

CHAPTER 1B

URO-GENITAL FISTULAS: CAUSES, CLASSIFICATION, EARLY MANAGEMENT AND FACTORS INFLUENCING OUTCOME OF REPAIR

Section 1B.1: Causes, sites, and classification
 Section 1B.2: Early management of fresh VVF
 Section 1B.3: Factors influencing the outcome of repair and case selection

(1B.1) CAUSES, SITES, AND CLASSIFICATION OF URO-GENITAL FISTULAS

CAUSES OF URO-GENITAL FISTULAS

Obstetric	Surgery	Trauma including foreign body
Malignancy	Radiation	Infection

While the leading cause of fistulas in the developing world is still obstructed labour, surgical trauma is increasing as a cause. In one study 26.5% of cases were related to surgery, mainly Caesarean section. *Reference: Obstetric fistula management and predictors of successful closure among women attending a public tertiary hospital in Rwanda: a retrospective review of records; Egziabher et al: BMC Research Notes 2015 8:774*

- (a) **Obstetric trauma:** The majority of fistulas occur as the result of neglected obstructed labour. The size of the fistula is a reflection of the tissue loss, and scarring may be severe. The first delivery is especially at risk accounting for nearly half of all cases.
- (b) **Surgical trauma (iatrogenic):** This has become the second most common cause. Trauma can occur at different sites. Ureteric and vault fistulas are definitely iatrogenic. Others may have a mixed cause.
- I. **Ureter to vagina:**
 - After Caesarean section or
 - After hysterectomy or a repair of a ruptured uterus.

These are more common on the left than the right. Occasionally they are bilateral. Most patients present with leaking urine and a small minority present with anuria and/ or abdominal distension.
 - II. **Bladder to uterus: (Vesico-uterine/ cervical)**
 - After Caesarean section or
 - Repair of a ruptured uterus.
 - III. **Bladder to vaginal vault:** after hysterectomy for obstetric or gynecological reasons. If a bladder opening is made during surgery, this greatly increases the risk of fistula formation even if the bladder is repaired immediately.
 - IV. **Urethra to vagina:** these are usually the result of symphysiotomy.
- In fistulas post-surgery, significant tissue loss should be uncommon. These fistulas usually develop between the 1st and 21st (peak day 7-10) post-operative days and often present after removal of the catheter. If they involve the bladder, they should be treated initially by continuous bladder drainage with a Foley catheter provided most of the urine drains through the catheter rather than into the vagina.
 - In a series of 805 iatrogenic uro-genital fistulas, 273 (33.9 %) were ureteric, 181 (22.5 %) were vault (bladder to vaginal vault), and 351 (43.6 %) were vesico-uterine/ cervical. *Reference: Iatrogenic genitourinary fistula: an 18-year retrospective review of 805 injuries Thomas J. I. P. Raassen & Carrie J. Ngongo & Marietta M. Mahendeka: Int Urogynecol J. 2014; 25(12): 1699–1706.*
 - High obstetric fistulas (defined as a ureteric, vesico-uterine, vesico-cervical, vaginal vault or juxta-cervical fistula) are associated with Caesarean deliveries and shorter duration of labor suggesting that iatrogenic injury rather than pressure necrosis has a causative role. High fistulas are less likely to result in long-term incontinence as compared to low fistulas (defined as a circumferential, mid-vaginal, bladder neck, or urethra-vaginal fistula) probably because high fistulas do not involve the urethral closing mechanism and there is less tissue loss. *Reference: Associations between obstetric fistula location and mode of delivery and post-repair incontinence. Harfouche M, Wilkinson J, Hosseinipour M, Kaliti SM. IJOG vol. 119, s837 2012.*
- (c) **General trauma:** Pelvic fractures; falls from heights.
- (d) **Sexual trauma:** Forced coitus especially before menarche; when an object is forced into the vagina; fistulas caused by female genital mutilation and Gashiri cutting.
- (e) **Pelvic malignancy:** Carcinoma of cervix (Stage 4a), vagina, and rectum are the most common malignancies to present in this way.
- (f) **Radiation:** Fistulas may follow treatment by pelvic or vaginal irradiation. Biopsy should be performed to rule out recurrent malignancy before attempting a repair.
- (g) **Infections:** Schistosomiasis has been reported as a cause of VVF (see below).

SITES OF URINARY FISTULAS

Fig. 1.2 a+b demonstrate the common sites of fistulas, both iatrogenic and those from obstructed labour. Ureteric fistulas are not shown.

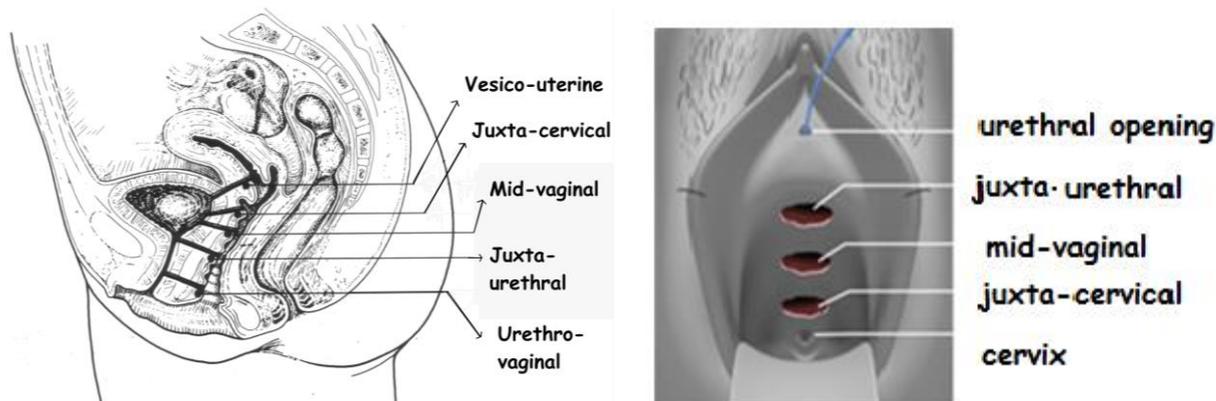


Figure 1.2a+b: Demonstrate the common sites for fistulas. Large fistulas may involve a number of sites. In addition, fistulas (both bladder and ureteric) may occur at the vaginal vault post-hysterectomy.

Fig. 1.2a: adapted from *Surgery for female urinary incontinence*; Editors: Stanton S, Tanagho E; Springer Berlin (1987). Chapter 14: the Management of Vesico-vaginal and Urethral Fistulae; Lawson JB+ Hudson CN.

CLASSIFICATION OF URO-GENITAL FISTULAS

There are two common systems in use. Both of these are based on descriptions of the size and anatomic location of the defect. Both of these were produced for obstetric fistulas, and neither has been shown to be of value in iatrogenic fistulae where the vast majority are type 1. (It is worth noting that if a fistula is type 1, it does not mean it is iatrogenic as obstetric causes may also lead to Type 1 fistulas.). Both classifications try to be objective whereas a simple grading system based on complexity will vary immensely between surgeons.

(1) Waaldijk classification:

Type I:	not involving the urethral closing mechanism
Type II:	involving the closing mechanism A: not involving (sub) total urethra a: without circumferential defect b: with circumferential defect B: involving (sub)total urethra (Urethral length < 1.5 cm) a: without circumferential defect b: with circumferential defect
Type III:	miscellaneous, e.g. ureteric fistula
Subclassification:	Size: small < 2 cm; medium 2-3 cm; large 4-5 cm; extensive > 6 cm

(2) Goh Classification: this is really a modified version of the Waaldijk classification. Three main aspects are considered: site, size and scarring.

	<p>Type 1: Distal edge of fistula > 3.5 cm from external urinary meatus.</p> <p>Type 2: Distal edge of fistula > 2.5 -3.5 cm from external urinary meatus.</p> <p>Type 3: Distal edge of fistula 1.5- < 2.5 cm from external urinary meatus.</p> <p>Type 4: Distal edge of fistula < 1.5 cm from external urinary meatus.</p>
<p>size: a: Size < 1.5 cm in the largest diameter b:Size 1.5 – 3 cm in the largest diameter c: Size > 3 cm in the largest diameter</p>	
<p>scarring and other factors</p> <ol style="list-style-type: none"> i. None or only mild fibrosis and / or vaginal length > 6 cm, normal capacity. ii. Moderate or severe fibrosis and/ or reduced vaginal length < 6cm capacity. iii. Special considerations e.g. post-radiation, ureteric involvement, circumferential fistula, previous repair. 	

- It can be argued that as fistulas are so varied, it is difficult to classify them into groups. However, the aim of a classification system is to allow audit of one's results and comparison with those of others.

- It should also predict the risk for unsuccessful closure and likelihood of residual incontinence after successful repair. In this respect, it is clear that they can predict outcome.
- To influence management, and thereby improve outcome is more difficult.
 - They can be used to reduce the risk of stress incontinence as steps can be taken where the fistula involves the urethra as discussed in chapter 1C.
 - To reduce failure rates in high-risk cases: this is discussed below in section 1B:3.

(1B.2) EARLY MANAGEMENT OF FRESH VVF



Do not pull slough off. It is better to cut it off to avoid damaging the surrounding live tissue and increasing the size of the defect.

Assessment: When patients are admitted following obstructed labour with a dead baby:

Examine the patient in the lithotomy position with a good light. The vagina needs to be cleaned with saline douche. Insert a bladder syringe into the vagina and irrigate with 2 litres of saline. Necrotic material is removed with knife or scissors. Do not pull as this causes bleeding indicating you are removing live tissue as well. Antibiotics (broad spectrum) are only useful if the patient is febrile.

Fig. 1.2c: Shows the slough which is about to be cut off using scissors.

CATHETER TREATMENT: If a fistula is detected soon after delivery (i.e. less than 3 weeks and the tissues still look raw) and is small (< 3 cm size), catheterization with a Foley catheter for 2-6 weeks may be all that is required for it to close provided most of the urine drains through the catheter. A period of continuous catheter drainage allows the diversion of urine away from the fistula. This allows spontaneous closure before epithelialization of the fistula tract can occur and this is certainly worth attempting in patients with vesico-vaginal or urethra-vaginal fistulas. It is estimated that 10-15 % of fistulas can be treated this way. Within 1-2 weeks you should know if the catheter treatment is being successful with most of the urine going via the catheter/ urethra. If necessary, the patient can be encouraged to lie prone as much as possible to reduce any leaking. You can then continue catheter drainage for 2-6 weeks after the patient stops leaking, being guided by the dye test.

- In a study from Burundi, only those fistulas < 3 cm and < 3 weeks duration healed with a catheter.
Reference: Tayler-Smith K, Zachariah R, Manzi M, et al. Obstetric fistula in Burundi: a comprehensive approach to managing women with this neglected disease. BMC Pregnancy Childbirth 2013; 13:164.
- With vesico-uterine fistulas after caesarean section, it is also worth trying conservative treatment as the involution of the uterus also encourages the fistula to close.
- Spontaneous closure is more likely to occur where there has been minimal tissue damage and is seen more often with obstetric and surgical fistulae than post-radiation fistulas.



If you decide to insert a catheter, make sure the balloon is inflated in the bladder rather than in the fistula or vagina as often happens. An inflated balloon in the fistula only makes the defect larger. If the balloon prefers to stay in the vagina, remove the catheter. Only inflate the balloon with 5-10 ml of water.

TIMING OF REPAIR:

There are no absolute rules on the timing of repair. The best timing is when there is no inflammation or infection.

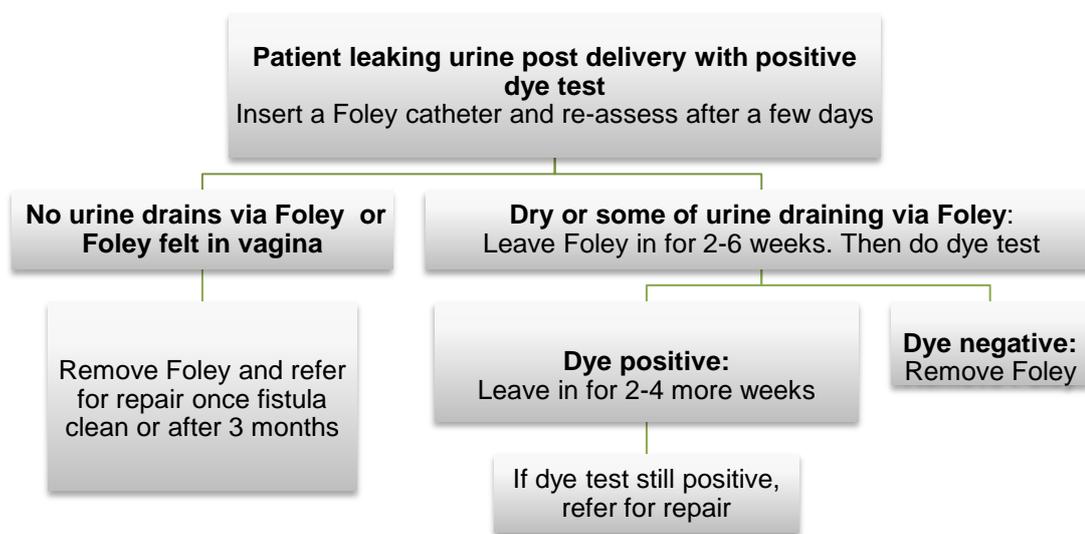
- (A) **Fistulas after prolonged labour:** A general rule would be to wait 8-12 weeks after delivery before attempting repair. This enables the slough to separate and the tissues to become less friable. The earliest a repair can be done is when the tissues look healthy.
- Repairing before 8-12 weeks is only appropriate for experienced surgeons as the tissues may still be friable. There is also an increased risk of bleeding. It can only be done once the fistula is clean which may be as early as 3-4 weeks. Occasionally if there is a small amount of slough, this can be removed at the time of surgery.

- One study recommended that any woman who develops a fistula should have a catheter inserted. Then as soon as the fistula is clean, an early repair should be performed unless the fistula is already healed.
Reference: Waaldijk K The immediate surgical management of fresh obstetric fistulas with catheter and/ or early closure. Int J Gynecol Obstet 1994; 45: 11-16.

(B) Post-surgical fistulas: It is a good idea to wait for the surgical inflammatory reaction to subside.

- If they involve the bladder, waiting at least 6 weeks and preferably 12 weeks will mean the tissues are less friable resulting in an easier operation with a better chance of success. Operating when the tissues are friable means that sutures are more likely to cut through with tearing of the bladder wall.
- The only exception would be if the fistula is diagnosed within 1-2 days after the operation; then immediate repair may be performed either trans-abdominally or trans-vaginally as the inflammation is not yet established. However, for fistulas < 1 cm, it is worth trying conservative management with a catheter first.
- Ureteric fistulas: see chapter 9.

! Tip! Any fistula that is small (< 3 cm), diagnosed early and the leakage stops with a catheter, is likely to heal with conservative treatment. For any fistula, if leakage persists after 4-6 weeks of catheterization, there is no benefit to continuing with catheterization and it only increases the risk of infection.



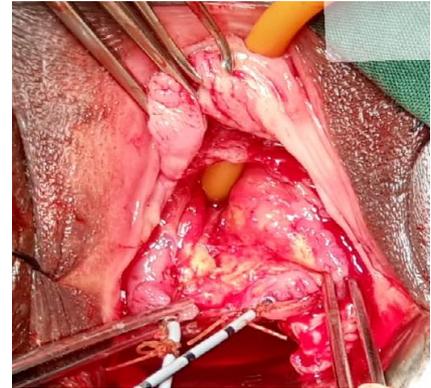
(1B.3) FACTORS INFLUENCING THE OUTCOME OF REPAIR AND CASE SELECTION

FACTORS INFLUENCING THE OUTCOME OF FISTULA REPAIR (12 S's)

These factors determine the accessibility and the quality of the tissues, which are the main prognostic factors for success of the repair. An aid to remember these are the 12 S's:

- **Site:** Fistulas involving the urethra are more likely to break down. In Goh's system, type 4 fistulae are more likely to have failed closure compared to those with type 1 or 2.
- **Size:** If fistula size > 4 cm or multiple fistulas, the prognosis is worse. This is because it affects the residual bladder size and urethra. With large fistulas, the ureters may be outside the bladder.
- **Scarring (fibrosis):** reduces the accessibility and mobility. Also scarred, fibrotic tissue has less blood supply and is less likely to heal.
- **Surgery before:** a simple fistula may become complex after a failed repair. Previous surgery causes more scarring and distorts anatomy. Iatrogenic fistulas usually have a higher success rate after repair as the tissues are usually healthier.
- **Shortness or stenosis of the urethra:** length and patency. Total urethral destruction, circumferential defects (see chapter 2) or involvement of continence mechanism are all poor prognostic factors.
- **Stool:** Combined RVF with the VVF. These are usually more difficult VVFs. See chapter 7.
- **Skill:** of the surgeon and of the fistula team.
- **Sero-status:** In HIV positive patients, failed VVF closure is significantly more common than among their HIV-negative counterparts. *Reference: Shephard, et al (2017), Effect of HIV infection on outcomes after surgical repair of genital fistula. Int J Gynecol Obstet. doi:10.1002/ijgo.12233.*

- **Sugar:** Diabetic patients have an increased risk of breakdown of the repair.
- **Sickness:** Any severe illness post-operatively (e.g. severe sepsis or malaria) often affects the healing of the VVF.
- **Sepsis:** of the operation site often leads to breakdown.
- **Schistosomiasis:** is associated with failed repairs even in cases where the mucosa appears normal. In other cases, the bladder mucosa may have a yellowish colour or a red granular appearance (Fig. 1.2d). In areas endemic for *S.haematobium*, either the urine should be screened for ova or treatment is given empirically. The optimum timing of surgery after treatment is not known. Dead ova may remain in the bladder tissues for months after treatment potentially inciting a persistent inflammatory response.



! Tip! Think of schistosomiasis especially if “an easy repair” breaks down.

Fig. 1.2d: Schistosomiasis during VVF repair (Courtesy I. Vaz).

CASE SELECTION

- One of the most important points to appreciate in fistula surgery is to know which cases to attempt and which not to attempt. Do not be afraid to tell the patient to come back later when an expert is coming.
- Selection is based on the same 12 S's as above. A midline mid-vaginal fistula which is not scarred and not too big (< 3 cm) and which has not been repaired before would be the ideal one for the novice fistula surgeon to start with. In contrast, a VVF accompanied by an RVF or foot drop would usually indicate a difficult case.
- However, pre-operative case selection is often not accurate especially for what seems like an easy case which may turn out to be difficult because the full extent of the fistula is often only seen once dissection is completed. Therefore all cases should be done under supervision until you have the necessary experience. In the words of Kees Waaldijk: “It looks so easy until the operation has started”.

! Tip! In settings where supervision is hard to get, there is a role for doing an examination under anaesthesia. This allows you to do a proper assessment, document well and make a good plan. You can then decide at that time whether the fistula repair meets your level of competence. If not, the patient is asked to come back later. This step can be helpful to a junior fistula surgeon and allows you to make progress without harming patients in the process.

IMPROVING SUCCESS RATES

- If overall success rates are below 80%, this would indicate a need for more training. Collecting difficult cases and doing them with a more experienced surgeon is a good way of achieving this.
- Even with good training, failures can occur. It is a combination of pre-operative findings and the difficulties encountered during the repair that gives an impression of the likelihood of success.

Pre-operative	Site, Size Scarring, Circumferential defect, Previous repairs
Operative findings	Tissue quality (in addition to any scarring), difficulty achieving a negative dye test, the presence of infected urine.

It is relatively easy to give an objective assessment of difficulty based on the pre-operative findings. However, the operative findings are more subjective. Most experienced surgeons at the end of the operation know which cases are at high risk of breakdown. What can be done in these cases? After closure of the bladder, place an intermediate layer between the bladder and the vagina (see Chapter 1C). Muscle interposition seems to give the best results for the most difficult cases. A good layer of fat (either Martius or omentum) is another option.

FISTULAS IN PREGNANCY

- Fistula repair is usually avoided due to increased bleeding and increased risk of miscarriage. However, some surgeons find that during the first four months of pregnancy there is no increased bleeding and healing may be better. What this means in practice is that simple fistulas may be repaired in early pregnancy by experienced surgeons.
- If there are bladder stones in association with a fistula in pregnancy, these may be removed suprapubically if necessary.