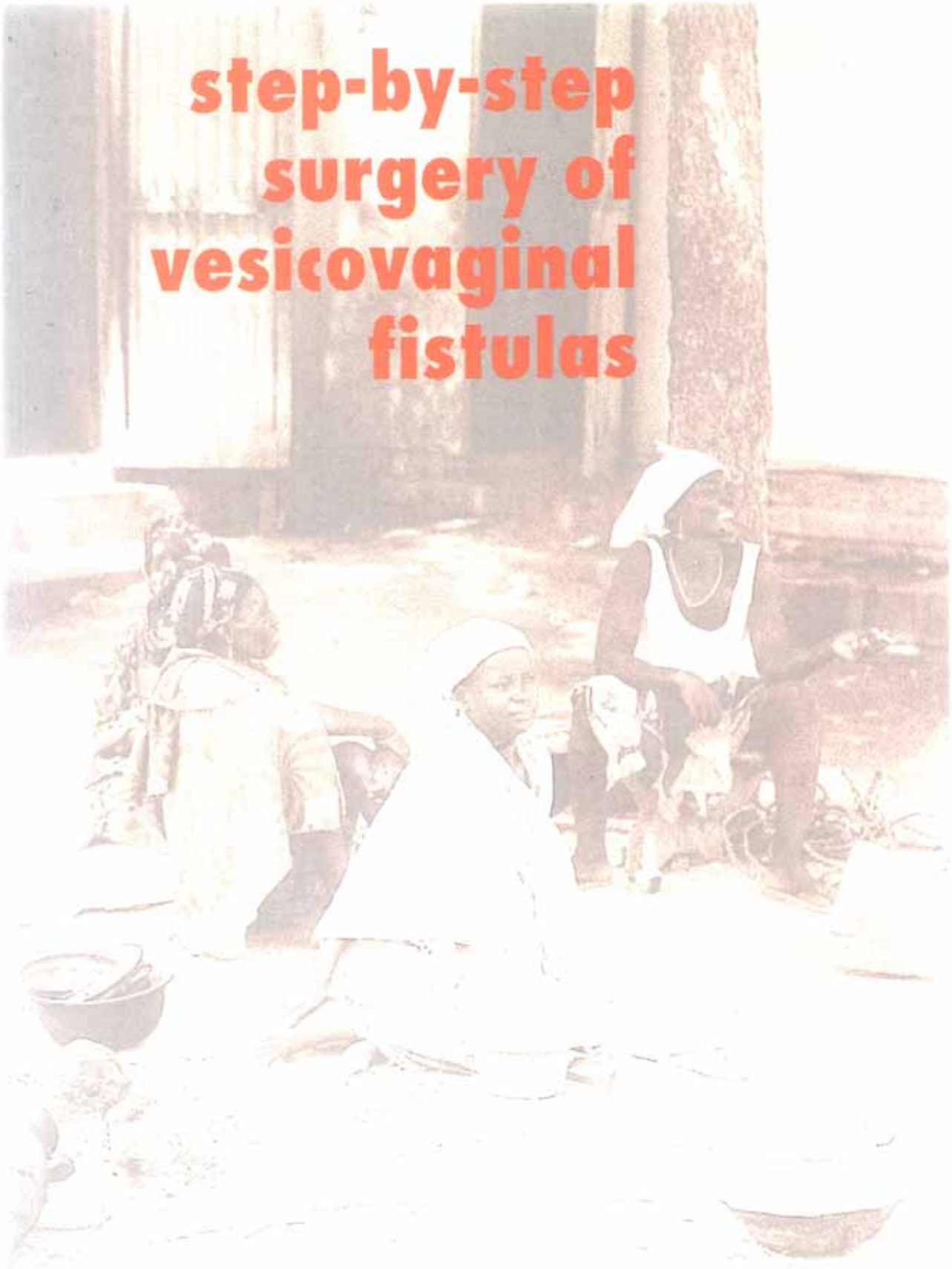
step-by-step surgery of vesicovaginal fistulas



kees waaldijk

step-by-step surgery of vesicovaginal fistulas

a full-color atlas

by

kees waaldijk

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preface

It is with great pleasure that I present this surgical manual, destined for general practitioners with some surgical experience and for other medical professionals. The book has been released with the support of SIMAVI, a Dutch NGO, founded in 1925 and supporting health related and medical projects in developing countries. Its support is given irrespective of race, religion or political persuasion. A substantial part of SIMAVI's aid is spent on training of health workers, on teaching aids and on educational programmes.

The subject of the manual is the repair of vesicovaginal fistulas (VVF), a major problem for women after child bearing. Although the repair of VVF lies within the range of the rural gynaecologist, training and instruction is very much needed and indispensable.

The author, a well-known Dutch surgeon based in Nigeria, has succeeded in writing a comprehensive, distinctly instructive manual on how to repair this type of fistula. The illustrations are clear and closely match the text. I am convinced that this step-by-step surgical manual is a major step forward in the training of VVF repair techniques. With the help from our SIMAVI friends and of other donor organisations this manual will be distributed throughout several countries and will find its way to various training centres.

Because of this manual many women will once again be able to lead their normal social lives. As one of the target areas of SIMAVI is to help women in developing countries, we consider it both our duty and an honour to contribute to this project.

Mrs. Drs. I.R. Smidt
President of SIMAVI

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foreword

The obstetric fistula still constitutes a major public health problem in many developing countries, but not much is being done to rectify the situation, and an international approach is lacking.

It seems that some 140 years after James Marion Sims, the obstetric fistula, from which modern gynecology started, has been forgotten in the industrialized world.

Many surgeons are trying very hard to do something about this, but most of the surgery is haphazard as they have not been trained in this type of surgery, and surgical literature is scarce.

However, in a small bush hospital in Northern Nigeria in January 1984 a programme of fistula surgery was started. In the ten year period following, up to 1993, some 5,000 procedures (VVF repairs, RVF repairs and/or catheter treatments) have been performed in over 4,250 fistula patients.

Based upon this experience, which has been documented since the very beginning, this manual has been prepared in order to help other surgeons (especially those working in developing countries) to develop a systematic surgical approach.

There is no need for expensive high-tech equipment, for extensive laboratory investigations, for X-ray examination, for special surgical instruments or for special atraumatic suturing materials. It is far more important to keep the procedure simple, surgically sound and effective. The weakest point of surgery in developing countries, far from being the lack of expensive tools, tends to be the poor postoperative nursing care.

It is my absolute belief, backed up by results, that even under primitive conditions and within a low budget a great deal can be done for the fistula patient.

Autumn 1994
Kees Waaldijk, author
chief consultant surgeon

Figure 1 KATSINA

Figure 2 KANO

Figure 3 Hostel

Figure 4 Hostel

Figure 5 Postoperative ward

Figure 6 Postoperative ward

Figure 7 Laundry

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introduction

The vesicovaginal fistula (VVF) is as old as mankind and has always been a constant source of misery to the women affected. Due to the constant dribbling of urine down their legs, the wetting of their clothes and the accompanying smell, most communities consider these women as outcasts.

The VVF may be caused by obstetric complications, surgery, radiation, trauma, infection, malignancy and congenital malformation.

The main cause, in over 85% of cases, is obstructed labor which is not relieved in time by a cesarean section. Thus, the anterior vagina wall and bladder become compressed between the fetal skull and the maternal symphysis, resulting in pressure necrosis: this gives rise to the obstetric fistula.

The trauma of unrelieved obstructed labor is such that most of the mothers die, and only the 'lucky' ones survive – the price they pay is a fistula and a stillborn infant. Once the child has died inside the mother, the head (its largest circumference) shrinks and it may then be passed spontaneously through the birth canal.

Even if a cesarean section or a cesarean hysterectomy (because of ruptured uterus) is performed, a fistula may develop because the surgery has either been too late or has superimposed some additional surgical trauma.

The abnormal connection (or fistula) may be between the urethra and the vagina, between the bladder and the vagina, between the bladder and the cervical canal, between the bladder and the uterine cavity or between the ureter(s) and the vagina; other exceptional fistulas are possible, and combinations of the different types may also occur. The size of the fistula may vary from very small (with only occasional leaking when the bladder is full) to very extensive (with total loss of the bladder floor, urethra and cervix).

There is also frequent combination with other intra- and extravaginal lesions. The intravaginal lesions include rectovaginal fistula (RVF), bladder prolapse, stone formation, loss of pelvic floor muscles and vagina stricture or stenosis. The extravaginal lesions include loss of labia minora, urine-induced dermatitis, peroneal paralysis, pressure ulcers over prominent bones such as the sacrum and poor general health or even cachexia.

Though the fistula may occasionally heal spontaneously, with or without the help of an indwelling bladder catheter, the majority of VVF patients can only be helped, if they can be helped at all, by surgical intervention.

Even if the fistula itself has been closed other serious problems may remain, including urinary stress and/or urge incontinence, vaginal stenosis or atresia, and infertility. Only if all of these problems have been solved can the patient be restored to a normal social life, and since a definitive solution cannot always be found, some patients have to live the remainders of their lives in a state of physical, social and psychological pain.

Though it has almost disappeared in the industrialized world (where the causes are non-obstetric when it does occur), the VVF is still very prevalent in the developing world and it still constitutes a major public health problem in many countries. In situations where there is no easy access to a functioning obstetric unit, the incidence rate can be calculated at a minimum of 1-2 per 1,000 deliveries where the mother survives.
The worldwide prevalence of the condition can be calculated at a minimum of 1,000,000 VVF patients in need of surgery: the actual number may be well over 2,000,000.

To understand the problem in the developing countries, it is important to recognize that there is not only obstruction of labor – there is also obstruction at every level of the management of the condition. There is obstruction of diagnosis, obstruction in deciding what to do with each patient, obstruction of fund raising for transport and medical care, obstruction of the transport needed to get the patient to a proper hospital, and obstruction of the secondary and tertiary health care which would organize a cesarean section.

In fact, the obstetric fistula is the only major public health problem where prevention and treatment is highly specialized – it is, specifically, surgery. Prevention cannot be provided within the primary health care system as a cesarean section has to be performed **within three hours** from the moment labor becomes obstructed. This can only be done in a fully equipped obstetric unit by a surgeon, with the help of highly qualified personnel (anesthesia, blood bank etc.). The only role primary health care can play is first to detect risk factors in pregnant women and later to diagnose obstructed labor and then take immediate action to have a cesarean section performed as soon as possible.

For the inhabited parts of Africa (some three-fifths of 30,244 million sq km) a total network of 75,000 obstetric clinics, each serving an area of 320 sq km, is needed.

It will take a long time to set up a network of functioning obstetric units throughout the developing world, to provide rapid transport to such units and to change sociocultural patterns.

The VVF will be a major public health problem for at least 50 years to come, and thus, despite the fact that it is preventable, it will continue to be a challenge to present and future generations of surgeons.

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Figure 33 Pressure ulcers

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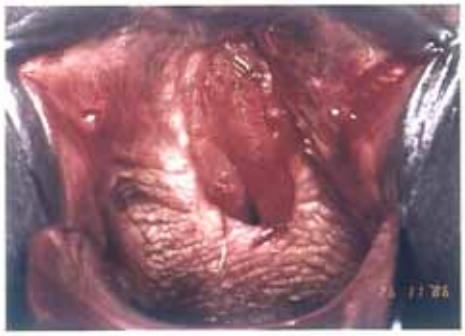

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chapter II

preoperative preparation

first visit of patient

At the first visit of any new patient, an extensive medical history is taken and a clinical check-up (together with a vaginal assessment if possible) is performed.
As most patients have to travel long distances to reach the hospital, they are admitted to a hostel where they can wait their turn for operation (this also helps with administration).

timing of operation

Previously a minimum period of 10-12 weeks from the onset of leakage was recommended, but nowadays it is recognized that action can be taken as soon as the slough has gone. Whatever the condition of the patient, a FOLEY balloon catheter can be inserted immediately, with or without primary suturing. Alternatively, as soon as her general condition allows it a repair can be carried out under spinal anesthesia.

antibiotics

The practice of routinely giving antibiotics or uroseptics to any patient presenting with a fistula should be abolished, as the fistula is caused by localized necrosis and not by infection. Only if there is generalized sepsis or if the patient has a specific infection such as pyelonephritis or pneumonia are antibiotics indicated.

cachexia

If the patient is cachectic she must be instructed to take a high-protein diet in order to improve her general condition.

anemia

If the patient is grossly anemic, oral hematinics (ferrous sulfate and folic acid) and/or systemic iron preparations (iron dextran) should be given.

laboratory

All VVF surgery can be done under very primitive conditions without laboratory tests (as it is in Babbar Ruga Hospital in Katsina), but it would be useful to have a hemoglobin count and renal function tests such as blood creatinine.
Urine tests are not appropriate because of the difficulty of obtaining a proper specimen (this would require catheterization).

blood bank

Because of the many problems involved, blood transfusions should be used only in emergencies.

examination under anesthesia

This is recommended by many surgeons as a standard preoperative routine, but it takes time, requires anesthesia, organization and expertise, costs money and delays the only thing which is important – the VVF repair. If the patient has been prepared for examination under anesthesia, why not proceed with the operation and help her immediately? If the surgeon finds himself unable to decide on treatment at a normal vaginal assessment it would be better for him to refer the patient to a more experienced practitioner. The

examination will, in any case, be done at the outset of each VVF repair (when the patient is fully prepared) so that the surgical technique can be matched to that specific fistula.

radiology

Intravenous pyelography is recommended by some surgeons as routine, but it also takes time, needs expertise and costs money. Even if one is lucky enough to have access to an X-ray machine, film may be in short supply, and the results may be of questionable quality. Routine chest X-rays to exclude tuberculosis are firstly not indicated and secondly not reliable. So far, in the clinic in Nigeria only two patients out of more than 4,250 presented with pulmonary tuberculosis. If there is clinical suspicion of pulmonary tuberculosis the sputum should be smeared for AFB.

dye examination

If the fistula is so small it cannot be visualized easily, or if there is doubt about its existence, up to 200 ml of gentian violet can be instilled into the bladder under direct vision.

cystoscopy

Even this can be considered high-tech for the developing countries. Used preoperatively it does not, in any case, offer new information. For scientific purposes it would be a useful postoperative tool.

clinical examination

A clinical check-up of heart, lungs, eyes (for gross anemia) and general condition should be performed the day before the operation, as should a vaginal assessment of the fistula, so that the surgeon can prepare properly for the surgery.
At the same time, the patient should be instructed not to eat anything from 24.00hr onwards, to shave the pubic area and to pass stools the following morning in order to have an empty rectosigmoid during operation.

conclusion

Even under primitive conditions and without high-tech medical equipment there is every possibility that surgery can help most VVF patients. A proper history taking and a clinical examination, including a vaginal assessment without anesthesia, are normally sufficient preparation for the operation.

chapter III

classification of fistulas

introduction

In order to find the optimal surgical management for any individual fistula it is necessary to compare the different surgical techniques and the results from different centers with each other. This can be done using a fairly simple classification.

methods

The following classification of VVF is presented according to the anatomic/physiologic location, and related to the recommended surgical technique and prognosis.

Table I: **classification of vesicovaginal fistulas**

- **I** fistulas not involving the closing mechanism
- **II** fistulas involving the closing mechanism
  - **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
- **III** miscellaneous, e.g. ureterovaginal and other exceptional fistulas

An additional classification can be made according to the size of the fistula into small, medium, large and extensive:

Table II: **additional classification as to fistula size**

small	< 2 cm
medium	2-3 cm
large	4-5 cm
extensive	≥ 6 cm

surgical technique

The approach route of choice for type I and type II is the vagina; exceptionally in these cases, and more generally for type III, the abdominal route might be necessary.
The operation becomes increasingly complicated from type I through type IIBb, type IIBb fistulas being the most difficult to repair.
In type I, it is sufficient to simply close the fistula, either longitudinally or transversely whatever is the most convenient. In type IIAa longitudinal closure is preferred, though it is only possible in some 15% of cases, and attention should be paid to repairing the closing mechanism.
In type IIAb a circumferential dissection has to be performed in order to create a circumferential reconstruction.
In type IIBa longitudinal closure is preferred, together with reconstruction of the urethra, and the closing mechanism should be repaired.

In type IIBb the variety of tissue loss is wide; usually only scar tissue is left, and this makes it very difficult to reconstruct anything. Often a 2-stage operation is necessary, though a better alternative may be reconstruction of the urethra from an anterior, lateral or posterior bladder flap.
Of type III, not much personal surgical experience is available. In this type it may be necessary to implant one or both ureters into the bladder or bowels, or even undertake more complex repair.

results

The success with which surgery deals with closure and postoperative urinary stress or urge incontinence decreases progressively from type I through type IIBb fistulas.

discussion

Classification of the fistula should be done under anesthesia at the beginning of the operation. It is important to check for circumferential defects: these are common in obstetric fistulas, and they complicate the operation and worsen the prognosis for closure and continence.
Within this classification, it is of course possible to further subdivide according to the size of the fistula: small (< 2 cm), medium (2-3 cm), large (4-5 cm) and extensive (≥ 6 cm). However, there are instances where the fistula may be small but the damage is such that they must be classified as extensive.

conclusion

This method of classification, based on the anatomic and physiologic location of the fistula, will enable systematic comparison of different surgical techniques and enable the results from different centers to be objectively compared. It offers guidance to the selection of surgical technique, and has consequences for outcome of the repair. Nevertheless, it can provide only principles: every fistula demands an individual approach matched to that specific fistula.

Figure 58 Closing mechanism

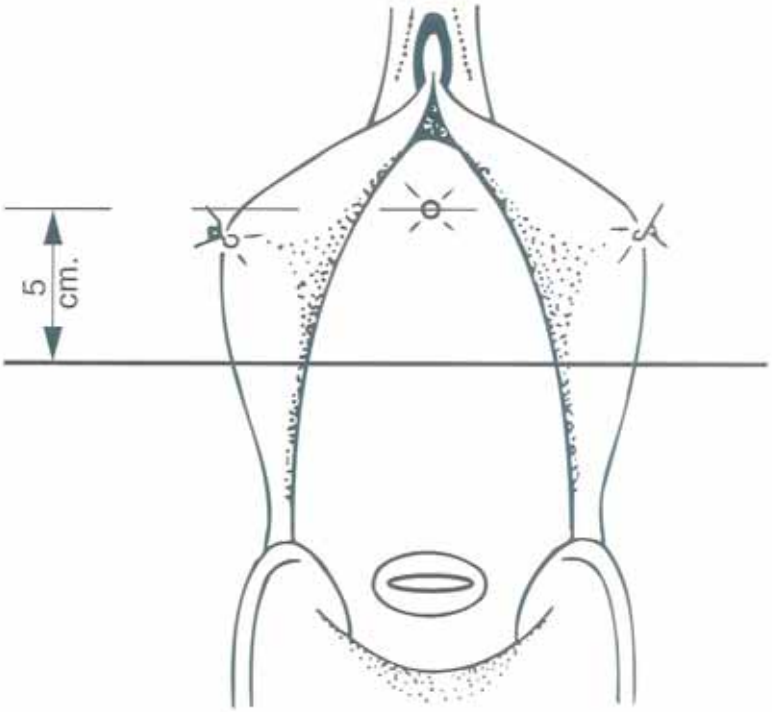

Figure 58-a Closing mechanism: frontal

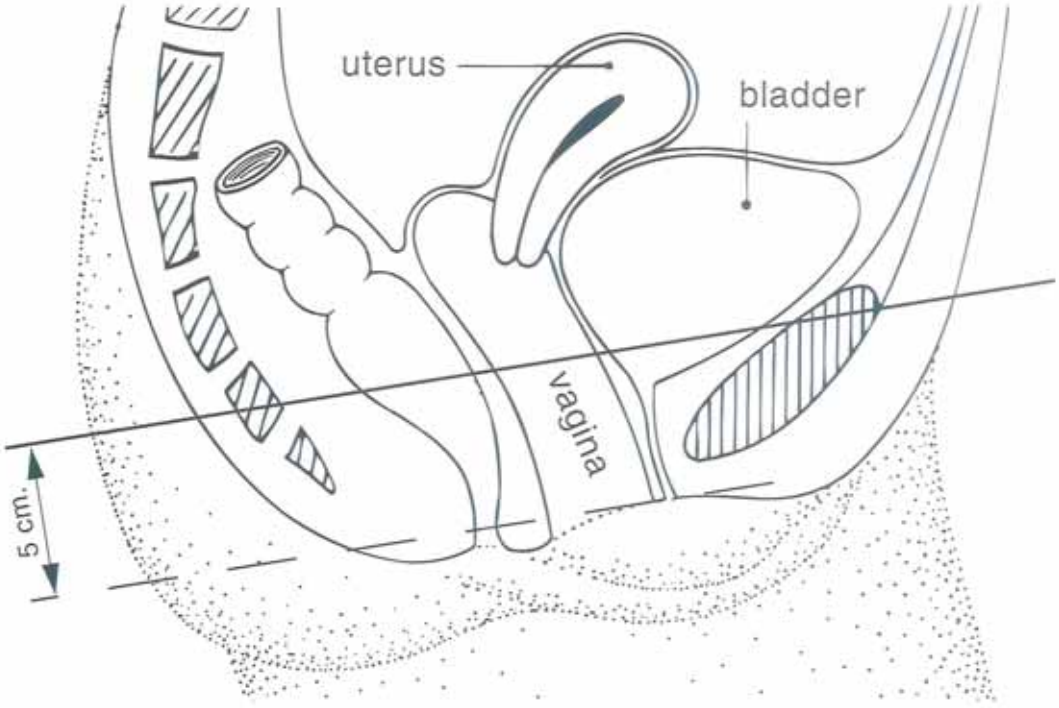

Figure 58-b Closing mechanism: sagittal

Figure 59 Type I fistulas

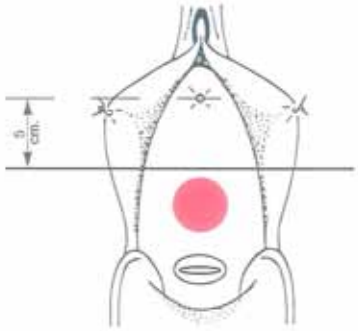

Figure 59-a Vesicovaginal fistula

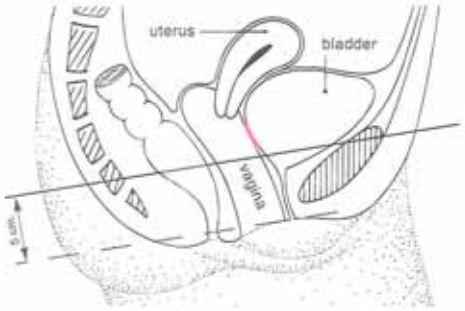

Figure 59-b Vesicovaginal fistula

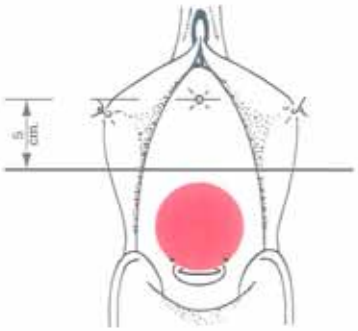

Figure 59-c Vesicocervicovaginal fistula

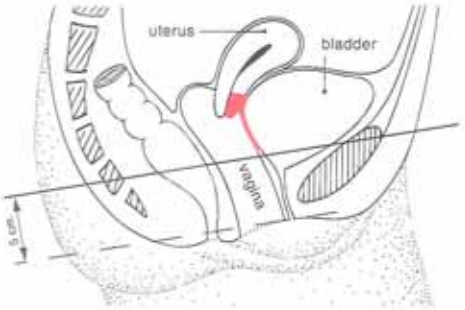

Figure 59-d Vesicocervicovaginal fistula

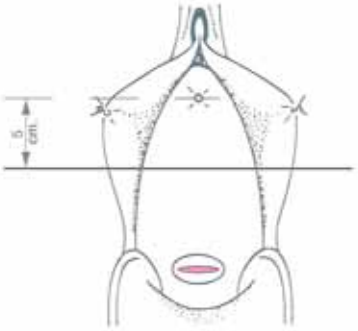

Figure 59-e Vesicouterine fistula

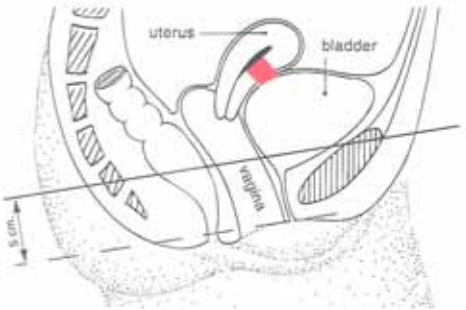

Figure 59-f Vesicouterine fistula

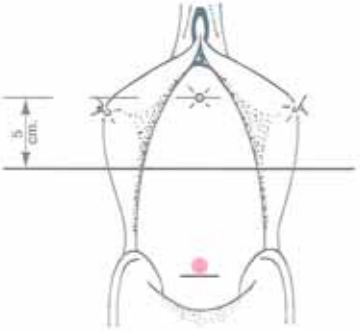

Figure 59-g Vagina vault fistula

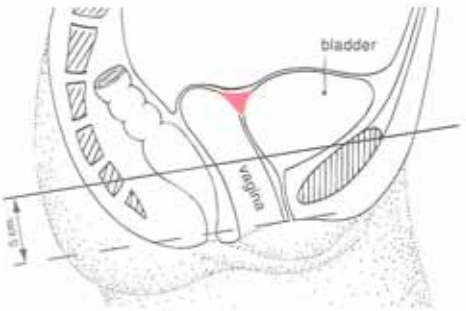

Figure 59-h Vagina vault fistula

Figure 60 Type IIAa fistulas

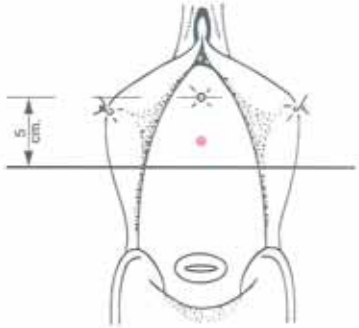

Figure 60-a Urethrovesicovaginal fistula

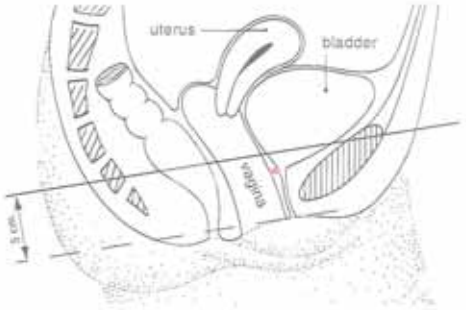

Figure 60-b Urethrovesicovaginal fistula

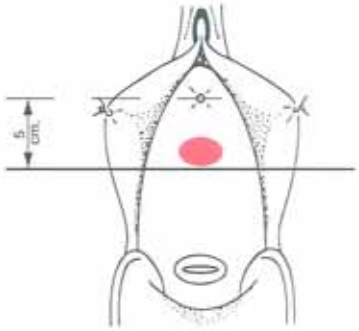

Figure 60-c Urethrovesicovaginal fistula

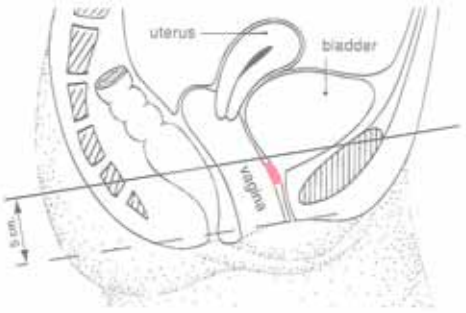

Figure 60-d Urethrovesicovaginal fistula

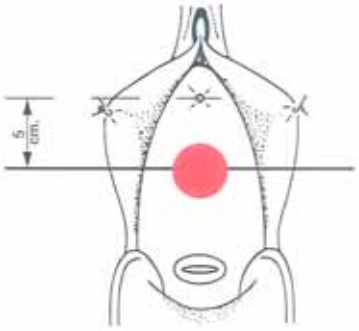

Figure 60-e Urethrovesicovaginal fistula

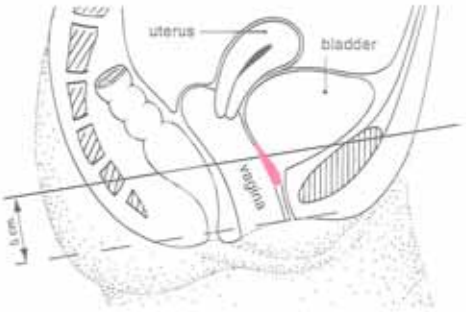

Figure 60-f Urethrovesicovaginal fistula

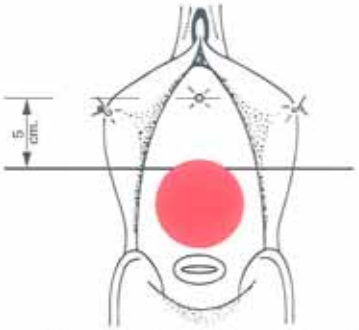

Figure 60-g Urethrovesicovaginal fistula

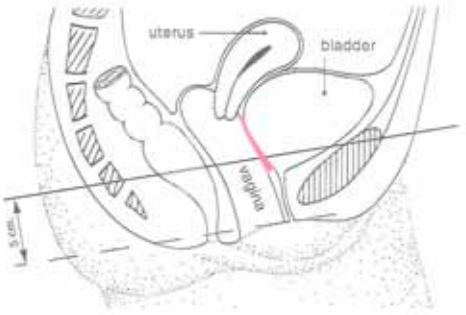

Figure 60-h Urethrovesicovaginal fistula

Figure 61 Type IIAb fistulas

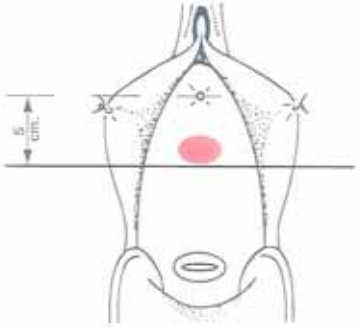

Figure 61-a Urethrovesicovaginal fistula

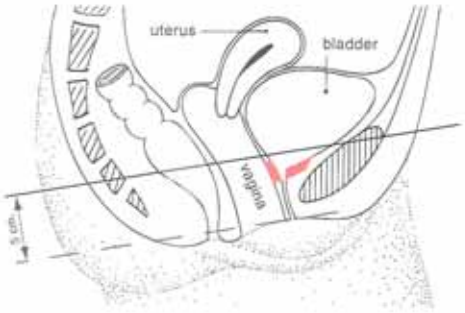

Figure 61-b Urethrovesicovaginal fistula

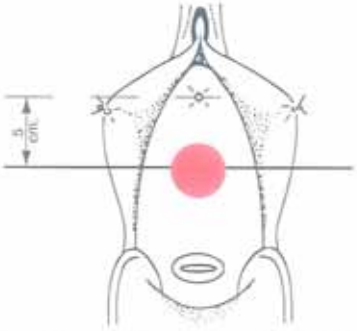

Figure 61-c Urethrovesicovaginal fistula

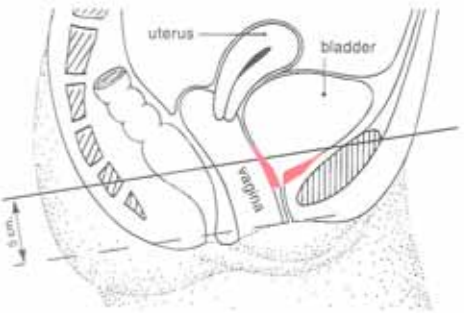

Figure 61-d Urethrovesicovaginal fistula

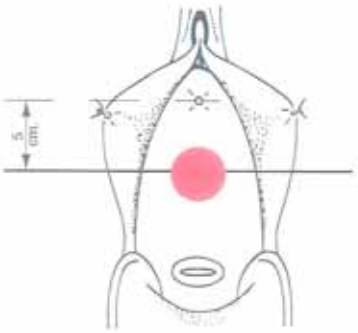

Figure 61-e Urethrovesicovaginal fistula

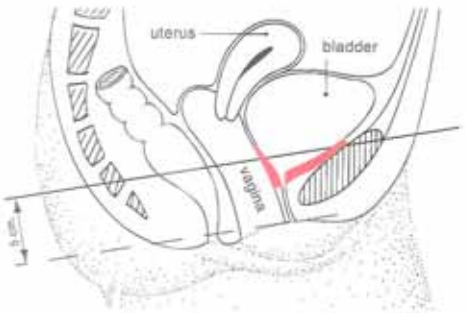

Figure 61-f Urethrovesicovaginal fistula

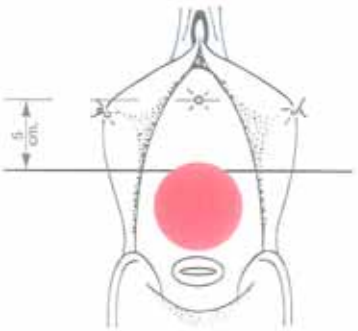

Figure 61-g Urethrovesicovaginal fistula

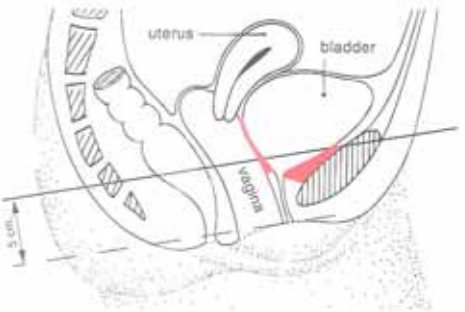

Figure 61-h Urethrovesicovaginal fistula

Figure 62 Type IIBa fistulas

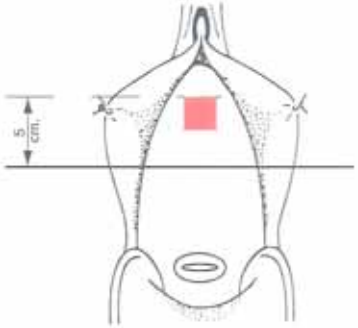

Figure 62-a Urethrovaginal fistula

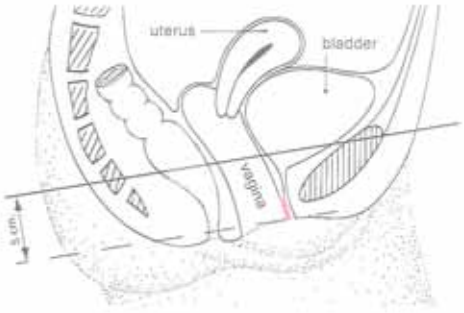

Figure 62-b Urethrovaginal fistula

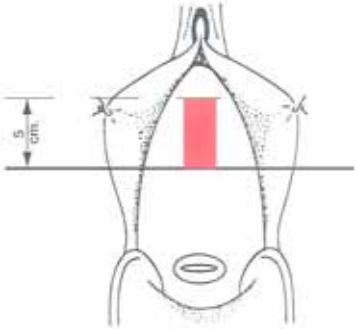

Figure 62-c Urethrovesicovaginal fistula

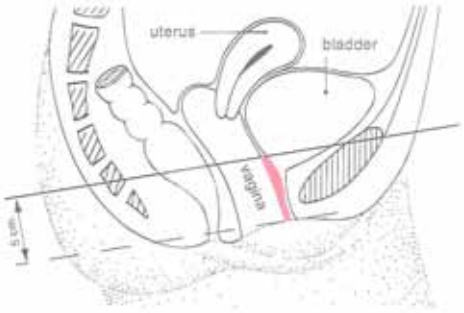

Figure 62-d Urethrovesicovaginal fistula

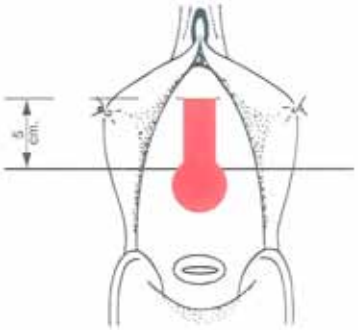

Figure 62-e Urethrovesicovaginal fistula

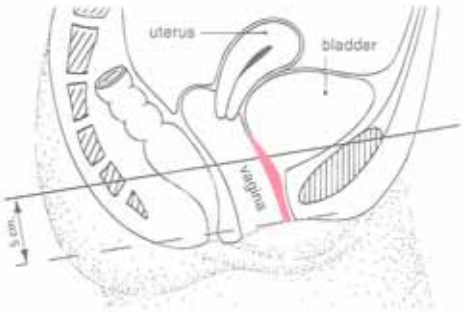

Figure 62-f Urethrovesicovaginal fistula

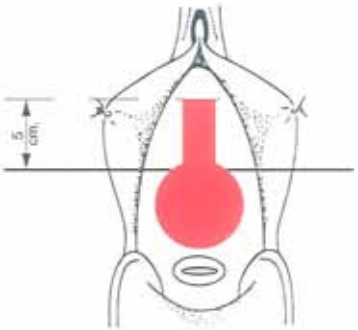

Figure 62-g Urethrovesicovaginal fistula

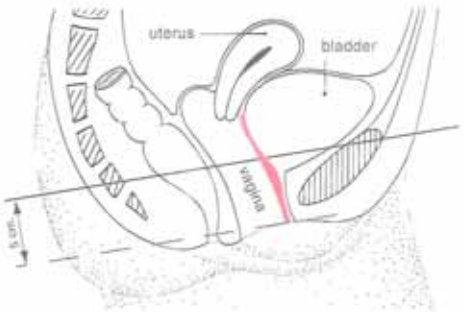

Figure 62-h Urethrovesicovaginal fistula

Figure 63 Type IIBb fistulas

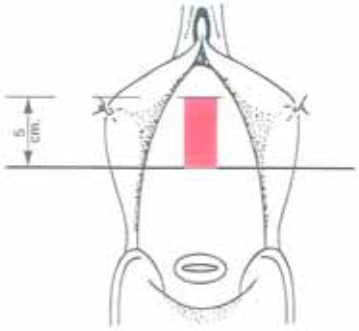

Figure 63-a Urethrovesicovaginal fistula

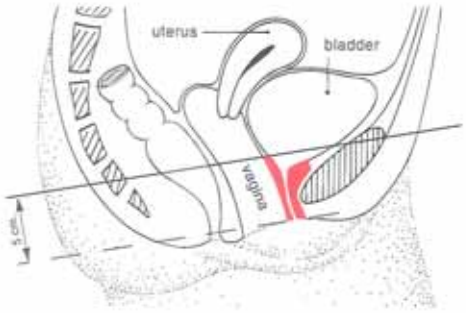

Figure 63-b Urethrovesicovaginal fistula

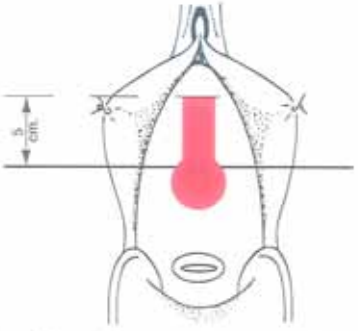

Figure 63-c Urethrovesicovaginal fistula

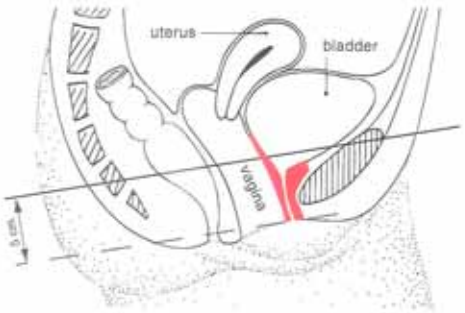

Figure 63-d Urethrovesicovaginal fistula

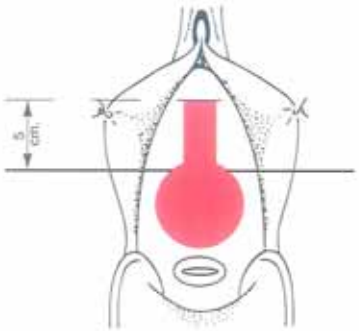

Figure 63-e Urethrovesicovaginal fistula

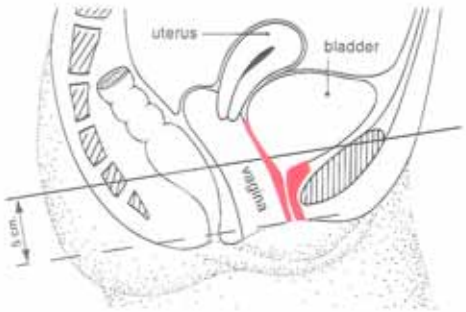

Figure 63-f Urethrovesicovaginal fistula

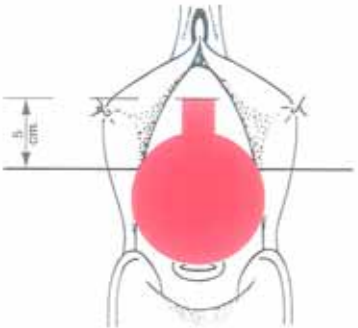

Figure 63-g Urethrovesicocervicovaginal fistula

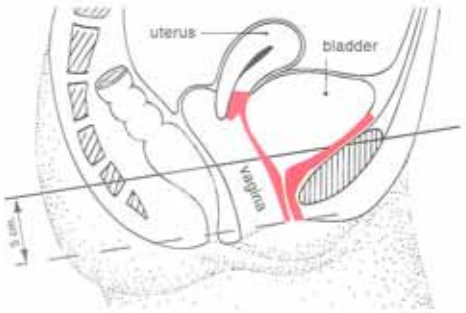

Figure 63-h Urethrovesicocervicovaginal fistula

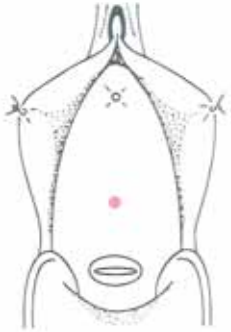

Figure 64-a Small

Figure 64-b Small

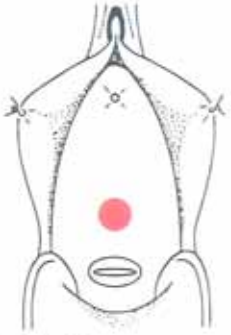

Figure 65-a Medium

Figure 65-b Medium

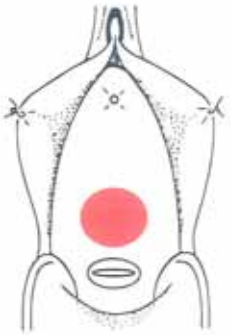

Figure 66-a Large

Figure 66-b Large

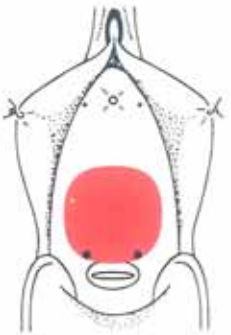

Figure 67-a Extensive

Figure 67-b Extensive

chapter IV

catheter treatment

introduction

It is possible for small fistulas to heal spontaneously before there is any cross-union between the bladder mucosa and vaginal mucosa.
In fistulas up to 2 cm in diameter, this spontaneous healing can be promoted by the use of an indwelling bladder catheter for 4-6 weeks.
For fistulas of 3-4 cm in diameter, adaptation of the clean fistula edges with nonabsorbable sutures may help the healing process.
Note, too, that following delivery patients may present with stress incontinence or with overflow incontinence due to poor bladder tone or urethrovesical stricture (UV stricture): these conditions may give the impression of a fistula.

methods

general use of catheters
Any patient complaining of involuntary urine leakage during the 2-3 months after giving birth should have an indwelling bladder catheter inserted, irrespective of the cause.
As soon as she is fit for vaginal examination, an assessment of the damage is carried out and a decision can be taken either to leave the catheter in place or to remove it.
fistulas
In fistulas up to 3-4 cm in size the catheter is left in and adaptation, either longitudinal or transverse, is performed as soon as the slough has disappeared and the fistula edge is completely clean.
The anterior vagina wall edges are adapted with nonabsorbable suturing material. If possible, freshening of the edges is carried out. Care must be taken to ensure that the needle is inserted between the anterior vagina wall and the bladder, and that the sutures evert the anterior vagina wall.
Anesthesia is not usually necessary as the anterior vagina wall is not very sensitive, but if the procedure cannot be done without anesthesia the patient should be prepared for surgical repair of the fistula under spinal anesthesia as soon as her general condition allows it.
Antibiotics should not be used routinely but only where there are clear clinical indications, such as sepsis, pneumonia etc. Otherwise they will simply be a waste of money. It is far more important to make sure that the patient drinks as much as possible – enough to produce at least 4000 ml of urine per 24 hr. This urine flow will prevent ascending urinary tract infection, and also prevent blocking of the catheter. The urine should be clear and completely colorless.
The patient must be instructed to report immediately if the catheter gets blocked, so that it can be flushed out or changed. She should also report routinely once a week to know if she still leaks or not and at this time any new instructions can be given.
After 4-6 weeks a vaginal examination can be performed and the catheter and/or sutures may be removed.
If the fistula has closed, the patient should be instructed to pass urine frequently and to report regularly for check-up. If it has not closed, the patient should be prepared for a VVF repair as soon as possible.
If the fistula has closed but the patient still suffers from urinary stress incontinence, the incontinence should be cured by surgery.

latest development
As soon as the slough has disappeared the fistula edge should be freshened. After minimal dissection, the bladder should be closed with inverting chromic catgut 00, and the anterior vagina wall should be closed with everting supramid 0. Chromic catgut 0 should be used in between (this is really a kind of mini-repair). After 4 weeks the catheter is removed and 1 week later the sutures are taken out.
bladder atony
This occurs mainly in very young patients, in the age group 13-14 years. The patients present with continuous leakage of urine due to overflow. On examination, the anterior vagina wall will be found to be bulging into the vagina, and no fistula will be found. Urine leaks from the EUO and a suprapubic mass is present. The bladder will be distended with a longitudinal diameter of 11 cm or more (sometimes more than 20 cm). When a catheter is inserted, 1-1.5 liters of urine will be drained.
The causal mechanism seems to be a mechanical overstretching of the bladder musculature so that the bladder is left unable to contract.
The catheter should be left in position for 4-6 weeks, and when it is removed the patient should be instructed to pass urine immediately and frequently.
UV-stricture
This may occur as a result of subfistula trauma to the UV junction, and it happens mostly in patients who have had a successful repair in the past, or as a result of the spontaneous healing of a minute fistula. After gentle dilatation up through H8 has been performed a catheter should be inserted and left in position for 4 weeks.
stress incontinence
Some patients develop stress incontinence immediately after delivery, and in these cases an indwelling bladder catheter is inserted for 4 weeks.

results

Using this type of treatment on fresh fistulas, it is possible to close 40-60% of smaller fistulas (those up to 3-4 cm). If a mini-repair is performed the success rate may go up to almost 95%.
Almost all patients with overflow incontinence due to bladder atony and/or UV-stricture following obstructed labor may be completely healed by a 4-week course of catheter treatment.
This is also true of cases of stress incontinence which develop immediately after delivery.

discussion

To date, there has not been enough work done to establish further parameters to indicate which fistulas can be healed by treatment with catheters and which will not. However, the procedure itself is simple, and if successful it saves the patient (and the surgeon) an operation.
The catheter of choice is a FOLEY catheter Ch 18, but in the developing world one cannot be too critical and any other catheter will do as long as it allows free flow of urine and decompression of the bladder.
A circumferential defect is no contraindication, and several such patients have healed using this procedure. Note that if no suturing is performed in type IIA fistulas the balloon might fill up the opening of the fistula and so prevent closure.
Patients with overflow incontinence are not really fistula cases; the cause is obstructed labor, though a minute fistula which healed spontaneously may also have been present.
In cases of bladder atony, total decompression of the bladder gives the musculature an opportunity to heal. Sometimes patients who have this condition for more than 55-60 days are seen.

Antibiotics are generally unnecessary because the cause of the obstetric fistula is localized necrosis and not infection. Secondary ascending urinary infection is prevented by adequate urine flow flushing out any bacteria.

conclusion

Any patient with a fresh fistula of up to 3-4 cm in size and up to 2-3 months in duration should be treated with an indwelling bladder catheter. Suturing and freshening of the fistula edge may or may not be necessary. The same applies to patients with stress incontinence or overflow incontinence due to UV-stricture or bladder atony.

No harm can be done by the procedure, and it may offer a cure in 40-95% of cases (depending upon how the fistula is closed). It also gives psychological support to the patient, who feels that something is being done to help her condition. However, the patient should be clearly told that the catheter treatment may not, by itself, be successful.

Figure 68-a Necrotic fistula

Figure 68-b Healed by catheter

Figure 69-a Balloon in fistula

Figure 69-b Suturing

Figure 70-a Fresh fistula

Figure 70-b Catheter

Figure 71-a Clean fistula

Figure 71-b Suturing

Figure 72-a Necrotic fistula

Figure 72-b Catheter till clean

Figure 72-c Suturing when clean

Figure 72-d Healed

chapter V

anesthesia

introduction

In developing countries there are many problems with anesthesia due to lack of personnel, training, equipment, materials, drugs and money. Often the surgeon himself is responsible for the anesthesia.

General anesthesia is complicated and expensive. It requires an anesthetic machine, anesthetic fluids (ether or halothane), oxygen, a variety of drugs for inducing anesthesia and relaxation, special skills, a range of tubes for intubation and well trained personnel. For safety reasons, it also demands intensive monitoring both intraoperatively and postoperatively.

There are very few anesthetists working in developing countries. Where anesthesia is used it is usually administered by an anesthetic nurse, and this practice has many limitations.

Due to lack of organization and management, planned operations often have to be postponed because of the lack of equipment or supplies (especially oxygen).

The maintenance of the anesthetic equipment tends to be below standard, and faults quickly develop: these are then repaired with hammers (or stones), screwdrivers and pliers – leaking tubes are often repaired with adhesive plaster – and a downward spiral sets in.

All these factors combine to make general anesthesia a dangerous and risky business in developing countries. They lead to an unacceptably high rate of anesthesia-induced complications including intraoperative and postoperative mortality.

Regional anesthesia, on the other hand, does not require special equipment, is easy to learn, does not need intensive intraoperative or postoperative monitoring, is as effective as general anesthesia, does not require electricity, and is safe and cheap.

Spinal anesthesia with a long-acting anesthetic drug thus seems to be the method of choice.

methods

In order not to lower the blood pressure before the anesthesia, no premedication should be given. Blood pressure is measured with the patient lying on her back on an operating table which is elevated at the head end. The patient is then instructed to sit on the operating table with the legs straight and to bend forward holding both feet with her hands. The patient's lower back and the surgeon's hands are disinfected with methylated spirit. A resterilizable spinal needle 20G is introduced between the lumbar vertebrae L3/L4 through the yellow ligament, turned 90 degrees in order to split rather than pierce the fibers, then inserted into the dural sac. To check whether the needle opening is inside the dural sac, the needle is turned back 90 degrees and the stylet removed. If cerebrospinal fluid comes out, 4 ml hyperbaric bupivacaine 0.5% may be slowly injected from a 5 ml glass syringe. The needle should be fixed in position with the left hand so that it cannot move; after each milliliter its position should be rechecked by releasing the pressure on the plunger. If the needle is still inside the dural sac, cerebrospinal fluid will flow into the syringe. Only if this occurs should further anesthetic fluid be injected. The needle is left in for a further 10 seconds, to prevent immediate leakage of the anesthetic agent out of the dural sac. Then it is removed and a spirit-soaked gauze applied to the site of the injection. The patient should be positioned flat on her back with a cushion under her head to maximally flex the cervical spinal column and with the table slightly elevated at the head

end. Her blood pressure is monitored after 5 and 10 minutes, and she should be spoken to continually, to help put her at ease.
If after 10 minutes she cannot lift her legs and her systolic blood pressure is at least 90 mm Hg the anesthesia has set in and the operation may proceed.
Intravenous fluids are only given if the blood pressure drops below 90 mm Hg. If the patient develops severe bradycardia (as sometimes occurs in patients over 50 years old) 0.6 mg atropine sulfate should be given i.v.
In girls below the age of 14, in order to avoid total spinal block, first attempts should be made to insert the spinal needle at L4/L5 or L5/S1.
If the needle cannot be inserted into the dural sac at L3/L4, it is tried again at L2/L3 or L4/L5 or L5/S1. If several tries are not successful the operation must be postponed, and after 3 to 5 days the whole procedure should be repeated.
If after 10 minutes the patient still can lift her legs, another spinal anesthesia (either a full or a half dose) is given. A lower level site is preferable for this, but if this is not possible a higher level will suffice. If the second dosage is not successful the operation must be postponed.
Intraoperative monitoring of the patient's condition is done by regularly conversing with her. At the end of the operation her blood pressure is taken, and only if it is below 80 mm Hg and there is insufficient urine flow should intravenous fluids be given.

complications

There are only three major complications of this procedure: total spinal block, shock and postspinal meningitis. Total spinal block should be treated with intubation and artificial ventilation until the drug effect has worn out. Shock demands immediate treatment with intravenous fluids and postspinal meningitis should be treated with antibiotics.
There are also three minor complications: bradycardia, nausea and postspinal headache. Severe bradycardia is treated with 0.6 mg atropine sulfate given i.v. Nausea during the operation usually disappears spontaneously after 5-10 minutes and needs no medication. Postspinal headache is a common complaint following the use of a 20G needle. It is treated with analgesics and disappears spontaneously after 3-5 days.

results

To date, over 5,000 procedures have been planned and performed under spinal anesthesia. In only one patient, who had a severely deformed rachitic spine, was it impossible to perform spinal anesthesia: in her case preparations had to be made for general anesthesia. In only 11 other cases did the operation have to be postponed due to unsuccessful spinal tap or spinal anesthesia, and in each of these cases spinal anesthesia was successful a few days later. One patient developed total spinal block after a second spinal injection and she died because there were no facilities for artificial ventilation: this can be blamed on a serious organizational fault. Another patient developed cerebrospinal meningitis and died, but this occurred at the height of a cerebrospinal meningitis epidemic with its epicenter at Katsina and had nothing to do with the technique.
In the early days i.v. fluids were routinely given, but experience of the latest 4,000 spinal anesthesia procedures has shown that there is no preoperative need for this. In all the procedures to date under spinal anesthesia, not a single intraoperative blood transfusion has been required.

equipment and costs of spinal anesthesia

The only equipment required for spinal anesthesia is a blood pressure machine, a stethoscope, spinal needles and 5 ml glass syringes.

The total cost of the spinal anesthesia including equipment, drugs, gauze, needles, syringes, intravenous fluids etc. is less than $1 US per operation.

discussion

Spinal anesthesia is a simple procedure, and only 12 out of more than 5,000 operations had to be postponed. In 11 of these cases spinal anesthesia was successful a few days later. Only one patient with a severely deformed rachitic spine had to be prepared for general anesthesia after spinal anesthesia had been attempted.

Spinal anesthesia with a long-acting agent such as hyperbaric bupivacaine 0.5% is effective for 3-4 hours. In only one case it was necessary to give morphine i.v. during surgery because the effect was wearing off.

Spinal anesthesia is safe: the only death due to spinal anesthesia was blamed on a serious organization fault and could have been prevented.

The procedure is also cheap, costing less than $1 US per operation.

By not giving any premedication and keeping the patient's legs straight, it might be possible to prevent the occurrence of shock. The lowering of blood pressure should not be considered as a complication, but as a further advantage of spinal anesthesia, as it leads to less intraoperative blood loss and better spontaneous hemostasis.

The fact that over 5,000 operations have been carried out without the need for intraoperative blood transfusion is probably due to the lowering effect which spinal anesthesia has on the blood pressure, and to the very strict indications for giving intravenous fluids. The highest intraoperative blood loss was estimated at no more than 500 ml, and this is certainly not high enough to cause acute major problems in anyone. If the blood loss is 250 ml or more oral hematinics (ferrous sulfate) and/or dextran iron i.m. are given post-operatively.

Due to secondary postoperative hemorrhage some 8-10 days after surgery, blood transfusion was necessary in 4 patients.

conclusion

Because it is simple, effective, safe and cheap, spinal anesthesia with a long-acting agent such as hyperbaric bupivacaine 0.5% is the anesthesia of choice in developing countries for operations on the lower half of the body, including VVFsurgery.

chapter VI

general surgical remarks

introduction

The main objectives of any VVF repair are, firstly, to close the fistula, secondly, to make the patient continent and, thirdly, to preserve or provide the means for sexual intercourse to take place.

If these three objectives have been achieved the patient will be rehabilitated completely into her own society; this will take place spontaneously without further measures.

manpower

Fistula surgery is a one-man job; the whole procedure is performed by the surgeon, with one assistant who can look after the instruments. One retractor inside the vagina is already a crowd.

instruments

Normal (long) vaginal surgery instruments are needed together with the following special instruments:

a) an AUVARD weighted speculum for keeping the vagina open;
b) long ALLIS clamps for grasping the vagina or bladder edges;
c) a pair of sharply curved THOREK scissors for dissecting the anterior vagina wall from the bladder; and
d) a sharp DESCHAMPS aneurysm needle for fixing the bladder, the bulbocavernosus graft and/or the anterior vagina wall onto the symphysis.

It is also absolutely vital to have a complete, well-functioning hydraulic operating table available.

suturing materials

Normal chromic catgut and nonabsorbable skin sutures are needed. These can be bought in cassettes of 100 m and are cheap. Atraumatic suturing material is too expensive, and the same applies to vicryl or dexon.

methods

The patient is placed in the exaggerated lithotomy position with the legs flexed and slightly abducted in stirrups and her buttocks over the end of the operating table. This is the position of choice and has been used in over 5,000 surgical procedures.

A careful examination (under anesthesia!) is carried out to determine the size, location and texture of the fistula in relation to the external urethra opening (estimated where necessary) and the cervix or vagina vault. The vagina should also be examined for general condition and the presence of stricture, stenosis or even atresia. Checks should be made as to whether there is an additional rectovaginal fistula, whether the fistula is accessible, whether there is any circumferential defect, and so on. Based upon this examination the fistula is classified, and the surgeon devises his specific plan of action for that specific fistula.

The labia minora are sutured onto the insides of the upper legs to keep the vagina open laterally, and accessibility is improved by performing a unilateral or bilateral episiotomy at 4 and/or 8 o'clock or a small median episiotomy at 6 o'clock.

Then an AUVARD self-retaining weighted speculum is placed inside the vagina with a gauze underneath it to cover the anus; no more specula are needed.

If necessary, as for example in fistulas near the cervix, an effort is made to identify and catheterize the ureters for 15-20 cm.
A circumferential incision is made at the fistula edge. In smaller fistulas, bilateral transverse extensions should be added; in larger fistulas these transverse incisions are often unnecessary.
The anterior vagina wall is widely dissected sharply and/or bluntly from the bladder and/or urethra using the sharply curved THOREK scissors.
The bladder must be mobilized sufficiently to allow a completely tension-free closure to be performed.
A FOLEY catheter size Ch 18 is inserted into the bladder, and the bladder or urethra is closed with a single layer of interrupted inverting chromic catgut 00 sutures; in most cases a second layer is impossible. Closure should be done from the lateral ends towards the midline, otherwise it may be very difficult to close the lateral angles and corner-corner fistulas may develop. Good bites are taken in order to get broad adaptation of the raw bladder and/or urethra musculature. Care must be taken to adapt only the tissues and not to apply tension on the sutures as they would then cut through the tissue.
Usually, because of the presentation of the fistula, a transverse closure is most logical; longitudinal closure seems to run against the lines of tension.
Care should be taken not to penetrate the bladder mucosa, as theoretically this might lead to stone formation, but this is occasionally unavoidable.
Watertight closure is checked with instillation of 20-50 ml of gentian violet into the bladder via the Foley catheter. If there is still leakage, more sutures can be applied. Sometimes leakage occurs through the suture holes, but if this happens it must be tolerated since nothing can really be done about it.
If necessary (as will be explained later) a bulbocavernosus muscle graft is performed; for right-handed surgeons this is done from the right side and for left-handed surgeons it is done from the left.
The anterior vagina wall is closed with interrupted everting (i.e. inverting into the vagina) nonabsorbable sutures and/or chromic catgut 0 sutures. Closure should again be done from the lateral ends towards the midline, otherwise the lateral angles may not close. Usually a transverse closure seems to be the most logical.
The distance from the external urethra opening (EUO) to the balloon of the FOLEY catheter (EUO/B distance) is measured in centimeters to help estimate the length of the urethra.
The degree of elevation of the urethra/UV-junction/bladder neck in relation to the symphysis is also estimated.
The FOLEY catheter is removed and a calibrated uterine sound is introduced into the bladder through the external urethra opening. The distance from the external urethra opening to the bladder wall (EUO/BW distance) is measured in centimeters to help estimate the bladder capacity.
The sound is then removed, the Foley catheter is reinserted, the balloon is inflated with 5 ml normal saline and the catheter is fixed by a nonabsorbable suture just above the external urethra opening.
If a bulbocavernosus graft has been performed the skin is closed and a pressure pad applied over the donor site.
If episiotomies have been performed only the skin is closed; they are left open intravaginally.
The vagina is packed tightly with gauze soaked in acriflavine to help hemostasis.
If the patient is in good general condition, with good urine flow, she can be transferred to the postoperative ward.

If there is no urine flow, even after attempts at forced diuresis, this indicates that both ureters have been traumatized and the whole repair must be undone.

small fistulas (< 2 cm)

Very small fistulas of up to 2 mm in diameter are troublesome, as the dissection is difficult and it is not easy to invert the bladder at closure. A transverse incision is made through the fistula and then the anterior vagina wall is dissected from the bladder. If possible, the fistulous tract is excised and the bladder is closed with a double layer of inverting chromic catgut 00 sutures.
Other small fistulas are easy to repair because the tissue loss is normally minimal.

medium fistulas (2-3 cm)

These are normally easy to repair as there is not much tissue loss and dissection is easy. If they are located near to the cervix an effort is made to identify and then to catheterize the ureters.

large fistulas (4-5 cm)

Large fistulas do not require the bilateral transverse extensions of the incision, except when a reconstruction of the anterior vagina wall is needed. In such cases, an effort should be made to identify and catheterize the ureters.

extensive fistulas (≥ 6 cm)

Here, very wide mobilization of the bladder and/or urethra is necessary in order to perform a tension-free closure. Often, the lateral bladder walls are fixed onto the pubic bones or symphysis to begin the bladder closure. An effort should always be made to identify and catheterize the ureters. To prevent severe shortening of the vagina, the anterior vagina wall often has to be reconstructed. Occasionally, the abdomen is opened deliberately between the bladder and uterus to enable better mobilization of the bladder. If possible the suture line should be sealed off with bladder peritoneum.

ureter catheterization

If identification is possible, the ureter(s) are catheterized for 15-20 cm and then ureter catheter(s) Ch 5 or 6 are guided through the urethra and fixed onto the skin, cranially to the clitoris, with a nonabsorbable suture.

vaginal stricture or stenosis

If there is any vaginal stricture or stenosis, it should be cleaved longitudinally at the same time as the episiotomies, either unilaterally, bilaterally or medially, and then left open at the end of the operation.

multiple fistulas

If there are multiple fistulas near each other, these should be joined together into a single fistula which can then be repaired normally. If there are multiple fistulas distant from each other, each one should be repaired separately either at the same session or in different sessions.

blocked urethra

If the proximal urethra is blocked (as is often the case with circumferential fistulas) it can be unblocked by passing a metal sound of at least Hegar 6-8 through it before the repair is started.

bladder prolapse

If bladder prolapse is present, it is always a prolapse of the bladder base. Normally this reduces spontaneously when the patient is in the exaggerated lithotomy position; otherwise it should be reduced by the surgeon. No other measures are needed, as the head down/buttocks up position will keep the bladder base reduced throughout the procedure.

combination VVF/RVF

Normally the VVF is repaired first, and if this is successful the RVF can be repaired two to three months later.

However, there are certain situations (for example, where the VVF/RVF is combined with severe vagina stenosis) in which the RVF is repaired first and a widening vaginoplasty is performed at the same time, to give better access for the VVF repair to be done later.

However, the most recent technique is to repair the VVF and the RVF in the same session, if time allows and if the procedure would not be too complicated.

discussion

There are many ways to close a fistula. If a surgeon is familiar with one technique, and achieves success with it, there is no need to change it.

For almost all fistulas, the **position of choice** is the exaggerated lithotomy position and the **route of choice** is the vagina. Some surgeons advocate other positions and other routes, but my experience all reinforces my initial choices.

The actual size of the fistula does not indicate the extent of the damage as there is a spontaneous tendency for the fistula to become smaller due to scarring. Of far more importance are the location and thus the accessibility of the fistula. Episiotomies are very helpful in improving the accessibility.

The texture of the tissues is also very important. If there is much scar tissue, such as might result from repeated surgery or recurrent fistulas, the whole repair will be difficult and the results may be unsatisfactory with regard to both closure and continence.

In very small fistulas it may be necessary to remove some scar tissue from the edge in order to allow inversion of the bladder at closure.

At first it was thought that the bladder roof was prolapsing, but later on it was noted that it was the bladder base. This is to be expected: the bladder roof is quite securely attached to the symphysis and anterior abdominal musculature.

The bladder is closed with inverting sutures, and the anterior vagina wall with everting sutures, to prevent contact and cross-union between bladder mucosa and vaginal mucosa and thus recurrence of the fistula.

Bladder capacity is classified according to the longitudinal bladder diameter (EUO/BW distance minus EUO/B distance) as small ($\leq$ 3 cm), moderate (4-6 cm), normal (7-10 cm) and increased ($\geq$ 11 cm).

The smaller the bladder capacity, the greater the chance that urge incontinence will later develop. However, if the bladder capacity is increased bladder atony should be suspected, and in these cases the catheter should be left in position for at least 4 weeks.

Figure 73 Position on operation table

Figure 74-a Bilateral episiotomy

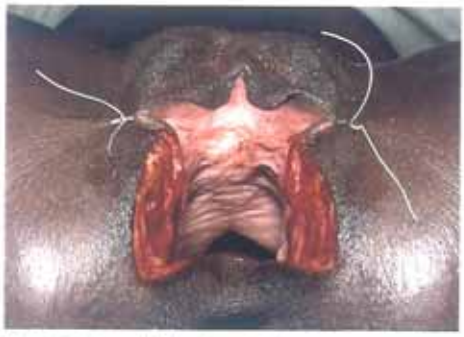

Figure 74-b Bilateral episiotomy

Figure 74-c Bilateral episiotomy

Figure 75-a Vagina stenosis

Figure 75-b Extensive episiotomy

Figure 76-a Urethra block

Figure 76-b Deblocking

Figure 77-a Bladder base prolapse

Figure 77-b Bladder base prolapse

Figure 77-c Prolapse reduced

Figure 77-d Prolapse stays reduced

Figure 78-a Examination

Figure 78-b Examination

Figure 78-c Examination

Figure 78-d Examination

Figure 79 AUVARD speculum

Figure 80-a Ureters

Figure 80-b R Ureter

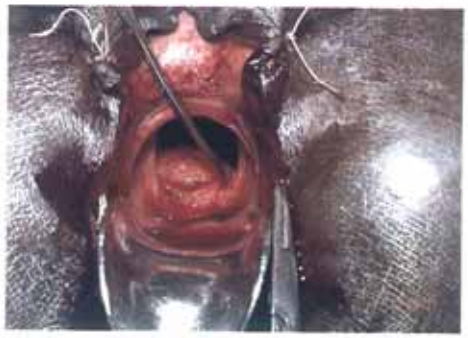

Figure 80-c L Ureter

Figure 80-d Ureter catheterization

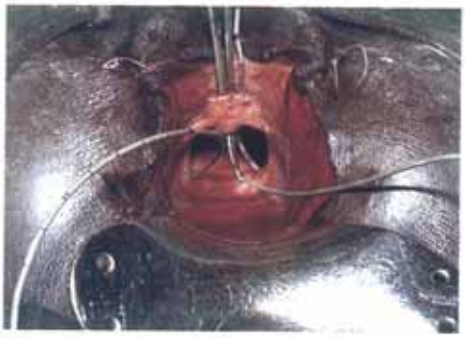

Figure 80-e Routing through urethra

Figure 80-f Catheters in situ

Figure 80-g Catheter fixation

Figure 81 Gentian violet testing

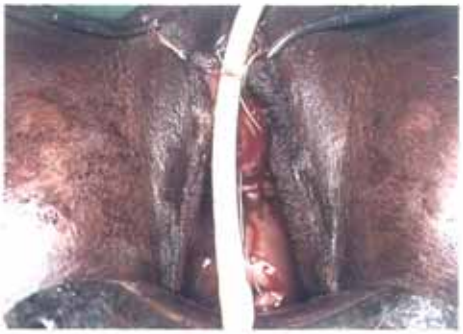

Figure 82 Fixation of catheter

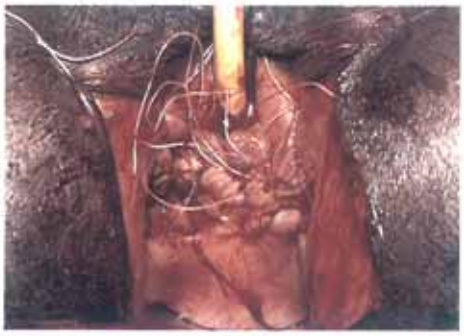

Figure 83 Transverse avw closure

Figure 84 Longitudinal avw closure

Figure 85-a Episiotomy closure

Figure 85-b Episiotomies closed

Figure 86 Pressure pad & vaginal pack

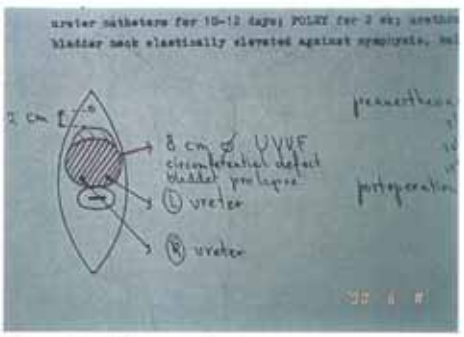

Figure 87 Documentation

chapter VII

type I fistulas

I Fistulas not involving the closing mechanism

Since the closing mechanism of the bladder is still intact, only the bladder needs to be closed. This can be done either transversely or longitudinally, whichever is the most convenient.
Because these fistulas involve the bladder base, an effort should be made to identify and to catheterize the ureters in situations where they may be cut or tied.

technique

A circumferential incision is made at the fistula edge. In the case of smaller fistulas, bilateral transverse extensions are added.
The anterior vagina wall is widely dissected from the bladder using the sharply curved THOREK scissors, and if necessary the bladder is dissected from the cervix in order to obtain a completely tension-free closure of the bladder.
A FOLEY catheter Ch 18 is inserted, and the bladder is closed completely, tension-free, with a single or double layer of interrupted **inverting** chromic catgut.
The bladder closure starts from the lateral angles and works towards the midline: otherwise it might not be possible to close the bilateral angles and corner-corner fistulas may develop. If the bladder is closed longitudinally, closure starts from the north and south poles towards the middle.
Watertight closure is checked by instilling 50 ml gentian violet and asking the patient to cough.
As the closing mechanism is intact, a bulbocavernosus graft is normally not performed. However, it may be used to bring a fresh blood supply to an ischemic area or to give an additional covering to the repair.
The anterior vagina wall is adapted (again ensuring that it is tension-free) also starting laterally and this time using interrupted **everting** nonabsorbable sutures.

small fistulas

A very small fistula (up to 2 mm in diameter) is troublesome as it can be difficult to find it after dissection. It may be helpful to insert a small probe through it when dissecting the anterior vagina wall. Alternatively, the fistula can be retraced by gentian violet instillation, but the color tends to obscure the site of the surgery. In these fistulas a transverse incision through the fistula is made to start the dissection. Sometimes minimal extirpation of the scar tissue at the fistula edge is necessary to achieve inversion of the bladder, and a 2-layer bladder closure is advocated. The prognosis is not very favorable.
Other small fistulas usually do not present problems, and they have a very good prognosis.

medium fistulas

Apart from the fact that one has to look carefully for the ureters, medium fistulas do not present any major problems.

large fistulas

With large fistulas, the surgeon has to do his utmost to identify the ureters. If this is not

possible, the dissection of the anterior vagina wall should be as far as possible from the bladder wall (and thus as near as possible to the anterior vagina wall) in order not to traumatize them.

vesicocervicovaginal fistulas

Normally, these fistulas develop following a cesarean section or a difficult cesarean supravaginal hysterectomy because of ruptured uterus.
Traction at the cervix, either by forceps or by nonabsorbable sutures, is helpful in obtaining a better presentation whilst operating.
In these cases, the bladder wall has to be dissected from what is left of the anterior cervix and/or uterus; occasionally, the abdomen is opened deliberately to allow better mobilization of the bladder.
If possible the ureters are catheterized, and the cervix is 'reconstructed'. When closing the anterior vagina wall onto the anterior cervix (or what is left of it) care must be taken not to close the cervical canal, for example by introducing a metal probe into it.

vagina vault fistulas

These fistulas follow a total abdominal/vaginal hysterectomy or a total cesarean hysterectomy, and they are often deeply internal and only accessible with difficulty.
Bilateral traction from the fistula edge, using nonabsorbable sutures, and large bilateral episiotomies are normally necessary to improve the accessibility.
The fistulas can be closed either by the LATZKO technique or by the normal flap-splitting procedure. With the LATZKO technique, parts of the anterior and posterior vagina walls are resected in order to perform a partial colpocleisis whereby the fistula in the bladder is closed by the intact rectum wall.
Where the normal flap-splitting technique is used, the abdomen is often opened through the vagina vault for better mobilization of the bladder.

vesicouterine fistulas

Usually these fistulas develop following a cesarean section, but they may also occur after normal labor. The incision is made at the anterior cervix and the bladder is then dissected from the cervix and the uterus in order that it may be closed. The abdomen may also have to be opened for this procedure. The uterus is left open rather than closed.

circumferential defect

One very seldom finds a circumferential defect in type I fistulas. A circumferential dissection with end-to-end anastomosis is not necessary as the fistula is outside the closing mechanism. The bladder should be sufficiently mobilized, then the lateral bladder walls are fixed onto the pubic bones and the repair is concluded normally.

discussion

Following cesarean section or cesarean supravaginal hysterectomy in particular, the accessibility of the fistula and the mobility of the tissues are poor. Therefore, some surgeons advocate the practice of operating on vesicocervicovaginal and vesicouterine fistulas transvesically or transabdominally. However, almost all of these fistulas can be operated on via the vagina if one is willing to perform episiotomies (which sometimes have to be large) and if one applies downward traction to the cervix.

The LATZKO repair has become the standard operation for vagina vault fistulas in the industrialized world and it gives excellent results. Its only disadvantage is that it shortens the vagina, and this might lead to problems where the preoperative vagina was already short. The flap-splitting technique also gives good results, without any shortening of the vagina.

Figure 88-a Minute fistula

Figure 88-b Median episiotomy

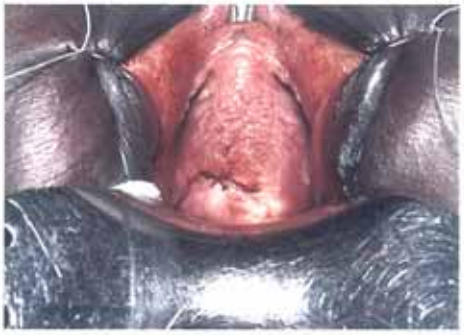

Figure 88-c Transverse avw incision

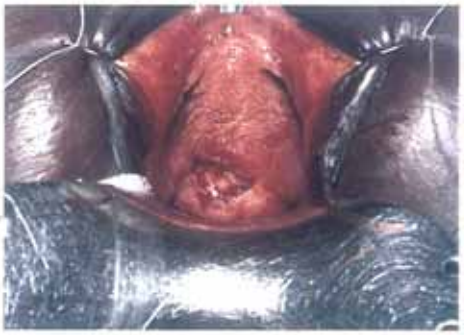

Figure 88-d Dissection

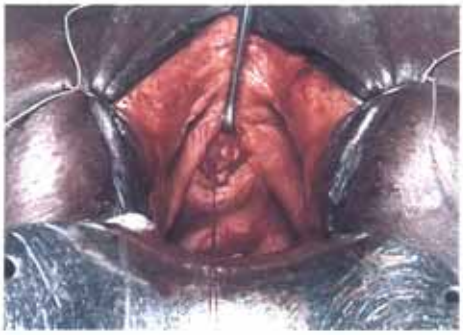

Figure 88-e First bladder suture

Figure 88-f Bladder closed

Figure 88-g avw closed

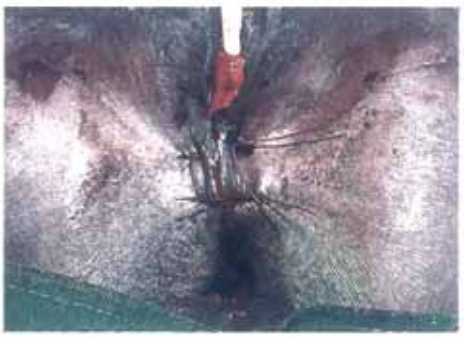

Figure 88-h Episiotomy closed

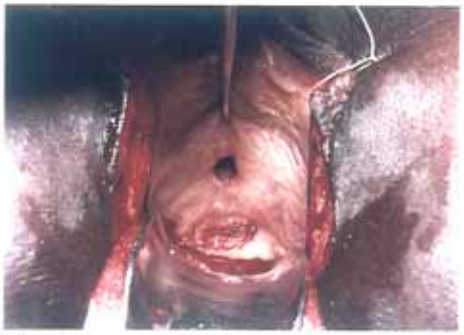

Figure 89-a Small fistula

Figure 89-b Examination

Figure 89-c Incision at fistula edge

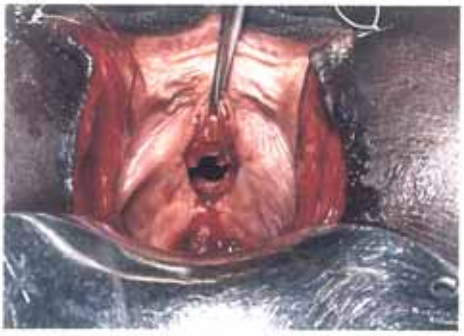

Figure 89-d Dissection

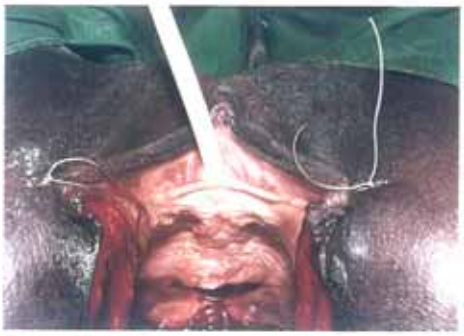

Figure 89-e Catheter insertion

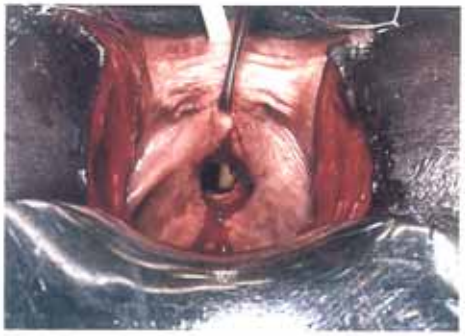

Figure 89-f Catheter in situ

Figure 89-g Bilateral bladder closure

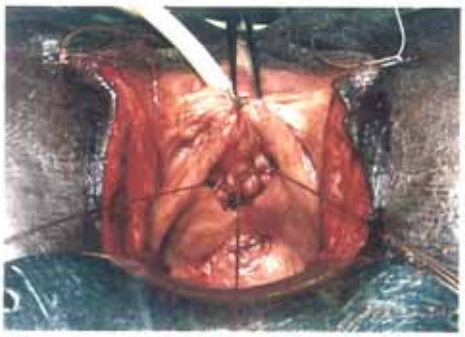

Figure 89-h Bladder closed

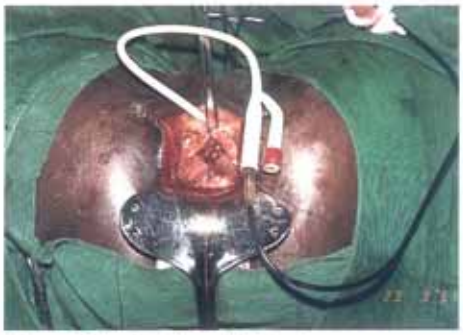

Figure 89-i Gentian violet testing

Figure 89-j Bilateral avw closure

Figure 89-k avw closed

Figure 89-l Sutures cut long

Figure 89-m Catheter fixation

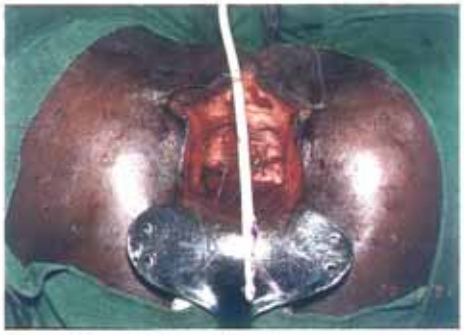

Figure 89-n Catheter fixed

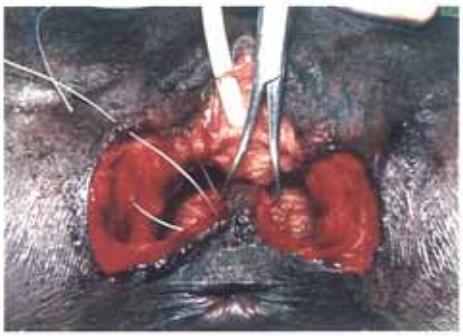

Figure 89-o Episiotomy closure

Figure 89-p Episiotomy closed

Figure 90-a Vesicouterine fistula

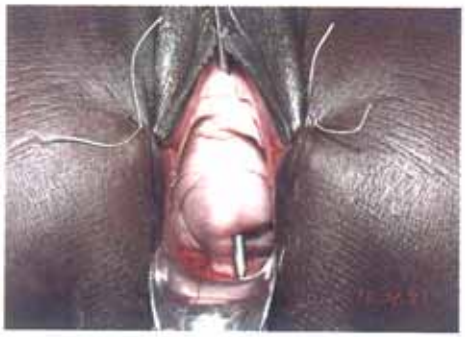

Figure 90-b Vesicouterine fistula

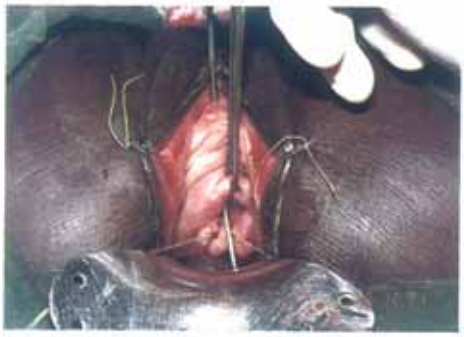

Figure 90-c Examination

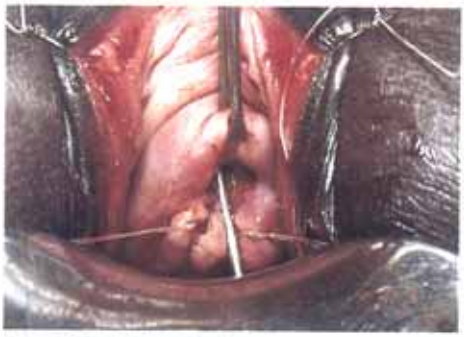

Figure 90-d Examination

Figure 90-e Incision at anterior cervix

Figure 90-f Dissection

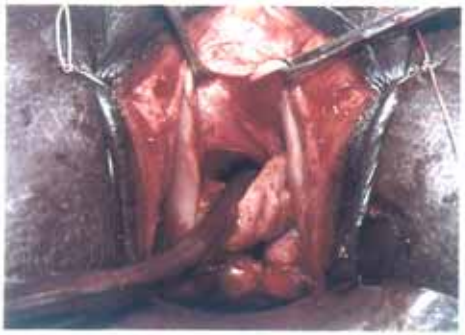

Figure 90-g Bladder fistula

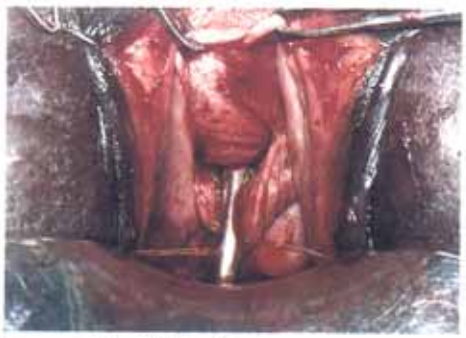

Figure 90-h Bladder fistula

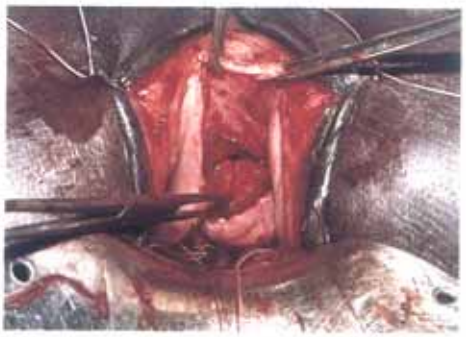

Figure 90-i Proximal bladder base

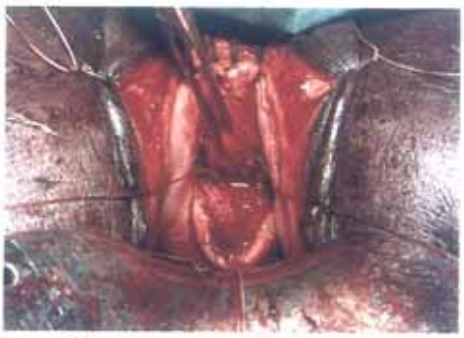

Figure 90-j Bilateral bladder closure

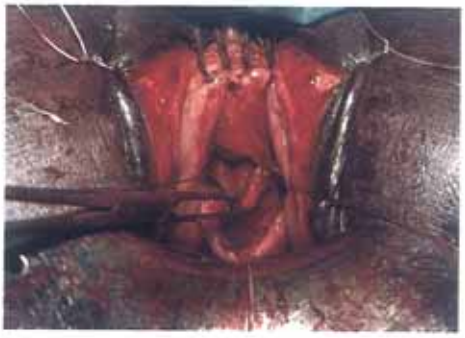

Figure 90-k Bladder base

Figure 90-l Bladder closed

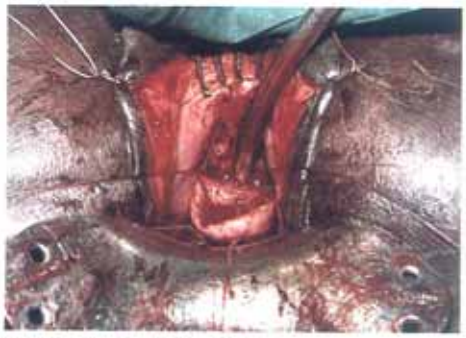

Figure 90-m Uterus defect

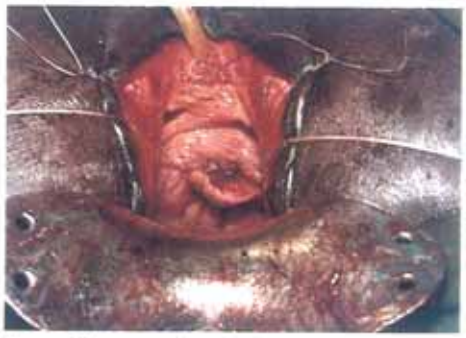

Figure 90-n avw/cervix closure

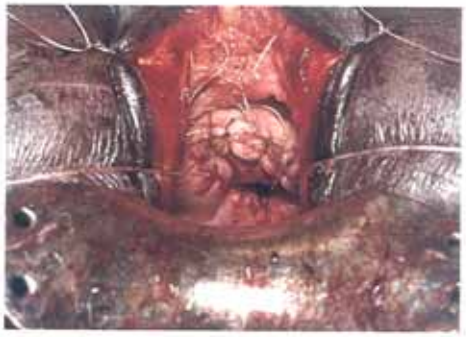

Figure 90-o avw/cervix closed

chapter VIII

type IIAa fistulas

II *fistulas involving the closing mechanism*
A *without (sub)total involvement of the urethra*
a *without a circumferential defect*

As this category involves the closing mechanism of the bladder, it is not enough to simply close the fistula. Action must also be taken to make the patient continent.
In these fistulas part of the closing mechanism is lost but only at the posterior (and lateral) wall. If these fistulas have been closed there should be functional bladder/urethra tissue all around circumferentially.

technique

A circumferential incision is made at the fistula edge. In the smaller fistulas, bilateral transverse extensions are added.
The anterior vagina wall is dissected widely from the bladder, but just enough from the urethra to make closure possible. If the latter dissection is too extensive this may result in necrosis of the urethra. If necessary the bladder is dissected from the pubic bones.
In theory, longitudinal closure of the bladder is preferable but this is only possible in 15% of cases.
Transverse closure seems to be the most logical approach, and in many cases the lateral bladder walls may be fixed distally onto the symphysis to relieve tension and allow closure.
An effort should be made to elevate the bladder neck/UV-junction/proximal urethra against the symphysis in order to prevent postoperative urinary stress incontinence from occurring. This will bring the closing mechanism into a position where any sudden increase in intra-abdominal pressure will be transmitted immediately to the closing mechanism, thus enabling the patient to stay continent. The elevation is performed by fixing the bulbocavernosus muscle graft to the symphysis as cranially as possible or, if this is not possible, fixing it to the superior pubic bones.
In the smaller fistulas (up to 1-2 cm) this can also be done by fixing the anterior vagina wall onto the posterior symphysis; this is easier to carry out and involves less surgical trauma.

bulbocavernosus graft

A circumferential incision is made at the edge of the fistula with bilateral transverse extensions, and the anterior vagina wall is widely dissected from the bladder/urethra.
The bladder neck is bilaterally dissected sharply and bluntly from the pubic bones in such a way that both paravesical spaces are completely opened and the dissecting finger is in contact with the posterior side of the abdominal musculature. At the end of the extensive dissection the bladder neck must be freed for three-quarters of its circumference so that it is suspended only ventrally.
Two chromic catgut 1 anchoring sutures are placed bilaterally through the periost of the posterior symphysis using the sharp DESCHAMPS aneurysm needle; the first is positioned as far cranially as possible and the second is positioned halfway.
A FOLEY catheter Ch 18 is inserted into the bladder, and the bladder/urethra is closed with a single layer of interrupted inverting chromic catgut 00 sutures. Watertight closure is checked by instilling 20 ml gentian violet and asking the patient to cough.

For right-handed surgeons, a longitudinal incision is made in the right labium majus; for left-handed surgeons the left side is easier. The bulbocavernosus fibrofatty pad is dissected sharply from the underlying fascia and mobilized from the anterosuperior towards the posterior leaving the posterior part (from which the blood supply and innervation come) intact. This pedicled graft is tunnelled under the right (or left, for left-handed surgeons) lateral vagina wall and fixed transversely over the repair and urethra and bilaterally on to the symphysis using the two anchoring sutures plus one more suture placed laterally from the EUO on each side. The tension should be such that the urethra is elastically elevated against the symphysis.
The anterior vagina wall is closed over the bulbocavernosus graft with interrupted everting sutures.

fixation of anterior vagina wall

Following dissection of the anterior vagina wall from the bladder/urethra, the bladder neck is bilaterally dissected from the pubic bones.
Then at each side one nonabsorbable 0 anchoring suture is placed through the periost at the back of the symphysis, positioned as cranially as possible.
The bladder is closed and, after checking the closure, these two sutures are put through the distal anterior vagina wall at a suitable place (between 4 and 6 cm from the EUO) but not yet tied. The anterior vagina wall is closed with nonabsorbable sutures and the anchoring sutures are then tied so that the anterior vagina wall is in close contact with the posterior side of the symphysis. The anchoring sutures are tied over a piece of infusion set to prevent the sutures from cutting through the anterior vagina wall.

discussion

If the proximal urethra floor has been lost and little is left of the distal urethra, the dissection of the anterior vagina wall from the urethra should be minimal – just enough to perform closure. Otherwise the urethra's blood supply will be damaged and loss of the urethra will result.
The advantages of the bulbocavernosus graft are as follows: it covers the repair, it seals off the repair, it introduces a new blood supply, it prevents any cross-union between bladder and vagina wall mucosa, it fills up dead space, it elevates the urethra against the symphysis and it functions as a bolster at any subsequent deliveries.
The disadvantages of the bulbocavernosus graft are as follows: it necessitates more dissection, involves a longer operation and increases the chance of wound hematoma and infection.
The bulbocavernosus fibrofatty pad serves as an elastic hanging mat in which the whole urethra, UV-junction and bladder neck are suspended. A sudden increase in intra-abdominal pressure is thus immediately transmitted to the closing mechanism.
The fibrofatty pad should be fixed in such a way that the closing mechanism is elastically elevated against the symphysis, so that it lies in close contact with the symphysis.
In the past, this fixation has been bilaterally onto the back of the anterior abdominal musculature, but this applied too much tension and meant that there was also too much tension on the repair: some repairs therefore broke down. Following this experience, the same fixation is planned again in future but less tension will be applied.
The same elevation is obtained with the technique of fixing the anterior vagina wall onto the symphysis (or onto the anterior abdominal wall as in urinary stress incontinence repair), but the other advantages of the bulbocavernosus graft are not achieved. On the other hand, the procedure is far quicker and where the damage to the closing mechanism is less extensive the outcome is more than sufficient.

Figure 91-a Small fistula

Figure 91-b Fixation of labia

Figure 91-c Examination

Figure 91-d Incision at fistula edge

Figure 91-e Paravesical space R

Figure 91-f Paravesical space L

Figure 91-g Sutures for graft

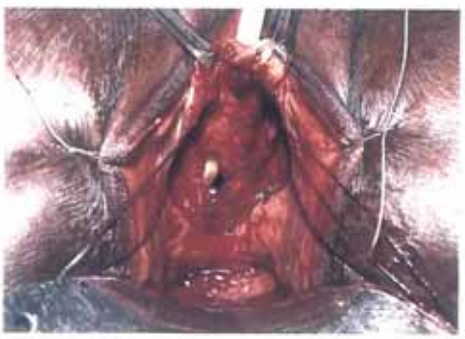

Figure 91-h Catheter insertion

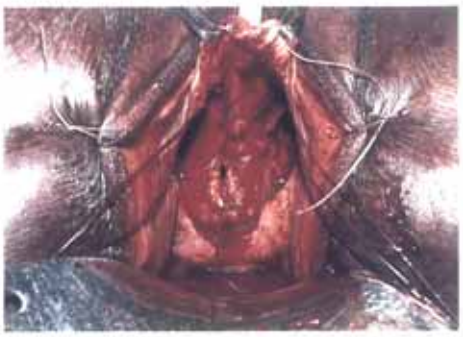

Figure 91-i Longitudinal closure

Figure 91-j Bladder/urethra closed

Figure 91-k Incision R labium majus

Figure 91-l Bulbocavernosus graft

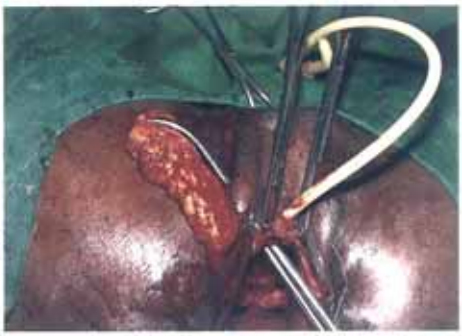

Figure 91-m Tunnelling

Figure 91-n Graft tunnelled

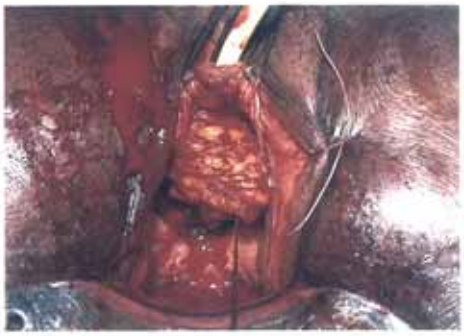

Figure 91-o Fixation of graft

Figure 91-p Fibrofatty pad fixed

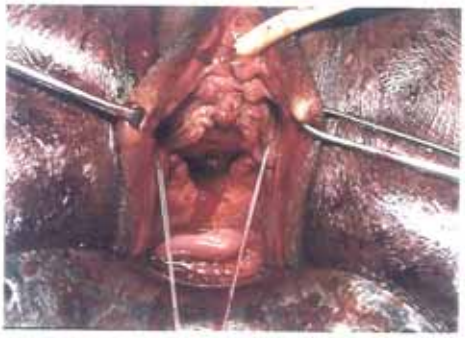

Figure 91-q Bilateral avw closure

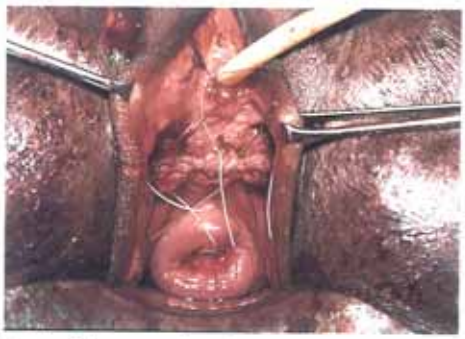

Figure 91-r avw closed

Figure 91-s Catheter fixation

Figure 91-t Catheter fixed

Figure 91-u Catheter in situ

Figure 91-v Labium closed

Figure 91-w Pressure pad

Figure 91-x Vagina pack

Figure 92-a avw elevation onto symphysis

Figure 92-b Examination

Figure 92-c Examination

Figure 92-d Examination

Figure 92-e Incision at fistula edge

Figure 92-f Dissection

Figure 92-g Paravesical space R

Figure 92-h Paravesical space L

Figure 92-i Catheter insertion

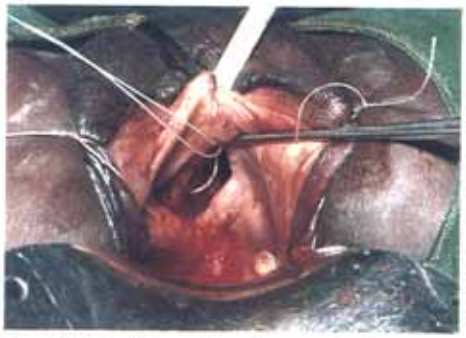

Figure 92-j Suture through symphysis

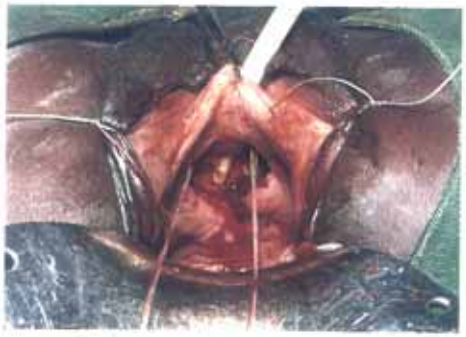

Figure 92-k Elevation sutures

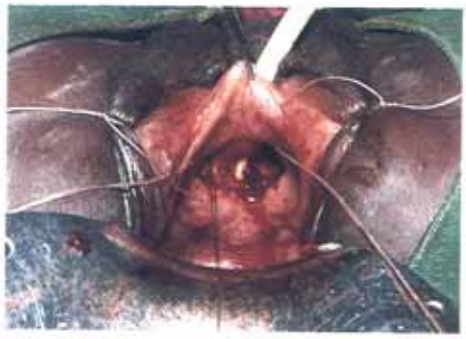

Figure 92-l Transverse closure

Figure 92-m Bladder/urethra closure

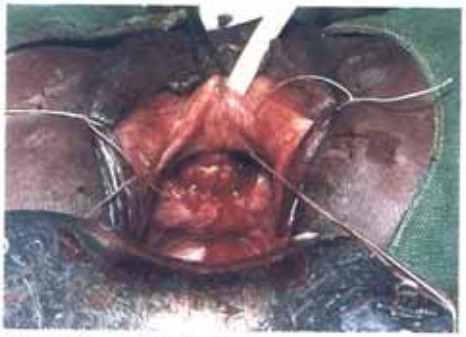

Figure 92-n Bladder/urethra closed

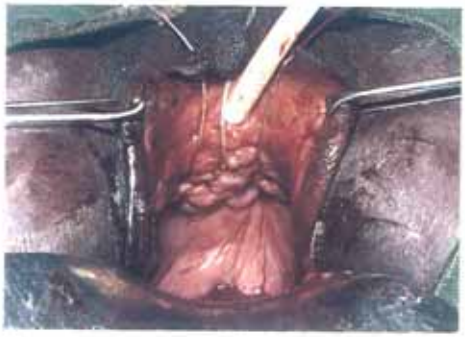

Figure 92-o avw closed & elevated

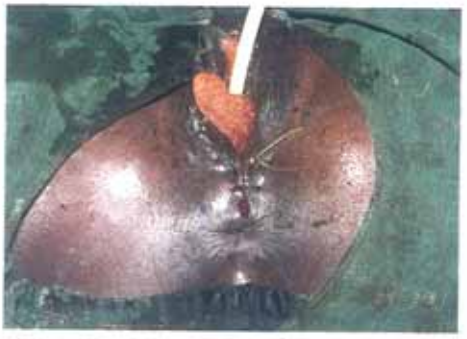

Figure 92-p End

chapter IX

type IIAb fistulas

II *fistulas involving the closing mechanism*
A *without (sub)total involvement of the urethra*
b *with a circumferential defect*

As these fistulas involve the closing mechanism of the bladder **circumferentially**, closure of the fistula alone is clearly insufficient. Action must also be taken to make the patient continent, and thus a circumferential repair should be attempted.

technique

A circumferential incision is made at the fistula edge with, in the smaller fistulas, bilateral transverse extensions. The anterior vagina wall is dissected sharply and bluntly from the bladder/urethra using the sharply curved THOREK scissors.
As the circumferential loss involves part or all of the closing mechanism, an effort is made to restore functional bladder musculature tissue circumferentially. This is done by the following three steps.
a. circumferential dissection of the bladder
The bladder is circumferentially dissected sharply and bluntly from the anterior vagina wall, from the pubic bones, from the symphysis and from the anterior abdominal wall without opening the abdomen.
b. advancement of the bladder
The mobilized bladder is advanced distally towards the urethra in order to perform a tension-free circumferential closure.
c. circumferential end-to-end anastomosis
First the anterior bladder wall is fixed caudally onto the symphysis with three interrupted chromic catgut 0 sutures. Then a FOLEY catheter Ch 18 is inserted into the bladder, and the repair is completed with interrupted inverting chromic catgut 00 sutures as an end-to-end vesicourethrostomy starting from the anterior end. The lateral bladder walls are also fixed on to the symphysis with chromic catgut 0 sutures so that the bladder is properly anchored anterolaterally (this prevents later dehiscence of the repair). Watertight closure is checked by the instillation of 20 ml gentian violet.

elevation of bladder neck/UV-junction/proximal urethra

To bring the closing mechanism into a better position, the bladder neck/UV-junction/proximal urethra should be elevated against the symphysis either by using the bulbocavernosus muscle graft or by fixing the anterior vagina wall onto the symphysis.
Using the sharp DESCHAMPS aneurysm needle, the sutures for fixing the graft or the anterior vagina wall are placed into the symphysis periost as soon as the bladder has been mobilized completely. Otherwise it is very difficult or impossible to position them in the right place.

corner-corner fistulas

These fistulas, which are usually bilateral in the corners and fixed to the symphysis, tend to develop after repair of a circumferential fistula has been attempted, but where no circumferential dissection has been performed. In these situations, small bilateral defects may remain or develop between the bladder and the symphysis. They are very difficult to

repair as the access is extremely poor, and the best results are usually obtained when an effort is made to undo the whole of the previous repair and then perform a circumferential repair.

discussion

This technique is a development of the 2-stage technique recommended for type IIBb fistulas, in which the first stage involves fixing the bladder as far caudally as possible on to the symphysis and the second stage involves reconstructing the urethra.

If the bladder is not mobilized circumferentially a gap will remain at the anterior bladder/urethra, behind the symphysis. This gap will be filled with nonfunctional scar tissue, and the closing mechanism will thus be defective. Using the recommended technique, this gap will no longer exist, and the circumference of the closing mechanism will consist of functional bladder muscle.

The elevation of the urethra/UV-junction/bladder neck the urethra, UV junction and bladder neck will bring the closing mechanism under abdominal pressure control.

Some surgeons advocate that the patient should be in the knee-elbow position for treatment of these fistulas, but it is remarkable how easily and quickly the procedure can be done in the exaggerated lithotomy position.

Figure 93-a Circumferential fistula

Figure 93-b Bilateral episiotomy

Figure 93-c AUVARD speculum

Figure 93-d Examination

Figure 93-e Examination

Figure 93-f Examination

Figure 93-g Examination

Figure 93-h Incision at fistula edge

Figure 93-i Circumferential dissection

Figure 93-j Anterior bladder wall

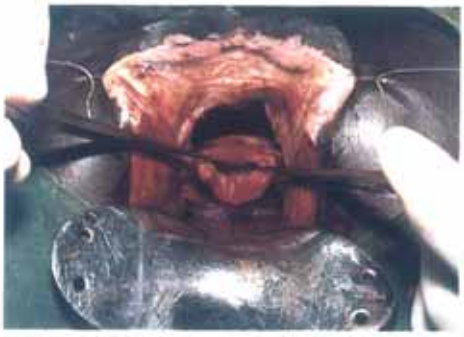

Figure 93-k Bladder totally mobile

Figure 93-l Advancement

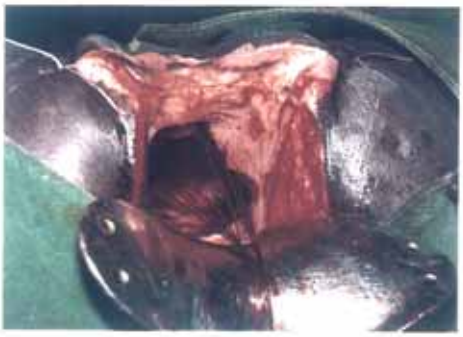

Figure 93-m Graft sutures R

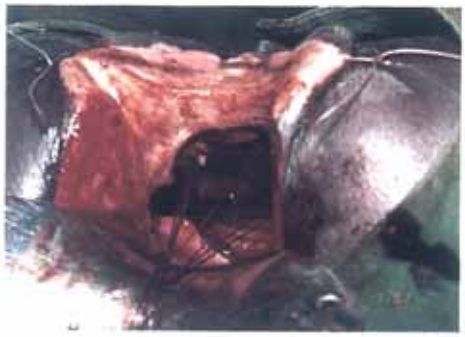

Figure 93-n Graft sutures L

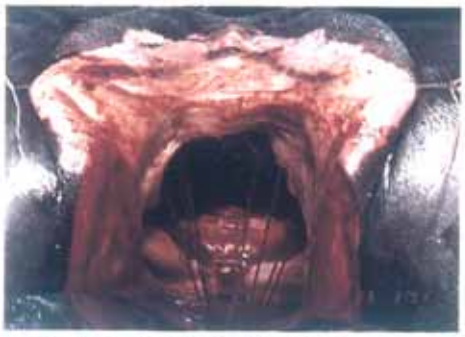

Figure 93-o Bladder fixation sutures

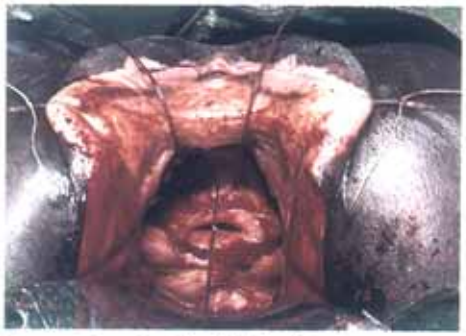

Figure 93-p Anterior bladder fixation

Figure 93-q Anterior bladder fixation

Figure 93-r Anterior bladder fixation

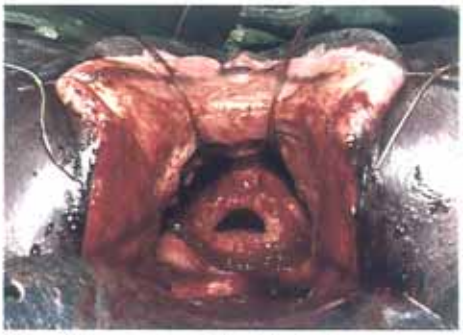

Figure 93-s Anterior bladder fixation

Figure 93-t Circumferential repair

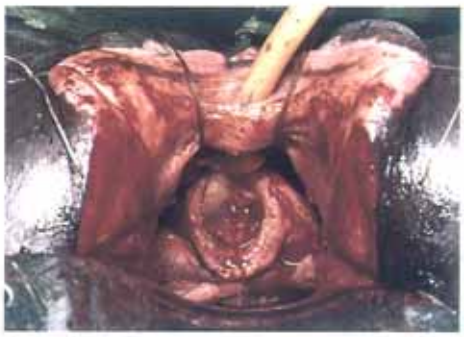

Figure 93-u Circumferential repair

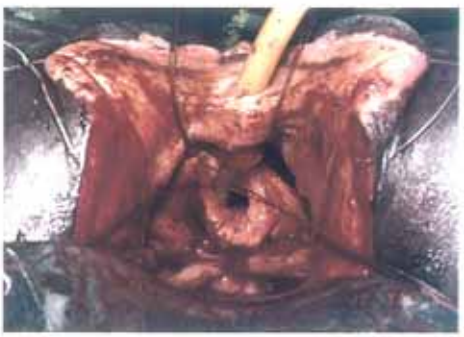

Figure 93-v Bladder fixation R

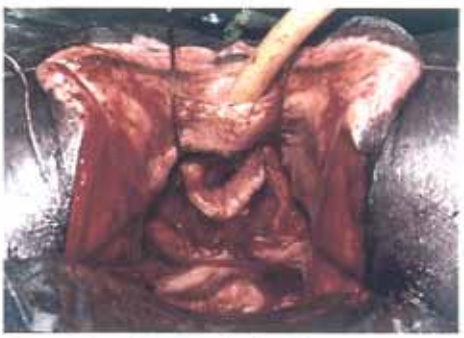

Figure 93-w Bladder fixation L

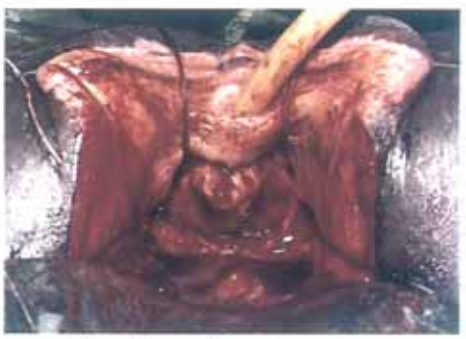

Figure 93-x Circumferential repair

Figure 93-y Complete vesicourethrostomy

Figure 93-z Incision R labium majus

Figure 93-aa Bulbocavernosus graft

Figure 93-bb Tunnelling

Figure 93-cc Tunnelling

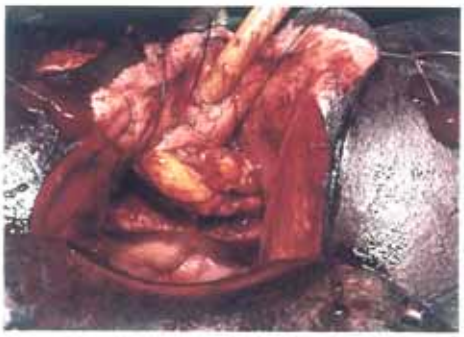

Figure 93-dd Graft fixation

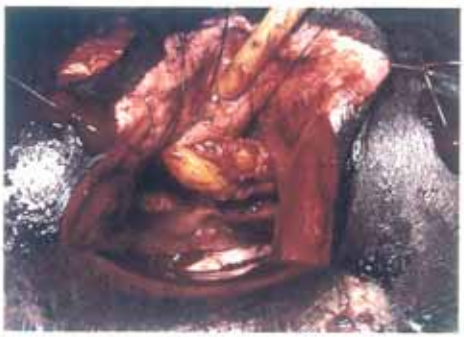

Figure 93-ee Graft fixation

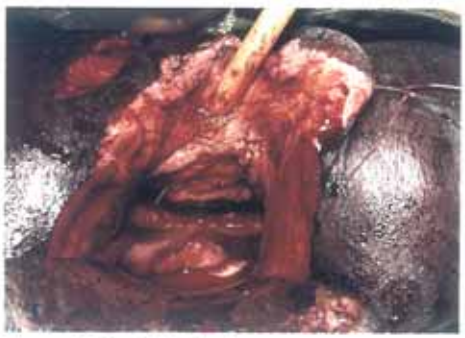

Figure 93-ff Graft fixed

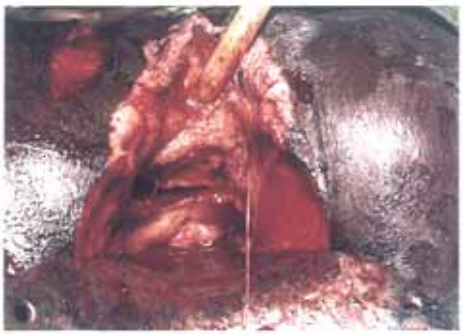

Figure 93-gg avw closure L

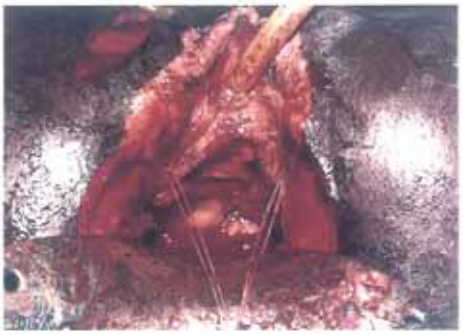

Figure 93-hh avw closure R

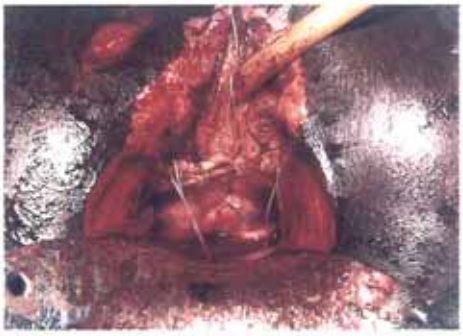

Figure 93-ii avw completely closed

Figure 93-jj Catheter fixation

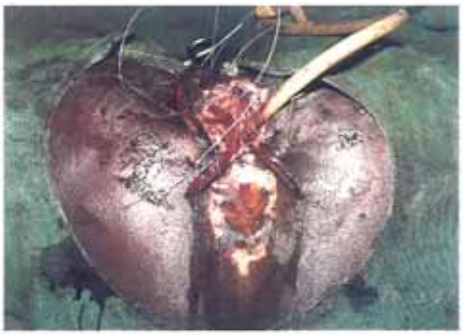

Figure 93-kk Episiotomy/labium closed

Figure 93-ll Sutures compression pad

Figure 93-mm End

Figure 94-a Bladder base prolapse

Figure 94-b Bladder base reduced

Figure 94-c Examination

Figure 94-d Examination

Figure 94-e Examination

Figure 94-f R ureter

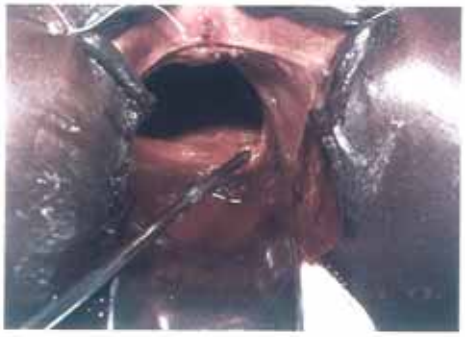

Figure 94-g L ureter

Figure 94-h Ureter catheterization

Figure 94-i Dissection L labia

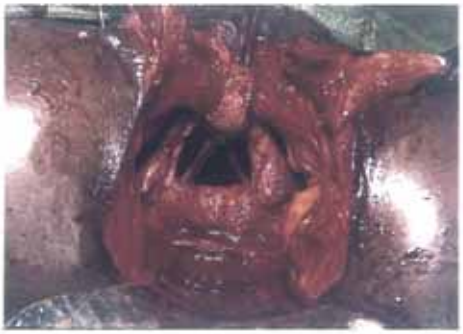

Figure 94-j Dissection R labia

Figure 94-k Paravesical space L

Figure 94-l Paravesical space R

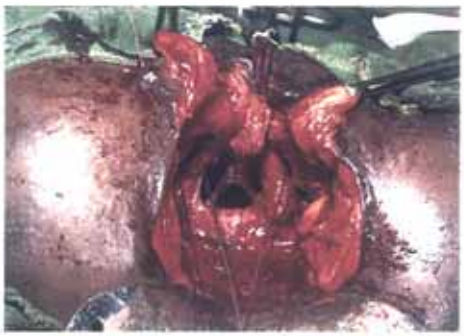

Figure 94-m Bladder/urethra closure

Figure 94-n Bladder/urethra closed

Figure 94-o Fibrofatty pad

Figure 94-p Graft fixed

Figure 94-q avw reconstruction

Figure 94-r avw reconstruction

Figure 94-s avw reconstruction

Figure 94-t avw reconstruction

Figure 94-u avw reconstruction

Figure 94-v avw reconstruction

Figure 94-w avw reconstructed

Figure 94-x Labium closed

chapter X

type IIBa fistulas

II *fistulas involving the closing mechanism*
B *with (sub)total involvement of the urethra*
a *without a circumferential defect*

These fistulas require a reconstruction of the urethra, and action must be taken to repair the closing mechanism. In this type of fistula the anterior urethra roof is still intact, and usually the lateral urethra walls have retracted. A neourethra can therefore be constructed by borrowing some of the paraurethral tissues.

technique

If there is only loss of the urethra floor, combined with a small vesicovaginal fistula, a U-shaped incision is made around the bladder opening and continued bilaterally along the urethra roof, with bilateral transverse extensions at the base. The anterior vagina wall is dissected from the bladder and from the lateral sides next to the urethra roof. The bladder neck is dissected bilaterally from the pubic bone so that the paravesical spaces are completely opened and the dissecting finger is in contact with the posterior side of the anterior abdominal musculature. Then the paraurethral and urethral tissues are mobilized bilaterally from the symphysis. The urethra is reconstructed longitudinally for 3-4 cm with interrupted inverting chromic catgut 00 starting with raphy of the bladder neck. After each suture the width of the newly created urethra is checked by passing an H6 or H8 metal sound. If possible, the paraurethral muscles are mobilized and sutured as a second layer over the neourethra. Then a FOLEY catheter Ch 18 is inserted. This should be freely mobile inside the neourethra. Watertight closure is checked by instilling 20 ml gentian violet and asking the patient to cough. The bulbocavernosus graft is fixed elastically and transversely over the whole repair and onto the symphysis in order to cover the repair and to elevate the bladder neck/ UV-junction/urethra against the symphysis. The anterior vagina wall is closed in the form of a Mercedes Benz star or an inverted Y.
If loss of the urethra is combined with a large vesicovaginal fistula, the base and neck of the bladder is repaired first and then the urethra is reconstructed in the same session.
If it is combined with an extensive vesicovaginal fistula the ureters must be catheterized as well: this sometimes necessitates a two-stage procedure in which the repair of the vesicovaginal fistula is carried out first and then the urethra is reconstructed.
At the end of the operation the results are evaluated to check the mobility of the catheter within the neourethra, to assess the elevation obtained and to estimate the length of the urethra and the capacity of the bladder by measuring the EUO/B and the EUO/BW distances respectively in cm.

discussion

In the early days of this procedure, the urethra was reconstructed over a FOLEY catheter Ch 16 or Ch 18, but better tissue adaptation is obtained when the urethra is reconstructed first and a catheter is then inserted. A FOLEY catheter Ch 18 is preferred as there is a tendency for stricture of the UV-junction to develop later on.
The bulbocavernosus graft is advocated as a method of protecting the neourethra and for bolstering.
Special care must be taken to ensure that the closure is completely tension-free. Therefore, the distance between the two legs of the U-shape should be at least 2.5 cm.
Probably, atraumatic suturing materials will give better results, as the urethra tissue is thin.

Figure 95-a Urethra loss

Figure 95-b Double fixation of labia

Figure 95-c Wide U incision

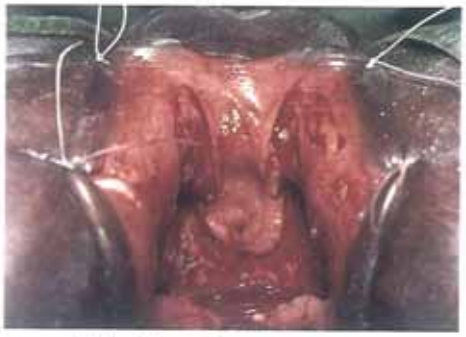

Figure 95-d Dissection

Figure 95-e Paravesical space R

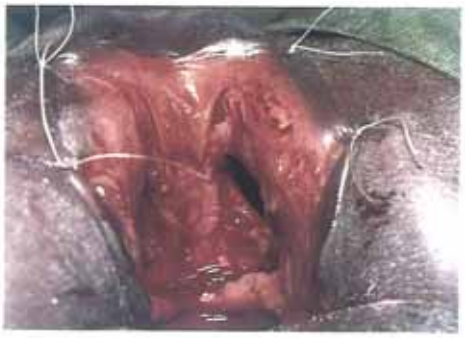

Figure 95-f Paravesical space L

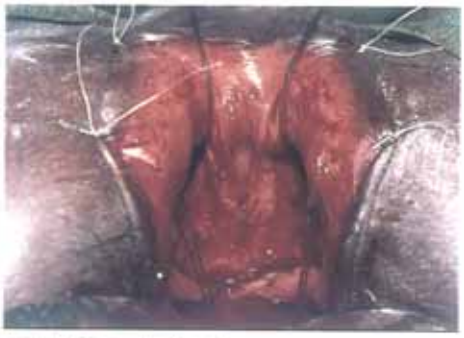

Figure 95-g Graft sutures

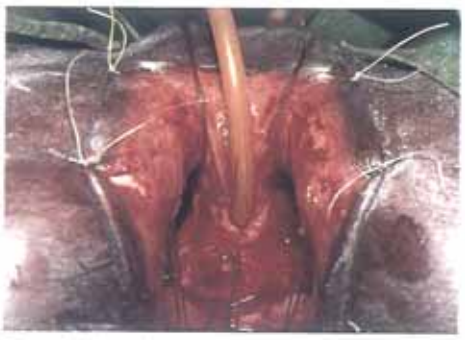

Figure 95-h Urethra reconstruction

Figure 95-i Urethra reconstruction

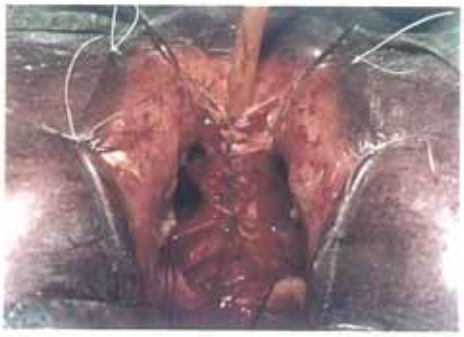

Figure 95-j Urethra reconstructed

Figure 95-k Graft sutures R

Figure 95-l Graft sutures L

Figure 95-m Incision R labium majus

Figure 95-n Bulbocavernosus graft

Figure 95-o Tunnelling

Figure 95-p Tunnelling

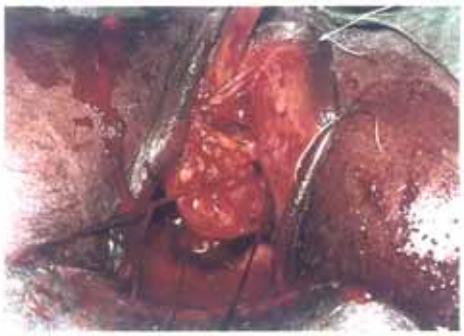

Figure 95-q Fixation of graft

Figure 95-r Graft fixed

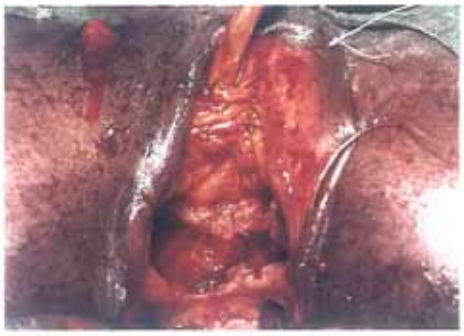

Figure 95-s Sutures cut

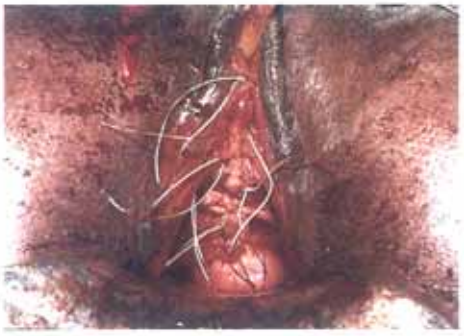

Figure 95-t avw closed

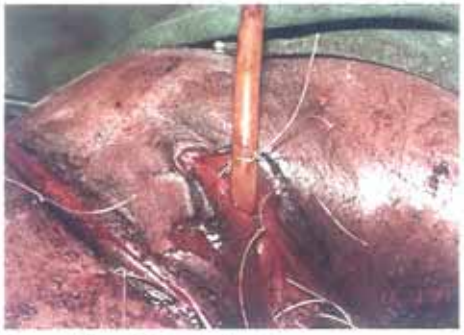

Figure 95-u Catheter fixed

Figure 95-v Episiotomy closed

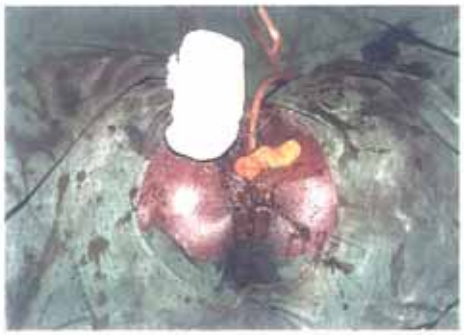

Figure 95-w End

chapter XI

type IIBb fistulas

II *fistulas involving the closing mechanism*
B *with (sub)total involvement of the urethra*
b *with a circumferential defect*

These fistulas are amongst the most difficult to deal with, as they require reconstruction of the urethra by a circumferential repair with functional tissue. They cover a wide variety, as the circumferential defect may be small or very extensive, and this may influence the outcome of the repair.

technique

If the circumferential loss is of the urethra only, without major involvement of the bladder, the urethra can be reconstructed from the scar tissue/paraurethral tissue covering the symphysis. To achieve this, a wide U-shaped incision is made around the bladder opening with bilateral transverse extensions at the base, and the anterior vagina wall is dissected from the bladder. The bladder neck is dissected bilaterally from the pubic bones so that the paravesical spaces are fully opened and the dissecting finger is in contact with the posterior side of the anterior abdominal musculature. The scar tissue and paraurethral tissue is mobilized the urethra is reconstructed longitudinally and a FOLEY catheter Ch 18 is inserted. Because there is no functional urethra tissue, continence will be a problem and a bulbocavernosus graft must be used.
The very extensive fistulas almost always require either a TANAGHO neourethra or a 2-stage procedure, and the ureters usually have to be catheterized as well.
In the 2-stage procedure, the first stage consists of circumferentially dissecting the bladder from the anterior vagina wall, the pubic bones, the symphysis and the abdominal wall. Then the bladder is advanced distally towards the introitus and fixed onto the symphysis with a least 5 chromic catgut 00 sutures. The second stage involves constructing a neourethra from the scar tissue covering the symphysis at the normal position of the urethra. A bulbocavernosus graft is then carried out as well.
If there is no tissue at all covering the symphysis (but only if there is enough bladder left) the TANAGHO procedure is used to reconstruct a urethra from a flap of the anterior bladder wall. The ureters are catheterized if necessary and if possible. The bladder is circumferentially dissected from the anterior vagina wall, the cervix, the pubic bones, the symphysis and the anterior abdominal wall. A flap 2.5 cm long and 3 cm broad is prepared from the anterior bladder wall by two parallel incisions. The bladder is closed (mostly transversely) and a neourethra is constructed over the ureter catheters using this flap as material, with either a single or a double layer of interrupted inverting chromic catgut 00. The width of the neourethra is checked after each suture by passing a H6 or H8 metal sound through it, and then a FOLEY catheter Ch 18 or Ch 16 is inserted. The anterior bladder wall is fixed distally to the symphysis with 2-3 chromic catgut 0 sutures, and the urethra is fixed onto the symphysis with 2-3 chromic catgut 0 sutures. A bulbocavernosus graft is fixed elastically and transversely onto the symphysis, covering at least the whole of the neourethra. With such an amount of tissue loss the anterior vagina wall also has to be reconstructed if possible.
If there is so little bladder capacity left that nothing can be done, the fistula is classified as type III.

discussion

These fistulas are the most difficult to repair, and the prognosis is poor. Even if it is possible to reconstruct a urethra of sorts, often it is only a rigid tube. As there is such a wide variety of tissue loss, improvisation and a very individual approach is needed.

Though the urethra is fixed onto the symphysis and thus well elevated, the bulbocavernosus graft is still needed; not so much as to elevate, because that has already been done, but to protect the neourethra and to provide some elasticity.

Though theoretically and practically the reconstruction of a neourethra from an anterior, lateral or posterior bladder flap seems to offer a solution in this type of fistula, the results are very poor and more research and experience is needed.

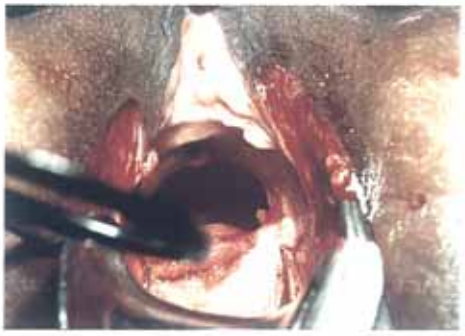

Figure 96-a Very extensive fistula

Figure 96-b Ureter catheterization

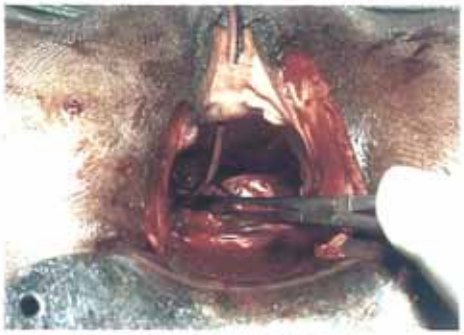

Figure 96-c Circumferential dissection

Figure 96-d Open RETZIUS space

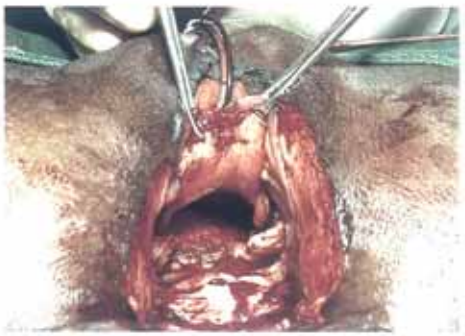

Figure 96-e Anterior bladder wall flap

Figure 96-f Anterior bladder wall flap

Figure 96-g Transverse bladder closure

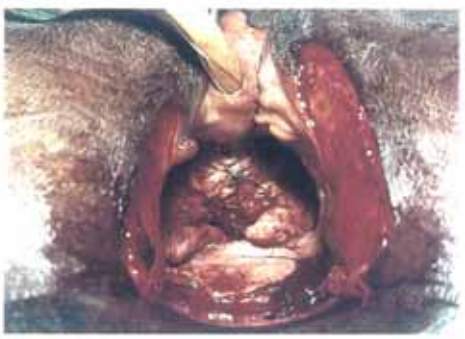

Figure 96-h Urethra reconstruction

Figure 96-i Urethra reconstructed

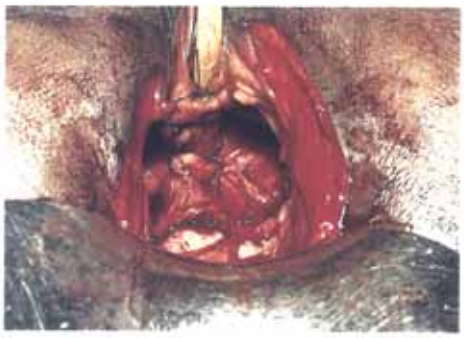

Figure 96-j Fixation into EUO

Figure 96-k Bladder/symphysis fixation

Figure 96-l Bladder fixed to symphysis

Figure 96-m Labia flaps

Figure 96-n avw reconstruction

Figure 96-o avw reconstructed

Figure 96-p End

chapter XII

type III fistulas

Ureter fistulas and other exceptional fistulas

Ureter fistulas require implantation of the ureter into the bladder (or eventually into the bowels). Fistulas where practically nothing is left of the bladder or urethra, and repair is technically impossible because there is no tissue available, also require implantation of the ureters into the bowels or skin.
The approach required by other fistulas varies according to their location and the dictates of common sense in the specific situation. In such fistulas, however, a vaginal approach is usually impossible.

technique

With limited personal experience of these cases, I would urge the reader to refer to suitable textbooks of urology.
The vaginal approach to ureterovaginal fistulas is as follows. The ectopic ureter opening into the vagina is traced by injecting methylene blue i.v., and the ureter is catheterized using a ureter catheter Ch 5 or Ch 6. A circumferential incision is made around the ectopic ureter opening, and the ureter is mobilized as far as possible. A metal probe is introduced into the bladder via the EUO, and a small iatrogenic vesicovaginal fistula is made as near to the ectopic ureter opening as possible. The ureter catheter is led through the EUO and fixed on to the skin just cranially from the clitoris. The ureter opening is fixed inside the bladder with a few chromic catgut 00 sutures. The bladder is closed with interrupted inverting chromic catgut 00 in such a way that the ureter opening comes to lie completely intravesically. Then a FOLEY catheter Ch 18 is inserted into the bladder, and closure is checked with 50 ml gentian violet. The anterior vagina wall is closed with interrupted everting supramid 0.

discussion

The implantation of the ureter or ureters into the sigmoid colon is not without problems. The postoperative mortality rate is high, the patient may develop an electrolyte imbalance, and there is a risk of ascending urinary tract infection. Many patients complain that they become incontinent at night (soiling their beds) due to relaxation of the anus sphincter muscle during sleep. For these reasons, this procedure is not performed by the author.

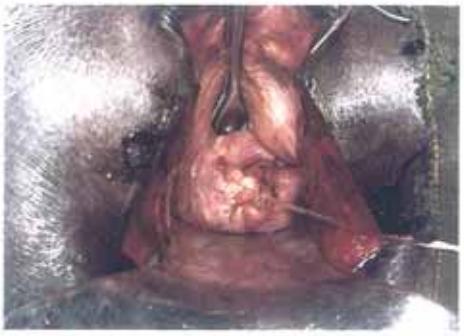

Figure 97-a Ureter fistula R

Figure 97-b Examination

Figure 97-c Examination

Figure 97-d Examination

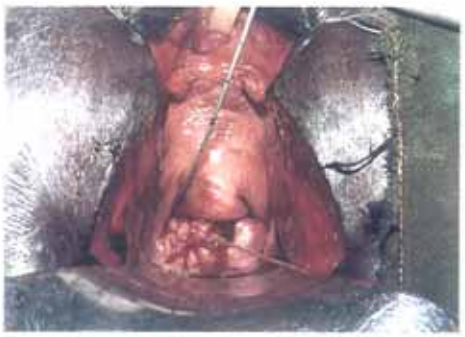

Figure 97-e Catheterization

Figure 97-f Incision around ureter

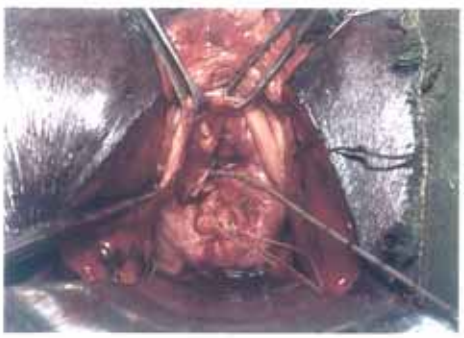

Figure 97-g Dissection

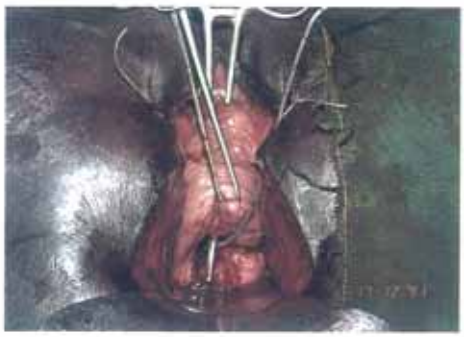

Figure 97-h Opening of bladder

Figure 97-i Routing of ureter catheter

Figure 97-j Ureter catheter in situ

Figure 97-k Ureter fixation

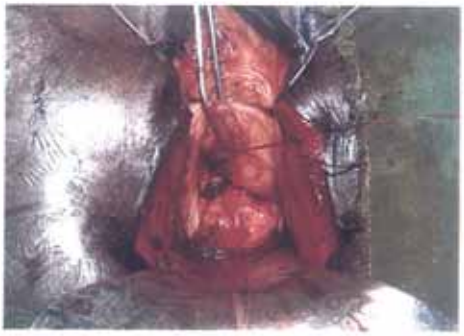

Figure 97-l Bladder closure

Figure 97-m Bladder closure

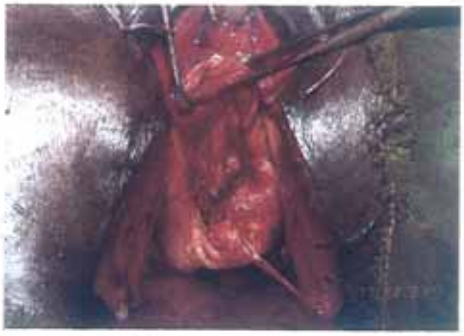

Figure 97-n Bladder closed

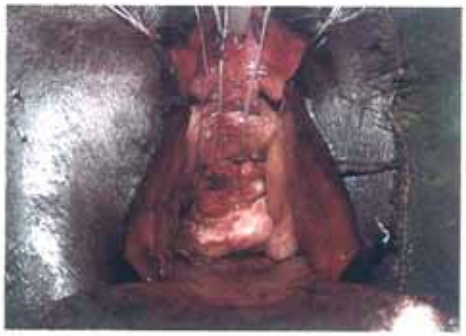

Figure 97-o 2nd Layer onto cervix

Figure 97-p End

chapter XIII

postoperative care and follow-up

postoperative care

When her general condition is good and she has a good flow of urine, the patient should be transferred from the operating theater to the postoperative ward. If the immediately postoperative blood pressure is below 80 mm Hg and there is insufficient urine flow, i.v. fluids should be given. For postoperative analgesic treatment, it is preferable to use an analgesic agent only, and not a morphine preparation.

The most important consideration is the achievement of a high-volume, uninterrupted urine flow, firstly to prevent ascending urinary tract infection and secondly to prevent blockage of the indwelling catheter in order to enable the bladder to stay empty and avoid placing any tension whatsoever on the sutures.

The patient must therefore drink as much as possible in order to produce a minimum of 4000 ml urine per 24 hr. The staff (or any other people looking after the patient) should be clearly instructed to make sure the patient drinks the required amount. There should be a continuous flow of clear colorless urine through the indwelling catheter at all times.

If the catheter becomes blocked the patient must approach the staff immediately, and the catheter must either be flushed out or changed. Any delay will result in tension on the sutures and the repair may break down.

On the day of surgery no food is given to the patient. Eating should begin again on the day following the operation. The patient should be given oral fersolate if possible and any patient with an intraoperative blood loss of 250 ml or more should also be given intramuscular iron dextran. A blood transfusion should only be given in emergencies.

No antibiotics or uroseptics are given routinely, as a good urine flow will prevent infection. Only where there are positive indications (such as fecal contamination of the abdominal cavity, pneumonia, urosepsis etc) is this necessary. Any patient with a fever should first be given antimalarial treatment. If wound infection develops, the wound must be widely opened without antibiotics but frequent dressings with an antiseptic such as acriflavine should be applied.

The vagina pack and pressure pad are removed the day following the operation. The vagina pack should be removed slowly with care, otherwise bleeding may result.

The skin sutures are removed 7 days after the operation and the intravaginal sutures, if nonabsorbable, no sooner than 20-21 days after the operation.

The indwelling bladder catheter is not removed for at least 14 days after the operation; if there is still leakage it can be left in for another 1-2 weeks.

Once the catheter is removed, the patient is instructed to pass urine immediately and as frequently as possible, and to report the following day on whether there are any problems with leaking, incontinence or micturition. The patient is also instructed to refrain from sexual intercourse for 6 months following the operation.

She can go home (or, even better, stay in the hostel) for 1-2 weeks, at which time the first vaginal examination is carried out and the vaginal nonabsorbable sutures are removed.

follow-up

The patient can then go home, returning for regular check-ups up to 6 months postoperatively.

Each patient is given a card with name, address, date, the type of surgery she has undergone, and written instructions that further pregnancies are to be ended by cesa-

rean section. She should also be instructed to return when she becomes pregnant. When this occurs, she should be examined, instructed to attend an antenatal clinic and told to go immediately to a hospital as soon as labor pains start.
However, not too much should be expected from the issuing of all these instructions. In reality, where can the patient actually go? This is one frustrating aspect of health education – it can only function properly if it is backed up by the necessary health facilities.

N.B. As the nursing care is often very poor, where a patient needs someone (such as a relative or friend) to look after her following the surgery, the person acting as carer has to be fully instructed as well.

chapter XIV

prognosis

In evaluating the prognosis, it is sufficient to look for successful closure and continence as these two gains will make the patient socially acceptable again. If she is also capable of sexual intercourse, she will be able to get married again.
The prognosis will depend upon the location and size of the fistula, the amount of tissue loss, the amount of scar tissue, the age of the patient and the accessibility of the site. It also, of course, depends upon the preoperative preparation, the surgical technique, the experience of the surgeon and the quality of the postoperative care.
The prognosis for closure and continence progressively worsens over the range from type I through type IIBb fistulas; of type III not much personal experience is available.
Once severe urinary incontinence develops it is very difficult to do anything about it. To the patient herself it may appear that there is still a fistula present: she may try to arrange another operation. A careful assessment has to be made as to whether it is stress incontinence, urge incontinence or a combination of both. Surgery may help in cases of stress incontinence but for urge incontinence only a very strict bladder drill will give any relief.
It is possible to close the fistula at first attempt in 85-90% of patients, with an incontinence rate of 11% in the closed fistulas. The final closure rate may go up to 95%; with an incontinence rate in the closed fistulas of up to 9%. As stated above, this depends very much upon the cause and type of fistulas (obstetric, surgical, radiation etc) as well as upon the surgical technique and the experience of the surgeon. It also depends very much upon the postoperative care; the better the postoperative care, the better the outcome. With regard to incontinence, the outcome is really only influenced by the type of surgical technique used.
Postoperative mortality can be influenced by both pre- and postoperative care. But this does not mean that fistula surgery can only take place in highly developed hospitals. For as long as such hospitals remain unavailable it is justified to perform the procedures under primitive conditions; a fistula makes a woman a social outcast.
If one wants to improve the prognosis, one has to bring a systematic approach to all the different aspects of the VVF problems and then compare systematically and objectively the outcome of different regimens of treatment.
The prognosis with regard to progeneration and the outcome of future pregnancies depend very much upon the proper instruction of the patients and upon the availability of health facilities within reach.
The prognosis for peroneal paralysis is favorable, as there is a tendency to spontaneous recovery within 2 years, but some 8% of obstetric fistula patients will still end up with permanent severe loss of motor function (grade 0, 1 and 2).

recurrent fistulas at subsequent deliveries

Despite repeated verbal and written instructions to the contrary, most patients stay at home during subsequent deliveries simply because there are no facilities for clinical delivery or cesarean section within easy reach. Many of them therefore come back with a new obstetric fistula either at the original site or elsewhere. Even if the recurrent fistulas have been repaired successfully, some return again with a new obstetric fistula.
But there is, in all honesty, nowhere for these women to go for proper antenatal care or, where necessary, a cesarean section.

chapter XV

repeat operations

These fistulas should be operated on by following the same guidelines as for a first operation.
It has been said that the prognosis of a repeat operation is less good than that of the first attempt, but this might only be because there is more scar tissue. Personally, I tend to believe that the prognosis depends more on the nature and qualities of the fistula (as outlined in the chapter dealing with prognosis).
There is one type of fistula which need special attention: the corner-corner fistula. This type of fistula develops when the original fistula is closed along the midline but is still open laterally (or bilaterally), The fistula is usually fixed onto the pubic bones and poorly accessible, as happens frequently when a circumferential fistula has been repaired without circumferential dissection, advancement and circumferential repair. Access to these fistulas is poor, making dissection difficult and closure even more so. Often the fistula can only be closed by fixing the bladder over the fistula onto the pubic bone, because it cannot be mobilized from the pubic bone. At present, the recommended procedure is to undo the previous repair and then make a circumferential dissection with advancement and perform an end-to-end vesicourethrostomy if technically possible.
Sometimes the amount of scar tissue prevents any closure other than the one given by following the guidelines of James Marion Sims: minimal dissection of the anterior vagina wall from the bladder and closure of the bladder and then of the anterior vagina wall. In exceptional cases only the anterior vagina wall is closed, after freshening of the fistula edge.

discussion

In repeat repairs it is even important to consider carefully what has to be achieved and evaluate what actually can be done. The more experienced the surgeon, and the more aware of alternative techniques he is, the better will be his planning and the better the outcome.
Corner-corner fistulas probably develop when the closure of the fistula is started at the midline instead of laterally at the angles; here one typically finds two fistulas. They also occur where a previous repair to a circumferential fistula has been carried out with no circumferential dissection of the bladder and without advancement and end-to-end vesicourethrostomy.
It is important to differentiate between a fistula and urinary incontinence. This can be done by instillation of a dye such as gentian violet into the bladder. If the fistula is excluded, it is necessary to differentiate between stress incontinence and urge incontinence (though a combination of both is possible).

chapter XVI

operations for stress incontinence

introduction

Roughly 10% of all VVF patients will develop, postoperatively, a severe form of stress or urge incontinence (or both) which makes them outcasts in the same way as the fistula did. Among the factors responsible for stress incontinence are the following:

a. loss of smooth muscle of bladder neck/urethra
b. loss of intrinsic striated muscle of urethra
c. loss of extrinsic striated muscle of levator ani
d. loss of mucosa of bladder neck and urethra
e. loss of elastin
f. scarring due to necrosis
g. scarring due to VVF repair
h. tethering of urethra to surroundings
i. abnormal position of urethra and bladder neck due to trauma of the stabilizing suspension apparatus
j. shortening of urethra

In extreme cases there is a rigid tube of urethra/bladder neck and nothing can be done about restoring continence.

As accurate a history as possible is taken of the incontinence, including details of whether leaking occurs when the patient is lying down, sitting, standing or walking, and if it happens with or without coughing. The findings should be tested objectively.

It is of utmost importance to differentiate preoperatively between stress incontinence and urge incontinence, as the latter cannot be treated operatively. Note, however, that a combination of both is possible.

In dealing with normal stress incontinence, several more advanced techniques have to be used because part or all of the closing mechanism has been lost. There is the added danger that during or after dissection the fistula may recur as a complication.

In most of the patients where the fistula itself has been closed but stress incontinence develops, dealing with the problem is very difficult and frustrating. Therefore, it cannot be stressed enough that even at the first repair procedure the surgeon should try to ensure effective working of the closing mechanism in order to prevent the development of stress incontinence.

The technique which has given the best results so far is a vaginal colposuspension. This involves fixing the anterior vagina wall laterally from urethra/UV-junction/bladder neck on to the anterior abdominal wall, symphysis, pubic bones and/or pubococcygeus muscles.

preoperative preparation

A gentian violet test is performed to exclude any small fistula which may be contributing to the incontinence. A careful examination is then made to exclude urge incontinence (this can be easily detected by leakage of gentian violet from the EUO **without** abdominal pressure rise). The longitudinal bladder diameter (EUO/BW minus EUO/B) is calculated and if this is less than 7 cm the advisability of surgery becomes dubious.

technique

A FOLEY catheter Ch 18 is inserted and the bladder is completely emptied in order to minimize further trauma to the bladder.
Two bilateral longitudinal incisions, 2-3 cm long, are made into the anterior vagina wall as laterally as possible in order to enter the paravesical spaces. The anterior vagina wall is **not** dissected from the bladder and/or urethra as this could result in recurrence of a fistula.
The bladder is dissected sharply and bluntly from the pubic bones so that the dissecting finger is in contact with the posterior side of the anterior abdominal musculature. If this is not possible due to severe scarring of the paravesical spaces, sharp dissection of the bladder is performed as far upwards as possible in order to create some space for fixation of the anterior vagina wall onto the symphysis, the superior pubic bones or the puboccygeus muscles.
Three sutures are placed at each side, the first inside the abdominal wall musculature or symphysis/superior pubic bone and the other two through the periost of the symphysis. Without further dissection of the anterior vagina wall these sutures are put through the anterior vagina wall at 1-2, 3-4 and 5-6 cm respectively from the external urethra opening, or as close to these positions as possible. Then the anterior vagina wall is fixed bilaterally on to the back of the abdominal musculature and symphysis by tying these sutures.
The first suture through the anterior abdominal wall or symphysis is nonabsorbable and is tied over a piece of infusion tube to prevent it cutting through the tissue. The other two sutures can be absorbable (such as chromic catgut or vicryl) so they do not have to be removed. Care must be taken to ensure that the anterior vagina wall is in close contact with the abdominal wall and the symphysis, so that there will be firm adhesion and the elevation will last.
Again, the EUO/B distance is measured and the degree of elevation is checked. The eventual episiotomies are closed and everything is left open inside the vagina, which is then packed with gauze soaked in acriflavine.
The catheter is removed 10-14 days postoperatively and the patient is instructed to pass urine as frequently as possible. The nonabsorbable sutures are removed after 4-6 weeks.
The latest development in incontinence surgery is a mini-invasive technique without episiotomies which uses bilateral 1.5-2 cm incisions of the anterior vagina wall.

discussion

Minute fistulas at the UV junction may induce stress incontinence. This is objectively demonstrable, and after closure of the fistula the incontinence may disappear as well.
Fixating the anterior vagina wall on to the back of the anterior abdominal wall and/or symphysis gives an excellent elevation. This can be thought of as a sling procedure where the anterior vagina wall is the sling (or, even better, a hanging mat) to fix the urethra/UV junction/bladder neck elastically against the symphysis.
However, as there is no dissection of the anterior vagina wall from the bladder there is no risk of fistula recurrence.
This procedure is different from the MARSHAL-MARCHETTI-KRANTZ procedure, from the BURCH procedure and from the STAMEY-PEREIRA procedure and it gives a theoretically better elevation and does not introduce any obstruction of the outflow.
It is a purely vaginal technique and is less traumatic than the alternative operations, especially the mini-invasive development. Its major disadvantage is that removal of the

nonabsorbable sutures is difficult and troublesome. It might be better to use thick, slowly absorbable sutures, such as vicryl, but these are expensive.
Though no experience is available, the procedure will probably also work in patients with simple stress incontinence.

Figure 98-a Stress incontinence

Figure 98-b Drainage of bladder

Figure 98-c avw incisions

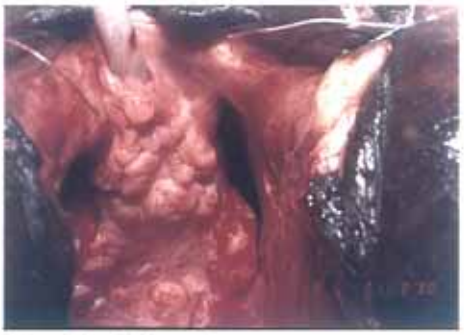

Figure 98-d Dissection

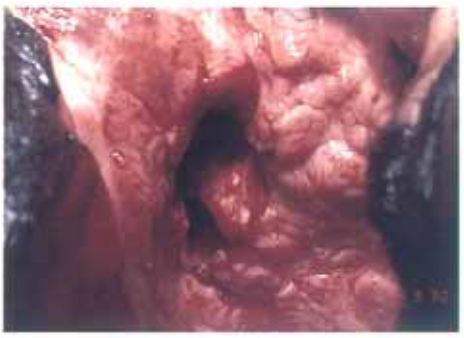

Figure 98-e Paravesical space R

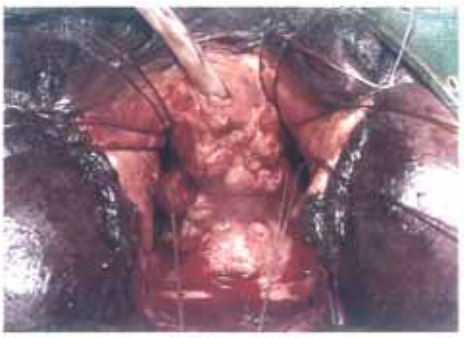

Figure 98f Elevation sutures

Figure 98-g Elevation sutures R

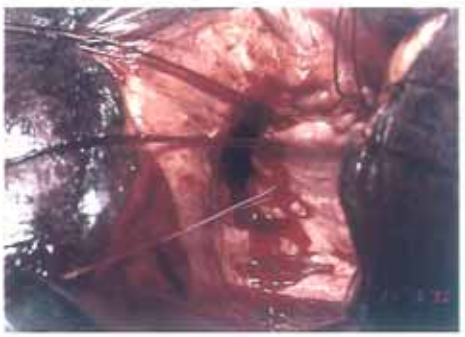

Figure 98-h Sutures through avw R

Figure 98-i Colposuspension R

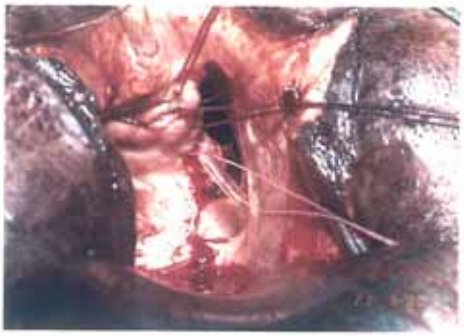

Figure 98-j Sutures through avw L

Figure 98-k Colposuspension L

Figure 98-l End

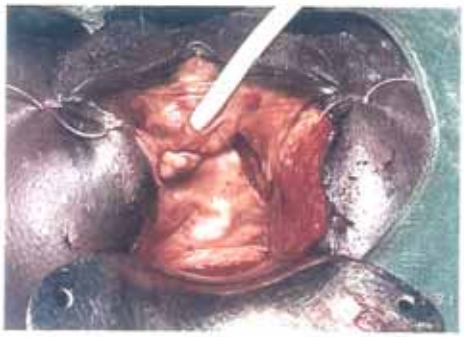

Figure 99-a avw incision L

Figure 99-b Dissection L

Figure 99-c Elevation before

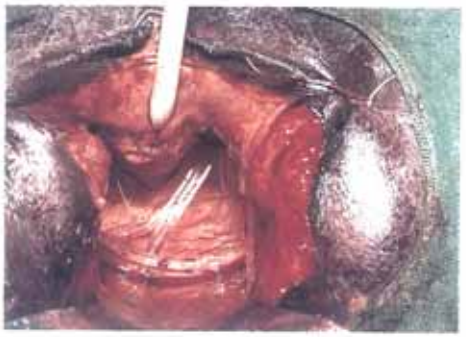

Figure 99-d Elevation after

chapter XVII

complementary operations

anterior vagina wall reconstruction
widening/lengthening vaginoplasty
bladder stone

The obstetric fistula is often accompanied by partial or even complete loss of the vagina, varying from loss of the anterior vagina wall to vagina stricture, circular stenosis and even atresia. It is wise to remember that there is always some loss of the anterior vagina wall. Bladder stone formation is a relatively common phenomenon and sometimes it is the cause of urosepsis. Postoperatively it may be caused by urine outflow obstruction.

anterior vagina wall reconstruction

Normally, the anterior vagina wall can be closed directly over the bladder repair once it has been mobilized. However, this is often only possible with a significant shortening of the anterior vagina wall. Sexual intercourse will still be possible if the posterior fornix is well developed, but if this is not the case, or if the anterior vagina wall is almost completely lost, there will be a need for reconstruction of the anterior vagina wall. There are several techniques available for this, and two in particular give good results.
In the first, a rotation advancement flap is taken from the mucosa and skin of the labia at the same side as the bulbocavernosus graft (according to the HAMLINS). The incision of this graft is extended at the posterior end into the vagina and up to the anterior vagina wall defect. Then after wide dissection this whole flap is rotated and advanced over the bladder repair and sutured onto the opposite side of the anterior vagina wall edge.
The second technique uses mucosa skin advancement flaps from both labia. An incision of the anterior vagina wall is made bilaterally along the urethra, extending inside the vagina up to the fistula and obliquely through the labia majora. A transverse incision is made at the lateral vagina wall and then two mucosa skin flaps are prepared from both labia at both sides with spatulation of the labia minora. These are so widely mobilized that they can be advanced easily into the vagina, united at the midline and sutured onto the anterior vagina wall edge proximally in order to bring healthy tissue to cover the repair and to reconstruct the anterior vagina wall.

widening or lengthening vaginoplasty

In severe stenosis and with severe posterior vagina wall stricture it is necessary to widen the vagina, and in extreme cases to lengthen the vagina as well.
In slight to moderate strictures of the posterior vagina wall, the wall is longitudinally incised bilaterally together with the episiotomies and then left open at the end of the operation.
In stenosis of the vagina one of the two episiotomies is filled with a skin rotation flap from the adjacent buttock. For right handed surgeons a full-thickness skin graft with little adjacent fat is prepared from the left buttock, with its base at the posterior commisure. This raised flap is rotated into the vagina and sutured into the left episiotomy and on to the posterior vagina wall. For left-handed surgeons the procedure is done from the right side.
This skin rotation flap can also be used for lengthening the vagina. Here, the posterior fornix is opened and the rotated flap is fixed with a few sutures on to the rectosigmoid and the back of the uterus, and on to the coccygeus muscles at the deep corners. It is

important to place all the sutures first and then fix the flap, the procedure will otherwise be impossible. The rest of the flap is then fixed bilaterally on to the pubococcygeus muscles.
The posterior vagina wall and posterior fornix can be lengthened reasonably in this way. The buttock donor site can be closed directly in such a way that the scar comes inside the skin folds.

bladder stone

If a stone is encountered pre- or intraoperatively, it is removed vaginally with or without spinal anesthesia; sometimes it is necessary to make bilateral transverse incisions if the stone is too big to be removed through the fistula. Then after 2-3 weeks, if the tissues have healed, the repair can be undertaken.
Where the stone is encountered postoperatively, the patient is often cachectic due to accompanying urosepsis. A small transverse suprapubic incision is made under spinal anesthesia (often as an emergency procedure), the bladder is opened longitudinally, the stone is removed and a FOLEY catheter, minimally Ch 18, is inserted through the urethra. Then the bladder is flushed out with normal saline through the indwelling bladder catheter until everything is clean. All the layers are left open and the wound is dressed with gauze soaked in acriflavine. The patient is instructed to drink as much as possible or, if she is too weak, intravenous fluids are given. If there is urosepsis present, antibiotics are also prescribed. The indwelling bladder catheter is left in position until the abdominal wound has closed. This normally takes 2-3 weeks.

discussion

The key to success in any kind of reconstructive surgery involving tissue loss is to replace the defect with healthy tissue (preferably with the same texture: bone with bone, tendon with tendon, skin with skin) from somewhere where it will not be missed. It always involves compromises, and a complete *restitutio ad integrim* will not be reached. The greater the amount of tissue loss the more compromises one has to accept.
In bladder stone removal, the suprapubic wound is left open deliberately following cystostomy so that all the infected material can drain easily.

Figure 100-a Vagina atresia

Figure 100-b Examination

Figure 100-c Episiotomy L

Figure 100-d Dissection

Figure 100-e Dissection

Figure 100-f Dissection

Figure 100-g Fixation sutures

Figure 100-h Fixation sutures

Figure 100-i Incision L buttock

Figure 100-j Flap dissected

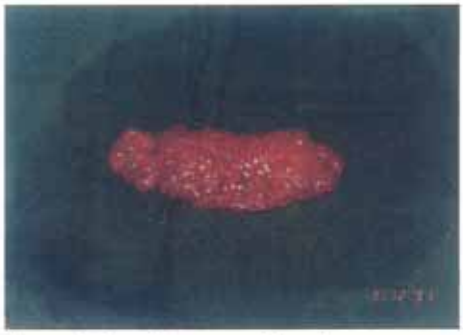

Figure 100-k Fat removed from flap

Figure 100-l Sutures through flap

Figure 100-m Flap rotated & fixed

Figure 100-n Adduction L leg

Figure 100-o Skin Closure L buttock

Figure 100-p Neovagina

Figure 100-q Vagina pack

Figure 100-r Skin sutures removed

Figure 100-s End result vagina

Figure 100-t End result L buttock

Figure 101-a Bilateral skin flaps

Figure 101-b Flap rotated & fixed

Figure 101-c Bilateral skin closure

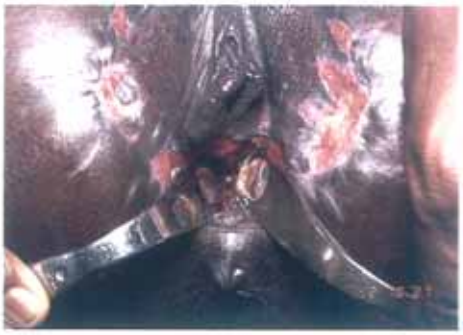

Figure 101-d End result

Figure 102-a Bilateral labia flaps

Figure 102-b avw reconstruction

Figure 102-c avw reconstructed

Figure 103 Healed avw

Figure 104-a Suprapubic incision

Figure 104-b Bladder stone

Figure 104-c Catheter, wound left open

Figure 104-d Acriflavine dressing

chapter XVIII

intra- and postoperative complications

As with any type of surgery there are intraoperative and early and late postoperative complications.

intraoperative complications

The most frequent complication is fecal contamination of the operating field when the patient passes stools during the operation. Normally, thorough cleansing with clean water is sufficient; only when the abdomen has been opened are antibiotics given.

So far, in over 5,000 operative procedures, no intraoperative blood loss exceeding 500 ml has been encountered, and this amount of blood can be lost without acute major complications.

In a stenosed vagina, episiotomies may produce further trauma to the sphincter ani muscle or rectum, resulting in a rectovaginal fistula; these must be repaired at once.

There is also a chance of further trauma to the anterior vagina wall or bladder, especially where dissection involving these organs has been extensive. Again, this should be repaired immediately. If the urethra has been traumatized such that it cannot be repaired simultaneously with the fistula, it must be reconstructed at a later stage.

Occasionally a piece of a needle breaks at the symphysis or pubic bones; usually the broken fragment can be retrieved, but sometimes it is lost.

The ureters can be cut or tied; if they are cut they should be repaired over a ureter catheter; if both ureters are tied as suspected when there is no urine flow whatsoever, the whole repair has to be dismantled.

When the bladder tears out or is damaged anterolaterally at dissection from the pubic bones and cannot be repaired, supra-pubic drains are placed into the paravesical spaces to prevent a urine phlegmone with accompanying urinary sepsis.

During dilatation of postoperative urethra strictures the bladder may be perforated, resulting in urine leakage into the abdominal cavity.

When operations for stress incontinence are undertaken the VVF may recur, especially if the procedure involves dissection of anterior vagina wall from the bladder.

early postoperative complications

The most serious postoperative complication, death, can only be prevented by intensive postoperative care. This is usually not optimal, and therefore every patient needs someone (a friend, relative or fellow patient) who has been clearly instructed and who can look after the patient at all times.

Diarrhea with dehydration is a major cause of postoperative death, and it can be treated with simple oral rehydration treatment (ORT); if this is unsuccessful, intravenous fluids are indicated.

Another cause of death is pulmonary thromboembolism. In the developing countries, nothing can be done when this occurs.

Urosepsis is a third cause of death. Where it arises, antibiotics and abundant oral or intravenous fluids are necessary; its onset is prevented by drinking as much as possible postoperatively.

Blockage of the catheter is treated by flushing out the catheter. If this is not successful, the catheter must be changed.

Hematoma of the bulbocavernosus donor site is not uncommon and needs opening and evacuation only.

As the episiotomies are left open intravaginally, dehiscence has only twice been encountered.
Wound infection of the bulbocavernosus donor site is uncommon. If it occurs, the wound must be opened and regular daily dressings applied; no antibiotics are necessary.
Fever is always treated first with chloroquine in malaria-endemic regions, and other causes are then looked for.
Occasionally, upon removal of the catheter the patient develops urine retention due to nervous system disorders. This is treated by catheterization and will heal spontaneously when the patient is instructed to pass urine immediately and frequently.
When cases of obstructed labor have destroyed most of the urethra, there is a chance that after the repair even the little which is left will get lost due to denuding by the dissection; in such cases, the urethra will have to be reconstructed later.
Vagina stenosis or atresia may occur, and in these cases a widening or a lengthening vaginoplasty is indicated.
Sometimes following high elevation for stress incontinence the patient has difficulty in passing urine spontaneously when the catheter is taken out (outflow obstruction). The catheter should be reinserted for a couple of days, and the patient instructed to start passing urine immediately it is removed again. So far, it has not been necessary to deal with this by surgery.

late postoperative complications

Postoperative urinary stress and/or urge incontinence is the major problem of VVF surgery, and no definite solution has yet been found. This presents a challenge to every VVF surgeon.
Several surgical techniques are available for dealing with stress incontinence, but most of them are unsuitable for the specific type encountered after VVF operations, and the prognosis is poor.
Urge incontinence (which is far more common than generally believed) may also develop as well when the bladder musculature itself has been damaged severely. A very strict bladder drill is the only thing which may help, but most patients are not cooperative.
Combinations of urge and stress incontinence are very possible, but they are difficult to diagnose under the primitive conditions of the developing countries.
Overflow incontinence, due either to urethra stricture with outflow obstruction or to atony of the bladder (overstretching), is not uncommon.
Urethra strictures at the UV junction, especially following a reconstruction of a urethra or repair of a circumferential fistula, are treated by repeated gentle dilatations. If this is not successful an anterior urethrotomy at 10 & 12 & 14 hr is performed.
Bladder atony is treated by installing an indwelling bladder catheter for 4-6 weeks and giving the patient strict instructions to pass urine every 15 minutes upon removal of the catheter.
Recurrence of the fistula may occur following periods of fever and abdominal pain or diarrhea.
Bladder stone formation is encountered regularly, probably due to outflow obstruction. A small transverse suprapubic incision is made with longitudinal cystostomy and removal of the stone.
Infrequently, keloid formation is noted at the longitudinal scar of the labium majus when a bulbocavernosus graft has been performed; nothing can be done about this.

chapter XIX

remarks for future developments

hormone treatment

Considering the excellent results of fistula closure in pregnant patients, it would be worthwhile to investigate whether a selected number of patients would benefit from taking the oral contraceptive pill in a double dose from 2 weeks preoperatively until 2 weeks postoperatively.

operation technique

More research is needed to find the optimal surgical approach to every specific fistula. It might be that a computer model would help in developing an individual approach to each fistula.

suture material

Vicryl sutures can be used for the anterior vagina as this material does not need to be removed and the half life is sufficient, but it is too expensive for use in the developing world. The same results can be achieved with nonabsorbable suture material, but this has to be removed after 2-3 weeks.

prevention of postoperative stress incontinence

Research is needed in order to find an operation which will reduce the incidence of postoperative stress incontinence following the first attempt at repair. Fixing the bulbocavernosus graft on to the abdominal wall was thought at one time to be the solution, but too much tension broke down the repair. The technique will be tried again in future, but using less tension.
As the pubococcygeus muscles play an important role in maintaining continence as part of the levator ani muscles, it would be worthwhile to investigate the best position for fixing the bulbocavernosus graft: on to the abdominal musculature, on to the symphysis or on to the pubococcygeus musculature.

treatment of stress incontinence

Further research is also needed in order to find a definite solution for postoperative stress incontinence. This will be very difficult, as in many patients the closing mechanism is completely lost. An artificial sphincter will not work because there is already too much tissue loss; the situation presents great technical difficulties and new fistulas can be expected.

type IIAb fistulas

If there is loss of more than 2 cm of the proximal urethra, a replacement neourethra made from a bladder wall flap with pull-through through the distal urethra may result in improved continence.

type IIBb fistulas

For type IIBb fistulas, a neourethra made from either the anterior (TANAGHO), the posterior or the lateral bladder wall appears to be the solution, with a bulbocavernosus graft also indicated to protect the neourethra. Though theoretically excellent and practically not too complicated, however, the personal results so far from this procedure

have been very poor. It has been tried in several patients without a bulbocavernosus graft, but only successful in one. Some of the others benefited from a second operation but some of them had to be classified as inoperable. Nevertheless, the procedure still theoretically appears to offer the solution.

urethra stricture

For UV strictures which do not respond to repeated dilatation, multiple anterior incisions of the UV junction (where the stricture is situated) could be performed by means of a urethrotome.
Another solution may be resection of the stricture and an end-to-end vesicourethrostomy, with eventually a neourethra made from a bladder flap if necessary.

peroneal paralysis

For permanent peroneal paralysis with drop foot, a tibialis posterior transfer can be done, but most patients are not interested.

widening or lengthening vaginoplasty

Changing the incision so that the flap rotates in just the opposite way may give a better cosmetic result intravaginally, as it will involve no displacement of the anus.

prevention of obstetric fistula

As, ultimately, the best solution is to prevent the obstetric fistula from occurring in the first place, more research is necessary to find practical ways to implement the theoretical solution (that is, to relieve obstructed labor in time by a cesarean section).

chapter XX

documentation

Objective documentation is very important: it enables reliable scientific data to be found and results to be evaluated. The better the documentation, the more we can know about fistula surgery and its associated problems. Therefore, for every operation a comprehensive report is typed out with full patient data, relevant obstetric history and a small diagram of the fistula in relation to EUO and cervix.

This will help in obtaining the baseline data of fistula patients in a particular area. Once these data are available and have been studied, a programme can be specially designed for that specific area.

One priority must be the calculation of reliable epidemiological data, that is, the incidence and prevalence of fistulas.

The data should include the patient's age at operation and height in cm, the duration of the leaking, number of children born and number still alive, age at marriage in relation to menarche, the cause of the fistula (whether obstetric or nonobstetric), the sex and condition of the infant, the duration of labor, the interval between delivery or surgery and the onset of leaking, whether a cesarean section was performed, social status (and whether living with husband or not), the size of the fistula and its location and type, the distance between the fistula edge and the EUO and cervix or vagina vault, history of any previous repairs, whether there is any peroneal paralysis (grading 0-5), RVF, a report on the procedure and outcome of the operation, notes of any future pregnancies and their outcome, and so on.

For ease of reference, each patient should be given a consecutive patient number (which remains unchanged) and the operation is given a consecutive operation number, so that a case would be identified as, for example, Pt 101 – VVF 123. If the same patient requires further operations, the latest operation number is added to the original patient data, so that the identification number becomes Pt 101 – VVF 123/150, then Pt 101 – VVF 123/150/229 and so on.

Photographic documentation of each case by slides is easily done before starting the operation, while the patient fully prepared on the operating table under spinal anesthesia. A camera with a data back will be extremely useful in correlating the correct photographs with the patient's other notes and data.

chapter XXI

abbreviations

AFB	acid-fast bacilli
avw	anterior vagina wall
pvw	posterior vagina wall
Ch	Charriere
G	gauge
H	Hegar
CS	cesarean section
EUO	external urethra opening
UV junction	urethrovesical junction
EUO/B	distance between EUO and balloon
EUO/BW	distance between EUO and bladder wall
EUO/F	distance between EUO and fistula
F/C	distance between fistula and cervix
F/V	distance between fistula and vagina vault
i.m.	intramuscular
i.v.	intravenous
min	minute
hr	hour
wk	week
mth	month
yr	year
RVF	rectovaginal fistula
UVF	urethrovaginal fistula
UVVF	urethrovesicovaginal fistula
U(V)VF	urethro(vesico)vaginal fistula
(U)VVF	(urethro)vesicovaginal fistula
VCF	vesicocervical fistula
VCVF	vesicocervicovaginal fistula
VUF	vesicouterine fistula
UVF	vesicouterovaginal fistula
VVF	vesicovaginal fistula

chapter XXII

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