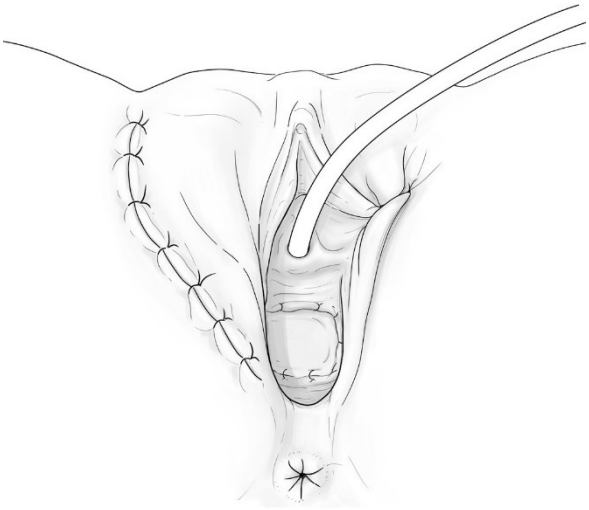

Figure 51. The flap is in place and the harvest site has been repaired.

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.

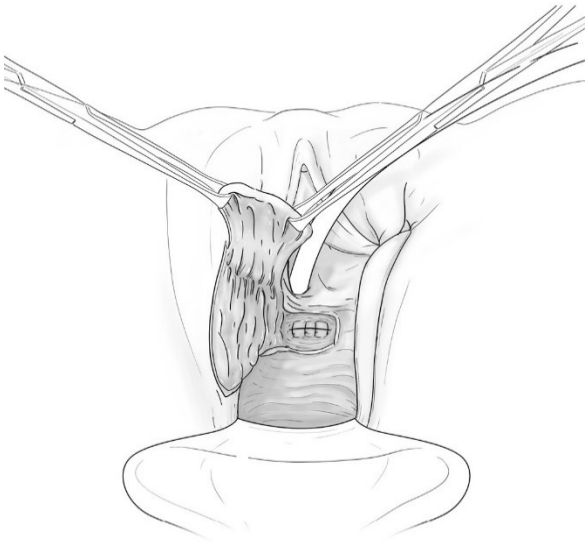

Figure 53. Flap developed.

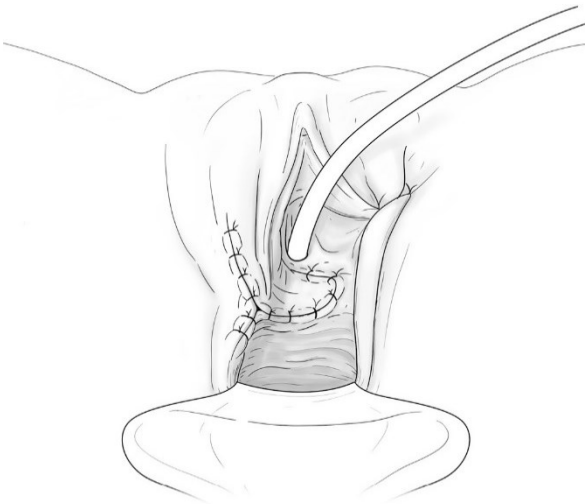

Figure 54. Labial rotation flap sutured in place over areas of vaginal tissue loss.

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

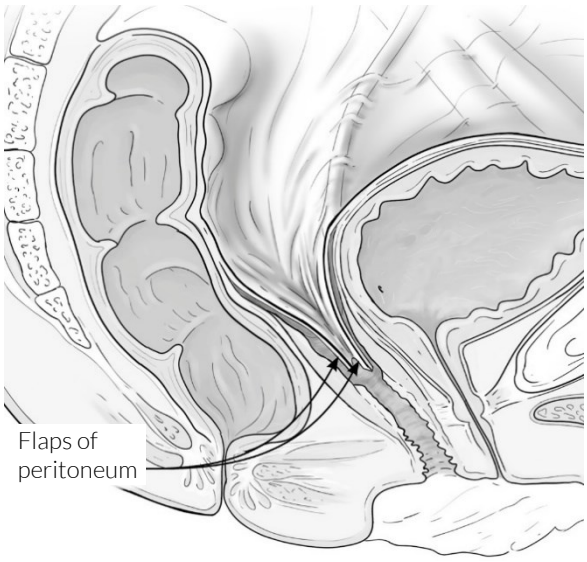

Figure 55. Creation of a neovagina using peritoneum (Davydov procedure). The Pouch of Douglas is entered vaginally. This may be difficult and it may be necessary to develop a space for the neovagina through an area of closed scar. Flaps of peritoneum are subsequently developed. Note that this patient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

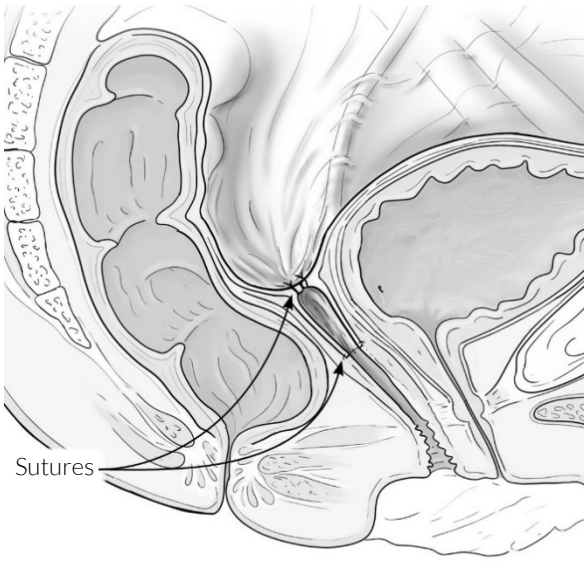

Figure 56. The peritoneum is closed off at the new vaginal vault and sutured to the remaining vagina.

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.		
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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.

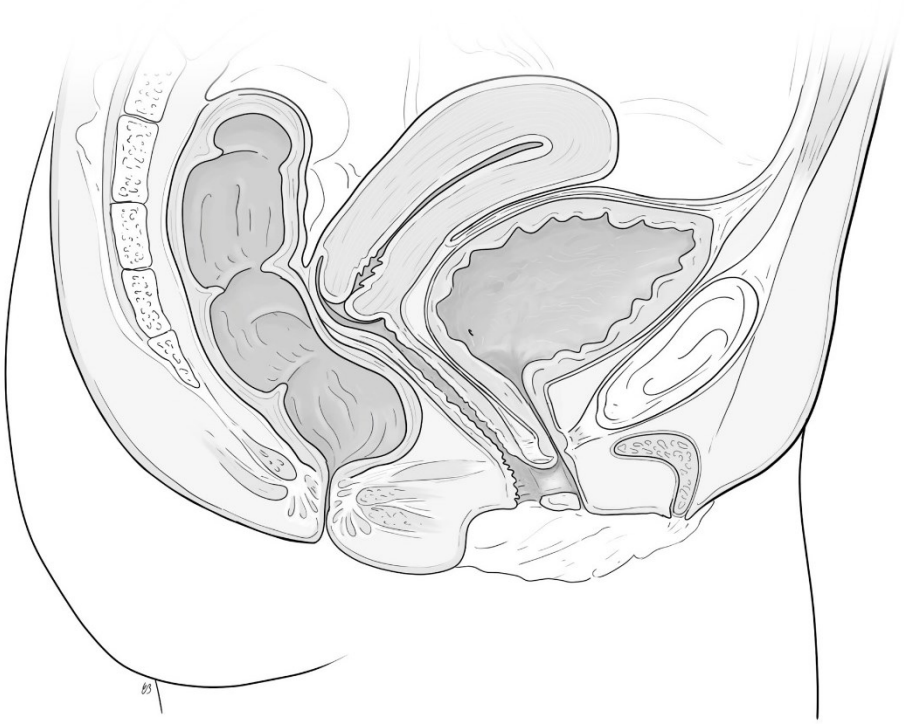

Figure 57. Cross-section showing a small distal urethral fistula.

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

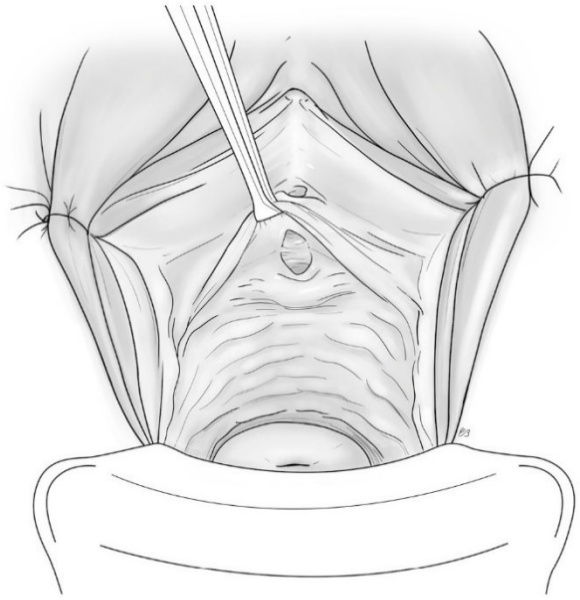

Figure 58. Small distal urethral fistula seen vaginally.

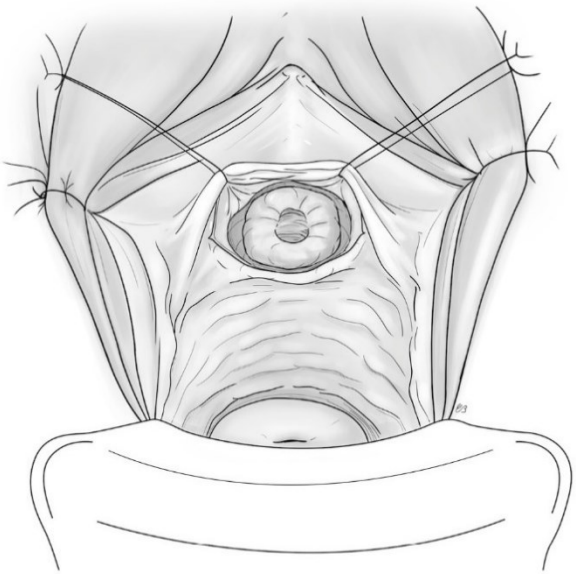

Figure 59. Carefully mobilise the vagina and urethra as the tissues can be very thin.

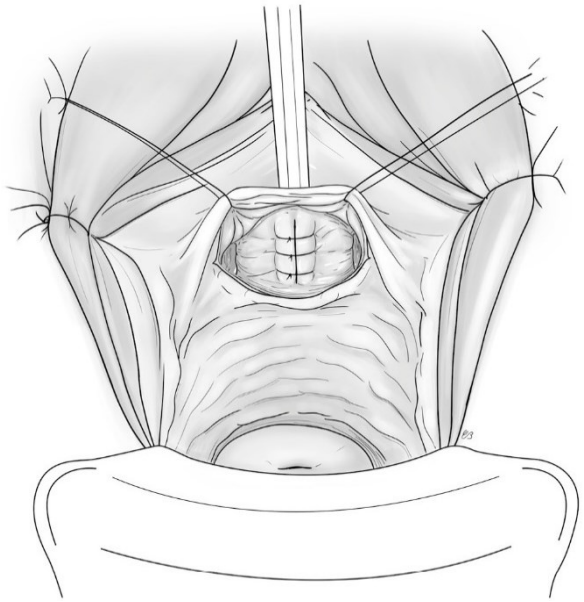

Figure 60. The fistula is repaired vertically over a Foley catheter to maintain the urethral length and width.

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.		
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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.

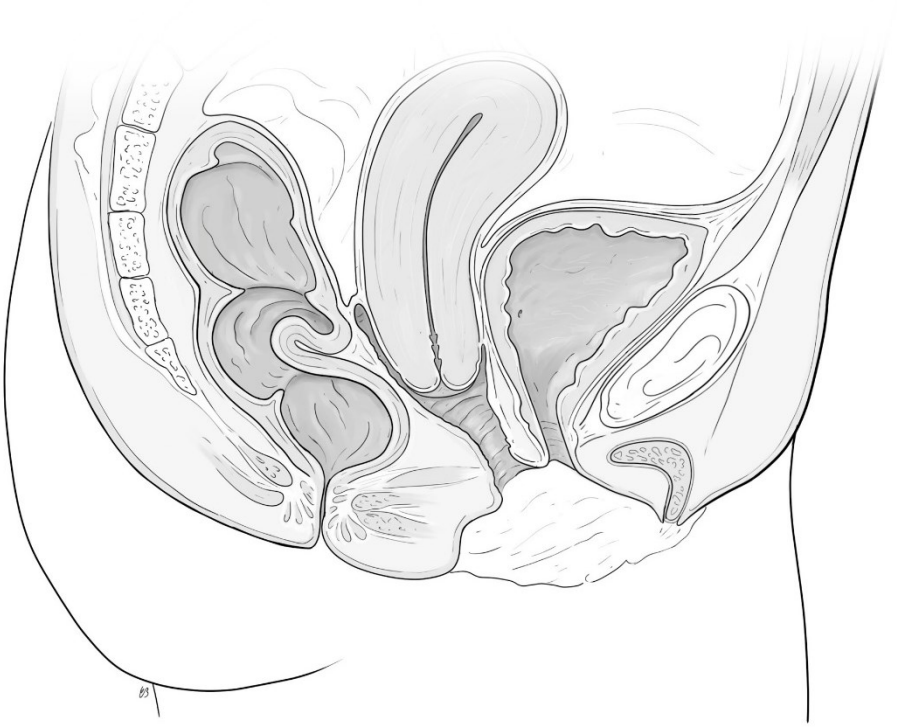

Figure 61. Cross-section showing a patient whose large fistula was closed successfully but who is still totally incontinent of urine through a wide, open urethra. Note the short anterior vaginal wall and cervix pulled down towards the introitus.

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

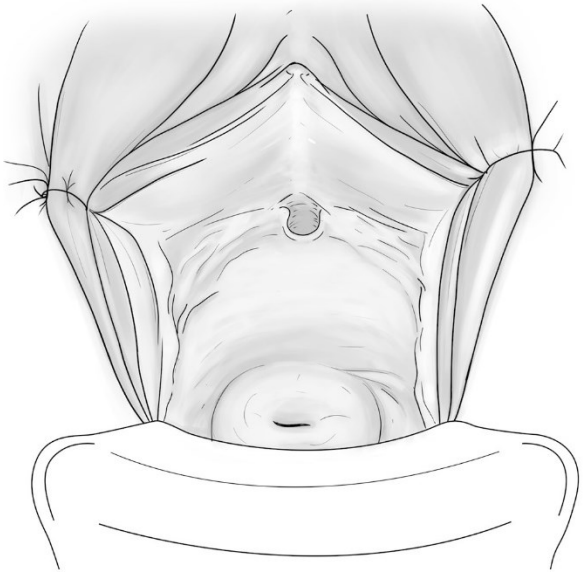

Figure 62. The same clinical case as in Figure 61 seen vaginally. Note the retracted open urethral meatus and short, tight anterior vaginal wall with no rugae.

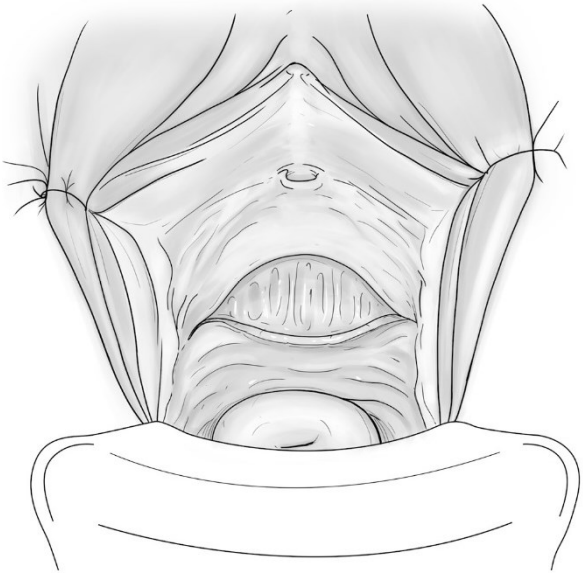

Figure 63. The anterior vagina was mobilised, pushing the uterus back to its normal position and the urethra has come forward. A flap should be used to fill the anterior vaginal gap and a sling of fascia to support the urethra.

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

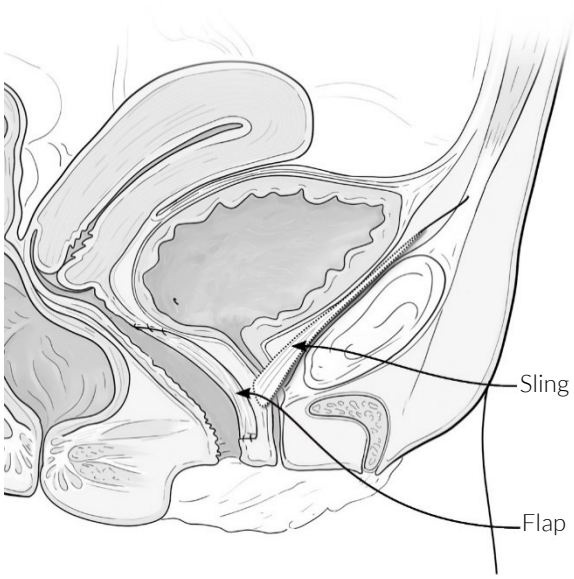

Figure 64. The anterior vagina was incised and mobilised enabling the urethra to advance forward and the uterus back. The urethra was reconstructed to achieve a normal length and width and supported with a sling. The gap in the vagina was filled with a flap.

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

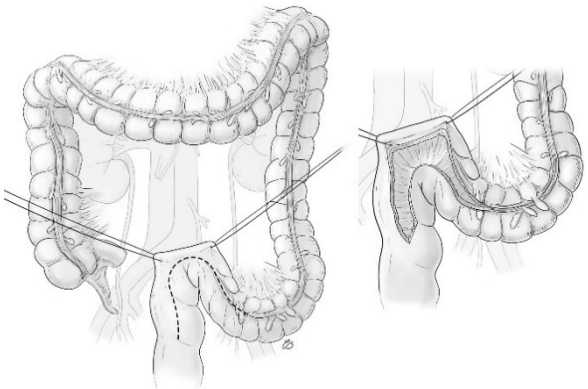

Figure 65. The single loop Mainz pouch II. The sigmoid is incised along the taenia coli.

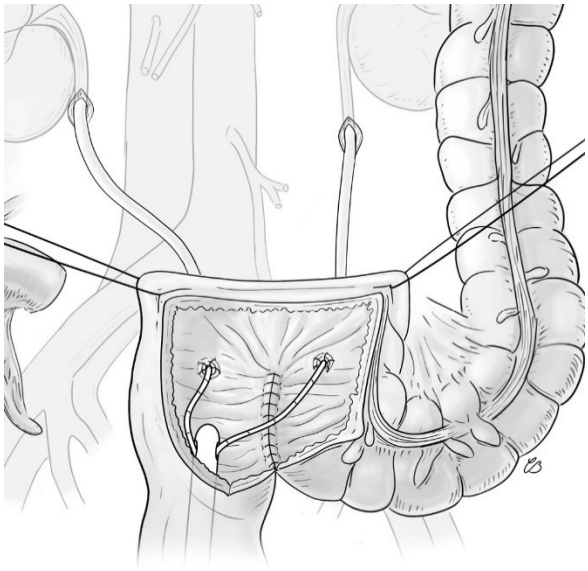

Figure 66. The posterior wall of the pouch is sutured in two layers and the ureters implanted directly left and right and catheterised. The ureteric catheters are then brought out through the rectal tube.

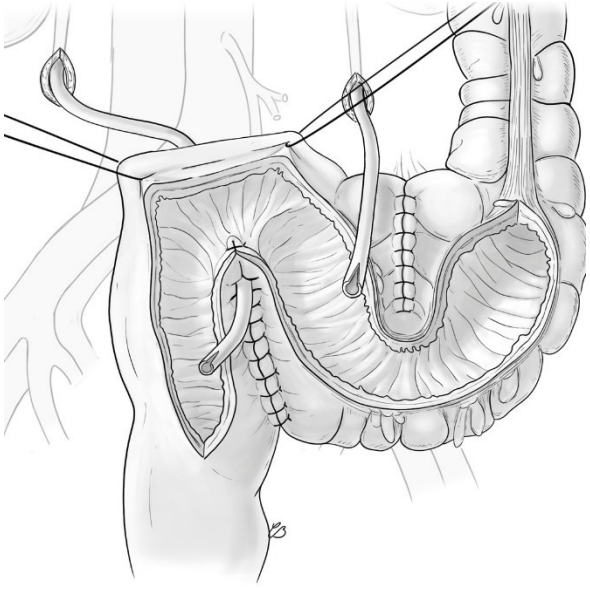

Figure 67. The double loop Mainz pouch II. A longer incision is made on the taenia coli and sutured in two separate places. The ureters are wrapped in a tunnel made along the suture line on the posterior of the pouch.

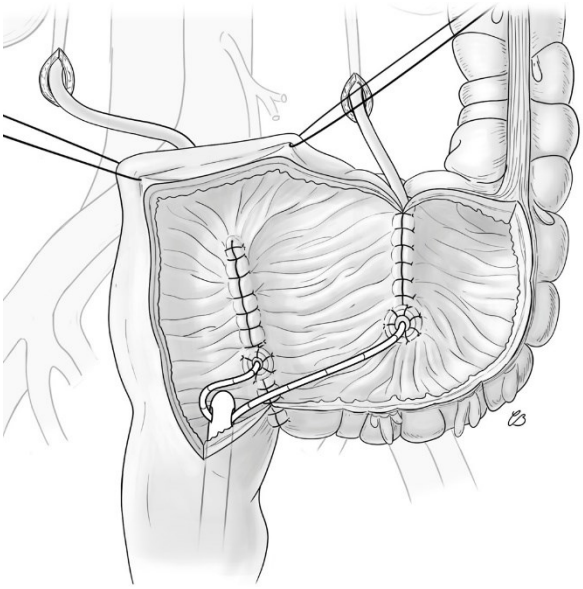

Figure 68. The ureters are now in place, wrapped in a tunnel created in the suture line. The ureteric catheters are drawn out of the anus via the rectal tube. The anterior pouch is now sutured in two layers.

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.

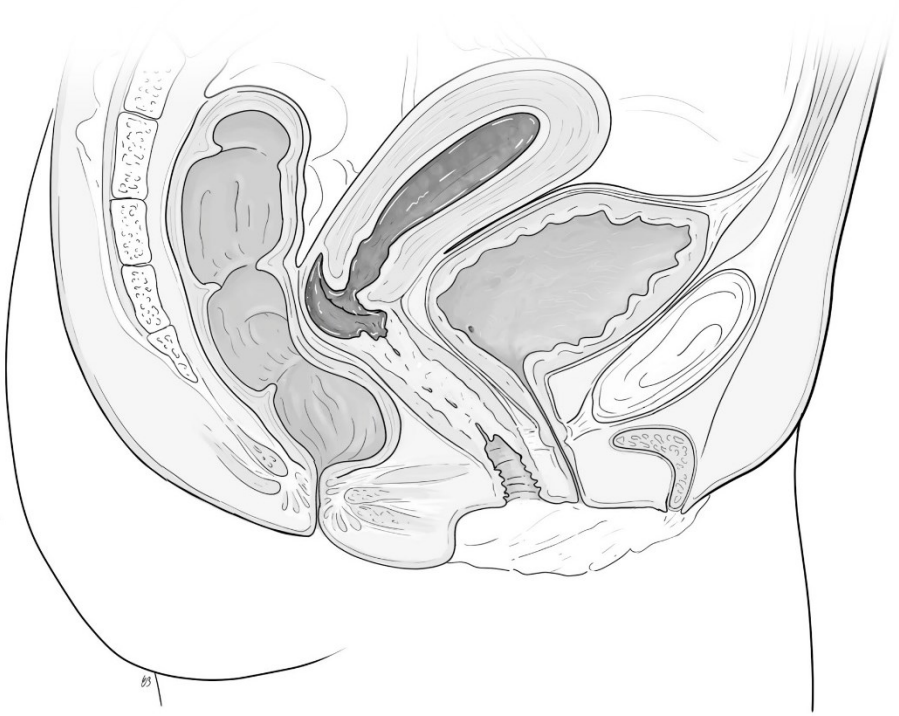

Figure 69. Cross-section showing severe vaginal stenosis, haematocolpos and haematometra. Some degree of cervical tissue loss is possible.

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

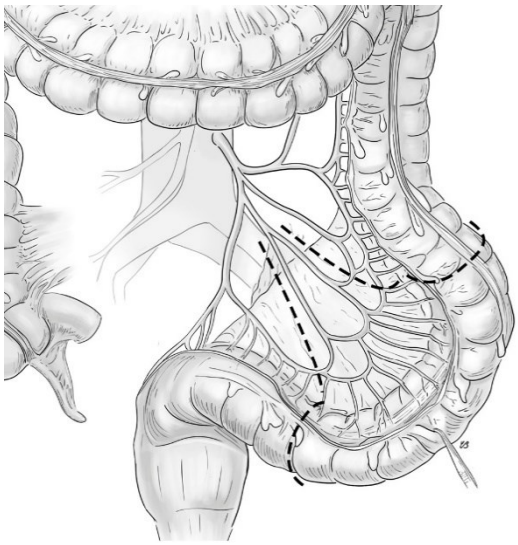

Figure 70. A segment of sigmoid is excised, keeping it on its mesenteric blood supply.

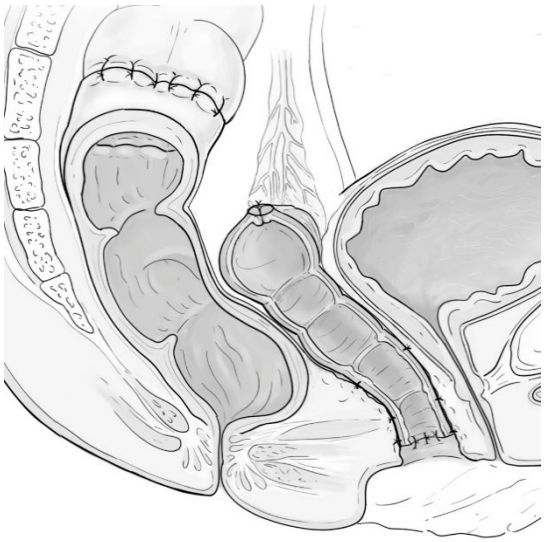

Figure 71. The sigmoid neovaginal pedicle is introduced into the space developed between the bladder and the rectum, and the sigmoid is closed with an end-to-end anastomosis. In the absence of the uterus and cervix, the proximal stump is closed, and the other side fixed to vaginal introitus.

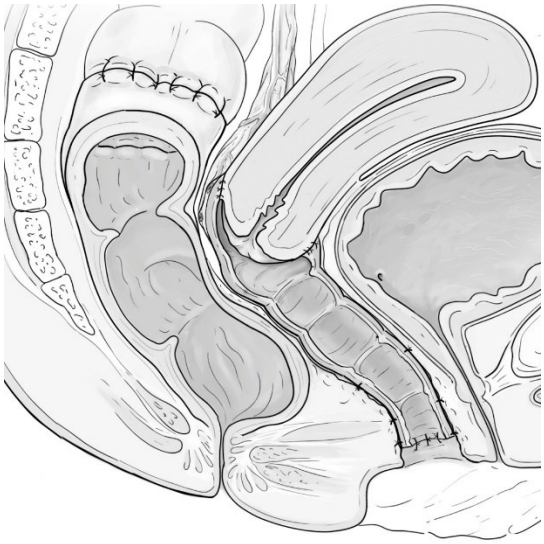

Figure 72. The sigmoid neovaginal pedicle is introduced into the space developed between the bladder and the rectum, and the sigmoid is closed with an end-to-end anastomosis. In the presence of the uterus and cervix, the sigmoid pedicle is attached to the cervical/uterine tissue, and the other side fixed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

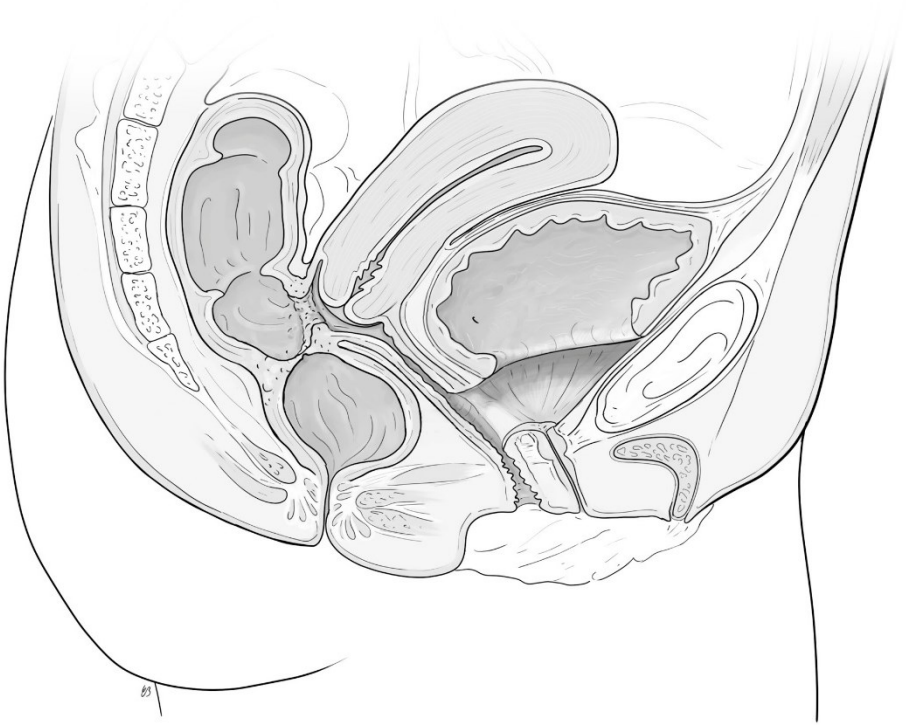

Figure 73. Cross-section of a circumferential/stenosed rectovaginal fistula. The distal rectum and anus are cut off from the proximal rectum and sigmoid by scar tissue. A circumferential vesicovaginal fistula is also present.

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

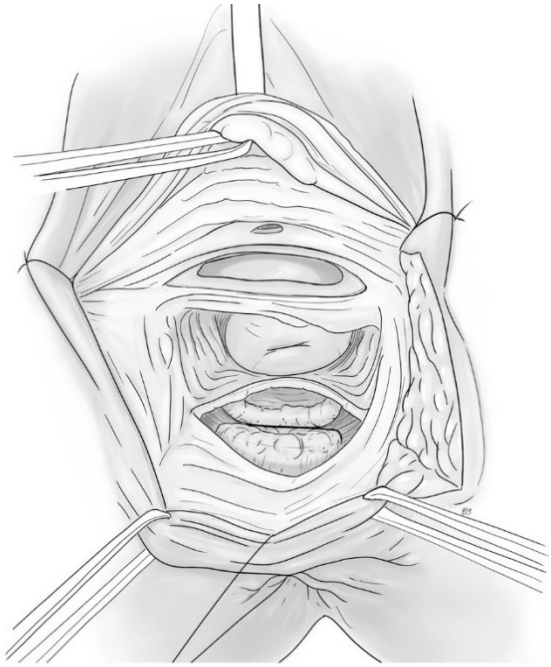

Figure 74. The two ends of the rectum have been mobilised and scar excised. Note the concurrent vesicovaginal fistula.

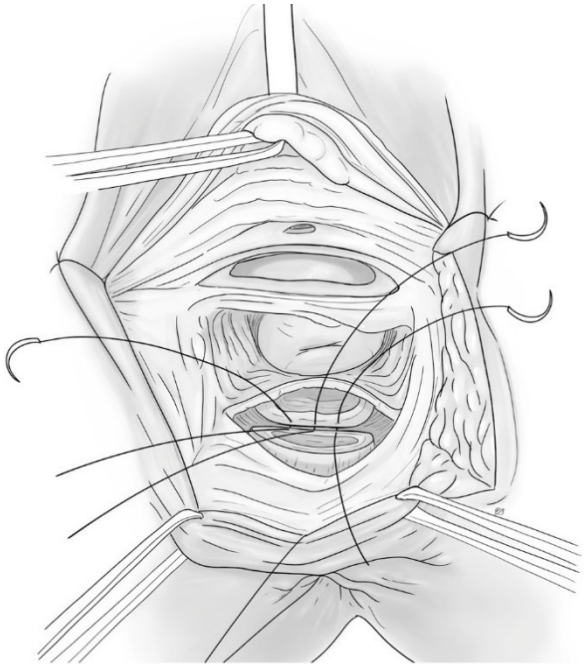

Figure 75. The posterior wall of the rectum is anastomosed first, suturing the muscularis excluding the mucosa.

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

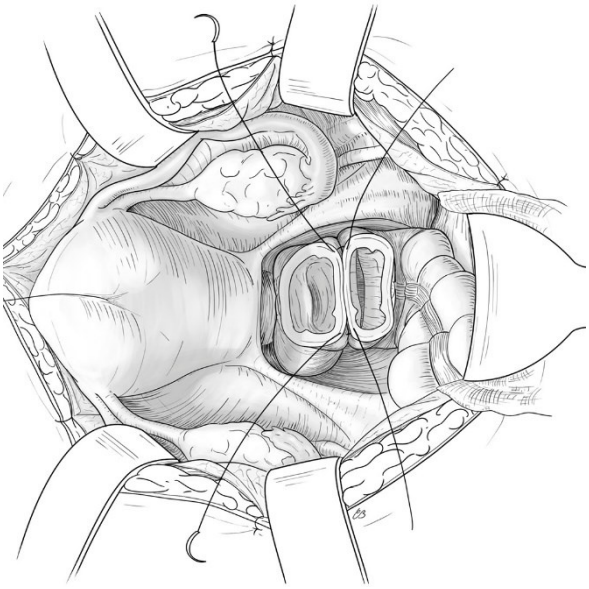

Figure 76. View at laparotomy. The proximal and distal ends of the rectum/sigmoid are mobilised. The posterior wall of the bowel anastomosis is repaired first.

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).