

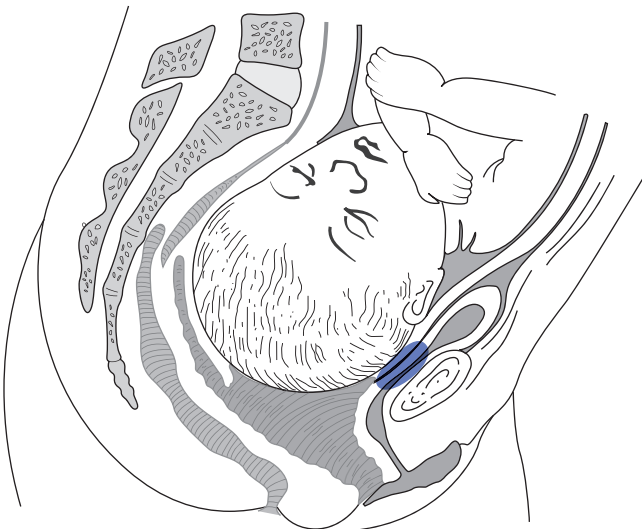
# 1 OBSTETRIC FISTULAE: CAUSE AND NATURE; THE OBSTETRIC FISTULA COMPLEX; CLASSIFICATION

## Understanding the cause and nature of vesico-vaginal fistulae

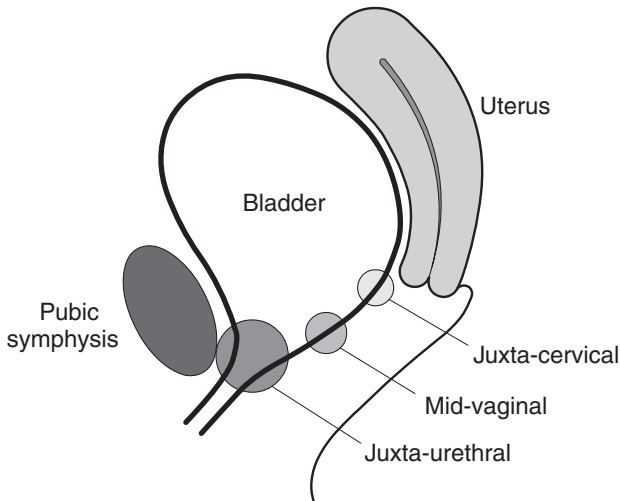
Obstetric vesico-vaginal fistulae (VVF) are caused simply by unrelieved obstructed labour. Prolonged pressure of the baby's head against the back of the pubic bone produces ischaemic necrosis of the intervening soft tissues, i.e. some part of the genital tract and bladder (Figure 1.1). In a labour that is sufficiently prolonged to produce this, the baby almost always dies. The head then softens and the mother eventually delivers a stillborn infant (if she survives that long).

When the baby's head is stuck deep in the pelvis, the most common site for ischaemic injury is the urethro-vesical junction, but injury can also occur in other positions, either in isolation or together as one massive defect (Figure 1.2).

The extent of the injury depends on the duration of labour and the strength of the mother to survive this ordeal. In the most severe cases, ischaemia will affect the whole of the anterior wall of the vagina, the bladder base, much of the urethra and sometimes the rectum as well, leading to a recto-vaginal fistula. In the most extreme cases, the bladder is completely destroyed. Varying degrees of vaginal stenosis are



**Figure 1.1** The area coloured blue is the first to undergo ischaemic necrosis.



**Figure 1.2** The various positions of ischaemic injury.

common. The exact site, size and amount of scar are functions of the position of the baby's head when it becomes stuck, and the duration of the obstruction.

Many mothers die of exhaustion or a ruptured uterus in unrelieved obstruction – the fistula patients are the survivors.

### The obstructed labour injury complex<sup>1</sup>

A fistula patient suffers from much more than a hole in the bladder. Her whole person is damaged. It is important to understand the full impact of the damage to the physical and mental well-being of the patient.

'Obstructed labour injury complex' is a term for a broad range of injuries that the patient suffering from an obstetric fistula may encounter. These can be divided into primary conditions directly due to the ischaemia from the obstructed labour and conditions that are secondary to this ischaemic damage.

### Primary conditions

#### The predominant lesion

This is a communication between the vagina and urinary tract, always involving the bladder and often the urethra.

#### Recto-vaginal fistulae

Recto-vaginal fistulae (RVFs) may coexist with VVFs in more severe cases of ischaemia. The incidence of combined fistulae ranges from 5% to 10%. Isolated RVFs are rare.

#### Ureteric fistulae

Ureteric fistulae can arise in two ways:

- They can result from involvement of the uretero-vesical junction in the ischaemic process, so that the ureter then drains directly into the vagina away from the fistula margin.
- More often, they are caused by operative injury during caesarean section or an emergency hysterectomy for a ruptured uterus.

**Renal damage**

A few fistula patients develop a stricture of the lower ureter leading to hydronephrosis and loss of renal function.

**Genital tract injuries**

The ischaemic process may destroy the tissues of the vagina, cervix and even the uterus. This leads to degrees of vaginal stenosis, loss of the anterior cervix and canal, and occasionally severe cervical stenosis leading to haematometra. Exceptionally, the whole uterus sloughs.

**Nerve damage**

Many fistula patients suffer compression damage to the lumbo-sacral plexus. The most common manifestation is foot drop from involvement of the L5 root. Minor degrees are easily overlooked. About 90% of patients with foot drop do slowly recover, but this can take up to 2 years. In the most severe cases of pelvic ischaemia, the patient may be paraplegic immediately after delivery, but this too recovers (apart from prolonged foot drop). There may also be saddle anaesthesia with the loss of anal reflex and the risk of pressure sores.

**Muscle and fascial damage**

The levator muscles, especially the pubo-coccygeus, and the pelvic fascial support are subject to ischaemic damage when they are crushed against the inferior pubic rami.

**Bone damage**

In about 30% of cases of obstetric fistula, a pelvic X-ray will reveal damage to the region of the pubic symphysis.

**Secondary conditions****Social consequences**

The social consequences of obstetric fistula can be just as devastating to the patient as the symptoms of incontinence. Many women will be ostracized by their families and communities. Attitudes to fistula patients vary from region to region: in some areas, the family can be very supportive; however, the longer a woman has had a fistula, the more likely it is that her husband will divorce her. Many patients will be unable to socialize or to go to market, church or community gatherings, and will live a life of exclusion.

**Mental health**

It is not surprising that many fistula patients are severely depressed. A stillbirth followed by incontinence is too much to bear. One hundred per cent of patients in Ethiopia test positive for psychological disorder when questioned on arrival at the hospital, with up to 40% thinking seriously of suicide. Interestingly, 30% still test positive on leaving hospital, even though they are dry. Making the patient dry is not always the end of her problems.

**Urine dermatitis**

Many patients restrict their drinking and end up with very concentrated urine. When the patient is incontinent, the phosphates and nitrates contained in the urine irritate the skin, causing local hyperkeratosis and secondary ulceration. The cure is to treat the incontinence, but in the meantime the condition will improve if the patient can drink more and dilute her urine. Barrier substances such as petroleum jelly may help. Also, dilute urine does not smell nearly so much.

**Bladder stones**

Concentrated urine will predispose to deposits in the bladder that may act as a nidus for the formation of stones. These can become large and can cause pain, haematuria and odour from chronic cystitis.

Some women may have had a foreign body introduced into the bladder either by themselves or by a traditional healer in an effort to stop the flow of urine. Such objects include cloth, plant material and even small stones.

**Contractures**

Up to 2% of fistula patients in Ethiopia suffer severe lower limb contractures, although these are very rarely seen in other African countries. They occur after delivery, because the patient will often lie curled up in bed with her legs together, trying to stop the flow of urine. Patients may remain in this position for months or even years, resulting in diffuse contractures.

**Malnutrition**

In Ethiopia, in particular, neglect and depression lead to malnutrition in some patients, with a fall in body mass index (BMI). In contrast, this appears to be a less common problem in other tropical African countries.

**Infertility**

Many fistula patients (up to 60%) have amenorrhoea after delivery. This has a variety of causes, the main one being supratentorial, e.g. the severe mental stress of losing a child and a husband, together with the shame of incontinence. Malnutrition may also be a factor. A small number of patients will have Sheehan's syndrome – anterior pituitary necrosis due to prolonged shock during labour. The resultant decrease in follicle-stimulating hormone (FSH) and luteinizing hormone (LH) leads to amenorrhoea. Ashermann's syndrome – scarring of the endometrium by either repeated infections or perhaps urine in the endometrial cavity – is another cause.

These women may have normal hormone levels, but the endometrium will be unresponsive to them. Finally, there may be cryptomenorrhoea, or hidden menses, if the cervical canal is stenosed leading to haematometra.

### **Reproductive outcomes**

For the above reasons, the potential for successful pregnancy in women with obstetric fistulae is quite low. Only about 20% of post-repair patients will achieve a term pregnancy. If a patient does become pregnant, she has a high chance of a miscarriage or prematurity. This is because of an incompetent cervix. The anterior lip is frequently torn so badly that it will not be strong enough to hold a pregnancy to term. Others have vaginal stenosis that is severe enough to preclude intercourse.

### **Other causes of incontinence not directly related to obstructed labour**

In war-torn countries sexual violence is a tragic cause of genital tract injuries. The principles of management are the same as for obstetric fistulae.

Anyone working in developing countries will encounter some patients with miscellaneous causes of incontinence. These include:

- congenital abnormalities, including ectopia vesicae, epispadias and ectopic ureters (usually as part of a duplex system)
- neurological causes, such as spina bifida
- advanced carcinoma of the cervix
- ureteric fistulae produced during elective gynaecological operations
- genital prolapse conditions.

Management of these (apart from ureteric injuries) is outside the scope of this book.

## **Basis of classification of obstetric fistulae**

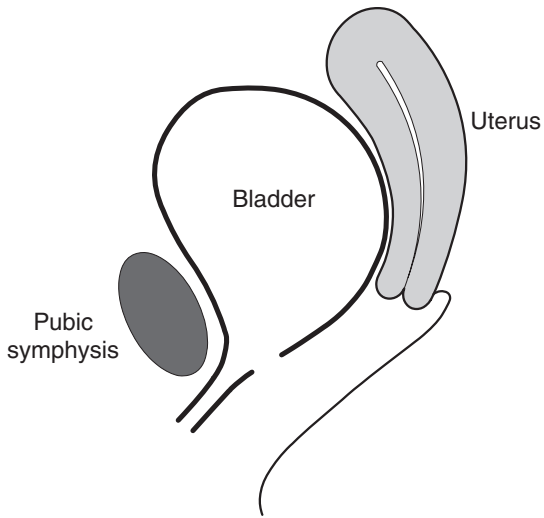
Despite much debate, there is no universally accepted system of classification. This is understandable, because so much of the assessment is subjective. For a classification to be worthwhile, it should enable surgeons to communicate with each other and even consider clinical trials. Most surgeons base their classification on simple descriptive terms involving three factors:

- site
- size
- scarring.

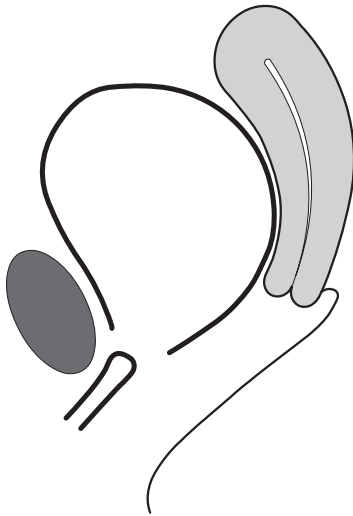
### **Fistula site**

#### **Juxta-urethral**

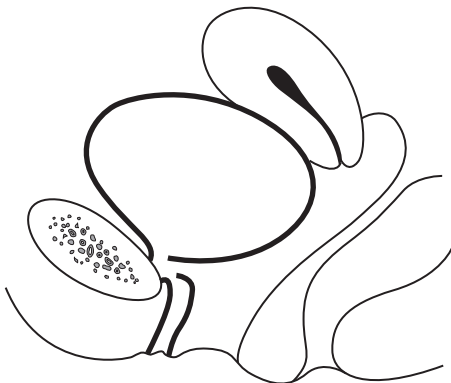
The most common site is juxta-urethral, i.e. at the urethro-vesical junction (Figures 1.3–1.5). In this situation, there is almost always loss of some proximal urethra. Mild



**Figure 1.3** A simple juxta-urethral fistula.



**Figure 1.4** A small circumferential juxta-urethral fistula. There is a gap between the bladder and the urethra. The latter is often blocked.



**Figure 1.5** A circumferential juxta-urethral fistula is often pulled up and stuck to the back of the pubic symphysis, making it relatively inaccessible.

ischaemia will produce just a simple hole, but prolonged ischaemia will cause circumferential tissue loss with the urethra and bladder becoming separated to a variable extent.

### Mid-vaginal

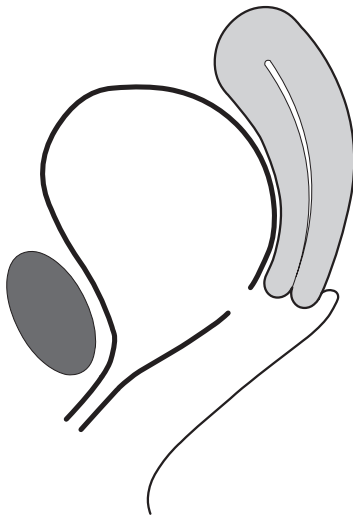
Small defects 4 cm or more from the external urethral orifice are not very common, but are very easy to repair. Larger defects may extend back as far as the cervix and laterally to the pubic rami.

### Juxta-cervical

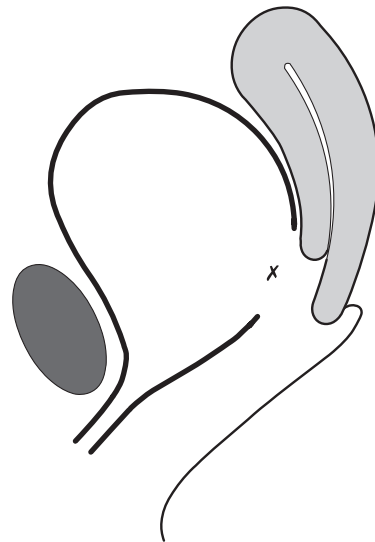
Juxta-cervical fistulae, i.e. fistulae in the region of the cervix (Figure 1.6), are common in multiparous patients and in those delivered by caesarean section. Patients who start to push before the cervix is fully dilated are prone to fistulae in this region. Sometimes, the defect extends into the cervical canal where the anterior cervical canal is completely missing or torn open (Figure 1.7). These fistulae presumably result from a vertical tear in the lower segment with associated bladder injury during caesarean section.

### Intra-cervical

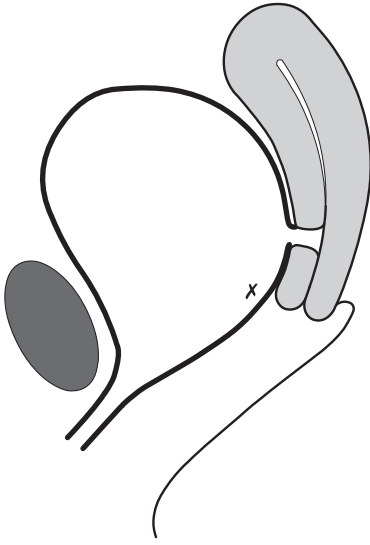
Intra-cervical fistulae, i.e. fistulae between the bladder and the cervical canal (Figure 1.8), are not very common. They almost always follow a caesarean section. There may be a history of a live baby, suggesting an iatrogenic cause.



**Figure 1.6** A simple juxta-cervical fistula.



**Figure 1.7** A juxta-cervical/intra-cervical fistula. The cross indicates the approximate position of the ureteric orifice.



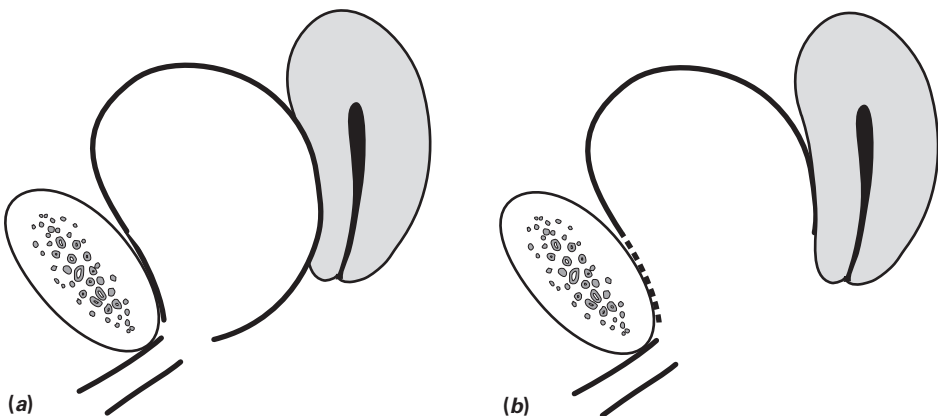
**Figure 1.8** An intra-cervical fistula. The cross indicates the approximate position of the ureteric orifice.

### Circumferential

The term 'circumferential fistula' is used when the bladder has been completely separated from the urethra (Figure 1.9). The urethra is almost always involved to some extent, and the extent of detachment varies from minimal with a normal-capacity bladder to extreme where the bladder has all but disappeared. The more common intermediate type is recognized clinically by palpation of bare bone at the back of the pubic symphysis. In these cases, most of the anterior vaginal wall and the base of bladder are destroyed.

### Miscellaneous fistulae

Fistulae can result from accidental damage to a ureter during caesarean section or hysterectomy, and vault fistulae can be produced during emergency hysterectomy



**Figure 1.9** Circumferential fistulae: (a) small gap; (b) massive gap.



for a ruptured uterus or elective hysterectomy. Locally advanced carcinoma of the cervix can cause a urinary fistula.

### Fistula size

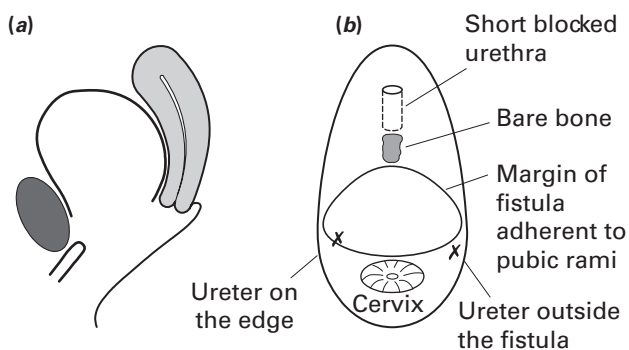
Fistulae may be:

- tiny (admitting only a small probe)
- small (0.5–1.5 cm)
- medium (1.5–3 cm)
- large (>3 cm), usually involving loss of most of the anterior vaginal wall and a circumferential loss of the urethro-vesical junction
- extensive, i.e. involving major loss of bladder and urethra, with a large gap between the two (Figure 1.10).

### Scarring

Scarring varies from minimal when the fistula margins are soft and mobile to extreme when the fistula margins are rigid and fixed. Scarring also affects the lateral and posterior wall of the vagina, causing complete stenosis in extreme cases. Vaginal stenosis can affect the proximal or distal canal or can extend throughout. The most common site is mid-vagina.

Scar is the big enemy – any fistula with significant scarring is not for a beginner.



**Figure 1.10** An extensive fistula: (a) sagittal section; (b) intra-vaginal view. The whole of the anterior vaginal wall has been lost; there is a gap between the stenosed urethra and the anterior bladder wall. Bare bone is exposed at the back of the pubic symphysis. The antero-lateral margins of the bladder defect are adherent to the underside of the pubic arch, and the ureteric openings will be on the edge or even outside the bladder, as indicated in (b).

## Classification systems

Two recent attempts to standardize classification have been proposed, by Judith Goh and Kees Waaldijk.

### Goh's system

Goh's classification<sup>2</sup> is based on three variables:

- the length of the urethra (types 1–4)
- the size of the fistula (a–c)
- the degree of scarring (I–III).

#### Urethral length

Type 1: Distal edge of fistula >3.5 cm from the external urethral orifice (EUO), i.e. the urethra is not involved

Type 2: Distal edge 2.5–3.5 cm from the EUO

Type 3: Distal edge 1.5–<2.5 cm from the EUO

Type 4: Distal edge <1.5 cm from the EUO.

#### Fistula size

- (a) Size <1.5 cm
- (b) Size 1.5–3 cm
- (c) Size >3 cm.

#### Scarring

- I. No or mild fibrosis around fistula/vagina, and/or vagina length >6 cm or normal capacity
- II. Moderate or severe fibrosis around fistula and/or vagina, and/or reduced vaginal length and/or capacity
- III. Special considerations, e.g. circumferential fistula, involvement of ureteric orifices.

We presently use this classification, as we believe it to be the best attempt to be objective about clinical findings. However, there are still problems with the system:

- The urethral length is often only estimated, but is important in predicting prognosis and management.
- Assessment of the degree of scarring and shortening of the vagina is inevitably subjective.

- There may be lack of agreement as to what constitutes a circumferential fistula. Even small juxta-urethral fistulae may be slightly detached from the bladder, although some surgeons reserve the term ‘circumferential’ for cases where there is a clearly palpable gap with bare bone between the urethra and the bladder.
- The ureteric orifices may be just inside, at the edge of or outside the fistula, so ureteric involvement is open to subjective interpretation.

Thus, there may be considerable inter-observer variation; however, if a surgeon applies the same criteria in all cases, this will enable a meaningful audit to be done.

As an example, we have used this classification to confirm our suspicion that the worst fistulae occur in primiparous patients and those having a vaginal delivery (see Appendix 2).

This system of grading from type 1aI to type 4cIII does indicate an increasingly poor prognosis, although it is not always an indication of difficulty of repair. Type 1aI cases have the best prognosis and are often the easiest to repair, but a small inaccessible fistula high in the vagina or cervical canal would have the same classification but might be a great challenge to close.

In addition, the surgeon should make an estimate of bladder size. This is done with a calibrated sound at the beginning of the operation. An additional refinement is to measure functional bladder capacity during dye testing.

### **Waaldijk's system**

The classification proposed in Waaldijk's book<sup>3</sup> has been valuable in predicting outcome and planning treatment, and has been vital for his own analysis of outcomes. It has not been universally adopted, but it is used by the many surgeons whom he has trained.

Type I: Fistulae  $\geq 5$  cm from the EUO and therefore not involving the closing mechanism. These have an excellent prognosis, because the all-important urethra and bladder neck are intact.

Type II: Fistulae that involve the closing mechanism (<5cm from the EUO):

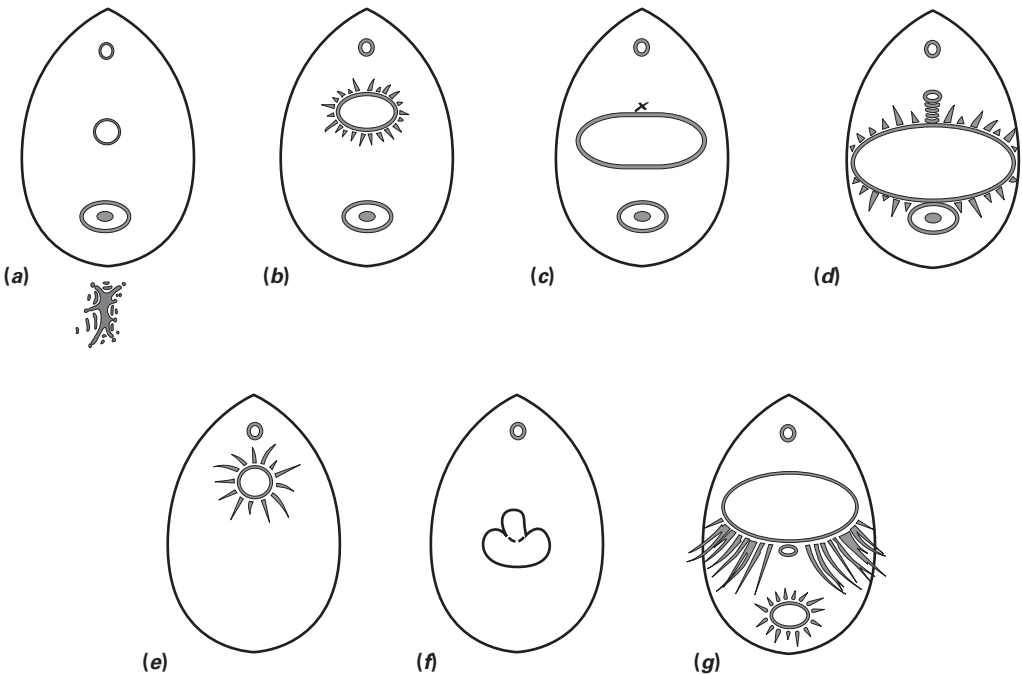
- A. Without (sub)total involvement of the urethra:
  - (a) without a circumferential defect
  - (b) with a circumferential defect
- B. With (sub)total involvement of the urethra:
  - (a) without a circumferential defect
  - (b) with a circumferential defect.

Type III: Miscellaneous fistulae, e.g. uretero-vaginal and other exceptional fistulae.

Some surgeons have had difficulty in distinguishing between types IIA and IIB, although recently Waaldijk (personal communication) has clarified this by defining type IIB fistulae as those with a urethral remnant of less than 1.5 cm.

### A descriptive template

In reality, each fistula case is unique, and there are so many variables that some surgeons feel that a satisfactory classification will never be achieved. To a large extent, the description of fistulae and their repair can be learned only by long apprenticeship. We recommend the use of a simple template for figurative description of clinical findings and operative details. This is very helpful in communication between individual surgeons. One such template, based on that used at the Addis Ababa Fistula Hospital, is illustrated in Figure 1.11, where the fistula is indicated roughly in size and in its position in relation to the urethra and cervix. The amount of shading indicates the degree of scarring in the vagina or around the fistula margins.



**Figure 1.11** (a) A simple small mid-vaginal vesico-vaginal fistula (VVF). (b) A medium VVF with some scarring of the margins. (c) A larger VVF without scarring but with a blocked urethra. (d) A large circumferential VVF with severe scarring and a gap between the urethra and the bladder. (e) Severe vaginal stenosis. (f) A juxta-cervical fistula extending into an open cervical canal. (g) A large VVF with severe posterior scarring of the vagina and a recto-vaginal fistula as well.

## Prognosis

The critical factors affecting the prognosis of an obstetric fistula are the length of the urethra, the sizes of the fistula and the bladder, and the amount of scarring. Almost all defects can be closed (although bladder capacity may be reduced). However, if the urethra has been crushed, denervated and shortened, it will not function and the patient may have total stress incontinence. The shorter the urethra and the greater the scarring, the higher is the chance of stress incontinence. Destroyed urethras can be repaired, but the prognosis for continence is not good.

## References

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3. Waaldijk K. *Step by Step Surgery of Vesico-Vaginal Fistulas*. Edinburgh: Campion Press, 1994.