

VESICOVAGINAL FISTULA (VVF)

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ABSTRACT... Vesicovaginal fistula is not an uncommon condition. It gives rise to multiple socio-psychological problems for women usually of younger age. It can be prevented by improving the level of education, health care and poverty. Early diagnosis and appropriate treatment is required to help the patient. Preoperative assessment, treatment of co-morbid factors, proper surgical approach & technique ensures success of surgery. Postoperative care of the patient is equally important to avoid surgical failure.



Vesicovaginal fistula

It is a condition that arises mostly from trauma sustained during child birth or pelvic operations caused by the interplay of numerous physical factors, social, cultural, political, and economic situation of women. This interplay determines the status of women, their health, nutrition, fertility, behaviour, and susceptibility to vesicovaginal fistula¹. Vesicovaginal fistula (VVF) is an abnormal passage between bladder and vagina. It is a subtype of female urogenital fistula (UGF). It allows the continuous involuntary discharge of urine into the vaginal vault. It has profound effect on the patient's emotional well-being in

addition to the medical sequelae from these fistulas.

It can be caused by injury to the urinary tract, which can occur accidentally during surgery to the pelvic area, such as a hysterectomy. It can also be caused by a tumor in the vesicovaginal area or by reduced blood supply due to tissue death (necrosis) caused by radiation therapy or prolonged labor during childbirth.

Patients with vaginal fistulas usually present 1 to 3 weeks after a gynecologic surgery with complaints of continuous urinary incontinence, vaginal discharge, pain or an abnormal urinary stream. Obstetric fistula lies along a continuum of problems affecting women's reproductive health, starting with genital infections and finishing with maternal mortality. It is the single most dramatic aftermath of neglected childbirth due to its disabling nature and dire social, physical and psychological consequences.

FREQUENCY

The physical factors that influence the incidence of VVF

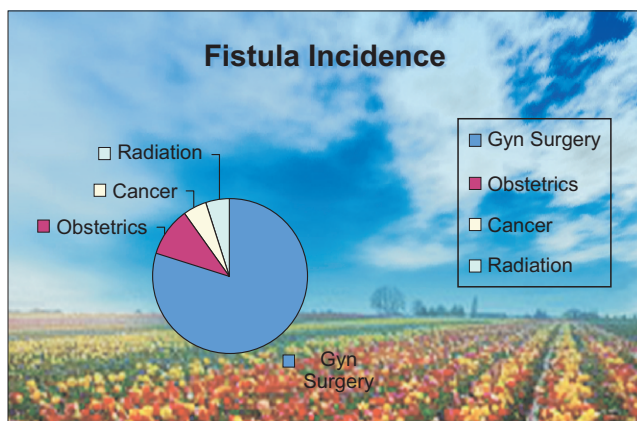
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include;

- Obstructed labour
- Accidental surgical injury related to pregnancy
- Crude attempts at induced abortion

Obstructed labour leads to vesicovaginal fistula formation when prolonged and unrelieved pressure on the woman's pelvic wall causes puncture in the bladder.

The predominant cause of VVF is prolonged obstructed labor (97%). Bladder base is sandwiched between bony maternal pelvis and fetal skull resulting in a vascular necrosis, sloughing of bladder and vaginal wall resulting in VVF formation.



The frequency of vesicovaginal fistula (VVF) is largely underreported in developing countries.

The rate of Vesicovaginal fistula is;
350 cases per 100,000 deliveries.

85% of the VVFs are related to pelvic operations.

75% are related to hysterectomy.

Number of unrepaired VVFs in Nigeria is between 800,000 and 1,000,000 (2001).

RISK FACTORS

Risk factors that predispose to VVFs include;

- Prior pelvic or vaginal surgery.
- Previous PID, ischemia, diabetes, arteriosclerosis, carcinoma, endometriosis.
- Anatomic distortion by uterine myomas, and infection, particularly postoperative abscess.

PATHOGENESIS

Numerous factors contribute to the development of VVF in developing countries.

Non availability of health care

Few women are attended by qualified health care professionals or have access to medical facilities during childbirth; their obstructed labor may be protracted for days or weeks. Prolonged impaction of the fetal presenting part in the pelvis leads to tissue edema, hypoxia, necrosis, and sloughing resulting from prolonged pressure on the soft tissues of the vagina, bladder base, and urethra. The vesicovaginal fistula (VVF) is large and involves the bladder, urethra, bladder trigone, and the anterior cervix.

Sociocultural Factors

Poor socioeconomic development is the basic underlying factor responsible for maternal ill-health, including the prevalence of obstetric fistulae. The standards of health in developing countries are low and that natural hazards such as malnutrition and infections remain largely unchecked.

Economic Factors

The single most important economic factor contributing to the prevalence of vesicovaginal fistula (VVF) is poverty, especially in rural areas. Women with fistulae come almost exclusively from poor families and communities. Poverty also serves as a disincentive or deprives fistulae patients from using modern health facilities in two ways;

- Personal costs incurred as a result of attending these facilities.
- Cuts in services and provisions at health facilities as a result of insufficient funding or budget cuts.

Malnutrition

Malnutrition is an indicator of a community's nutritional status, women have been noted to be more acutely malnourished than men due to differential feeding practices for boys and girls from birth. This is probably due to male dominated society. The effects of

malnutrition contribute greatly to the underdevelopment of women's physiology, and eventually to some of the physical problems.

Early age of Marriage and Child Birth

Girls are given in marriage at very young ages in some cultures, often before or during the process of puberty, and childbearing is seen as an indicator of the attainment of "married woman" status. This helps to explain why vesicovaginal fistula (VVF) sufferers are often very young girls.

Health and Social Consequences of VVF

Women with vesicovaginal fistula (VVF) suffer from urinary incontinence which, if not managed properly, causes them to smell of urine. This continuous urine leakage makes them vulnerable to urinary tract infection, vaginitis, and excoriation of the vulva. The most traumatic aspects of vesicovaginal fistula (VVF) from the social point of view are the resulting incontinence, childlessness which may lead to marital breakdown and eventually divorce⁷. Such women shun the company and become practically outcast from the society.

Lower level of Education

Lack of health education hinders vesicovaginal fistula (VVF) prevention. Most rural dwellers see obstetric complications either as a result of the pregnant woman's sin, the anger of the gods, a curse, evil spirits, or heredity. Illiteracy deters people from attending hospitals, particularly when they are made to feel stupid and when hospital staff come from an alien culture with differing traditions, customs, and language⁴.

Education gives young women better access to profitable employment alternatives. It also reduces the incidence of high-risk pregnancies, unwanted pregnancies, and abortions by increasing contraceptive use and reducing parity. Average age at marriage tends to rise, as does the average age at first birth when girls stay in school longer, especially when family planning services are promoted, readily available, and accepted by the women^{1,5}.

Late Decision-making

Another social contributor to vesicovaginal fistula (VVF)

is the lack of decision-making power available to women. The timing of decisions to go to a hospital has been linked to knowledge of the possible complications and a mistrust on modern health care services (WHO 1991). Most of the women are examined by male doctors⁶. This is one of the reasons, why many women keep away from seeking medical help early.

CAUSES OF VESICOVAGINAL FISTULA (VVF)

Major cause of vesicovaginal fistula (VVF) is prolonged, obstructed labour which is often followed by instrument delivery (mainly forceps). The fistula formation occurs due to pressure necrosis.

Surgical procedures that cause vesicovaginal fistula (VVF) are of two types. Injury caused to the bladder during obstetric operations performed within the formal/modern health care system, such as the hospital. Such procedures include;

- Caesarean section
- Caesarean hysterectomy
- Gynecological operations
- Abdominal hysterectomy specially Werthiem's hysterectomy
- Vaginal hysterectomy and/or repair
- Difficult forceps delivery
- Aldridge sling
- Caesarean sections and difficult forceps delivery.

The second form of surgical procedures that may lead to vesicovaginal fistula (VVF) are;

- Female circumcision
- The Gishiri cut
- Angurya: traditional practice in which tissue is removed from the vagina by traditional surgeons for the treatment of coital pain, infertility, obstructed labour, amenorrhoea, dyspareunia, vulva rash, goitre, and generalized body aches and pains³.
- Congenital injuries
- Insertion of caustic materials into the vagina.

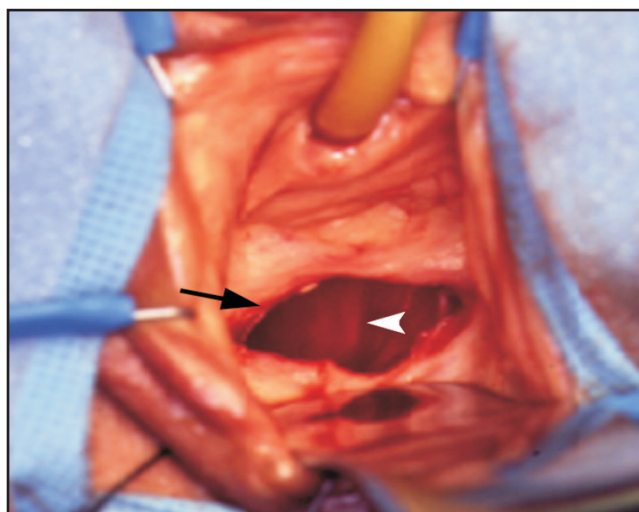
VVFs are attributed predominantly to inadvertent bladder injury during pelvic surgery (90%) performed in developed countries. These involve a relatively limited

focal bladder injury leading to smaller vesicovaginal fistula (VVF) than observed in developing countries (large defect formation).

Suture placement through the bladder wall in itself may not play a significant role in vesicovaginal fistula (VVF) development. However, the risk of formation of a hematoma or avascular necrosis after a suture is placed through the bladder wall can lead to infection, abscess, and subsequent suture erosion through the bladder wall. This wall defect permits the escape of urine into the vagina and may be followed by an eventual epithelialization of the track.

CLINICAL FEATURES

The uncontrolled leakage of urine into the vagina is the hallmark symptom of patients with vesicovaginal fistula (VVF). Patients may complain of urinary incontinence or an increase in vaginal discharge following pelvic surgery or pelvic radiotherapy with or without antecedent surgery. The drainage may be continuous; however, in the presence of a very small vesicovaginal fistula (VVF), it may be intermittent. Increased postoperative abdominal, pelvic, or flank pain; prolonged ileus; and fever should alert the physician to possible urinoma or urine ascites and requires careful evaluation. Recurrent cystitis or pyelonephritis, abnormal urinary stream, and hematuria should also initiate a workup for vesicovaginal fistula (VVF). The patient may also experience irritation in the area of the vulva, and frequent urinary tract infections.



Vesicovaginal Fistula (Inspection)

DIAGNOSIS

An accurate diagnosis is paramount before consideration of repair. Excessive or suspicious vaginal discharge in a patient who recently underwent pelvic surgery or who has a history of pelvic radiotherapy should be promptly evaluated.

A full vaginal inspection is essential. It should include;

- Assessment of tissue mobility.
- Accessibility of the fistula to vaginal repair.
- Determination of the degree of tissue inflammation, edema, and infection.
- Possible association of a recto-vaginal fistula.

The differential diagnosis for the discharge of urine into the vagina includes single or multiple vesicovaginal, urethrovaginal, or ureterovaginal fistulas and fistula formation between the urinary tract and the cervix, uterus, vagina, vaginal cuff, or (rarely) ureteral fistula to a fallopian tube.

DIAGNOSTIC TESTS

- The bladder can be filled with sterile milk or methylene blue in retrograde fashion using a small transurethral catheter.
- Placement of tampons in the vaginal vault and observation for staining of the tampons by methylene blue may help to identify and locate fistulas.
- Staining of the apical tampon would implicate the vaginal apex or cervix/uterus/fallopian tube; staining of a distal tampon raises suspicion of a urethral fistula.
- 3 swab test is performed for differentiation between vesicovaginal fistula (VVF) and uretero vaginal fistula.
- If the tampons are wet but not stained, oral phenazopyridine (Pyridium) or intravenous indigo carmine then can be used to rule out a ureterovaginal, ureterouterine, or ureterocervical fistula.
- Intraoperative assessment for bladder or ureteral injury may be performed by administering indigo carmine intravenously and closely observing for any subsequent extravasation of dye into the pelvis.

- Cystourethroscopy is performed to assure bilateral ureteral patency and absence of suture placement in the bladder or urethra.

Combined Vaginoscopy-cystoscopy is a technique of simultaneously viewing two images on the monitor screen (both cystoscopic and vaginal examinations). A speculum in the vagina and cystoscope in the bladder is used to enhance visualization and identification of vesicovaginal fistula (VVF).

- Transillumination of the bladder or vagina by the vaginal or bladder light source allows for easier identification of the fistula in the more difficult cases.

Lab Studies

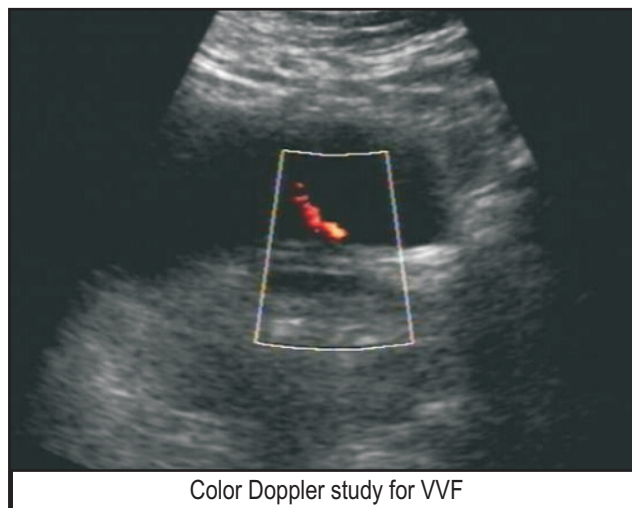
- Fluid collection from vagina is tested for urea, creatinine, or potassium concentration to determine the likelihood of a diagnosis of VVF as opposed to a possible diagnosis of vaginitis.
- Once the diagnosis of urine discharge is made, its source should be identified.
- Urine is collected for culture and sensitivity, and patients with positive results is treated prior to surgery.
- Biopsy of the fistula tract and microscopic evaluation of the urine is warranted in patients with a history of local malignancy.

Imaging Studies

- An intravenous urogram (IVU) is necessary to exclude ureteral injury or fistula because 10% of Vesico-vaginal fistulas have associated ureteral fistulas.
- If suspicion is high for a ureteral injury or fistula and the IVU findings are negative, retrograde ureteropyelography should be performed at the time of cystoscopy and examination under anesthesia.
- A Tratner catheter can be used to assist in evaluation of a urethrovaginal fistula.

Color Doppler Ultrasonography

Color Doppler ultrasonography of urinary bladder with contrast media is performed. It demonstrates VVF in nearly 92% of cases. The jet phenomenon is observed through the bladder wall towards vagina.



TREATMENT

Prevention

The health of women in vesicovaginal fistula (VVF) endemic areas depend greatly on prevention, which itself is an indicator of social change. Social change must include an improvement in the status of women, as stated by the WHO's Maternal Health and Safe Motherhood Programme²:

Its prevention ultimately lies in a profound change in the status of women. This change must involve, among other things, recognition of women's value, starting with adequate nutrition in childhood and continuing with access to primary education as a very minimum. It must include the eradication of harmful traditional practices and raising the age of marriage. It is encouraging that women are now raising awareness of this issue, and are trying to make real changes. This issue is likely to remain unresolved without the active participation of women⁹ as vesicovaginal fistula (VVF) is solely a woman's problem.

The geographic distance to the nearest hospital is an important factor in accessibility. People in rural areas are marginalized in terms of health provisions, health infrastructures including local health centres, good roads, and experienced health personnel as most hospitals established in urban areas, .

Most rural dwellers, particularly pregnant women, consider it a waste of time to travel long distances to visit

clinics for just a few hours. The costs of going to and receiving health care in hospitals or health centres is also too dear for women, including those with vesicovaginal fistula (VVF).

Cystourethroscopy is done when performing pelvic surgery to assure bilateral ureteral patency and the absence of suture placement in the bladder or the urethra.

Supracervical abdominal hysterectomy may be performed instead of TAH, as the incidence of vesicovaginal fistula (VVF) formation is lower for supracervical versus total hysterectomy.

Modern health sector is trying to incorporate vesicovaginal fistula (VVF) patients to make them more comfortable in the hospital environment. Unfortunately VVF patients refuse to see male doctors.

MEDICAL THERAPY

Conservative management

If vesicovaginal fistula (VVF) is diagnosed within the first few days of surgery, a transurethral or suprapubic catheter should be placed and maintained for up to 30 days. Small fistulas (<1 cm) may resolve or decrease during this period if caution is used to ensure proper continuous drainage of the catheter.

SURGICAL THERAPY

It is very important to repair the vesicovaginal fistula correctly on the first attempt. Excellent success rates have been achieved both with the vaginal and abdominal approaches if the following general surgical principles are followed;

Pre-operative Preparation

Complete preoperative diagnosis and treatment of associated diseases performed. Assessment of fistula and plan of its treatment is finalized pre-operatively. Treatment of co-morbid factors is done preoperatively.

Exposure

Adequate exposure of the operative field should be obtained to avoid inadvertent organ injury and to ensure prompt identification of any injury incurred.

Hemostasis

Bleeding and hematoma formation is minimized. Pressure packing and electrical diathermization is used to stop the oozing from raw area.

Mobilization of tissue closure without tension

The bladder is widely mobilized from the vagina and the repair of fistula is performed without any tension to avoid breakdown of repair.

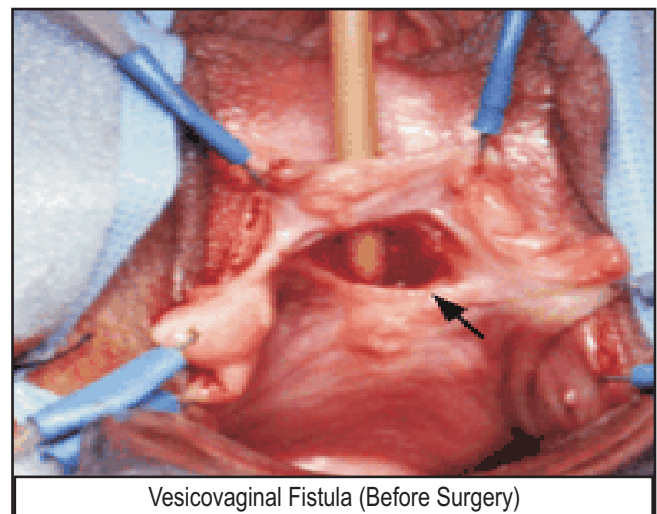
Watertight closure of bladder

Intraoperative bladder injury is closed without tension. For repairing a cystotomy at the trigonal area, a transverse closure is preferable over a vertical one. Vertical closure would be more likely to produce ureteral obstruction because the ureteral orifices would be drawn inward toward each other. Ureteral catheters should be considered in repair of a cystotomy involving or encroaching on ureteric orifices.

Intraoperative retrograde filling and emptying of the bladder or mild traction on a temporarily placed small Foley catheter inserted into the fistula itself are helpful to optimally identify anatomical planes and reveal intraoperative bladder lacerations.

Timing of repair

The occurrence of a vesicovaginal fistula (VVF) is an anguishing experience for both the patient and the surgeon. The timing of repair is dictated by the overall medical condition of the patient and the tissue quality surrounding the fistula.



Vesicovaginal Fistula (Before Surgery)

While the emotional status of the patient should not be underestimated, it also should not play a dominant role in the decision process of when to repair a vesicovaginal fistula (VVF).

Types of repair of vesicovaginal fistula

The best chance for a surgeon to achieve successful repair is by using the type of surgery with which he or she is most familiar. Techniques of repair include;

- The vaginal approach
- The abdominal approach
- The laparoscopic approach
- Electrocautery
- Fibrin glue
- Endoscopic closure using fibrin glue with or without adding bovine collagen

VAGINAL APPROACH

It is repair of vesico-vaginal fistula through vaginal approach. Most of the fistulas can be repaired with ease and good exposure through this route.

Positions

Dorsal lithotomy position: Dorsal lithotomy position with standard Trendelenburg positioning provides excellent access for repair of a high vesicovaginal fistula (VVF).

Lawson position: This position is ideal for proximal urethral and bladder neck fistulas. The patient is placed in a prone position with the knees spread and ankles raised in the air and supported by stirrups. Combining it with reverse Trendelenburg positioning enhances visualization with this technique.

Jackknife position: This is ideal for proximal urethral and bladder neck fistulas. The patient is placed in a prone position with the hips abducted and flexed and the table jackknifed.

Exposure

All of the above mentioned positions provide satisfactory exposure for surgery. The exposure can further be improved by giving an episiotomy incision prior to surgery. It has following advantages;

- Minimal blood loss
- Low postoperative morbidity
- Shorter operative time
- Shorter postoperative recovery time

The vaginal approach obviates bowel manipulation, reducing operative morbidity, particularly in patients with radiation-associated fistulas.

Procedure

Labial folds are sutured to the thighs for good exposure. Excision of fistulous tract is done but minimum tissue is excised.

Vaginal wall is dissected and separated from bladder wall.

Both bladder wall and vaginal wall are separated for about 1 to 1.5 cm away from fistula.

Bladder wall is repaired protecting ureteric injury or suturing.

Vaginal epithelium is repaired separately making the repair water tight.

There are some other methods as well for achieving water tight closure of fistula such as colpoceleises, flap splitting and vaginal cuff excision.

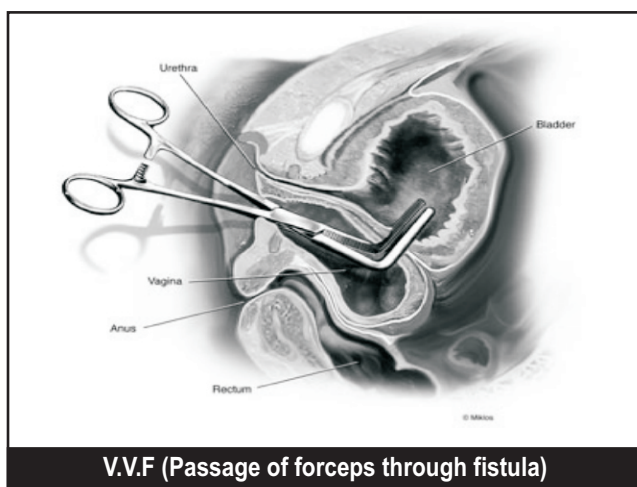
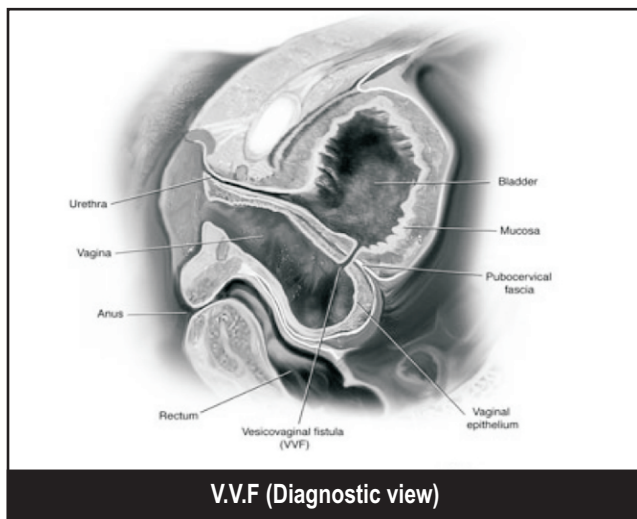
Problems/contraindications

Vaginal approach is not helpful to treat following conditions due to technical reasons;

- Concomitant fistulas with other pelvic organs such as ureters, small and large gut.
- Multiple fistulas.
- Vesico-uterine fistula.
- Vesico-cervical fistula.
- Recurrent and complex fistula.

Patients undergoing a vaginal fistula repair surgery can experience intra and post operative complications such as;

- Post Operative Failure
- Recurrent Fistula Formation
- Injury to Ureter, Bowel, or Intestines
- Vaginal Shortening



ABDOMINAL APPROACH

Indications

- The need for concomitant abdominal surgery, such as augmentation cystoplasty and ureteral reimplantation
- The inability to adequately expose the fistula vaginally.
- A complex presentation of VVF involving the ureters, bowel, or other intraabdominal structures.
- Involvement of the VVF with ureteric orifices.

Position

Supine position with Trendelenburg orientation. However, modifying this by flexing the patient's hips and abducting and supporting her legs in stirrups is wise. Simultaneous access and examination of the vaginal vault may assist with laparotomy procedures.

Exposure

Exposure with the transabdominal approach can be augmented with the use of traction sutures and with catheterization of the fistula with a Fogarty catheter.

Procedure

Following techniques may be used;

- Trans vesical extra peritoneal
- Trans peritoneal

The choice of incision includes Pfannenstiel or vertical midline.

The bladder is opened extra peritoneally

The fistula is dissected off the vaginal wall and bladder wall.

The vaginal wall is repaired after refreshing the edges of fistula.

The bladder defect is repaired separately after excision of fistula.

The bladder drainage is continued suprapubically or urethrally as required.

LAPAROSCOPIC PROCEDURE

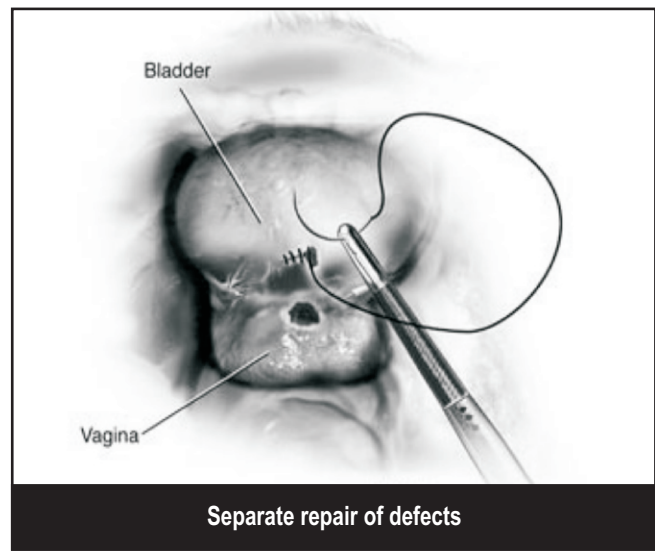
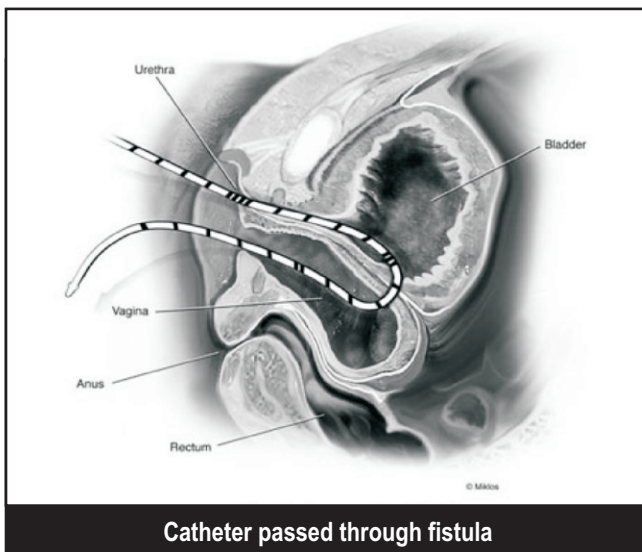
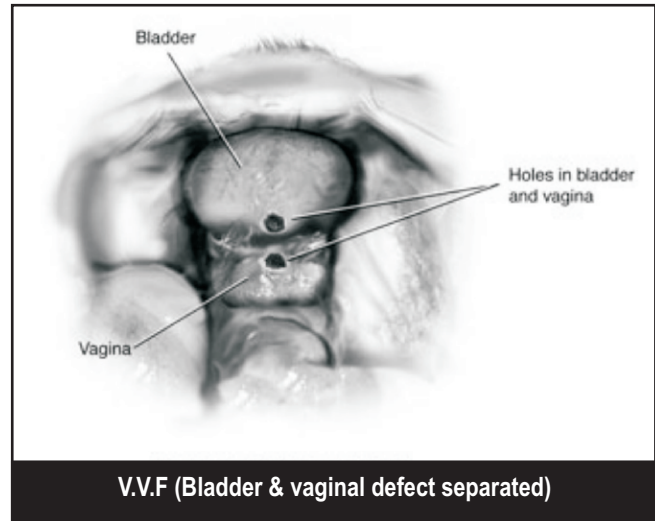
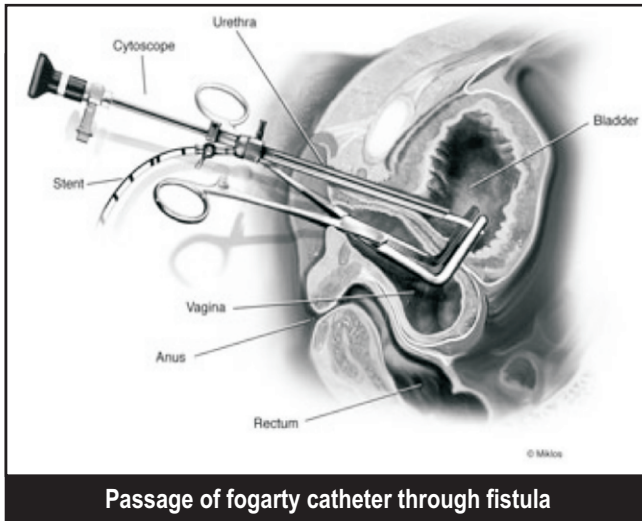
Laparoscopic Vesicovaginal Fistula Repair is a minimally invasive procedure. Many patients have had multiple previous surgical attempts through the vagina and now are faced with a final attempt at repair through a large abdominal incision.

The fistulas can be repaired with greater detail and complete visualization by utilizing the minimally invasive approach known as laparoscopic fistula repair surgery than either by the vaginal or abdominal approach.

If the fistula persists after a vaginal repair, the defect occurs very high at the vaginal apex near the bladder. This is where the laparoscopic approach can help in the repair.

This procedure is usually combined with transvaginal approach is well.

A catheter is passed cystoscopically and brought out through fistula vaginally and the catheter is pulled to give better exposure.



The laparoscopic ports are placed after producing pneumoperitoneum at appropriate sites in the lower abdomen.

The viewing telescope is passed through the port and attached the video camera. Appropriate forceps are passed through the ports and dissection is performed to separate bladder from vagina till the fistula is exposed at bladder and vaginal ends.

The bladder mucosa adjacent to the fistula is excised and repaired. The vaginal defect is repaired separately. The bladder is drained suprapubically or urethraly.

ELECTROCAUTERY / ELECTROCAUTERY & ENDOSCOPIC CLOSURE USING FIBRIN GLUE

This is minor most surgery for fistula repair. It can be used to repair smaller vesicovaginal fistula (VVF). The electrical destruction of the fistula leads to closure and healing of the fistulous tract. Fibrin glue can be used with this procedure to give better results.

LASER WELDING

Laser is used to close the fistula. The procedure is less popular now.

POST OPERATIVE CARE

Better and meticulous postoperative care ensures good results.

Bladder drainage:

It is the most important part of postoperative care. An adequate size catheter is passed to drain the urine properly. The urine is continuously drained for two weeks. It is vital for success of VVF repair. Post radiotherapy fistulas require urinary drainage for longer duration.

Acidification

Acidification of urine to diminish risks of cystitis, mucus production, and formation of bladder calculi is a consideration for patients with an indwelling catheter.

Vitamin C at 500 mg orally three times per day may be used to acidify urine.

Alternatively, methenamine mandelate at 550 mg plus sodium acid phosphate at 500 mg 1-4 times daily also can be administered to achieve urine acidification.

Hormonal therapy

Estrogen replacement therapy in the postmenopausal patient may assist with optimizing tissue vascularization and healing.

Treatment with estrogen vaginal cream is recommended for patients with vesicovaginal fistula (VVF) who are hypoestrogenic. A 4- to 6-week treatment regimen prior to surgery is commonly recommended. It may be used alone or in combination with oral HRT/ERT. Dosages range from 2-4 g placed vaginally at bedtime once per week. Alternatively, the patient may place 1 g vaginally at bedtime 3 times per week.

Oral hormone replacement therapy/estrogen replacement therapy (HRT/ERT) alone has been found to suboptimally estrogenize urogenital tissue in 40% of patients.

Control of postoperative bladder spasms

Urised is effective for control of postoperative bladder spasms. It is a combination of antiseptics (methenamine, methylene blue, phenyl salicylate, and benzoic acid) and

parasympatholytics (atropine sulfate, and hyoscyamine sulfate).

Antibiotic therapy

The use of antibiotic therapy postoperatively is controversial. Oral antibiotic prophylaxis to patients with VVF postoperatively is useful to control infections until the foley catheter is removed. Close follow-up and prompt evaluation for any urinary tract infection and antibiotic therapy, when indicated is mandatory.

Minimizing Valsalva maneuvers

Stool softeners and a high-fiber diet postoperatively minimize Valsalva maneuvers in the patient.

Examinations

Pelvic and speculum vaginal examinations should be avoided during the first 4-6 weeks postoperatively because the tissue is delicate.

Pelvic rest

Coitus and tampon use for a minimum of 4-6 weeks are avoided.

Sitz Bath

Sitz baths and barrier ointments, such as zinc oxide preparations, can provide needed relief from local ammoniacal dermatitis.

COMPLICATIONS

Risks of infection; hemorrhage; injury to other organs, particularly the ureters; surgical failure of fistula repair; possible new fistula formation; thromboembolism; and death.

Preoperatively, patients should be informed of the possibilities of sexual dysfunction or dissatisfaction, new-onset incontinence, and the progression of preexisting urge and/or stress incontinence symptoms. Cesarean delivery for subsequent pregnancies is helpful to avoid recurrence of vesicovaginal fistula (VVF).

Abdominal approach procedures carry additional risks of abdominal and pelvic adhesions. Vaginal approach procedures carry increased risks of dyspareunia due to diminished vaginal length and caliber.

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