

Management of Obstetric Fistula for Health Care Providers – On-the-Job Training

Reference Manual
March 2014



Government of Nepal
Ministry of Health and Population
National Health Training Center

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PREFACE

	Government of Nepal Ministry of Health & Population	Tel. : 4261436 : 4261712 Fax : 4262238
	DEPARTMENT OF HEALTH SERVICES	Pachali, Teku Kathmandu, Nepal
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PREFACE		
<p>Obstetric fistula still remains a largely neglected area in the developing world. It has remained a hidden condition, because it affects some of the most marginalized members of the population—poor, young, often illiterate girls and women in remote regions of the world. Obstetric fistula in low-resource settings is one of the most visible indicators of the enormous gaps in maternal health care between the developed and developing world.</p> <p>Until very recently, obstetric fistula was not officially recognized as a public health problem in Nepal until few years ago. However recently, the field work on reproductive health screening camps have identified Obstetric fistula as one of the priority areas. It is almost entirely preventable and, in most cases, can be surgically repaired. Preventing and managing obstetric fistula contributes to achieving the Millennium Development Goal 5 of improving maternal health.</p> <p>Until very recently there were very few dedicated individuals working in this field with very limited financial or institutional support. But now, with this United Nations Population Fund (UNFPA) funded program additional competent health care providers will be developed to provide quality services. These services will restore dignity to the millions of girls and women suffering with fistula and living in shame and poverty.</p>		
		
----- Dr. Kiran Regmi Director Family Health Division		

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Subjects:-

Government of Nepal
Ministry of Health and Population
Department of Health Services
National Health Training Centre

Phone: 4-255892
4-262161
Fax: 977-1- 4-261817

Pachali, Teku
Kathmandu, Nepal

Date:

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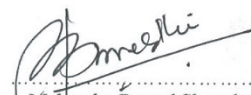
Nepal has made tremendous progress in reducing Maternal Mortality – nearly halving the rate between 1996-2006 from 539 to 281 deaths per 100,000 births (MOHP 2007) –the rate is still high at 190 per 100,000 births (UN Estimates, 2013). While the targets for Skilled Birth Attendants (SBAs) set for the country are: 40% of all births to be assisted by an SBA by 2005, 50 % by 2010, and 60% by 2015 (GoN 2006), to date only 19% of births take place with the assistance of a SBA. (2012 World Bank). Additionally, for every woman who dies, 30 or more are injured or experience serious complications (Gutmacher, 2009). The major associated reproductive health morbidities in Nepal are Pelvic Organ Prolapse and Obstetric Fistula (Gurung et al., 2007).

Until very recently, obstetric fistula was not officially recognized as a public health problem in Nepal. Every year 200-400 women suffer from obstetrics fistula in Nepal (UNFPA, GON, WOREC, 2011), but this number may represent only the tip of an iceberg as most of the cases remain hidden due to the lack of knowledge about its causes, treatment and, as well as shame associated with fistula. Preventing and managing obstetric fistula contributes to Millennium Development Goal 5 of improving maternal health. Like maternal mortality, fistula is almost entirely preventable and, in most cases, can be surgically repaired.

Effective education and training strategies, implemented by well-qualified instructors, are essential for producing and sustaining an adequate number of proficient health care providers. Successful learning strategies are based on evidence, following instructional design principles and support formal as well as informal, life-long learning opportunities.

I would like to thank Family Health Division, Jhpiego Corporation and UNFPA for the technical support and also express my gratitude to UNFPA for the financial support for development of this training package. In that spirit, Management of Obstetric Fistula, On-The-Job-Training is a competency-based training package (Reference manual, Facilitator's guide and Learner's Handbook). The aim of which is to develop competent service providers to address this important public health problem in Nepal. National and international experts have provided their input in developing and finalizing this training package.

I would like to acknowledge Dr. Shilu Adhikari, RH Specialist, United Nations Population Fund and Dr. Kusum Thapa, ANE Regional Technical Advisor, Jhpiego for taking lead for this program. I would also like to acknowledge Jhpiego's Instructional Design team for their support and also thank Ms. Sandhya Limbu, Program Officer, Jhpiego for providing support to organize workshops and incorporating all the feedback and inputs of the experts in the training package.


Mahendra Prasad Shrestha
Director

CONTRIBUTORS' NAMES FOR DEVELOPMENT OF TRAINING PACKAGE

1. Dr. Ajay Agrawal, Associate Professor, B.P. Koirala Institute of Health Sciences
2. Dr. Alka Singh, Associate Professor, Patan Academy of Health Science
3. Dr. Aruna Karki, Head of OBGYN Department, Kathmandu Model Hospital
4. Dr. Bandana Sharma, Associate Professor, Nepal Society of Obstetrician and Gynecologists
5. Dr. Bholam Shrestha, Medical Superintendent, Mid-Western Regional Hospital, Surkhet
6. Ms. Binita Rai, Staff Nurse, B.P. Koirala Institute of Health Sciences
7. Dr. Blami Dao, Director, Maternal and Newborn Health, Jhpiego/Baltimore
8. Ms. Chandra Rai, Country Director, Jhpiego/Nepal
9. Ms. Dhana Basnet, Public Health Nurse Officer, Family Health Division
10. Dr. Ganesh Dangal, Consultant, Kathmandu Model Hospital
11. Dr. Harshad Shangvi, Vice President, Innovations, and Medical Director, Jhpiego
12. Dr. Jeffery Michael Smith, Sr. Maternal Health Technical Advisor, MCHIP
13. Ms. Julia Bluestone, Sr. Technical Advisor, Global Learning Office, Jhpiego/Baltimore
14. Dr. Kiran Regmi, Director, Family Health Division
15. Dr. Kundu Yangzom, Sr. Consultant, NORVIC/B&B Hospital
16. Ms. Kusum B.C. Staff Nurse, Western Regional Hospital, Surkhet
17. Dr. Kusum Thapa, ANE, Regional Technical Advisor, Jhpiego
18. Dr. Khageshwor Gelal, Sr. Integrated Medical Officer, National Health Training Center
19. Dr. Madhu Tumbhamphe, Sr. Consultant, Paropakar Maternity and Women's Hospital
20. Dr. Mohan Chandra Regmi, Associate Professor, B.P. Koirala Institute of Health Sciences
21. Ms. Nancy Kiplinger, Sr. Technical Advisor, Global Learning Office, Jhpiego/Baltimore
22. Ms. Neera Thakur, Reproductive Health Officer, United Nations Population Fund
23. Dr. Padam Raj Pant, Professor, Tribhuvan University and Teaching Hospital
24. Dr. Pushpa Chaudhary, President, Nepal Society of Obstetrician and Gynecologists
25. Dr. Ramila Devkota, Medical Officer, National Health Training Center
26. Dr. Rene Genadry, OB/GYN, Clinical Professor of Obstetrics and Gynecology - Urogynecology and Reconstructive Pelvic Surgery, Clinical Professor of Urology
27. Ms. Reeta Limbu, Staff Nurse, B.P. Koirala Institute of Health Sciences
28. Dr. Ronald H. Magarick, Vice President, Technical Leadership, Jhpiego/Baltimore
29. Dr. Sapana Amatya, Registrar, Paropakar Maternity and Women's Hospital
30. Dr. Saroja Pande, Sr. Registrar, Paropakar Maternity and Women's Hospital
31. Dr. Shilu Adhikari, RH Specialist, United Nations Population Fund
32. Dr. Shilu Aryal, Sr. Consultant, Family Health Division
33. Dr. Shirley Heywood, Gynecologist, INF
34. Dr. Tarun Pradhan, Assistant Professor, B.P. Koirala Institute of Health Sciences
35. Dr. Willy Shasha, Sr. RHFP/MNH Advisor, Technical Leadership Office, Family Planning and Reproductive Health, Jhpiego

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LIST OF ABBREVIATIONS

BMI	Body Mass Index
Ba	Barium
CT	Computerized Tomography
COC	Comprehensive Obstetric Care
CBC	Complete Blood Count
DoHS	Department of Health Services
DVT	Deep Vein Thrombosis
EMG	Electromyography
EmOC	Emergency Obstetric Care
EUA	Examination Under Anesthesia
FGM	Female Genital Mutilation
FHD	Family Health Division
GoN	Government of Nepal
HIV	Human Immunodeficiency Virus
HLD	High-Level Disinfection
IV	Intravenous
LLP	Leak Point Pressure
MoHP	Ministry of Health and Population
NPO	Nil per Oral (Nothing by Mouth)
OF	Obstetric Fistula
OT	Operating Theater
PC	Pubococcygeus
PFD	Pelvic Floor Disorder
RVF	Rectovaginal Fistula/Fistula
SBA	Skilled Birth Attendant
sEMG	Surface Electromyography
UDS	Urodynamics
UNFPA	United Nations Population Fund
UPP	Urethral Pressure Profilometry
VVF	Vesicovaginal Fistula/Fistula
WHO	World Health Organization

CHAPTER I

EPIDEMIOLOGY OF FEMALE GENITAL TRACT FISTULA INCLUDING OBSTETRIC FISTULA AND PREVENTION

OVERVIEW

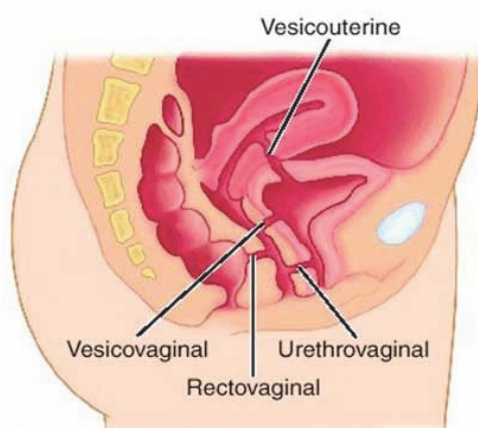
Female genital fistula (FGF) is a tragedy of the developing world because of illiteracy, poverty, ignorance, and lack of health facilities. In developed nations, FGF occur most commonly as a result of gynecologic surgery and less commonly by infections, malignancies, radiation injury, sexual violence, and harmful social practices or obstetric trauma. Fistula as sequela of neglected labor, or obstetric fistula (OF), occurs almost exclusively in developing nations, where access to intrapartum clinical care is limited compared to that for women living in affluent nations. Optimal fistula programming is based on the principle that all fistula warrant hypervigilant attention to the details of patient preparation, meticulous reconstructive surgical technique, and rigorous postoperative care paradigms, regardless of whether the fistula is of the misnomered “simple” type or the more complex, large, fibrotic variety.^{1,2}

DEFINITION OF OBSTETRIC FISTULA

FGF occurs when open defects between the female genital organs and adjacent urinary and colorectal tracts create urinary or fecal incontinence. These defects, literally holes, allow the urine or stool to leak into the vagina. In developing nations, where pregnant women often give birth with minimal or no obstetric care, fistula most often occur as a result of several days of prolonged or obstructed labor. These genitourinary or rectovaginal fistula (RVF) occurring after labor and its complications are labeled OF.¹⁻⁴

TYPES OF FISTULA

Fistula nomenclature depends on the anatomic sites involved.



Source: Merck & Co., Inc. 2006. *Dorland's Illustrated Medical Dictionary*. Whitehouse Station, NJ. (From: Page 131 of *Counseling the Obstetric fistula Patient: A Training Curriculum*, www.fistulacare.org.)

Figure 1-1: Types of fistula

MAGNITUDE OF GENITAL FISTULA

OF was eradicated from developed nations in the late 1800s when the foundation of modern obstetric standards of care was laid. However, this condition continues to affect women in developing nations. The true prevalence of OF is not fully documented, although the 2006 World Health Organization (WHO) estimate of “2 million women worldwide” is often quoted. However, the method or data set used to validate this widely quoted global number has never been disclosed.⁴ Literature on OF tends to cite empiric estimates or facility-based prevalence of OF admissions as a proportion of gynecologic admissions that, at best, reflect regional trends and the sheer persistence of this preventable complication of pregnancy. The prevalence data for OF in Southeast Asia are, as in many parts of the world, suboptimal.

In Nepal’s 2006 United Nation’s Population Fund (UNFPA) survey on Status of Reproductive Morbidities in Nepal, 3 of 2,070 women evaluated were documented to have OF, yielding an extrapolated population rate of 0.15%.⁵ Nepal has thousands of silent sufferers with vesicovaginal fistula (VVF). An estimated 200–400 new cases of OF occur each year in Nepal; in a country of intermediate incidence (until 0.6/1,000), it is estimated at 56.4 fistulas for 100,000 women aged 15–49. Thus, there are 4,362 OF cases in Nepal.⁶ Because the conditions for OF tend to exist in the remote regions of Nepal, accurate prevalence data for OF continue to challenge the medical community caring for women forced to live with this risk.⁷

Female Pelvic Anatomy—Internal Structures

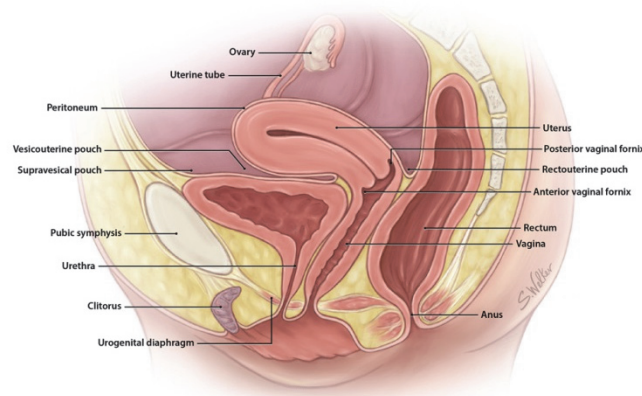


Figure 1-2: Female pelvic anatomy

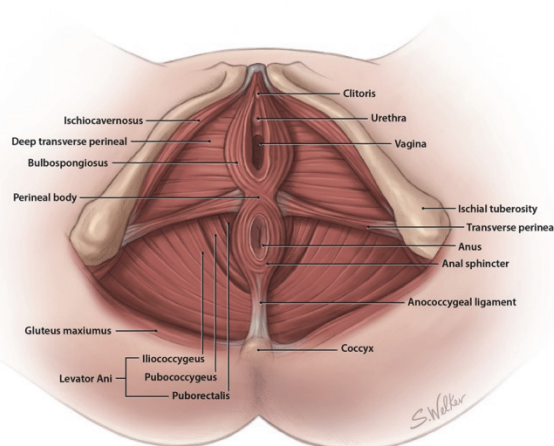
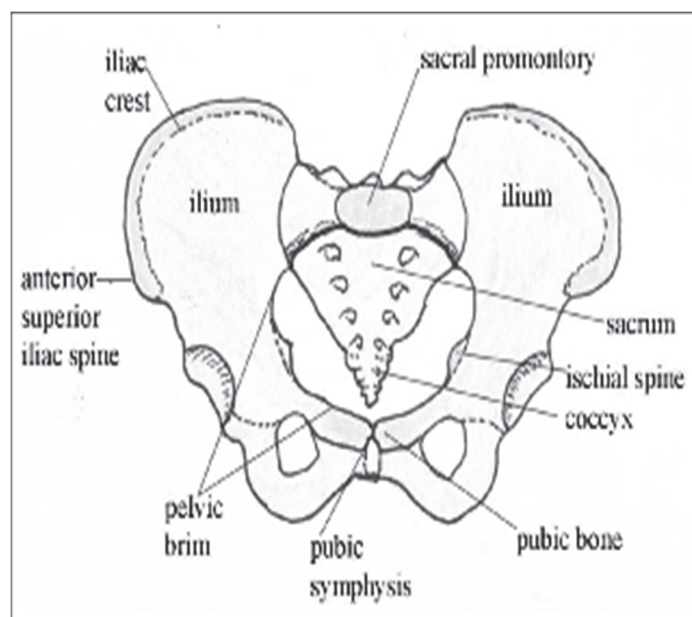


Figure 1-3: Female pelvic anatomy

ANATOMY OF THE FEMALE BONY PELVIS

The female pelvis, with a wider and flatter shape than the male pelvis, is adapted for childbearing.



Source: Ethiopian Federal Ministry of Health (FMOH) Health Education and Training (HEAT) Programme, Antenatal Care Module.

Figure 1-4: Anatomy of the female bony pelvis

The pelvis is a hard ring of bone that supports and protects the pelvic organs and the contents of the abdominal cavity. It consists of three pairs of hip bones: the ilia, ischia, and pubes as well as the sacrum and the coccyx. The pelvic inlet is the space where the fetal head enters the pelvis; it is larger than the pelvic outlet, where the fetal head/presenting part of the fetus emerges from the pelvis. In order to get through the widest diameter of the inlet and the outlet, the fetus has to rotate as it passes through the pelvic canal. In the event of malpresentation, cephalopelvic disproportion, or malrotation, the labor becomes obstructed, requiring some form of intervention in order to complete a healthy delivery.

PATHOPHYSIOLOGY OF FEMALE GENITAL FISTULA

In developing countries, obstructed labor is one of the top five causes of maternal mortality, whereas in developed countries, obstructed labor is not permitted to progress beyond a few hours. Women in developing countries still live with an unacceptably high maternal mortality, with obstructed labor, hemorrhage, infection, hypertension, and unsafe abortion being the top five causes of death as a result of pregnancy.⁸ Women who do not die from obstructed labor almost always suffer the dual devastation of a stillborn infant and problems resulting from the obstructed labor, including OF, lumbosacral compression neuropraxia causing foot drop, and extensive vaginal fibrosis causing hardened vaginal walls or severe vaginal stenosis. When obstructed labor persists beyond 24 hours, maternal soft tissue edema, ischemia, necrosis, and sloughing of vaginal tissues occur due to the fetal head/presenting part becoming impacted against the bony pelvis and crushing vaginal soft tissue. This ischemic necrosis allows fistula and abnormal adhesions to form between the uterus and/or vagina and the adjacent urinary and colorectal organs that are also affected by the ischemia. These defects bypass the normal storage anatomic functions of the urinary and colorectal tracts, resulting in continuous incontinent flow of urine and/or feces.³

ETIOLOGY OF GENITAL FISTULA

Obstetric Causes

- Prolonged obstructed labor (predominant cause of OF)
- Other causes include:
 - Destructive delivery
 - Instrumental vaginal delivery
 - Cesarean delivery with or without hysterectomy
 - Traditional practices (e.g., when defibulation before delivery is necessary in women with a pharaonic circumcision)
 - Symphysiotomy

Non-Obstetric Causes

- Traumatic:
 - Coitus (responsible for many RVF)
 - Sexual violence (e.g., forceful intercourse and/or introduction of foreign objects into the vagina)
 - Accidental trauma (e.g., falling on a stick)
 - Female genital mutilation (FGM)
- Infectious:
 - Granulomatous infection
 - Tuberculosis
 - Human immunodeficiency virus (HIV) infection
- Congenital (rare)
- Malignancy (especially advanced cervical cancer)
- Iatrogenic (during pelvic surgery)
- Radiotherapy

When the pelvis is truly too small for any term infant to traverse, or the pelvis is narrow or deformed by rickets, a first baby will not come out easily. Indeed, in most series, first childbirth is the fistula-causing event in at least half of the women treated. In developing nations, first childbirth often occurs at a young age due to arranged marriage, early coitarche, and early pregnancy. This has led to myriad well-intentioned, authoritative claims that the age of the mother is a direct “cause” of fistula.⁴ This agenda mixing ignores the equally prevalent multiparous OF, which occurs in women who have already given birth, often at home, and end up with obstructed labor. The only cause of OF is obstructed labor without Emergency Obstetric Care (EmOC) obstetrical interventions. Oxytocin augmentation of labor, instrument-assisted vaginal delivery, and cesarean section are the mainstay therapies. In the case of “developing nation–obstructed labor,” that intervention may never come or may take the form of well-meaning but tragically misguided traditional therapies, such as application of hot irons or other forms of burning or the use of sharp objects to carry out Gishiri cutting in some parts of Nigeria.^{9,10} Teenage mothers are not at extra risk because of their age *per se* but because their social situation and lack of education put them at high risk of lack of access to or acceptance of modern obstetric care.¹

Even if a first baby is delivered without difficulty, other labor-obstructing factors can manifest in subsequent pregnancies. Advanced maternal age and a higher prevalence of gestational diabetes causes

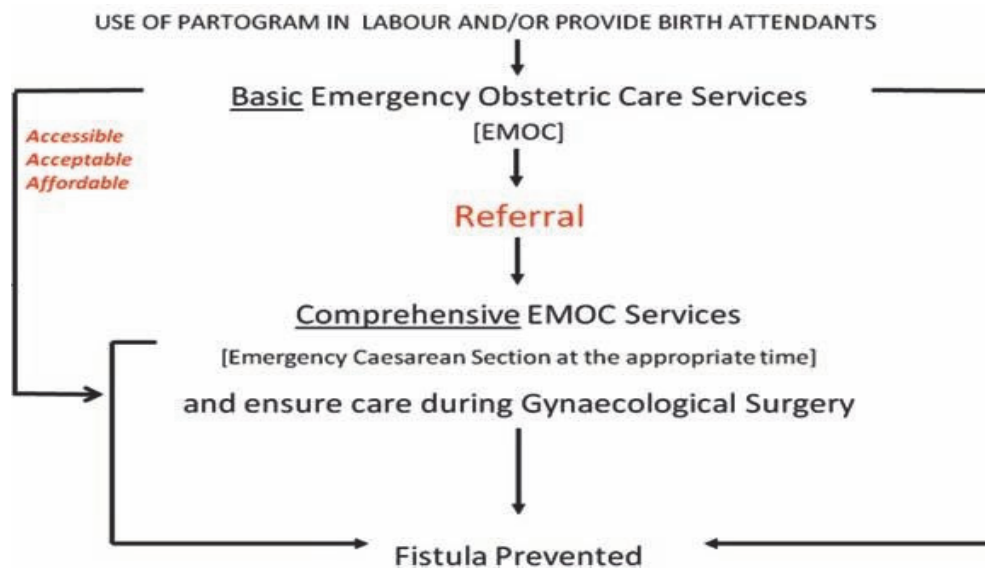
larger birth weights that may prove challenging to the architecture of a previously adequate pelvis. Fibroids are more common and may, when located in the lower segment or cervix, block fetal descent. Likewise, a full bladder may at times interfere with the progress of labor. The softer uterus of a parous woman is prone to allowing the baby to adopt an abnormal position, such as transverse lie, which may cause life-threatening labor obstruction if not relieved by external cephalic version or cesarean section. The majority of women, including primiparous and multiparous, sustain their fistula at an average age of late teens/early 20s, an age range that may be socially suboptimal but biologically adequate for pregnancy and, in and of itself, not a contraindication to healthy pregnancy outcomes. The focus on young primiparous patients creates the false assumption that fistula will go away if women marry later, when the more critical factor for OF is not maternal age but, rather, lack of access to EmOC.

OF may also occur without obstructed labor, particularly RVF occurring due to breakdown of episiotomy or vaginal tear repair suture lines or as a direct or indirect complication of cesarean section. Fistula occurring after cesarean delivery may be due to errors of technique, which is perhaps a safe assumption with labors lasting less than a day. However, when OF occurs after cesarean section performed in the setting of classic obstructed labor, through tissue planes with compromised blood flow and endometritis with secondary severe distortion of intra-abdominal pelvic anatomic landmarks (particularly uterine rupture), poor surgical technique probably is not the cause of the fistula.¹¹ In this cesarean circumstance, any subsequent fistula is more likely due to exacerbation of the edema/ischemia/necrosis cascade by introducing an incision and suture line into the proximal aspects of the damaged organ systems, thereby making the fistula more complex than it may otherwise have been.

FGF also occur after pelvic surgery, most commonly hysterectomy. In developed nations, gynecologic surgery is the most common cause of FGF, with a common “risk of fistula” rate quoted as 2%. Fistula may also occur after genital trauma, most often the foreign-body rape used as a gender violence tool of warfare in some war-torn areas.¹² Uterovaginal prolapse is rarely associated with genitourinary fistula. When it does occur, it usually involves an untended pessary-related erosion through the vaginal wall into the bladder or bowel, or fistulous erosion of uterovaginal prolapse.¹³

PREVENTION OF OBSTETRIC FISTULA

OF incidence can be reduced if pregnant women have access to skilled antenatal care, skilled care during labor and delivery, and EmOC. A woman’s family and her community can play a role in helping her to obtain such care. Use of the partograph in the management of labor can improve pregnancy outcomes and reduce OF. Prompt, professional care of women who have recently endured prolonged and obstructed labor can also prevent OF.



Source: Global Competency-based Fistula Surgery Training Manual. FIGO and Partners. London: FIGO; 2011.

Figure 1-5: Algorithm to help prevent fistula

The following factors may contribute to the occurrence of the fistula:¹⁴

Lack of Access to Maternity Care

In poor countries, the majority of the women who die or who develop fistula during childbirth do so because they did not receive the timely health care that they needed. This may be due to a lack of basic health-care provision or through an inability to access the local health-care services.

The Need for Skilled Care

Skilled care before and after birth, and particularly during labor, can make the difference between life and death for women and their babies and can help to prevent OF.

Availability of Facilities

Accessing equipped facilities for antenatal care and safe childbirth is usually difficult, especially in rural settings where there is no easy or affordable form of transport to health centers able to provide basic EmOC.

Additionally, women are often required to pay the cost of a delivery. For a poor family living in extreme poverty, the costs of an emergency cesarean section can be crippling; some families simply cannot afford them.¹⁵ Therefore, improving access to timely obstetric care is the most important first step that can be taken to prevent fistula from occurring.

Lack of Knowledge about or Facilities for Fistula Repair

Once they occur, OF require surgical repair; they usually cannot heal by themselves. More than 90% of women can be cured with one operation and can resume an active and fulfilling life, including having additional children. However, many women and/or their families, especially those who lacked skilled care during delivery, may not even know that a fistula treatment exists. Even when their existence is known, they are often too far away or too expensive.

Underlying Social Causes

Most fistula occur among women living in poverty in traditional cultures, where a woman's status and self-esteem may depend almost entirely on her marriage and ability to bear children.

Poverty

Although the immediate causes of OF are obstructed labor and a lack of EmOC, pervasive poverty is an important underlying cause. Women who suffer from OF tend to be impoverished and malnourished, to lack basic education, and to live in remote or rural areas without maternity care and without assistance from skilled birth attendants.

Early Marriage and Childbirth

The practice of early marriage contributes to a risk of obstructed labor and fistula. In parts of the world where OF is most common, women often marry as adolescents, sometimes as young as 10 years of age, and many become pregnant immediately, before their pelvis are fully developed for childbearing. Fistula formation is more likely to follow a first labor.¹⁶ To compound the problem, often these girls may have been the victims of forced marriages, and many are undernourished.

Inadequate Family Planning

In many traditional communities, early marriage and childbearing and large families are the norm. Little awareness exists of the need to delay the first pregnancy or to space pregnancies well apart to enable the mother to recover. Changes in social and cultural attitudes, and enacting legislation to protect the rights of the health of adolescent girls, are also needed to help women delay their first pregnancy until they are physically able to deliver safely.

The Role and Status of Women

The low socioeconomic and educational status of women plays a fundamental part in fistula development. Some women are denied access to care, or actually harmed, as a result of cultural beliefs and traditional practices. Some women may live in seclusion, and, for many, the responsibility to decide to seek health care in pregnancy or even after prolonged labor falls to the husband or the in-laws. They are often immediately divorced and left alone.

Harmful Traditional Practices

Harmful traditional practices, such as female genital cutting (FGC) or FGM, also contribute to the risk. Such cutting is usually carried out under unsanitary conditions, often by removing large amounts of vaginal or vulval tissue, thus causing the vaginal outlet and birth canal to become constricted by thick scar tissue. These practices increase the likelihood of gynecologic and obstetric complications, including prolonged labor and fistula. Harmful cutting before or during labor by unskilled birth attendants also contributes to fistula formation.

Sexual Violence or Rape

Although most fistula cases in developing countries stem from obstetric causes, others result from direct tearing caused by violent rape of children or vaginal trauma with sharp objects. In wartime conditions, horrific sexual violence is common.

STRATEGIES FOR PREVENTION OF OBSTETRIC FISTULA

Any strategy for OF prevention and treatment should be an integral part of the national maternal and neonatal health strategy. It is also important that such plans be integrated into broader reproductive health plans as well as national development plans and poverty-reduction strategies.

The need for OF prevention and treatment services will vary greatly between individual countries or areas. Although policies and strategies to prevent and treat OF need to be adapted with national support, in some circumstances, they may need to be modified at the local level to identify, address, and overcome the particular constraints.

The goal of any fistula program for delivering preventive and treatment services should be to:

- Prevent women from developing fistula through health promotion and awareness and the development of high-quality basic and comprehensive maternal health services, available and accessible to all.
- Ensure that all women living with fistula have easy and early access to skilled professionals who are able to repair simple fistula and/or refer more complex cases to higher centers.
- Promote universal state coverage of cesarean section and fistula repair surgery.

RECOMMENDATIONS TO PREVENT OBSTETRIC FISTULA ⁵

Primary-Prevention Strategies

Primary-prevention strategies are aimed at ensuring that pregnancies are planned and wanted and occur at an optimal age. These strategies ensure that all women, as well as their families and communities, understand the need for delaying the age of first pregnancy and the advantages of birth spacing and providing access to family planning. In the developing world, girls and women often receive less nutritious food. They are often malnourished and anemic and thus are less able to manage the physiologic demands of pregnancy or complications such as hemorrhage. They have underdeveloped pelves that can increase the incidence of obstructed labor. Girls are also less likely to be educated, and illiterate girls are far more likely to suffer from complications of pregnancy including OF.

Each girl's and woman's right to health, including reproductive rights, which are closely linked with the prevention of OF, are recognized and protected by the provision of an enabling policy and regulatory environment. The wider social determinants for the improvement of the general health of girls and women may include, for example, addressing issues such as better child and adolescent nutrition, recognizing a girl's right to education, and setting a minimum age for marriage. Health-system issues include providing health education and access to modern methods of family planning as well as easy access to maternity health services. Enabling and empowering women to seek care without seeking approval from family members will also break the cultural barriers.

Secondary-Prevention Strategies

Once a woman is pregnant, she, her family, and the community need to be aware of the need to seek antenatal care, the importance of skilled care at childbirth, and the signs and symptoms of possible problems during pregnancy and childbirth, such as prolonged labor. This can be promoted by increasing community awareness; training traditional birth attendants; and increasing women's knowledge of normal pregnancy and delivery and about when, why, and where to seek help. However, increasing knowledge is not enough, and easy access to a local essential obstetric-care facility is paramount.¹⁸

One of the principal measures to reduce maternal mortality and prevent fistula formation is to ensure that women have a skilled professional present during childbirth and have access to comprehensive obstetric-

care services.¹⁸ Consistent use of a partograph for the correct monitoring of labor has been proven effective for the early diagnosis and management of prolonged/obstructed labor. A referral to a setting in which a cesarean section or assisted vaginal delivery can be performed in a timely manner is the key intervention to prevent deaths and complications related to obstructed labor.

Tertiary-Prevention Strategies

Tertiary-prevention strategies are designed to identify and prevent the development of fistula in labor or in women who recently delivered and are at risk. This includes monitoring every labor by use of a partograph to identify those women who are at risk of or who have developed obstructed labor and to refer them quickly to a comprehensive EmOC facility with the capacity to undertake cesarean sections and assisted vaginal deliveries. WHO recommends the use of a partograph at any birth.¹⁶ Midwives and doctors should also be trained to help prevent fistula formation or to enable closure of very small fistula without surgery by the use of an indwelling urinary catheter for all mothers who have survived an obstructed labor. This simple technique will help very small OF to close and is estimated to prevent fistula formation in 10%–20% of cases.¹⁹ Further, all pregnant women who experience prolonged or obstructed labor should be informed about fistula symptoms and encouraged to consult a skilled attendant as soon as such symptoms appear.

Community Involvement

Women living with fistula very often suffer stigmatization and discrimination and become social outcasts. This not only has individual psychological consequences but also means that women living with fistula are often hidden and thus more difficult to reach if repair services are available. It is necessary for all stakeholders to contribute to the empowerment of women, men, families, and communities to increase control over maternal and newborn health as well as to increase access to and utilization of quality health services. This involves education and health promotion on the prevention of fistula and information on the availability of repair services to both communities and their leaders. Community participation is key for maternal and neonatal mortality and morbidity reduction strategies. The role of local nongovernmental organizations (NGOs) and other groups active in local communities in promoting fistula awareness, prevention, and treatment is also crucial, and they should be involved in the development of any local or national action plans.

KEY POINTS

- FGF has obstetric and non-obstetric causes.
- Unrelieved obstructed labor is the most common cause of OF.
- Obstructed labor can also be the cause of uterine rupture, stillbirth, hemorrhage, and septicemia and can result in dyspareunia, amenorrhea, infertility, pelvic floor and organ dysfunction, prolapse, and neuropathies.
- Most common causes of obstructed labor include malpresentations, malrotations, cephalopelvic disproportion, and malnutrition.
- Social factors in OF include lack of education, lack of economic means, lack of access to care, and lack of empowerment.
- Prevention relies on awareness and access to and availability of care.
- There are three levels of prevention strategies:
 - Primary: Focuses on the individual, ensuring a planned pregnancy, proper nutrition, and antenatal care with timely access to EmOC.

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- Secondary: Focuses on the community, providing skilled birth attendants using a partograph to detect abnormal labor and the knowledge to make timely referrals.
- Tertiary: Focuses on the professional, ensuring timely delivery including cesarean delivery and proper preventive care including indwelling catheter placement.

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CHAPTER II

DIAGNOSIS, CLASSIFICATION, PROGNOSTIC FACTORS, AND OUTCOMES

OVERVIEW OF PATIENT ASSESSMENT

The evaluation of obstetric fistula (OF) patients entails an intimate understanding of the pathophysiology of obstructed labor (fetal wedging/ischemia/necrosis cascade) that damages soft tissue organs adjacent to the vagina in variable combinations, each of which warrants concomitant clinical attention.¹

Possibilities include:

- **Fistula:** Any number of organs may be involved in the fistula, and there may be more than one fistula. Fistula may involve the bladder, urethra, rectum, anus, cervix, uterus, and ureters, in any conceivable combination.²
- **Fibrosis** of the vaginal tissue planes leading to distortion and shortening of the vagina: The cervix may be buried behind vaginal fibrosis, with secondary hematometra causing chronic abdominal pain.
- **Atrophy, tearing, and detachment** of the levator ani muscles: This makes Kegel exercise therapy impossible.
- **Stricture and outflow obstruction** of urinary and colorectal tracts: These are not necessarily involved with the fistula.
- **Ischemia and scarring** of the uterine lining: This causes Asherman syndrome, which leads to secondary amenorrhea and infertility.
- **Loss of tissue:** Mostly involving the anterior vaginal wall but sometimes the posterior vaginal wall; this leads to reduced bladder capacity.
- **Compression neuropraxia** of lumbosacral nerve roots and distal nerves: This causes foot drop and saddle block anesthesia, neurogenic bladder dysfunction (atony/overflow incontinence and stress urinary incontinence), and neurogenic impairment of anal sphincter tone with fecal/flatus incontinence and joint contracture in the lower extremities.

Obstructed labor has sequelae involving multiple systems; therefore, careful evaluation of pelvic anatomy and other systems is essential.

ANATOMIC DEFECTS

Careful evaluation of all potentially involved anatomy is crucial, as there may be more than one fistula, including rectovaginal fistula (RVF). There is always loss of anterior vaginal wall tissue with varying degrees of loss of posterior vaginal wall tissue.

Sometimes fibrosis of the vaginal wall can bury or damage the cervix, resulting in hematometra, which causes chronic abdominal and pelvic pain.

RENAL SYSTEM IMPAIRMENT

A renal sonogram and intravenous (IV) urography should be used whenever indicated and available to identify hydronephrosis/hydroureter and end-stage renal atrophy. Blood urea nitrogen and creatinine values provide a gross indication of overall renal function. With hydronephrosis, ureteric reimplantation is

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necessary. With end-stage renal atrophy, the ipsilateral ureter may not efflux, and knowing that the kidney is nonfunctional saves much time and effort during the operation.

Ureters may be both fistulized and strictured, with lower tract incontinence, upper tract hydronephrosis and obstructed nephropathy. The increased risk of upper and lower urinary tract infections is of utmost importance to the fistula clinician. Fistula surgeons always consider the health of the upper urinary tract, whether it is involved in the fistula defect or not.

Dehydration, due to lack of potable water or intentionally adopted by the fistula patient to reduce incontinent urine volume or control incontinent stool, combined with the frequent use of intravaginal cloths, vegetation, or other sponge-like material, may precipitate stones along the fistula tract.

NEUROLOGIC IMPAIRMENT

Pelvic neuropraxia of the sacral nerve roots, caused by the same fetal impaction cascade, may result in saddle anesthesia with dermal ulcerations due to incontinence, combined with the inability to sense pain, infection, and necrosis in the numbed soft tissues of the affected dermatomes.³ The peroneal nerve, which controls foot flexion and eversion, is particularly vulnerable to prolonged squatting and obstetric compression of the lumbosacral plexus. If left untreated, permanent inversion/plantar flexion with atrophy of extensor and peroneous muscles and contraction of the Achilles tendon may result, requiring surgical intervention.² Walking as early as possible with a cane(s) or crutches is highly advised to prevent full-blown peroneal neuropraxia.³

Damage to the urethra may render the patient chronically incontinent even if the “hole is closed,” in a drainpipe-urethra type of incontinence condition.² Damage to the parasympathetic plexus may cause overactive bladder, with or without nocturia and urge incontinence, in the closed-but-incontinent fistula patient.

MENSTRUAL ABNORMALITIES AND INFERTILITY

It is important to counsel patients about the possibility of infertility and vaginal scarring precluding normal coitus that will not be restored by fistula surgery. Obstructed labor is often associated with prolonged rupture of membranes and a secondary endometritis. When endometrial scarring is severe, Asherman syndrome, with its attendant amenorrhea and secondary infertility, may result.

DEPRESSION

The near-100% rate of stillbirth, the 30%–60% rate of marital abandonment, and the extreme social isolation induce a reactive depression that, while appropriate and understandable, may warrant ongoing care even after successful surgery, as the posttraumatic-stress disorder features may be severe.

RECTOVAGINAL FISTULA

RVF are less common than vesicovaginal fistula (VVF), as the rectal vault is not quite so entrapped by the bony pelvis during obstructed labor. It is quite common for RVF to accompany the more common VVF when obstructed labor is the cause. RVF may also occur as a complication of episiotomy or spontaneous perineal tears sustained during normal, nonobstructed labor and without any concomitant VVF. When a combination urinary-rectogenital fistula occurs, wound healing dictates repair of the RVF first, with a staged approach repair of the VVF once the RVF is fully closed and well-healed.

RVF may occur with concomitant rectal stricture above or, less commonly, below the level of the fistula, a rectal equivalent of the vaginal fibrotic reaction to the inflammatory component of fistula formation. Further, the anal sphincter may be partially or totally torn, in a “persistent fourth-degree tear”

configuration, or intact but affected to the point of anal incontinence after RVF repair, a possibility that requires careful patient counseling. A staged approach may be necessary to restore fecal continence if a global sphincter/fistula repair is not possible.

SYMPHYSEAL SEPARATION AND OSTEITIS PUBIS

OF patients may have spontaneous symphyseal separation requiring binding, activity restriction, and physical therapy. Osteitis pubis must be considered in the obstructed labor differential list.

HISTORY AND CLINICAL EXAMINATION

History Taking

A general history and physical screening allow the clinician to assess general health factors that will help to prepare the woman for surgery. Many fistula patients do not typically go for check-ups and health screenings. This evaluation may be the woman's only personal contact with the health care system for the duration of her life.

A focused urogynecologic and colorectal history is obtained, with a focused examination to delineate not only the fistula, but also precedent conditions that may affect urogynecologic/colorectal function after successful closure of the fistula. A patient with daily leakage of urine with heavy lifting or fecal incontinence of solid stool prior to the delivery that caused the fistula may be expected to continue to have those symptoms after a fistula is closed.

The fistula history includes:

- Age
- Parity
- Last menses
- Age of marriage
- Age of coitarche
- Age of first pregnancy
- Address and ethnicity
- Educational status
- Use of contraception
- Medical and surgical history
- Social history

With regard to the fistula, the patient may be leaking urine, stool, or both. The duration of fistula symptoms and years since the fistula-related event are noted. Specifics of the clinical events related to the fistula are obtained: labor complications, particularly obstructed labor; mode of delivery; neonatal status; and gynecologic or other type of surgery. A history of fourth-degree tears or uterine rupture is also noted. Whether a catheter was worn for the fistula is also recorded.

Information is obtained regarding the management of fistula up to this point, or, if this is a recurrent fistula, its management after the last operation. Details regarding prior fistula surgery, route of access, pelvic floor function after the repair, recurrence, voiding or defecatory dysfunction, and urinary or fecal incontinence should be sought. It is important to review any patient records.

CLINICAL EXAMINATION

Examination, although focused on the fistula defect, nevertheless warrants a thorough head-to-toe, documented examination. Physical screening for nutritional, thyroid, cardiopulmonary, abdominal, retroperitoneal, neurologic, orthopedic, and dermatologic pathology allows optimal wound-healing preparation for the extensive soft-tissue reconstructive surgery required for many OF. The success of any reconstructive surgery depends greatly on optimal wound healing. A woman with extreme nutritional deprivation, advanced thyroid disease, uncontrolled diabetes, or uncontrolled hypertension will not heal well. If such conditions are found on fistula screening evaluation, every effort must be made to correct and balance physiologic function prior to surgery.

Fistula evaluation includes a written description (size, location from an anatomic staging landmark, fibrosis, other confounding factors, etc.), staging, a blue test (genitourinary), and a drawing of the defect(s). A rectovaginal version of blue testing may be done by inserting approximately 15 ml of blue exam gel into the rectum. Compress the gel against the anterior rectal wall with an examining finger while exposing the posterior vaginal wall with a retractor and bright lighting. Blue gel may express through a small RVF in this fashion.

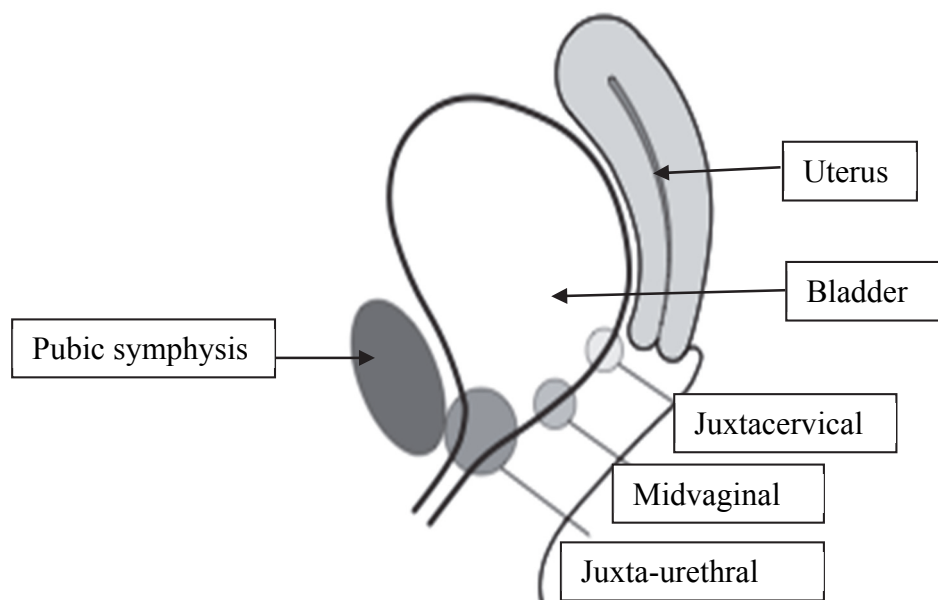


Figure 2-1: The various positions of ischemic injury and subsequent fistula

Examination is performed for gross nutritional status, developmental stage, and mental status.

The neurologic system is affected by symptoms (such as foot drop or saddle anesthesia) caused by obstructed labor. If anal reflex and pudendal nerve function are impaired, residual stool and or flatal incontinence may continue to trouble the patient despite good anatomic repair. Bilateral lower limb examination for power and dermatome assessment (if indicated) should be done.

The external genitalia are examined for signs of ulceration and excoriation (“urine dermatitis”), bleeding, stones, genital mutilation, perineal tears, etc.

Speculum and digital examination facilitates fistula diagnosis and allows the clinician to take note of any characteristics that may affect treatment and outcome. Although most fistula are diagnosed by digital examination, it is very useful to examine them under direct vision with the aid of a speculum. The following are checked during this examination:

- Patency of the reproductive tract: The vagina, uterus, or cervix can be occluded, and the cervix may even be missing.
- Location (anterior and/or posterior) and extent of vaginal scarring: Scarring often appears as a thick band of scar tissue on the posterior vaginal wall.
- Clinical presentation: Note fistula number (there can be more than one bladder or rectal fistula), fistula size and location; urethral length; whether the urethra is circumferential (a bony structure can be palpated anteriorly when the urethra has been severed from the bladder); whether the proximal portion of the distal urethra is scarred and obstructed; presence of bladder stones; anal sphincter status; and any other abnormality in the genital tract.
- Bladder capacity: Although difficult to evaluate pre-operatively, this can be roughly assessed by sounding the bladder with a metal catheter or probe.
- Stress urinary incontinence: If there is no obvious fistula, the physician asks the patient to cough and looks for signs of incontinence (this test requires some urine in the bladder) and carries out a dye test.

GENITOURINARY DYE TEST

A dye test detects a small or unusual fistula, especially a uterovaginal or cervicovaginal fistula. It may be carried out on screening evaluations or during examination under anesthesia.

A dye test is performed by inserting dry cotton swabs into the vagina (classically, three are inserted) and instilling methylene blue or other sterile, colored solution into the bladder by means of a catheter. The swabs are removed after a few minutes. If the swab that was the lowest in the vagina is stained, the patient has a urethrovaginal fistula; if the middle swab is stained, the patient has a VVF; and if the upper swab is stained, the patient has a juxtacervical fistula, a vault fistula, a ureterovesical fistula, or a cervicovesical fistula. If the upper swab is stained with urine but not with dye, the patient has a ureterovaginal fistula. The origin of the leakage of dye can often be visualized with the aid of a speculum (refer to Appendix 3).

PRE-OPERATIVE INVESTIGATIONS

Some of the following investigations will probably not be available at all centers:

- Hematocrit, blood group, and Rh group
- Additional tests:
 - Blood tests for HIV, syphilis, hepatitis infection, and renal function
 - Urinalysis and urine culture (most women with fistula have a colonized urinary tract; unless frankly purulent or if findings are consistent with active upper tract infection, pre-operative urinalysis and/or urine culture to direct antibiotic therapy for cystitis is not proven to be helpful or necessary)
 - Stool tests for occult blood, ova, and parasites
 - Ultrasound exploration of the kidney, ureter, and bladder to look for stones and obstruction, especially if the patient previously had a fistula repair or an abdominal operation, especially a cesarean delivery or hysterectomy
 - Radiologic exploration (IV urography) to look for stones and obstruction and assess renal function
 - Indigo carmine test/benzopyradine dye to look for ureteric fistula
 - Endoscopy (cystoscopy and urethroscopy)
 - Electrocardiogram (ECG) and chest x-ray when indicated

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- Barium enema (colorectal pathology; nonpalpable fistulous tracts)

CLASSIFICATION AND STAGING

Basis of Classification of Obstetric Fistula⁸

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

- Site
- Size
- Scarring

Fistula Site

Juxta-urethral

The most common site is juxta-urethral, that is, at the urethrovesical junction (Figures 2.2–2.4). In this situation, there is almost always loss of some proximal urethra. Mild ischemia will produce just a simple hole, but prolonged ischemia will cause circumferential tissue loss with the urethra and bladder becoming separated to a variable extent.

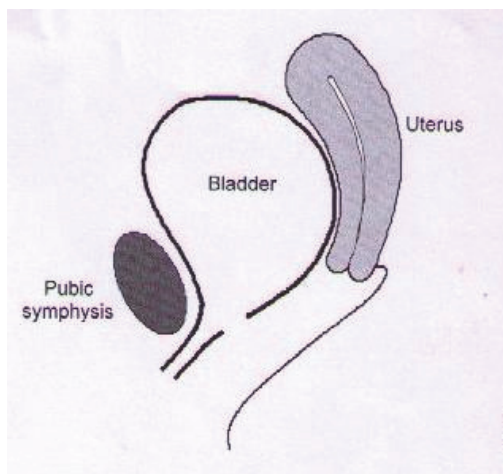


Figure 2-2: A simple juxta-urethral fistula

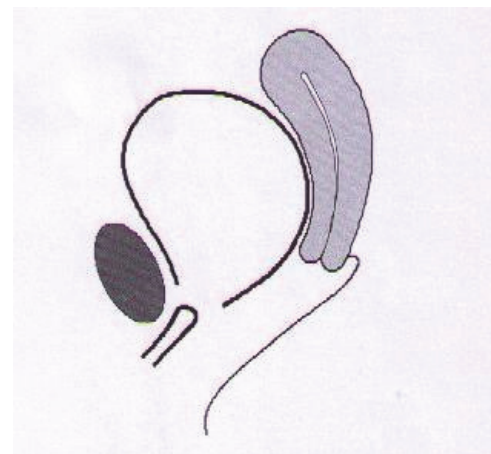


Figure 2-3: A small circumferential juxta-urethral fistula. There is a gap between the bladder and the urethra. The latter is often blocked.

Figure 2-4: Circumferential juxta-urethral fistula. It is often pulled up and stuck to the back of the pubic symphysis, making it relatively inaccessible.



Midvaginal

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

Juxtacervical

Juxtacervical fistulae, that is, fistulae in the region of the cervix (Figure 2.5), are common in multiparous patients and in those who have undergone cesarean section. Patients who start to push before the cervix is fully dilated are prone to fistulae in this region. Sometimes, the defect extends into the cervical canal where the anterior cervical canal is completely missing or torn open (Figure 2.6). These fistulae presumably result from a vertical tear in the lower segment with associated bladder injury during cesarean section.

Intracervical

Intracervical fistulae, that is, fistulae between the bladder and the cervical canal (Figure 2.7), are not very common. They almost always follow a cesarean section. There may be a history of a live baby, suggesting an iatrogenic cause.

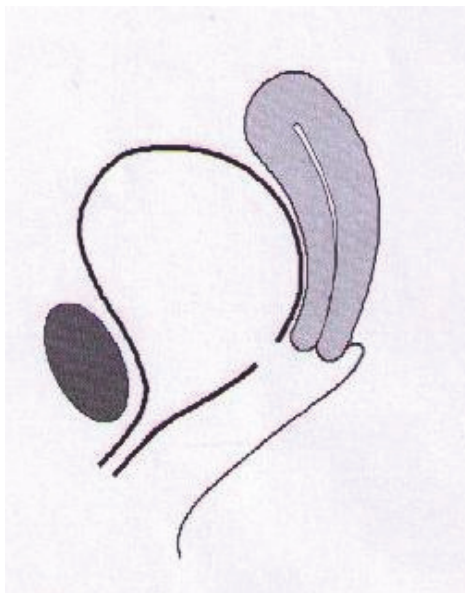


Figure 2-5: A simple juxtacervical fistula



Figure 2-6: A juxtacervical/intracervical fistula. The cross indicates the approximate position of the ureteric orifice.



Figure 2.7: An intracervical fistula. The cross indicates the approximate position of the ureteric orifice.

Circumferential

The term “circumferential fistula” is used when the bladder has been completely separated from the urethra (Figure 2.8). The urethra is almost always involved to some extent, and the extent of detachment varies from minimal with a normal-capacity bladder to extreme in which the bladder has all but disappeared. The more common intermediate type is recognized clinically by palpation of bare bone at the back of the pubic symphysis. In these cases, most of the anterior vaginal wall and the base of bladder are destroyed.

Miscellaneous fistulae

Fistula can result from accidental damage to a ureter during cesarean section or hysterectomy, and vault fistulae can be produced during emergency hysterectomy for a ruptured uterus or elective hysterectomy. Locally advanced carcinoma of the cervix can cause a urinary fistula.

Fistula Size

Fistula may be:

- Tiny (admitting only a small probe)
- Small (0.5–1.5 cm)
- Medium (1.5–3 cm)
- Large (>3 cm), usually involving loss of most of the anterior vaginal wall and a circumferential loss of the urethrovesical junction
- Extensive, that is, involving major loss of bladder and urethra, with a large gap between the two (Figure 2.8)

Scarring

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

Scarring is a confounder—any fistula with significant scarring is not for a beginner.

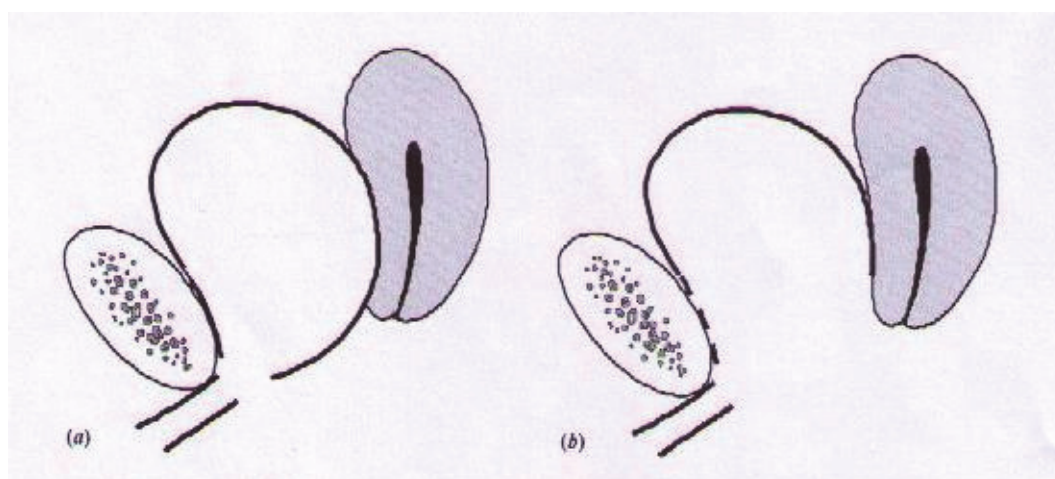


Figure 2-8: An extensive fistula: (a) Sagittal section; (b) Intra-vaginal view. The whole of the anterior vaginal wall has been lost; there is a gap between the stenosed urethra and the anterior bladder wall. Bare bone is exposed at the pubic symphysis. The anterolateral margins of the bladder defect are adherent to the underside of the pubic arch, and the ureteric openings will be on the edge or even outside the bladder, as indicated in (b).

A classification system should be descriptive and prescriptive, as well as prognostic (i.e., present a description and indicate both the operative technique to be applied and the outcome to expect), and it should be a reliable tool for study and communication. Each fistula is unique, and there are so many variables that some surgeons feel that a satisfactory classification will never be achieved.

However, there are different classification systems for genitourinary fistula, and most are based on the location of the fistula.

OUTCOME AND PROGNOSIS

The critical factors affecting the prognosis of OF are the length of the urethra, the sizes of the fistula and the bladder and its degree of involvement of the sphincteric mechanism, and the amount of scarring. Almost all defects can be closed (although bladder capacity may be reduced). However, if the urethra has been crushed, denervated, and shortened, it will not function, and the patient may have total urinary

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incontinence. The shorter the urethra and the greater the scarring, the higher the chance of persistent incontinence. Destroyed urethras can be repaired, but the prognosis for continence is not good. Incontinence persisting after repair can be predicted by urethral involvement, significant scarring, and size of defect and bladder capacity.

The main classifications are based on the degree of involvement (or lack of involvement) of the closing mechanism insofar as this will have consequences for the operative technique and the prognosis of the repair.

Educate the patient about the problem of prognosis. Develop a management plan based on probable prognosis.

GRADING OF THE DEGREE OF ANTICIPATED DIFFICULTY OF THE REPAIR⁷

This classifies fistula into two groups according to the degree of operative difficulty:

- Good prognosis/simple fistula: Able to be repaired by surgeons fully trained and competent to undertake uncomplicated fistula repairs.
- Uncertain prognosis/complicated fistula: Will require referral to, and repair by, a specialist fistula surgeon.

Table 2-1: Criteria based on the degree of anticipated difficulty of the repair

Defining Criteria	Good Prognosis/Simple	Complicated/Uncertain
Number of fistula	Single	Multiple
Site	Vesicovaginal (VVF)	Rectovaginal (RVF) Mixed VVF/RVF Involvement of cervix
Size (diameter)	<4 cm	>4 cm
Involvement of the urethra/continence mechanism	Absent	Present
Scarring of vaginal tissue	Absent	Present
Presence of circumferential defect*	Absent	Present
Degree of tissue loss	Minimal	Extensive
Degree of tissue loss and ureter/bladder involvement	Ureters are inside the bladder, not draining into the vagina	Ureters are draining into the vagina; bladder may have stones
Number of attempts to repair	No previous attempt to repair	Failed previous attempts to repair

*Complete separation of the urethra from the bladder

KEY POINTS

- Diagnosis is suggested by the history of continuous leakage of urine following a difficult delivery or surgery, often with stillbirth.
- Physical exam confirms the presence, size, and location of a communication with leakage of urine, feces, or both in a scarred and often foreshortened vagina.
- A dye test is useful to visualize the site and number of the communications: The bladder is filled with methylene blue fluid, and the rectal exam is done with blue lubricating gel.
- A complete exam should assess other gynecologic, urologic, dermatologic, neurologic, orthopedic, and psychological injuries.
- No uniform classification system exists. The most commonly used are those of Waaldijk (based on continence mechanism involvement) and Goh (based on measured size, site, and degree of scarring).

- A simple fistula has a good prognosis and is defined as single, less than 4 cm, vesico-vaginal with no scarring or circumferential defect of the urethra, minimal loss of tissue, and no previous attempts at repair (World Health Organization [WHO]).
- A complex fistula is more challenging to repair and is defined as larger than 4 cm, with scarring, a circumferential defect of the urethra, extensive tissue loss, a failed previous repair, ureteral involvement, and/or bladder stones (WHO).

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CHAPTER III

MANAGEMENT OF OBSTETRIC FISTULA

INTRODUCTION

The evaluation and treatment of obstetric fistula (OF) create one of the most challenging clinical scenarios in soft-tissue reconstructive surgery. The preparation for surgery, surgical technique, and postoperation wound healing all bear significant impact on the final outcome. The first operation presents the best opportunity for successful outcome. Fistula recurring after attempted surgical repair are often bigger, more fibrotic, or more complex.

Management of OF can be divided into conservative treatment and surgical repair.

CONSERVATIVE MANAGEMENT OF OBSTETRIC FISTULA

Catheter and Debridement Immediately Postpartum after Obstructed Labor

Immediate catheter drainage of the bladder prevents fistula formation in a site of vaginal wall necrosis when inserted immediately after obstructed-labor delivery. In instances where patients are diagnosed with a new fistula immediately postpartum, an estimated 15%–20% of such fresh OF may achieve spontaneous closure by catheter drainage when inserted immediately after obstructed-labor delivery.^{1,3} This early intervention strategy may be extrapolated in the training of skilled birth attendants by instituting continuous catheter drainage during labor as an obstructed pattern emerges. In the instance of actual fistula development in a monitored obstructed labor postpartum patient, vaginal wound care, including daily debridement of the fresh fistula, may allow spontaneous healing of the fistula.¹ When an OF is diagnosed in the immediate postpartum period, continuous catheter drainage may result in spontaneous, nonsurgical fistula closure within the first 3 months postpartum.⁴ Excision or other debridement method of fibrinous exudate, purulence, and devitalized tissues, followed by thorough irrigation with saline, should be done. Betadine preparation and irrigation are best avoided, as iodine inhibits macrophage migration, which may, in theory, retard or inhibit robust wound healing.

After a cesarean section for prolonged obstructed labor, the catheter should be retained for at least 10–14 days. Earlier removal predisposes to chronic retention. The bladder is often atonic after a prolonged labor. If there is urinary leakage after removal of the catheter, it should be reinserted immediately. If the fistula is less than 2 cm in diameter, the catheter should be kept in at least 4 more weeks. Fistula that have not healed spontaneously with 4 weeks of drainage are unlikely to do so.²

Early Fistula Closure through Catheter Drainage or Surgery

When an OF is diagnosed in the immediate postpartum period, catheter drainage as noted above may result in spontaneous, nonsurgical fistula closure within the first 3 months postpartum.⁴ Fistula may be successfully closed surgically at whatever point the tissue quality is optimal (no infection or crusting, minimal induration).^{5,6} This requires notification of a qualified fistula surgeon once the debridement therapy is under way, so that early fistula closure of wounds that do not close spontaneously may be carried out in a timely fashion. This also allows the fistula surgeon to participate in the choice to graduate the patient from daily debridement to early fistula closure. The spontaneous closure of around 15%–20% of simple or small fistula can be achieved by conservative means, provided these women are treated immediately after or within a few days of delivery. The regime is identical to that previously described for the management of women who have survived a prolonged or obstructed labor, except that continuous bladder drainage by catheter should be maintained for a minimum of 4 to a maximum of 6 weeks. As before, any necrotic tissue should be regularly and gently debrided, if necessary, even if the woman will eventually require surgery, as fistula surgery should not be performed if necrotic tissue is present in the

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vagina. Women for whom the above regime proves successful may be discharged when the vagina is clear of necrotic tissues, and the fistula has completely healed. As with other women who have had a fistula repair, before discharge the woman should receive advice **about family planning and contraception, the need to seek antenatal care in future pregnancies, and to deliver in a unit equipped and staffed to undertake emergency cesarean sections.** This information should also be given to her husband and family members.

There is no clear consensus on the optimum timing to undertake fistula surgery in women who have recently delivered and for whom the above measures have failed. Many experienced fistula surgeons prefer to operate as soon as the vagina is clear of necrotic tissues, whereas others prefer to wait for 2 to 3 months after the fistula occurred.

Alternative Fistula Procedures: Plugs, Cautery, and Glue

Endoanal fistula plugs, made of Surgisis-brand porcine small intestine submucosa, facilitate spontaneous closure of small rectovaginal fistula (RVF) by creating a growth-factor laden matrix that mechanically closes the hole while catalyzing histologic aspects of wound healing.⁷ In the OF setting, this may be considered for women with an intact anal sphincter and a small RVF with minimal fibrosis.

Several case series demonstrated the limited but real utility of cautery for small vesicovaginal fistula (VVF) that are not in proximity to the urethra or ureters.^{8,9} Thus, cautery plays an extremely limited role in the treatment of OF, which rarely meet the criteria for application of this modality. Cautery may be carried out transvesically through a cystoscope, or vaginally, either as primary therapy or secondary treatment after surgical failure. Fistula amenable to cautery are typically less than 0.7 cm in diameter. A cystoscopic “Bugbee” cautery, designed for cauterizing the bladder, or alternative low-intensity electrocautery equipment, is used. Catheter drainage for 2–3 weeks, with or without postfulguration anticholinergic medications, is reported to successfully close fistula in limited case series.

Bioglue is a fibrin-based surgical adhesive composed of bovine serum albumin mixed with glutaraldehyde. The albumin and glutaraldehyde induce a glue-like sealant in soft tissue. Used extensively in vascular surgical repair of the aorta and femoral and carotid arteries, it also has a documented utility in intestinovaginal fistula.^{10,11} Bioglue injection has demonstrated utility in the closure of RVF that are small, minimally fibrosed, and not occurring subsequent to chronic inflammatory bowel disease, such as Crohn’s disease.

The choice to use porcine plug, cautery, and surgical glue mandates advanced fistula care experience. By definition, the use of these options will be minimal and limited in an OF setting. Nevertheless, the possibility of expanding OF care beyond standard, decades-old surgical repair into the realm of modern-day advanced wound healing optimization therapies warrants inclusion of alternative fistula repair procedures in a contemporary OF clinical manual. The use of any of these therapies must take place in an established fistula center managed by an experienced fistula surgeon. In the event of failure, traditional surgical therapies may be instituted in a timely fashion.

SURGICAL MANAGEMENT OF FISTULA

The first repair provides the optimal chance for successful closure in any given fistula patient. Each subsequent operation undertaken for fistula recurrence will be complicated by exacerbation of tissue devitalization inherent in the fistula process, even if subsequent recurrent fistula are smaller in size.¹⁻³ **The traditional mandate of waiting 3 months before closing fistula has been disproved; freshly formed fistula may be repaired at any point in which involved tissues are deemed optimal for repair.**⁴⁻⁶

Basic Principles of Fistula Surgery

The basic principles of fistula surgery include:

- Watertight closure of the defect, under no tension, after gentle dissection to separate organ systems involved in the fistula followed by continuous bladder drainage
- Avoiding damage to the upper urinary tract; stent ureters as needed
- Bladder neck and anal sphincter reinforcement when involved in the defect
- Adequate vascular supply; incorporation of flaps and grafts as needed

The dissection and suturing technique for fistula repair incorporates principles of plastic surgery. Meticulous handling of tissues in forceps and clamps facilitates a minimum of surgical trauma while mobilizing the bladder and excising dense scar adequately so that neither mechanical traction on the suture line nor devitalized soft tissue will jeopardize wound healing. If fibrosis is minimal, excision of the fistula tract may be avoided, particularly if preservation of bladder capacity or urethral diameter is a concern. The tradition of multiple layer closure has lost its mandate in the realm of OF surgery, to be carried out at the discretion of the surgeon. Most contemporary techniques avoid multiple layer closure in order to preserve bladder capacity.

Wound-Healing Principles

Wound-healing principles offer an opportunity to improve spontaneous or surgical closure of OF.¹³ Wound-healing principles are an integral part of training and clinical care.

The following factors are associated with wound-healing optimization.

Acute and Proliferative Phase Considerations

Healing involves three phases, namely: the inflammatory phase, the proliferative phase, and the maturation phase. The proliferative phase characterized by intense macrophage and fibroblast activity and neo-angiogenesis is crucial in fistula wound healing.

WHO Thinness Scale
Grade 1: BMI 17.0–18.5 (mild)
Grade 2: BMI 16–16.99 (moderate)
Grade 3: BMI <16 (severe)

Nutritional and Medical Assessment

Screening with the World Health Organization (WHO) guidelines of thinness based on body mass index (BMI), skin turgor, tenting, and edema provides rapid assessment of nutritional status.¹² Skin edema may be a sign of chronic and severe protein deficiency, and skin tenting is a sign of dehydration.

Patients deemed nutritionally needy warrant a high-protein, high-fat diet; aggressive rehydration; and vitamin supplementation. Deworming is performed when worm infestation is suspected, and iron supplementation is given to anemic patients. Nutritional supplements such as L-carnitine, arginine, zinc, and vitamin C improve wound healing.^{15,16} Topical estrogen has been shown to help dermal wound healing.^{17,18} While difficult to apply vaginally before fistula surgery, estrogen cream in a zinc oxide mixture applied to the vulva before surgery may improve urine dermatitis and wound healing and indirectly reduce internal vaginal fibrosis prior to OF repair through the common dermatologic “field effect” of topical therapy. Estrogen cream after OF repair may enhance wound healing and reduce fibrosis progression after surgery. As an alternative to estrogen cream, vaginal insertion of oral contraceptive pills may be considered.

Anemia, chronic pulmonary disease, and hypertension reduce oxygen content and capillary flow in soft tissues, retarding all aspects of soft tissue metabolism. Likewise, diabetes impairs connective tissue

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metabolism, as high blood sugar inhibits fibroblast migration, a crucial component of acute wound healing and soft tissue metabolic turnover. Cessation of smoking and minimizing exposure to smoke helps in wound healing.

Anti-inflammatory medications can affect wound healing. Medications that interrupt the inflammatory process, particularly steroid medications and nonsteroidal anti-inflammatory drugs (NSAIDs), have been shown to exert a deleterious effect on wound-healing integrity.

Exercise stimulates blood flow, growth-hormone production, and endorphin release, all of which stimulate the healing process.¹⁴ Range-of-motion and pelvic girdle stabilization exercises may be done in bed or at the bedside to improve blood flow and endogenous production of growth hormone. Performing Kegel exercises makes sense in the OF patient, as exercise of the muscles around the fistula repair may improve capillary blood flow to the repair region.

WOUND-HEALING OPTIMIZATION AND BIOLOGIC GRAFTS FOR GENITAL FISTULA SURGERY

Traumatic wound and pelvic floor vaginal reconstructive surgery success rates have been demonstrated to benefit from the use of biosynthetic grafts. Although not currently popular in the OF setting, some of these principles—debridement; a high-protein diet, adequate hydration, and wound repair-accelerating nutritional supplements; and active management of diabetes, hypertension, anemia, and chronic pulmonary disease—all warrant consideration in the pre- and postoperative management of the genital fistula patient. In direct comparison to full-thickness human skin (AlloDerm) and traditional woven Vicryl mesh, porcine submucosa (Surgisis) demonstrated superior collagen deposition and organization and far superior neovascularization in an animal model study of abdominal hernia repair.²² Surgisis has demonstrated superior results in vaginal prolapse surgery and has increasingly been used in the highly complicated RVF setting of Crohn's disease and obstetric RVF.^{23,24} The possibility of incorporating porcine intestinal submucosal grafts warrants clinical trial in a high-prevalence OF region.

Wound-Healing Optimization: Potential Frontiers

The combination of stem cells and growth factors has been shown to result in enhanced repair outcomes that emulated uninjured tissue. Preclinical evidence from gene therapy and stem cell studies are being used to move therapy from the experimental phase to clinical translation in other reconstructive surgical specialties.^{13,19,20}

STANDARD INFECTION-PREVENTION PRACTICES³⁰

Patients living with OF are at high risk for infection. Thus, infection prevention is critical in their care. Infections contracted by patients living with OF include urinary tract infections, dermatitis, kidney infections, and ascending infections after insertion of an indwelling catheter.

Nurses are heavily involved in maintaining the standards of infection prevention and strict aseptic technique, correct instrument processing, and appropriate disposal of fistula care waste.

The best way to prevent infections at a health facility is to follow standard precautions. These are a set of recommendations designed to help minimize the risk for exposure to infectious microorganisms by both patients and staff.

Standard Precautions

Standard precautions are guidelines designed to create “barriers” between microorganisms and an individual to prevent the spread of infection (i.e., the barrier serves to break the disease-transmission cycle). They apply to all clients, patients, and staff at health facilities.

Protective Barriers and Handwashing

Placing a physical, mechanical, or chemical barrier between microorganisms and an individual, whether a client or health-care worker, is an effective means of preventing the spread of disease. The following actions create protective barriers for infection prevention:

- Washing hands
- Wearing gloves (both hands) either for surgery or when handling contaminated waste materials or soiled instruments
- Wearing appropriate attire (e.g., protective goggles, face mask, or apron) when contact with materials containing blood or body fluids is possible
- Using antiseptic solutions to prepare the skin
- Preventing injuries from sharps
- Processing instruments and patient-care equipment
- Ensuring environmental cleanliness and following waste-disposal practices

Infection Prevention: Instrument Processing

Decontamination

More than 20 years ago, decontamination was shown to markedly reduce the level of microbial contamination of surgical instruments. For example, in the study by Nystrom (1981), 75% of previously soiled instruments had fewer than 10 microorganisms and 98% had fewer than 100 after being decontaminated prior to cleaning. Because of these findings, it was strongly recommended that if instruments and other items are to be cleaned by hand, they first should be decontaminated to minimize the risk of infection following accidental injury to cleaning staff as well as to reduce microbial contamination of their hands.

Before cleaning, decontaminate items by placing them in a 0.5% chlorine solution for 10 minutes. This step rapidly inactivates hepatitis B and C viruses and HIV, making the items safer to handle by personnel who clean them.^{31,32}

Decontamination Products

Chlorine solutions made from sodium hypochlorite generally are the least expensive and the most rapid-acting and effective products to use for decontamination, but other agents can also be used, such as 70% ethyl or isopropyl alcohol and 0.5% phenolic compounds (Crutcher et al. 1991).

If no disinfectants are available for decontamination, extreme care must be taken when handling and cleaning sharps (e.g., suture needles, scissors, and scalpel blades).

Decontamination Tips

- Use a plastic container for decontamination to help prevent:
 - Dulling of sharps (e.g., scissors) due to contact with metal containers; and
 - Rusting of instruments due to a chemical reaction (electrolysis) that can occur between two different metals (i.e., the instrument and container) when placed in water.
- Do not soak metal instruments that are electroplated (i.e., not 100% stainless steel) even in plain water for more than an hour because rusting will occur.

After decontamination, instruments should be rinsed immediately with cool water to remove visible organic material before being thoroughly cleaned. For example, some health-care facilities now keep two buckets in the procedure areas or operating theaters, one filled with 0.5% chlorine solution and one with water, so that the instruments can be placed in the water after soaking in the chlorine solution. Although this will help to prevent corrosion, even leaving the instruments in plain water for more than 1 hour can lead to rusting.

Large surfaces, such as pelvic examination or operating tables that may have come in contact with blood and body fluids, should be decontaminated. Wiping with a suitable disinfectant such as 0.5% chlorine solution before reuse or when visibly contaminated is an easy, inexpensive way to decontaminate these large surfaces.

Once instruments and other items have been decontaminated, they can safely be further processed. This consists of **cleaning** and then either **sterilization** or **high-level disinfection (HLD)**.

Cleaning

Importance of Cleaning

Cleaning is important because:

- It is an effective way to reduce the number of microorganisms, especially endospores that cause tetanus, on soiled instruments and equipment.
- Neither sterilization nor HLD is effective without prior cleaning (Porter 1987).

A thorough washing with soap and clean water also physically removes organic materials such as blood and body fluids.¹ This is important because dried organic materials can entrap microorganisms, including endospores, in a residue that protects them against sterilization or disinfection. Organic matter also can partially inactivate some high-level disinfectants, rendering them less effective.^{31,33}

Use of soap is important for effective cleaning because water alone will not remove protein, oils, and grease (Nystrom 1981). The use of hand (bar) or powdered soap is discouraged because the fatty acids in bar soap react with the minerals in hard water, leaving a residue or scum (insoluble calcium salt), which is difficult to remove. Using liquid soap, if available, is preferable because it mixes more easily with water than bar or powdered soap. In addition, liquid soap breaks up and dissolves or suspends grease, oil, and other foreign matter in solution so that they can be removed more easily by the cleaning process.

¹ If tap water is contaminated, use water that has been boiled for 10 minutes and filtered to remove particulate matter (if necessary), or use chlorinated water—water treated with a dilute bleach solution (sodium hypochlorite) to make the final concentration 0.001%.

Cleaning Tips

- Wear **gloves** while cleaning instruments and equipment (thick household or utility gloves work well). If torn or damaged, they should be discarded; otherwise, they should be cleaned and left to dry at the end of the day for use the following day.
- Wear protective eyewear (**plastic visors, face shields, goggles, or glasses**) and a plastic apron, if available, while cleaning instruments and equipment to minimize the risk of splashing contaminated fluids into the eyes and onto the body.

To prevent splashing, keep the items being washed under the surface of the water.

- **Instruments** should be washed with a soft brush (an old toothbrush works well) in soapy water. Particular attention should be paid to instruments with teeth, joints, or screws where organic materials can collect. After cleaning, instruments should be thoroughly rinsed with clean water to remove soap residue that can interfere with chemical disinfectants used for HLD or sterilization.
- **Syringes (glass or plastic)** when reused should be disassembled only after decontamination and cleaning with soapy water. They should then be thoroughly rinsed (three times) with clean water to remove the soap by expelling the water through the syringe into another container (to prevent contaminating the rinse water) and then dried.
- **Surgical gloves** should be washed in soapy water. Both the inside and outside should be washed and rinsed in clean water until no soap remains. Test gloves for holes by inflating them and holding them under water (air bubbles will appear if there are holes).
- **Rubber or plastic tubing**, such as nasogastric suction, should be reused only if it can be thoroughly cleaned, rinsed, and dried.
- **Oral thermometers** should never be mixed, even after cleaning. Keep them in separate containers.

Sterilization and High-Level Disinfection

Sterilization

Sterilization destroys all microorganisms, including bacterial endospores.

Sterilization should be used for instruments, surgical gloves, and other items that come in direct contact with the blood stream or normally sterile tissues (Spaulding 1939). It can be achieved by high-pressure steam (autoclave), dry heat (oven), and chemical sterilants (glutaraldehydes or formaldehyde solutions) or physical agents (radiation). Because sterilization is a process, not a single event, all components must be carried out correctly for sterilization to occur.

Surgical gowns, linen drapes, and wrappers should be washed with liquid soap and water to remove all particles, rinsed with clean water, air- or machine-dried, and sterilized.

High-Level Disinfection

Although sterilization is the safest and most effective method for the final processing of instruments, sterilization equipment is often either unavailable or unsuitable.³³

In these cases, HLD is the only acceptable alternative. The HLD process destroys all microorganisms (including vegetative bacteria, tuberculosis, yeasts, and viruses) except some bacterial endospores.

Management of Obstetric Fistula

HLD can be achieved by boiling in water, steaming (moist heat), or soaking instruments in chemical disinfectants. To be effective, all steps in the performance of each method must be monitored carefully.

Use or Storage

All sterile items should be stored in an area and manner whereby the packs or containers will be protected from dust, dirt, moisture, animals, and insects. This storage area is best located next to or connected to where sterilization occurs, in a separate enclosed area with limited access that is used just to store sterile and clean patient-care supplies. In smaller facilities, the area may be just a room off the Central Supply Department or the operating unit.

- The storage area should be clean, dry, dust-free, and lint-free.
- Control temperature (approximately 24°C) and relative humidity (<70%) when possible.
- Packs and containers with sterile (or high-level disinfected) items should be stored 20–25 cm (8–10 inches) off the floor, 45–50 cm (18–20 inches) from the ceiling, and 15–20 cm (6–8 inches) from an outside wall.
- Cardboard boxes should not be used for storage (they shed dust and debris and may harbor insects).
- Date and rotate the supplies (first in/first out). This process services as a reminder, but it does not guarantee sterility of the packs.
- Distribute sterile and high-level disinfected items from this area.

Shelf-life of an item (i.e., how long items can be considered sterile) after sterilization is event-related. The item remains sterile until something causes the package or container to become contaminated. An event can be a tear or worn area in the wrapping, the package becoming wet, or anything else that will enable microorganisms to enter the package or container. These events can occur at any time.

Therefore, the shelf-life of sterilization depends on the following factors:

- Quality of the wrapper or container
- Number of times a package is handled before use
- Number of people who have handled the package
- Whether the package is stored on open or closed shelves
- Condition of storage area (e.g., humidity and cleanliness)
- Use of plastic dust covers and method of sealing (AORN 1992)

Most packages are contaminated as a direct result of frequent or improper handling or storage. To make sure items remain sterile until you need them:

- Prevent events that can contaminate sterile packs, and
- Protect them by placing them in plastic covers (bags).

Before using any sterile item, look at the package to make sure the wrapper is intact, the seal unbroken, and all is clean and dry (as well as having no water stains). If so, it is reasonable to assume that it is sterile regardless of when it was sterilized.³⁴

In some health-care facilities where replacement of supplies is limited and the cloth used for wrapping is of poor quality, time as a limiting factor also serves as a safety margin. If plastic covers (bags) are unavailable for the sterilized items, limiting the shelf-life to a specific length of time (e.g., 1 month) may be a reasonable decision as long as the pack remains dry and intact.

Waste Management

Purpose

The purpose of waste management is to:

- Protect people who handle waste items from accidental injury,
- Prevent the spread of infection to health-care workers who handle the waste,
- Prevent the spread of infection to the local community, and
- Safely dispose of hazardous materials (toxic chemicals and radioactive compounds).

Disposal of Contaminated Waste

- Pour liquids or wet waste directly into a safe sewage system.
- Incinerate (burn) items to destroy the item as well as any microorganisms. (This is the best method for disposal of contaminated waste. Burning also reduces the bulk volume of waste and ensures that the items are not scavenged and reused.)²
- Bury all contaminated waste to minimize the spread of infection to health-care personnel and to the local community. Whenever possible, contaminated waste should be collected and transported to disposal sites in leak-proof, covered waste containers.
- Use plastic or galvanized metal containers with tight-fitting covers for contaminated wastes. Many facilities now use colored plastic bags to alert handlers to the contents and to keep the general (noncontaminated) waste separate from contaminated waste.

Note: If a sewage system does not exist, dispose of waste in a deep hole and cover.

- Use puncture-resistant sharps containers for all disposable sharps (sharps that will not be reused).
- Place waste containers close to where the waste is generated and where convenient for users (carrying waste from place to place increases the risk of infection for handlers). This is especially important for sharps, which carry the highest risk of injury for health workers and staff.
- Do not use equipment that is used to hold and transport wastes for any other purpose in the clinic or hospital. (Contaminated waste containers should be marked as such.)
- Wash all waste containers with a disinfectant cleaning solution (0.5% chlorine solution plus soap) and rinse with water regularly.
- When possible, use separate containers for combustible and noncombustible wastes prior to disposal. This step prevents workers from having to handle and separate wastes by hand later.

Note: Clean contaminated waste containers each time they are emptied, and clean those for noncontaminated waste when visibly soiled.

- Use personal protective equipment (PPE) when handling wastes (e.g., heavy-duty utility gloves and closed protective shoes).
- Wash hands or use a waterless, alcohol-based antiseptic handrub after removing gloves when handling wastes.

Note: Training staff and having conveniently placed sharps containers available close to where sharps are used will help eliminate the problem of improper disposal.

² Burning may release toxic chemicals into the air, however.

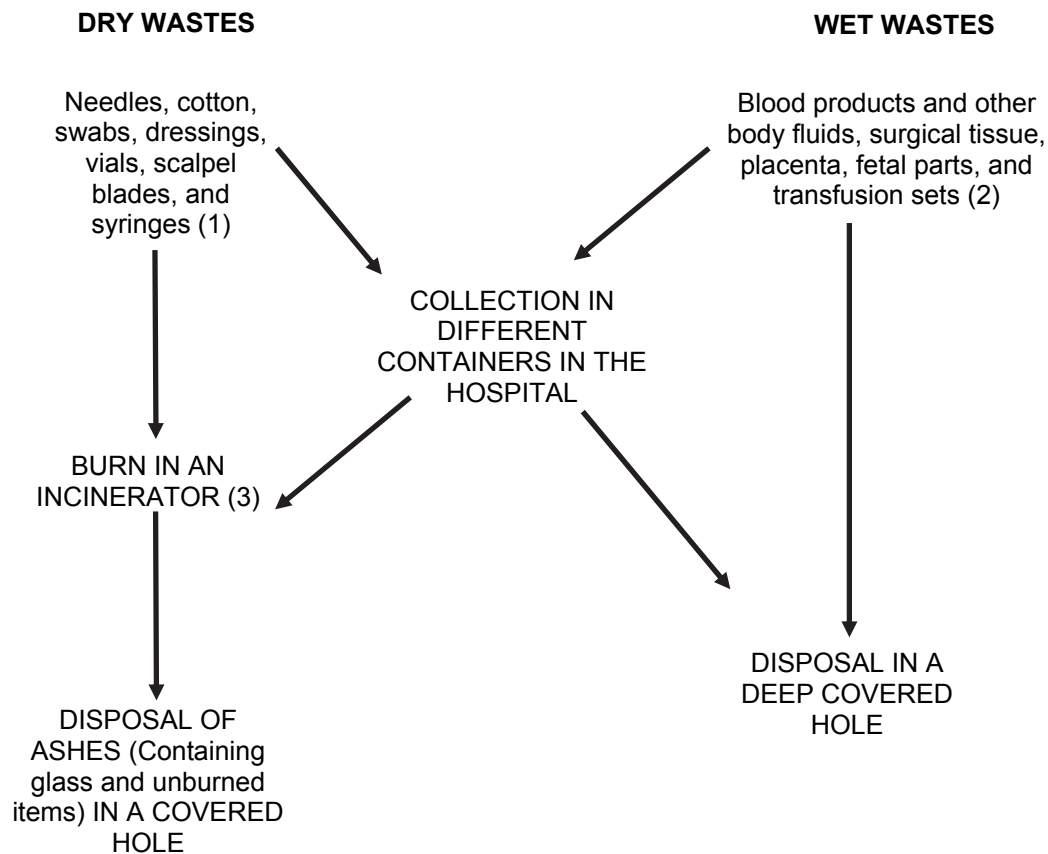


Figure 3-1: Flow diagram: Collection and disposal of medical waste

BASIC SURGICAL TECHNIQUES OF FISTULA REPAIR

A key component of any surgical technique is use of the WHO surgical safety checklist to ensure patient safety and protection. This checklist should be reviewed by the team before every surgery. The specifics of the checklist are addressed in more detail in Chapter V.

Dissection Technique

Infiltration of the fistula circumference with saline or a mixture of saline and lignocaine 1%–2% with adrenaline promotes both hydrodissection and hemostasis. The incision line is planned and marked to facilitate the reconstructive goals, particularly when urethral reconstruction, labial rotation flap, or Martius grafting is planned.

Incision begins with a fine scalpel blade; size 15 is recommended, but any size scalpel will suffice when supply limitations dictate use of a larger blade. The incision must be deep enough for Allys clamp placement, but not so deep as to create a larger fistula defect than already exists or to create a new hole near the fistula.

Dissection then turns to the clamp and scissors. Usually two Allys clamps, one on each side of the incision, allow for separation of the vagina from the fistulized lumen of the adjacent organ system. Gentle traction and counter-traction allow the surgeon to dissect into the proper plane, the avascular, shiny white undersurface of the vaginal skin. Scissors may be used to cut or to “push and spread” in parallel with the plane of dissection. Advancing the pair of clamps in the direction of dissection gives the surgeon and first assistant an efficient mechanism for wide dissection around the entirety of the defect. The first assistant

holds the counter-clamp in one hand and a retractor or suction tip in the other. The surgeon holds the primary Allys clamp in the nondominant hand and the dissecting scissors in the dominant hand.

Fingertip blunt dissection may also be used, as it is atraumatic and allows the surgeon to palpate deep areas of fibrosis that may warrant aggressive retraction and deep, sharp dissection to facilitate a tension-free closure. **Fingertip dissection of fistula is never to be done with gauze over the dissecting finger.** This finger-gauze method used by many gynecologists during vaginal dissection tips the risk/benefit ratio in the wrong direction when operating on the traumatized tissue of a fistula defect by creating false traction underneath the gauze fibers. These fibers may imbed further into the fistula closure, creating a nidus for infection that may cause the repair to break down and fail.

Selecting Dissection Scissors

The choice of dissecting scissors relates to the integrity of the tissue in the Allys clamps—if it is fibrotic, a sturdy tenotomy or curved Mayo pair is used. When the dissection plane is in normal tissue, a fine Metzenbaum pair is used. The extent of dissection is dictated by the size of the defect, mobilizing all structures attached to the fistula such that each may be reconstructed without tension on the primary suture line and without damaging any involved organ system. Sharp dissecting and fine blunt-tipped dissecting scissors selections are advised for fibrotic and nonfibrotic dissections, respectively. Having Reynolds or Padgett Stevens tenotomy scissors and curved Mayo scissors for fibrosis dissection; Thorek curved scissors 7” and 10” for fine, tight-angle dissections; and 7” and 11” Metzenbaum scissors for delicate nonfibrotic dissection is optimal for the variety of dissection needed in fistula surgery.

Hemostasis

A minimum of blood loss may be achieved with saline hydrodissection or a cocktail of adrenaline/lignocaine/saline that further controls capillary bleeding. Traditional “clamp and tie” or “clamp and suture” may also be used. **Cautery is best kept to a minimum, applied to bleeding in tissues** not directly involved in the fistula, or avoid cautery altogether to prevent inadvertent cautery necrosis.

Suturing

Polyglycolic (Vicryl) suture has the durability and nonreactivity preferred by most fistula surgeons. Usually 3-0 is used for urethral and bladder mucosa closure, whereas 2-0 is used for fascial and vaginal wall closure. However, the surgeon may comfortably use 2-0 or 3-0 for the entire operation. Suturing is carried out in a fashion that minimizes multiple “failed attempt” passes.

Selection of Needle and Suture

Fine, delicate cutting type needles may not be the optimal choice for vaginal fistula closure. Most fistula surgeons prefer sturdy, semicircular noncutting needles and the circular noncutting urology needles, two sizes of each, mounted on 2-0 or 3-0 Vicryl suture. Ureteric reimplantation may be done with 4-0 or 5-0 Vicryl on the more delicate noncutting needles. Delicate noncutting needles, although seemingly preferable, often result in multiple passage and pull-outs due to needle bending or needle twisting in the needle holder, making the heavier urology/circular or semicircular sturdy noncutting needles preferable. The circular urology needles are of great utility in tight corners, under the pubic symphysis, or in closing a fistula that is stuck to bone. The semicircular sturdy needles, usually less expensive, may be used for all other fistula suturing except for ureteric reimplantation.^{1,2,21}

About Flaps and Grafts

Flaps and interposition grafts are believed to improve blood flow to the fistula closure and may also be used to facilitate skin covering when the vaginal skin is inadequate. The use of flaps and grafts waxes and wanes. For example, the Martius graft, once popular and believed to reduce recurrence in years past, has now fallen from favor, as no clear added benefit has been shown. This fat may be harvested through a vertical incision in the labia majora, or mobilized infralabially, accessed through the lateral vaginal dissection edge, without resorting to a visible, second labial incision. Dissected in a thumb-shaped pedicle that may extend down to the ischiopubic ramus, the graft is rotated either from the posterior margin/pudendal vessel side or the anterior margin/clitoral artery side, depending on the location of the fistula. Once harvested, the pedicle is tunneled under the vaginal sidewall to rest over the fistula site, theoretically improving vascularity and creating an interposition layer between suture line and vagina.

The labia minora, medial and/or lateral surface, and the labia majora may be harvested in rotation flaps to cover the anterior, and less commonly, posterior vaginal wall, lending both blood flow and genital dermis covering to the fistula site. Perineal/peri-anal rotation skin flaps may be used to cover the posterior vaginal wall. Gracilis muscle and wide buttock flaps are less commonly used but have utility when healing by secondary intention is undesired, and no other suitable grafts are available. Peritoneum from the pouch of Douglas or vesicouterine reflection may also be accessed and, if adequate in surface area, advanced intravaginally to cover the anterior or posterior vaginal walls. Some fistula surgeons report success when allowing open fistula repair beds to granulate spontaneously, healing by secondary intention. Meticulous nursing care and clinical monitoring are mandatory for the success of spontaneous epithelialization of an exposed fistula bed.^{2,21}

PRINCIPLES OF POSTOPERATION CARE

As with all reconstructive surgery, the healing phase is of equal importance to the operation itself, as without optimal healing, the desired results may not be realized.

Promoting Wound Healing

A high-protein diet, adequate hydration, and vitamin/nutritional supplementation, designed to optimize wound healing, are advised. Menopausal and severely fibrotic patients may benefit from topical estrogen therapy. As alternatives to premixed estrogen cream, estrogen tablets may be dissolved in water-based lubricant or lanolin-based ointment for 1% mixture (1 mg estradiol in 100 ml lanolin ointment or cream). In the place of ready-made or compounded estradiol ointment, birth control pills may be placed intravaginally by the physician, daily or every other day, as part of postoperation care. Antibiotics may be used at the discretion of the surgeon.

Using Urinary Tract Drains

Urinary catheters must be draining and patent at all times. A catheter blocked by kinking of tubing or blood clot or mucus plug at the catheter tip in the bladder will quickly result in urinary retention. Urinary retention can ruin a well-repaired fistula by bursting the suture line. When a catheter is not draining, either urine is not entering the bladder due to dehydration or ureteric obstruction, or urine is entering the bladder but cannot exit through the catheter. If the bladder is full to palpation, any kinks in the tubing must be corrected immediately. If there are no kinks, or undoing the kink(s) does not produce efflux of urine, the catheter must be separated from the collection tubing. If this does not result in urine efflux, the catheter must be gently and immediately flushed with 20 ml normal saline. Care must be taken not to flush with a large amount of saline, as many postfistula bladders are low capacity, and flushing with a full 60-ml catheter tip syringe could damage the repair. If flushing with ~20 ml saline does not relieve the obstruction, the catheter may be changed for a new one. Stents may also kink, bend, or be blocked by

clots or mucus. Nondraining stents may be flushed with 3–5 ml saline. If flushing does not affect outflow and flank pain is evident, the physician must be contacted immediately.

The Foley catheter must be taped in a no-tension, no-kinking fashion. Usually a J-loop configuration taped securely to thigh or suprapubic abdominal skin is sufficient. Duration of catheterization, traditionally 14 days, is undergoing scientific scrutiny, with preliminary results demonstrating safety and efficacy of flexible, case-by-case catheterization duration for as little as 7 days.^{28,29} Stent drainage may be secured with a Foley catheter by the surgeon through an access cut in the catheter tube, through which the stents are inserted directly into the Foley bag tubing. Stents may also be drained into a separate collection bag or simple water bottle emptied at regular intervals.

Stool Management

RVF patients must be in a state of having very loose, soft stool so that stool does not distend the suture line in transit during a bowel movement. Oral stimulants and softening laxatives may be used.

Perineal Care

Perineal care with tap water or saline mixture is done twice daily or more often as needed, whether the fistula repair is urinary, intestinal, or both. Douching and enemas are to be avoided.

Expected Activity

Most surgeons advise bed rest for 1–2 days, ambulating carefully thereafter, with assistance if suffering concomitant foot drop. Ankle rotations and gentle range-of-motion exercises may be instituted during the bed rest phase to maintain circulation and prevent deep vein thrombosis (DVT). Postoperative care for psychological support also includes counseling a patient who experiences early recurrence of fistula after repair or significant incontinence despite successful healing of the fistula defect.

SPECIAL CONSIDERATIONS

Management of Fibrosis

Fibrosis must be considered a part of the fistula diameter, as this devitalized tissue requires excision. The larger the fistula/fibrosis complex, the wider and more completely the bladder is mobilized from the sidewalls, pubic symphysis/space of Retzius, and vesicouterine space. With an intact uterus and complete vaginal-hysterectomy style mobilization of the bladder from the anterior uterine surface, care must be taken to secure uterine artery hemostasis.

Multiple Fistula

Multiple fistula in proximity may be excised en masse to create a single defect for dissection and closure. Multiple fistula not in proximity may be addressed separately. Fistula involving the cervix may warrant cervical reconstruction and/or transcervical insertion of a small 10 or 12 French Foley catheter, to restore normal anatomy and maintain cervical patency during fistula healing. When a combination of VVF and RVF are present, the surgeon must determine whether or not to close both at one operation or adopt a staged approach of “RVF first; VVF closure once the RVF is healed.” In either strategy, clean bowel preparation is advised.

Urethral Fistula and Urethral Reconstruction

Urethral reconstruction is necessary when the urethra is nearly or completely absent. Urethral fistula require special attention to the damaged urethral sphincter and the delicate architecture that creates particular challenges to the principle of adequate fistula mobilization. The surface area of the urethra

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usually makes tension-free closure a mechanical challenge. A transected urethra may be patent at the proximal end or blind-ended. When blind-ended, patency may be restored with gentle pressure applied to the inserted metal catheter. With patency of the proximal urethral tube established, re-anastomosis to the bladder may involve posterolateral compensatory reconstruction or circumferential re-anastomosis to the robustly mobilized and advanced anterior and posterior/trigonal bladder walls.²

Rectovaginal Fistula

RVF occurs subsequent to obstructed labor or after obstetric tear/episiotomy repair breakdown. When occurring after obstructed labor, RVF often accompany the more common VVF, often in a “cloacal” configuration with extensive vaginal fibrosis. When RVF occur subsequent to episiotomy or perineal tear, they are often adjacent to the sphincter, and the sphincter is often attenuated to the degree that concomitant sphincteroplasty is advisable.

When RVF occur concomitantly with urinary tract fistula, it may be advisable to close the RVF first, followed by VVF closure after the RVF is healed, in order to reduce contaminant load and infection-related failure of the VVF repair. The Hamlin Fistula center in Addis Ababa makes a point to close combined VVF/RVF at the same operation whenever possible. The principles of RVF repair are the same as VVF repair, with the added problem of coliform contamination of the repair and the possibility of constipated hard stool creating mechanical stressors on the repair suture line, warranting aggressive postoperation bowel management to keep stool soft.

Care must be taken to screen for concomitant rectal stricture in the presence of RVF, and stricture revision may be done at time of RVF repair. The rectal wall flap may be rotated from the anterior rectum to create a neovaginal skin covering when vaginal and labial skin is not of adequate dimensions. Transverse closure of rectal defects reduces the possibility of repair-related rectal stricture. When occurring in proximity to the rectal sphincter, it is sometimes best to transect the sphincter, repair the fistula, and finish with sphincteroplasty. Perineoplasty and/or interposing levatorplasty may be used as needed to restore normal outlet anatomy, create an interposed layer between vagina and rectum, and reduce suture line tension on the fistula and/or sphincter repairs.

Abdominal Repair of Genital Fistula

The choice to proceed abdominally is usually made because of a combination of factors: Re-implantation of the ureter and the fistula being high, difficult to visualize and mobilize from below, or leaking only per cervical os, indicating vesicouterine fistula with the possibility of more than one defect, are commonly cited indications.^{25,26} The commonly cited “supratrigonal location” of VVF as an indication for abdominal access is inaccurate—fistula located in the bladder dome, well above the level of the trigone, have been repaired vaginally by every experienced fistula surgeon.²⁷ None of these indications are mandatory, however. Even ureters may be re-implanted per the vaginal approach when vaginal dissection and exposure permit.

Abdominal access may be obtained by midline vertical, or transverse Pfannensteil or Mayllard incisions, depending on prior incision(s) and surgeon preference. Cystotomy most typically is transverse across the dome, although vertical incision may also be carried out at the surgeon’s discretion. The principles of wide dissection, mobilization, and closure of both sides of the fistula are identical to that of the vaginal approach. VVF will be relatively low in the pelvis, mandating careful evaluation of the location of the ureteric orifices and liberal use of stents to increase ureteric safeguard throughout. Bladder stay-stitches are recommended to prevent the low bladder dissection from extending into the urethra. VVF require successful closure of the nongravid uterine wall in addition to bladder closure. Dissection may be direct—circumferential around the defect—or by bladder-bivalve, incising vertically down to the bladder fistula, then circumscribing around its entirety, and closing the bivalved bladder wall afterwards.

Complicated Fistula

High rectovaginal, rectouterine/cervical, or intestinovaginal/uterine fistula mandate bowel preparation in advance of surgery, coliform/anaerobic antibiotic coverage, and careful adherence to the principles of intestinal dissection and suturing including adequate mobilization, avoiding intestinal devascularization, and transverse closure of intestinal lumens, with Lambert suture technique being the mainstays. For high RVF, vaginal mobilization followed by abdominal closure may prove most efficacious. Colostomy for RVF is rarely necessary.

Fistula Involving the Ureter

Fistula involving the ureter and ureteric stenosis causing moderate to severe proximal hydroureter or hydronephrosis require ureteric reimplantation. This reimplantation begins with dissection of the ureter on the sidewall of the pelvis, avoiding unnecessary devascularization of the ureter while achieving adequate mobilization. Care must be taken to preserve the adventitial capillary blood supply throughout. Adequate mobilization is crucial to a tension-free re-anastomosis of the ureter into the bladder. Once mobilization is complete, the ureter is transected at the lowest point, usually adjacent to the uterine artery. Bladder mobility may require dissection of the ipsilateral bladder pillar. The ureter may be passed through an avascular window in the broad ligament, or the infundibulopelvic ligament may be dissected free of the uterus to further facilitate proximity and tension-free anastomosis of the bladder and ureter. The anastomosis site is best done in the medial surface of the posterior dome or posterior wall of the bladder. Re-implantations placed in the lateral bladder walls are prone to kinking and obstructive nephropathy. Suturing the bladder wall to the psoas muscle lateral to the portion of bladder used for re-implantation both elevates the bladder and secures the lateral wall, facilitating tension-free anastomosis and minimizing anastomotic kinking.

For ureters shortened by fibrosis, the anterior wall of the bladder may be tubularized on the lateral aspect to form a new distal ureter, and the anastomosis is made from this tubularized (Boari) flap to the short, proximal native ureter. Typically, the bladder can spare enough surface area for only one Boari flap. In situations of severe bilateral ureteric damage, double re-implantation may require a Boari flap on one side and uretero-ureteric anastomosis of the contralateral ureter.

Given that most ureteric fistula involve some degree of distal fibrosis and proximal hydroureter/nephrosis, most re-implanting fistula surgeons will do direct, spatulated, tension-free anastomosis to the bladder. When conditions dictate, a nonrefluxing re-implantation of the surgeon's choice may be performed.

In any case, abdominal grafting may be done with peritoneal interposition between defistulized organs, or with J-flap harvesting from the omentum.^{1,2,21}

Fistula That Cannot Be Repaired

OF may occur to the extent and severity that it is deemed "incurable." Incurability is a relative term, as an experienced, dedicated fistula surgeon may successfully repair a complicated patient, whom a less experienced surgeon may not be able to treat. Ideally, women deemed incurable by the best readily available surgeon would be listed for evaluation and possible surgery by one of the small community of elite fistula surgeons, invited at regular intervals, especially for accumulated groups of such potentially irreparable fistula patients. Once two expert fistula surgeons have deemed the patient beyond the reach of normal pelvic reconstruction, the patient would be labeled incurable.

Diversion methods include ileal conduit, continent ileal diversion, Mitrofanoff continent cecal diversion (appendiceal drainage through the umbilicus via self-catheterization), and Mainz pouch diversions, in which ureteric implantation into a detubularized sigmoid colon reroutes urine to stoma-free voiding per

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the rectum. Each and every one of these urinary diversion operations requires lifelong scheduled care at set intervals and ready access for acute urgent care. Re-implanted ureters may stricture or develop severe reflux. Other potential complications include neoplastic tumors developing in the intestinal lining in response to urine exposure; B12 deficiency requiring constant monitoring in applicable diversion procedures; stones forming in the pouch; and continent and incontinent stomas that may stricture, prolapse, avulse, or develop soft tissue infection of the stoma itself or adjacent dermis.^{2,21}

Without the ability to invite an experienced surgeon at intervals, the patient may be deemed “incurable by available clinicians.” This delineation is superior to the attempt to “do something” for a patient who may best be left untouched. Such patients, while technically meeting criteria for urinary and/or fecal diversion, more often than not lead lives that make diversion ethically fraught. The potential for stenosis, stones, infection, cancer, stomal prolapse, and metabolic imbalance mandates ready, regularly scheduled access to diversion monitoring, management, dietary supplementation, and stoma supplies for the rest of the patient’s life. If these postdiversion conditions cannot be met, a diversion procedure is out of the question. If postdiversion criteria can be met, then the patient must be prepared to live the stoma/diversion lifestyle. For many fistula patients, fistulous efflux of bodily waste(s) is preferable to a diverted stoma.

KEY POINTS

- In a patient who has recently experienced a prolonged and obstructed labor, conservative management may be an option for prevention.
- In a patient who has experienced a traumatic delivery with a fresh, small fistula, continuous catheter drainage and debridement as needed may be an option of treatment.
- Realizing that the first procedure stands the best chance of success, the basic principles of fistula surgery include:
 - The handling of the tissues should be gentle, the dissection meticulous, and hemostasis complete.
 - The fistula should be widely mobilized from surrounding tissues.
 - The ureters should be protected.
 - The closure should be without tension at the site of the repair.
 - The repair should be watertight.
 - The bladder should be drained for 10–14 days.
- A simple VVF can usually be successfully closed by carefully following the above-stated principles and with proper preoperative preparation and postoperative care.
- The preoperative preparation promotes hygiene, hydration, and proper nutrition to improve wound healing and reduce infection. In that respect, proper instrument sterilization may promote healing and protect the site of repair.
- A complex VVF requires additional steps to insure proper exposure with episiotomies in the presence of severe scarring. It challenges one’s ability to maintain continence because of involvement of the continence mechanism or the complete or partial destruction of the urethra and the small bladder size. Additional steps for urethral reconstruction, reattachment, and support are usually needed.
- Although a vaginal approach is generally preferred, an abdominal one may be needed in circumstances in which a complicated fistula involves ureteral re-implantation or is otherwise inaccessible vaginally because of its location or scarring.
- An incurable fistula is one that requires diversion methods as determined by two expert fistula surgeons when such diversion can be appropriately monitored for life.

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CHAPTER IV

COMPLICATIONS AFTER FISTULA SURGERY AND THEIR MANAGEMENT

OVERVIEW OF COMPLICATIONS

A number of complications may occur during the course of repair, and some of these and their management will be described here. Lower urinary tract and colorectal dysfunction persisting or occurring *de novo* after obstetric fistula (OF) repair often affects the patient as severely as did the fistula. Setting patient expectations in advance of fistula surgery, to the extent possible by cultural and educational factors, helps prepare the preoperative fistula patient for the possibility of long-term therapies, staged surgeries, and adjunctive medications that may be needed to restore, or partially ameliorate, chronic pelvic floor dysfunctions, whether they are incidentally concomitant or further sequelae of the obstructed labor that caused the fistula.

COMPLICATIONS OF OBSTRUCTED LABOR AND FISTULA SURGERY

Most published data from experienced surgeons report that 2%–3% of fistula are incurable at screening, and, of the remainder, 90% of the favorable cases can be successfully closed on the first repair, with incrementally lesser success rates with each recurrence and subsequent repair.¹⁻³ To echo these statistics, consider Dr. Kees Waaldijk's statement, "There are no simple fistulas. It only looks simple in the hands of the few expert fistula surgeons."

Common complications after fistula surgery are:

- Hemorrhage
- Infection/dehiscence
- Surgical injury
- Anuria
- Deep vein thrombosis (DVT)
- Urethral and vaginal strictures
- Bladder stones
- Gynecologic complications, such as hematometra, menouria, secondary amenorrhea, and secondary infertility

Early Complications

Complications that may appear soon after fistula repair surgery include the following.⁴

Anesthetic Complications

These are generally of two varieties:

- From the medications given: dosage problems; allergic reactions
- From the anesthetic procedure: largely depend on the type of anesthesia (e.g., general with or without endotracheal intubation; spinal anesthesia)

Complications after Fistula Surgery and Their Management

Hemorrhage

Hemostasis should be maintained throughout surgery. Hemorrhage during surgery can be mild, moderate, or severe. If necessary, blood should be transfused and hemostasis achieved. Primary hemorrhage, which occurs within 24 hours of surgery, is usually from unsecured bleeding points. Secondary hemorrhage, which occurs more than 24 hours after surgery, is due to infection with erosion into a vessel, which occurs 1–2 weeks after surgery. Secondary hemorrhage is due to infection, which can be treated with antibiotics, vaginal packing, and blood transfusion.

Vaginal Hemorrhage	Management
Characterized by vaginal bleeding, including through the vaginal pack	This complication requires immediate attention. Assess the amount of bleeding, start primary management (of hemorrhage), and inform the attending doctor , who will decide on further management. <ol style="list-style-type: none">1. Assess for shock and manage accordingly.2. If bleeding is not arterial, a firm vaginal pack may be used.3. If bleeding is arterial, the patient will need to be taken back to the operating theater.4. The surgeon will evaluate the causes of the patient's bleeding.5. If the bleeding has been severe, check the hemoglobin level and treat with iron supplementation as needed.
Bladder Hemorrhage	Management
Characterized by gross hematuria	This complication requires immediate attention. Start primary management (of hemorrhage) and inform the attending doctor, who will decide on further management. <ol style="list-style-type: none">1. Medical management (tranexamic acid and blood transfusion)2. Surgical management

Infection

Infection can involve the wound, the urinary tract, and the respiratory tract. Wound infection can lead to early breakdown of suture line, urinary or fecal incontinence, and stricture formation in the urethra or vagina. Wound infection can also lead to gynecological problems like hematometra, menouria, infertility, amenorrhea, and dyspareunia. These can lead to psychological problems as well. Wound dehiscence and failure of repair usually occur after the first week or about days 9–12 postoperatively. Meticulous attention to patient preparation for surgery, including nutritional status, aseptic techniques, proper surgical techniques, and appropriate sutures, antibiotics, and postoperative care, can be helpful in preventing wound infection. If infection leads to wound breakdown, the catheter should be left longer; cleaning the wound regularly and sitz baths and irrigation can also help.

Wound Sepsis	Management
Characterized by fever, foul smell of urine or vaginal discharge, pain on urination or lower abdominal pain, and/or pain and swelling or discharge at the episiotomy site	<ol style="list-style-type: none"> 1. Inform the doctor of the patient's symptoms immediately. 2. Take a sample for culture and sensitivity. 3. The doctor will treat infection of the repair site or the urinary tract with appropriate antibiotics. 4. If the wound is infected, it may need to be reopened. 5. Personal hygiene, nutrition, and wound care are needed. 6. Psychological and physical support should be given.
Breakdown of Repair	Management
Characterized by the patient being wet from leaking urine	<p>Inform the doctor that the patient is leaking urine. <i>Note:</i> Before catheter removal, the doctor will check for completeness of repair using a dye test.</p> <ol style="list-style-type: none"> 1. If the test is positive, the catheter remains <i>in situ</i> and on free drainage for an additional 4–6 weeks, to facilitate healing. 2. If within 48 hours, reassess in the theater. 3. If the breakdown occurs early (within 5 days of surgery), it is unlikely that prolonged drainage will help healing. 4. Breakdowns that occur 7–14 days after surgery may respond to prolonged drainage. 5. Provide psychological support to the patient. 6. Provide personal hygiene and nutritional support.

Surgical Injury

Injury can occur to surrounding pelvic structures like the bladder, urethra, ureters, and bowel during vesicovaginal fistula (VVF) repair. When recognized during surgery, these injuries should be dealt with immediately. These injuries can occur due to cauterization, crushing, tearing, and tying of surrounding structures, especially when there is extensive fibrosis and adhesions. Ureters can be catheterized prior to VVF repair to prevent accidental ureter injury during surgery.

Anuria

Anuria after fistula surgery can occur due to blocked catheters, ureteric ligation, and prerenal or renal failure. If due to blocks, the catheter should be unblocked by flushing or changing. Ureteric injuries must be managed immediately by releasing the suture, repairing the tear, and re-implanting the ureters as needed.

Anuria	Management
Characterized by absence of urine in the basin or drainage bag	<ol style="list-style-type: none"> 1. See the vitals to rule out shock. 2. Check that the catheter is not blocked. 3. Ensure that the patient has been drinking/getting the recommended amounts of fluids. 4. Monitor urine flow closely and carefully; if the patient is not producing urine, inform the attending doctor, who will decide on further management.

Deep Vein Thrombosis

Strategies to prevent DVT include early mobilization/physiotherapy, use of compression stockings, anticoagulants, and aspirin. These should be considered in high-risk patients.

Late Complications

Complications that may appear later include the following.

Urethral and Vaginal Strictures

These strictures occur as a delayed complication. They can be managed by scar incision and urethral dilatation or intermittent catheterization.

Recurrence

One of the most painful complications is that of fistula recurrence after surgical repair.^{5,6} Persistent leakage may be managed with another week or two of drainage. Most recurrences are smaller than the original defect, but are prone to the multiple-opening configurations.

Fistula recurrences that occur after dry discharge from the hospital are poorly understood. Regardless of etiology, the method of recurrence evaluation and management is identical to primary evaluation and management.

Vaginal Fibrosis and Coital Incapacity

This complication needs careful evaluation and treatment with vaginoplasty and dilatation with a mold.

Symptomatic Stenosis

Stenosis and obstruction of the colorectal or urinary tract may plague the patient with a successfully closed fistula. Every effort must be made to find and treat preoperation strictures at the time of fistula surgery. All fistula patients warrant daily evaluation for costovertebral angle tenderness. Any back pain must be screened with sonography if available.

Urethral stenosis may be managed with dilation. Anal stenosis after rectovaginal fistula (RVF) repair usually complicates sphincteroplasty done concomitantly with fistula repair and typically needs incision and drainage, as it results in wound breakdown. For anal stenosis with attendant defecatory dysfunction that does not result in wound breakdown, methods that may prove useful in anatomically or pharmacologically relaxing the anal sphincter include dilation, anal revision sphincterotomy, or topical diltiazem ointment 6%.

Bladder Stones

Bladder stones are relatively common after fistula surgery, particularly with urethral stricture. First, a urethral stricture should be ruled out. Stones of different sizes are removed as follows:

- Stones <2 cm: endoscopically
- Larger stones: via a suprapubic cystostomy

The patient should be encouraged to drink plenty of fluids to prevent infection and recurrence.

Infertility/Amenorrhea

Gynecologic complications include hematometra, menouria, amenorrhea, and infertility, which might be present before surgery. Hematometra is usually caused by vaginal and cervical stenosis. This is managed by draining the uterus and stenting the cervical canal. Menouria is caused by the cervix draining into the bladder. This is managed by separating the bladder and cervix and interpositioning the omentum between them.

Bladder and Bowel Dysfunction

Dysfunctions of storage (incontinence) and emptying (voiding dysfunction including total urinary retention; defecatory dysfunction including fecal impaction or rectal obstruction) may occur individually or in combination after successful closure of a fistula defect.

Incontinence is by definition symptomatic, but voiding and defecatory dysfunction may not be as evidently symptomatic or may be symptomatic in atypical ways such that diagnosis can be difficult.

A detailed history, careful physical exam, office testing, and self-monitoring help set the stage for accurate diagnosis, the key to successful treatment. Delineation of therapeutic success may be related to patient definition of success (closed, dry, coital capacity, fertile, pain-free, and neurologically intact), surgically closed and continent, closed and somewhat incontinent, closed and severely incontinent, and closed with lower urinary or colorectal dysfunction other than incontinence.

Persistent Lower Urinary Tract Dysfunction

Up to 30% of patients suffer urinary incontinence after repair of urinary tract fistula.^{5,7} The prevalence of postfistula voiding dysfunction is not known but is common to the experience of fistula clinicians.

Urinary incontinence after OF closure may be caused by:

- Overactive bladder
- Poorly compliant, low-capacity bladder
- Atonic bladder with overflow incontinence
- Stress incontinence from urethral and/or direct sphincter damage or short urethra
- Combination of these conditions (most common)

In its severest form, stress incontinence is caused by a totally nonfunctional urethral tube, called “drainpipe urethra.” Drainpipe urethra is common in full-reconstruction neo-urethra, as the urethra has no original fibrosphincteric function. Loss of bladder wall surface area occurring with extensive fistula typically results in severely reduced bladder capacity. Bladder fibrosis may lead to severe loss of bladder compliance.

Sling surgery will not improve continence with this condition. Any woman suffering incontinence or voiding phase dysfunction after fistula repair warrants a meticulous consideration of all possible bladder conditions of storage and voiding.

Evaluation may include the following tests; each of these tests may be repeated to monitor progress of therapies.

- Bladder diary
- Pad test
- Urinalysis to rule out infection
- Urodynamics (simple cystometrics, multichannel urodynamics)

The details of these tests are given in the appendices.

BLADDER DIARY

(Refer to Appendix 6)

In a bladder diary, the patient records voiding times, voided volumes, and wetting episodes with attendant symptoms and activities for a 24-hour period. This diary allows the clinician to quantify functional bladder capacity (maximum voided volume on a diary) and frequency of voiding and wetting.

PAD TEST

(Refer to Appendix 7)

A pad test allows the clinician to determine the volume of urine leaked into pads over a 24-hour period.

SIMPLE CYSTOMETRICS

(Refer to Appendix 8)

Simple cystometrics allows for rudimentary evaluation of cystometric bladder capacity; frank detrusor instability (the underlying condition of overactive bladder/urgency incontinence); demonstration of stress incontinence; and, when combined with post-fill measurement of urination, evaluation of voiding efficiency/postvoid residual volume.

CYSTOSCOPY

When available, cystoscopy allows evaluation of urethral contour, visualization of strictures and false passages, bladder contour, ureteric orifice, configuration and efflux, evaluation of ureteric patency through passage of a 5 or 6 French stent from orifice to renal pelvis, and degree of any bladder trabeculation.

Trabeculation may be a variant of normal in older patients but is also commonly found in obstructed and neurogenic bladders.

URODYNAMICS

(Refer to Appendix 10)

Urodynamics (UDS) is a valuable tool when properly applied.⁸ UDS equipment must be available to the fistula surgeon prepared to offer himself or herself as the designated trainee and UDS program director.

UPPER AND LOWER URINARY TRACT IMAGING

Sonography done vaginally or transperineally may visualize ureteric efflux, while upper tract sonography allows efficient demonstration of obstructive nephropathy. Intravenous urography may further delineate the contours of the upper tract collection system and bladder contour, with the potential to demonstrate recurrent fistula. Retrograde cystography is of little value in evaluating incontinence or voiding dysfunction but may be another method by which to diagnose occult fistula recurrence.

TREATMENT OF LOWER URINARY TRACT DYSFUNCTION

Kegel Exercises

(Refer to Appendix 9)

For stress incontinence and urge incontinence, pelvic floor physical therapy, also known as Kegel exercises, have decades of data showing reduction and/or cure of incontinence in men and women with urinary and fecal incontinence. None of this historic and compelling data included women incontinent after OF surgery, many of whom have complete levator muscle atrophy rendering them incapable of pelvic floor exercises. However, in women with intact levators after obstructed delivery, Kegel exercise teaching is possible and useful.¹¹ In postfistula women with normal-capacity bladders and muscles that contract on bimanual exam, pelvic floor physical therapy does no harm and may improve continence. The exercises are tailored to the patient's ability.

Anticholinergic Medications

Although stress incontinence may be treated surgically, urge urinary incontinence may only be treated nonsurgically, typically with anticholinergics, such as oxybutynin, that reduce bladder overactivity by blocking muscarinic contractility of the detrusor smooth muscle. Women with mixed stress and urge incontinence must be counseled that the surgery for stress incontinence will not cure the urge incontinence and that the pills for overactive bladder will not prevent leaking with activities such as coughing, laughing, and carrying.

Stress Incontinence Surgery

Surgery for stress incontinence may be done only in a bladder of normal capacity and normal compliance. The gold standard stress incontinence procedure is an autologous fascia urethral sling.

The urethral sling for stress incontinence, classically done with rectus fascia harvested through a Pfannensteil incision (or fascia lata), then tunneled through the space of Retzius and pubovesical fascia to fashion a tension-free hammock resting at the level of the bladder neck, presents special technical challenges in the postfistula stress incontinent patient.

Atonic Bladder

Atonic bladder may be dealt with by intermittent self-catheterization. Atonic bladder combined with stress incontinence may also respond well to self-catheterization.

Bladder Augmentation

Poorly compliant bladders rarely respond to anticholinergics, but, as mentioned earlier, this therapy is worth a 5-day trial. The optimal therapy for poor bladder compliance is bladder augmentation. Most commonly, a woman with a low-capacity/poorly compliant bladder is given the option of urinary diversion or indwelling catheter, a painful choice in any socioeconomic setting.

The **urethral plug** is a relatively new option popular among fistula surgeons working in Ethiopia.³ Designed as a short, nonpatent catheter secured with a meatal button platform below and an intravesical inflatable balloon above, the plug lives up to its name. It has utility both for moderate and more severe “drainpipe urethra” stress incontinence and also with low-capacity/low-compliance bladder leaking, as long as capacity permits plug insertion.

PERSISTENT COLORECTAL DYSFUNCTION

After successful RVF repair, persistent fecal incontinence is most commonly due to an unrepaired anal sphincter and/or severe unrepaired perineocele. Defecatory dysfunction most often comes from an unrecognized or *de novo* intrarectal stricture or baseline dysmotility disorder.

Primary dysmotility disorders have no surgical therapies and only often ineffective medical therapies, relying heavily on stimulant laxatives to improve the defecation motility reflex.

Treatment of Colorectal Dysfunction

Kegel exercises: As with urinary incontinence, pelvic floor therapy can strengthen pelvic floor muscles.

Diet: Dietary fiber bulking aids women with fecal incontinence by increasing stool volume. Many women incontinent with soft or loose stool are continent with formed stool.

KEY POINTS

- Intraoperative complications can be related to anesthesia (arrhythmias, hypersensitivity reactions, hypotension) or surgery and are treated accordingly. Hemorrhage and visceral injury are the most common surgical events requiring correction and repair.
- Complications in the early postoperative period should be closely monitored and anticipated. They include delayed hemorrhage; infections; anuria from prerenal (hypovolemia); renal (acute tubular necrosis); or postrenal (ureteral ligation, blocked catheter) etiologies and thromboembolic events.
- Late complications are the result of the combined effect of the initial injury and the surgical insult. They are mainly the result of strictures, scarring, and stenosis. They affect the gynecologic (hematometra, menouria, amenorrhea, and infertility), urologic (anuria, stone formation, incontinence, and retention), rectal (defecatory dysfunction and incontinence), and sexual functions (dyspareunia and apareunia).
- In complex fistula, residual urinary incontinence is not rare and may be due to stress incontinence, urgency incontinence with overactive bladder, overflow incontinence with urinary retention, and incontinence as a result of a small, noncompliant bladder. Bladder evaluation including simple cystometrics and UDS may help differentiate and diagnose.
- Treatment of residual incontinence should be directed at the cause and could include drugs (overactive bladder), plugs, biofeedback and Kegel exercises (stress and urgency incontinence), or surgery (stress, retention, and noncompliant bladder).
- Anorectal dysfunction and incontinence can likewise be evaluated with anorectal manometry and ultrasound imaging of the anal sphincter. Treatment includes alteration of stool consistency, drugs, biofeedback, and surgery.

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Complications after Fistula Surgery and Their Management

CHAPTER V

CARE OF WOMEN WITH OBSTETRIC FISTULA

OVERVIEW OF NURSING CARE OF WOMEN WITH FISTULA

Nurses and midwives play a major role in the care of women who live with obstetric fistula (OF) and seek health care. They are responsible for many of the procedures that help prevent infection at all stages of the patient's treatment. Nurses and midwives often perform the initial assessment of women living with OF. These women require preoperative assessment, laboratory investigations, and preoperative preparation counseling. They sometimes require a prolonged hospital stay before surgical repair due to comorbidities like poor nutrition, joint contractures, nerve paresis, depression, etc. After surgical repair, they need to stay for at least 2 weeks; if any complication arises after surgery, their stay can be much longer. During their hospitalization, these women will interact mostly with the nurses. A committed and dedicated nurse and her team can make significant contributions in the care of women with genital fistula if they are trained, motivated, and experienced with the admission, counseling, preoperative preparation, and postoperative care. A nurse with good interpersonal communication skills can effectively counsel and provide psychological support to the woman and her family members as well as advocate for OF prevention.

Nurses also manage patients who present with fresh fistula. Catheter care is an important nursing function. Nurses and other trained skilled birth attendants (SBAs) are in the optimal position for early catheter intervention in all fistulous or near-fistulous women with postobstructed labor. They may also take responsibility for wound care debridement and timely communication with the fistula surgeon regarding successful spontaneous closure or referral for early surgical closure when debridement does not facilitate complete healing.

PREVENTION OF OBSTETRIC FISTULA

OF is a preventable condition. The main cause of OF is lack of or inadequate or improper care during labor. Prevention of OF can be categorized as primary, secondary, and tertiary prevention. **(Refer to Chapter III: Prevention of Obstetric Fistula.)**

SUPPORTIVE AND PSYCHOLOGICAL CARE OF WOMEN WITH FISTULA

One of the important aspects of the care provided for women being treated for OF is that they will require supportive and empathetic care along with the surgical repair. This starts when they first present at the reception desk of an outpatient clinic and continues with their inpatient stay through discharge from the hospital.

Many women with OF have been traumatized by prolonged labor and a stillborn baby, leading to subsequent neglect and abandonment by husbands, other family members, and their community once they start leaking urine and/or stool. Some may see themselves as cursed, and they may be frightened, anxious, and depressed. They may never have visited any health facility. The nursing team should talk to each woman individually to alleviate any specific fears that she may have and let her know that the staff are available to help her. Supportive and empathetic care will help women to adjust to the hospital environment as well as prepare them psychologically for a successful operation and recovery period. Some women may have had surgical repair attempted in the past, which may have failed. These women may be even more anxious and upset.

After admission, the patient with OF will be subjected to a number of unfamiliar intimate and uncomfortable examinations and procedures and will need anesthesia and a major operation. Because

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these can be frightening, patients should, ideally, be supported through each step by the reassuring presence and touch of a nurse or a nurse's aide. Each procedure should be explained beforehand as well as step by step throughout the process. The patient should be informed of what is being done at each point and why, in a language that she is able to understand. This counseling part is very important, and all the members of the treating team should provide appropriate counseling to OF patients.

There are six stages of service delivery:

- First contact
- Clinical intake or evaluation
- Preoperative management
- Intraoperative management
- Postoperative management
- Discharge and follow-up

Counseling for the OF woman has to be a part of every stage of service delivery. Counseling is an integral part of comprehensive OF care services. As such, nurses and midwives need to be able to provide counseling related to fistula prevention and management and the reintegration of patients post-repair.

COUNSELING FOR FISTULA PREVENTION

Counseling for OF prevention falls into three types, based on when it occurs:

- Preconception counseling
- Antenatal counseling
- Postnatal counseling

Preconception Counseling

The competencies (i.e., skills and actions) for preconception counseling include:

- Explaining the causes of fistula and the importance of antenatal care
- Explaining how to prevent fistula with proper nutrition of female children, delay of early childbearing, and use of family planning
- Engaging partners and/or others influencing decision-making in the family

Antenatal Counseling

The competencies for antenatal counseling include:

- Providing information on understanding danger signs during pregnancy and knowing when to go to the hospital, accessing timely hospital services during labor, and making a birth preparedness plan (including making plans and setting aside funds for transportation)
- Educating husbands and other family members about the risks of prolonged labor and about the importance of delivery being performed by a trained provider
- Encouraging the concept of seeking care much earlier after labor starts, before the second sunset

Postnatal Counseling

The competencies for postnatal counseling include:

- Providing information on the healthy timing and spacing of pregnancies and the family-planning options available
- Providing information on optimal nutrition for the new mother and her infant—particularly the nutritional needs of female infants
- Explaining the possibility of leakage of urine in the postpartum period with a history of prolonged labor and educating about the importance of early check-ups

FISTULA MANAGEMENT COUNSELING

Any counselor must have knowledge about the patient and her situation so that counseling is appropriate for the patient's needs. Counseling related to the management of OF falls into four types, based on when it occurs:

- Preoperative counseling
- Intraoperative counseling
- Postoperative counseling
- Discharge counseling

Preoperative Counseling

The competencies (i.e., skills and actions) for preoperative counseling include:

- Assessing the patient's ability to give and receive information and exploring the patient's needs and feelings
- Providing information on the initial assessment; possible treatment options; potential outcomes; and possible side effects, complications, and risks
- Linking the patient with social support groups and/or resources within the facility
- Maintaining emotional support through verbal and nonverbal communication, using techniques to minimize fear and anxiety
- Providing information on the patient's expected postoperative role in self-care, catheter care, mobility, nutrition, pain management, complications and danger signs, physiotherapy, period of sexual abstinence, future childbearing, family-planning needs, and the need for close antenatal care and cesarean delivery for subsequent pregnancies

Note: When available fistula repair services are limited, the patient must wait at home until her repair surgery can be scheduled and performed. Although specific preoperative counseling instructions for the patient will vary depending upon her condition, the resources she has at home, and local medical protocols, those instructions typically include information about how to care for the fistula, the need to take sitz baths, drinking plenty of water (enough fluid so that the color of the urine is the same as water), and the importance of good nutrition.

Intraoperative Counseling

The competencies for intraoperative counseling include:

- Protecting the patient's privacy and ensuring her respect and dignity

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- Providing reassurance and comfort before administration of anesthesia
- Providing information about the anesthesia to be used, its risks, and the management of pain

Counseling needs during the intraoperative period vary, depending on whether the surgery is conducted under general or spinal anesthesia. Nurses and midwives must always maintain emotional support for the patient by:

- Providing positive, empathetic verbal and nonverbal communication
- Alleviating patient fears regarding surgery
- Offering reassurance, comfort, and reasons for hope
- Providing information about the following as appropriate, based on the patient's condition and discussion with the surgical team looking after her: the type and risks of the anesthesia to be used, pain, and the steps involved in the procedure

Note: The theater staff should avoid focusing exclusively on the perineum and ignoring the patient while the repair is being done.

Postoperative Counseling

The competencies for postoperative counseling include:

- Maintaining emotional support and monitoring pain management needs during the immediate recovery period
- Providing information as indicated related to surgery outcome, self-care, catheter care, mobility, nutrition, pain management, complications and danger signs, physiotherapy, period of sexual abstinence, future childbearing, family-planning needs, the need for close antenatal care, and the need for cesarean delivery for subsequent pregnancies
- Engaging partners and/or others influencing decision-making in the family about the recovery needs of the patient (e.g., rest, follow-up at the facility, sexual abstinence, and the use of family planning for delay of desired pregnancy until healing is complete) and about support for the patient to receive close antenatal care and cesarean delivery for subsequent pregnancies

Discharge Counseling

The competencies for discharge counseling include:

- Assessing the patient's feelings, questions, and concerns regarding the recovery phase and the future
- Providing discharge information according to the postoperative management plan and information on healthy nutrition, sexual abstinence for 3 months, avoidance of reproductive tract infections (including sexually transmitted infections), delaying pregnancy, and management of stress incontinence
- Reinforcing the importance of information discussed during postoperative counseling regarding sexual abstinence, family planning, the need for antenatal care, and the need for cesarean delivery for subsequent pregnancies
- Scheduling a follow-up visit within 3 months of surgery and emphasizing the importance of keeping the appointment at the facility even if the patient feels well
- Assessing additional psychosocial needs and linking the patient with additional counseling services or referral for additional services and with community organizations that support women with fistula repair

REINTEGRATION AND REHABILITATION COUNSELING

Counseling related to the reintegration of patients with OF falls into three types, based on the situation that it addresses:

- Counseling on physical therapy/physiotherapy
- Counseling on community/family reentry
- Counseling on livelihood

Counseling on Physical Therapy/Physiotherapy

The competencies (i.e., skills and actions) for counseling on physical therapy or physiotherapy include:

- Exploring the patient's feelings about her physiotherapy progress
- Exploring the patient's feelings about her progress to independence

Counseling on Community/Family Reentry

The competencies for counseling on community/family reentry include:

- Exploring the patient's feelings about her acceptance and functioning within the family and/or community
- Linking the patient with community and/or social services that address her changing needs

Counseling on Livelihood

The competencies for counseling on livelihood include:

- Linking the patient with skills-building for income-generation opportunities and management of her resources
- Explaining the importance of staying in a rehabilitation center until properly recovered from disability

Note: In cases in which surgery was unsuccessful, counseling related to reintegration should also provide information specific to the patient's condition, including why the surgery failed, possible future procedures and options, complications and/or infections, personal hygiene and nutrition, management of incontinence, and the need to delay pregnancy until after a future procedure.

REGISTRATION AT AN OUTPATIENT DEPARTMENT

A warm welcome for women registering at an outpatient department is very important. The role of the registration officer is key, as he/she is the first person the patient with OF will meet. The receptionist should be a kind, sympathetic person. It is important to document the details of each case carefully as this not only helps with developing a patient care plan but also provides crucial data for professionals and health-care planners to use in helping to advocate for and provide better service for other women in the future. A special card should be prepared for each woman to record where she is from, how far she has traveled, how she arrived at the hospital, etc. The person working at the registration desk should introduce the patient to the OF nurse's or doctor's team.

THE OUTPATIENT EXAMINATION

A nurse or a nurse's aide should accompany the woman into the examination room and gently show her to a chair near the examining doctor, where a brief medical history is taken. If possible, the accompanying nurse should stay with the woman throughout her examination and subsequent discussion. The medical

history will be followed by a physical examination. After the examination, the woman should be informed of the findings. When possible, her relatives should then be called in, and the patient's condition and the possible options and outcomes for her treatment should be explained to them. Time should then be allowed for both the woman and her relatives to discuss the possible options and ask any questions before they decide whether to undergo surgical repair.

CARE AFTER ADMISSION IN THE GYNECOLOGY OR FISTULA WARD

Women admitted for OF surgery in a hospital may feel nervous and frightened in the new environment. Both the patient and her family members will be interacting more with the nurse than the treating specialist and will feel more comfortable communicating with the nurse. The nurse should talk to the patient politely and use language that she understands. These patients will require a prolonged hospital stay, so the nurse should orient them to the hospital premises and familiarize them with the bathroom, kitchen, laundry, pharmacy, garden, temple, etc. A patient may require clean clothes, blanket, bed-sheets, etc. The nurse will have to instruct her about taking a bath, maintaining hygiene, and cleaning the perineum. Some women may have poor nutritional status, so the nurse may have to instruct them about food and coordinate with the hospital dietician about their meals.

Women with OF can give off a urinary odor, which can lead to discrimination by other patients and visitors. If possible, OF patients should be kept in a separate room prior to surgery. A well-balanced diet should be provided, and deworming should be done. If the patient is very weak, she will require supportive nursing care. She may need help with her personal care, including bed baths, and she should receive appropriate medical supervision when required.

On admission, each woman should be checked for signs of nerve injury in her lower limbs. These should be assessed by examining her gait and noting if she is able to move her toes, ankles, knees, and hips in normal directions. Common presentations include foot drop on one or both sides and, less frequently, weakness of the hip muscles or the quadriceps/hamstring muscles. Such injuries are common but may be missed and can quickly lead to the development of contractures, which will require prolonged physiotherapy before and after surgery.

PERIOPERATIVE NURSING CARE² (REFER TO APPENDIX 4)

Preoperative Care

The normal preoperative preparation is followed like in any other operation. For the woman with vesicovaginal fistula (VVF), an additional preparation is abundant preoperative oral fluid intake, which cleans the fistula, bladder, and urine and hydrates the patient so that spinal anesthesia becomes safe. Other advantages with abundant fluids are that the ureters can be identified, the occurrence of catheter blockage postoperatively is minimal, and patient compliance is ensured.

Diet

A high-protein, high-calorie diet is essential for women with OF both prior to and after surgery. These women may be suffering from nutritional anemia and malnutrition. They should be encouraged to drink at least 3–5 liters of water a day to discourage the development of bladder calculi. Two days before surgery, the patient should be given a light diet only, but encouraged to maintain a high oral intake of fluids; the day before surgery she should have a liquid diet. She should be instructed to stay nil per os (NPO) from midnight prior to the surgery.

Medication

Medication should be given according to institutional protocols and may include:

- Iron supplementation if required
- Anthelmintics if needed, or according to the routine protocol for bowel care and preparation
- Sedation (lorazepam 1 mg) the night before surgery
- Administering premedication, if ordered by surgeon and anesthetist
- Preoperative antibiotic coverage:
 - Give tinidazole 2 g orally the night before surgery.
 - Give gentamycin 2 mg per kg 30 minutes before surgery; repeat the dose if surgery is more than 3 hours' duration; if there is fecal contamination, add metronidazole 500 mg intravenously (IV) every 8 hours and continue for a minimum of 3 days.

Bowel Care

- A rectal enema (optional for VVF, essential for rectovaginal fistula [RVF]) with warm, soapy water or a glycerin-based enema (e.g., Easyvac) should be given until clear water returns.
- For women with RVF or a complex fistula, some surgeons give castor oil 30 cc with plenty of water 2 days prior to surgery.

Other Preoperative Care

- The nurse must ensure that the patient understands the operation and signs the informed consent form a day prior to surgery.
- The nurse must ensure that the patient's preoperative vital signs have been checked and recorded.
- The nurse must ensure collection of reports of tests that may have been performed, including blood tests, x-ray studies, etc.
- The nurse must ensure that the patient's hygiene is maintained, her pubic hair has been trimmed or clipped, and that she is wearing proper hospital dress.
- The nurse must ensure that patient has had nothing orally for at least 6 hours prior to surgery.
- The nurse must know the type of operation to be performed.
- The nurse must know the patient's detailed medical and surgical history and any possible allergies.
- The nurse must prepare the woman emotionally and psychologically for the surgery by talking to her and answering her questions.
- The nurse must ensure that the patient and her family member understand probable outcomes of the surgery including success, complications, and failure.
- The nurse must ensure that all relevant information is passed on to the other members of the operating theater team.

Patient Counseling and Consent

The surgical team members usually take the informed consent after counseling. The nurse has to make sure the woman understands the procedure, its risks and success/failure probabilities, and other aspects of surgery and care after surgery before signing the consent form. The nurse has to ensure that the consent form has been signed and that the woman is on the surgery list as planned.

PREPARATION OF THE PATIENT FOR SURGERY

Intraoperative Care

The following steps are from the 2009 World Health Organization (WHO) surgical safety checklist and must be completed before any surgery.

Before Anesthesia Induction

- Patient identity, site of surgery, procedure, and consent should be confirmed.
- The anesthesia machine and medications should be checked.
- Any history of allergy should be noted.
- A difficult airway and aspiration risk should be noted.
- Two IV access sites should be ready if blood loss is expected to be >500 ml.

Before Skin Incision

- All team members (surgeons, anesthetist, and nurse) should introduce themselves.
- The patient's name, procedure, and site of incision should be reviewed.
- Antibiotic prophylaxis should be confirmed.
- Anticipated critical events should be discussed (e.g., any critical steps, time duration, anticipated blood loss).
- Specific patient concerns should be discussed.

Before the Patient Leaves the Operating Theater

- The name of the procedure should be confirmed.
- Completion of the surgical checklist should be done.
- Specific concerns for recovery and postoperative management should be addressed.

Patient Reassurance and Support

Nurses have a vital role to play in providing support and reassurance for women with OF before and during the operation. Besides reassurance, nurses can provide a step-by-step explanation of what is happening during induction of anesthesia as well as during the operation itself. A nurse who speaks the patient's language and who can be with her and answer any questions can be helpful. Most women are awake during the repair of a VVF, as a spinal anesthesia is usually used for the surgery. For more extensive surgery, general anesthesia may be given.

In addition to providing support and reassurance the nurse or nurse's aide will:

- Help the surgeon or other staff to shift the woman gently on the operating table in the required position
- Ensure that her vital signs are regularly monitored
- Record on the operating note sheet the number of instruments, sutures, and vaginal packs used and left in situ
- Assist the surgeon as scrub nurse or circulating nurse during the surgery

Preparation of Personnel

Surgical team members should wear proper operating theater dress, including cap, mask, and footwear as per hospital protocol.

Preparation of Operating Theater

- Equipment and instruments needed for OF surgery are checked against an operating list.
- Special attention is given to the operating table and accessories to ensure that these are in working order.
- The spotlight or portable light fittings are inspected for illumination and focus.
- All electromedical apparatus such as the diathermy and suction machines and pipeline suction sets are switched on and tested.
- Anesthetic equipment should be checked.
- The floor should be clean and dry.
- Emergency supplies and drugs should be checked.
- Ensure that there are adequate numbers of theater dress for the surgical team.
- Ensure that clean linen is available.
- Ensure that sterile supplies (gowns, gloves, gauges, and instruments) are available.

PREPARATION OF INSTRUMENTS AND SUPPLIES

Specific equipment is used for OF surgery. Some may be used very frequently. Each instrument and piece of equipment should be in proper functional condition in the operating theater. This equipment should be inspected regularly, and any defective or missing instrument should be replaced.

Draping Packs for Surgery

Draping packs must be of sufficient thickness and must be fan-folded, so that they can be opened quickly and with aseptic technique. Drapes and instruments need to be sterilized before surgery.

The following instruments must be set in a tray and packed properly: laparotomy sheet, table cover, Mayo covers, towels, tetra legging and gowns for the surgery team, Macintosh.

Supplies

Sutures, syringes, blades, antiseptic solution, vaginal packs, indwelling catheters, ureteric catheters, double J stents, urobags, methylene blue, decontamination solution, IV solution, and antibiotics must be ready for surgery.

BLUE TEST

Before surgery, the blue test is done for diagnosing the fistula. Similarly, the blue test is also done after surgery to ensure that watertight repair has been achieved, and other tiny fistula have not been missed. For both blue tests, preparation is the same.

PATIENT PREPARATION AND POSITIONING

After the patient is received from the ward with complete reports, she is transferred to the operating table, where she is placed in the proper position for surgery. Careful and correct positioning of the patient is

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very important to provide good visualization for surgery and to prevent harm to the patient due to pressure on the nerve and vessels. Nerves may be damaged when they are compressed or stretched by hyperextension of the joints. Damage due to ischemia and pain may result in paralysis. The patient is positioned by the circulating nurse, her assistant, the anesthetist, the surgeon, or the surgeon's assistant, depending on the hospital's practice.

For fistula repair by the vaginal route, an exaggerated lithotomy position is needed. In this position, the patient lies on her back, and her buttocks are placed at the edge of the operating table. The patient's legs are flexed at the hips, and her knees raised on the leg rests, stirrups, feet supporters, or slings. A deep Trendelenberg tilt of the operating bed is desirable for vaginal fistula surgery.

Important Points for Positioning

- The arms are secured on the arm board.
- Both legs are flexed and abducted and secured by the webbing slings on the outer side of the poles or legs stirrups. Similarly, in returning the patient to a supine position at the completion of surgery, both legs are removed from the supports simultaneously and slowly moved to the flat position.
- Ensure that lithotomy poles are padded to minimize any pressure on the patient's legs.
- Avoid exposing the patient's skin to the metal part of the stirrups to prevent diathermy burns.
- Ensure that the patient's legs are not in hyperabduction, especially for elderly patients or those with any hip problems like arthritis or prior hip surgery.



Source: Practical Obstetric Fistula Surgery, Brian Hancock, MD, FRCS.

Figure 5-1: Positioning for surgery

GOWNING, GLOVING, AND SCRUBBING

All sterile team members should perform hand and arm scrubs before entering the surgical suite. After surgical scrub-up, the operating team don sterile gowns and gloves for surgery. Ensure that sterility is maintained throughout surgery. Breaks in sterility can occur in any type of surgical procedure. It is important to recognize them and take quick action to correct them.

POSTOPERATIVE NURSING CARE

The key to the success of fistula repair surgery is the postoperative care. Lack of proper postoperative care may lead to failure of surgery. After surgery, the patient should be shifted to a patient bed or trolley. The patient will have an indwelling Foley catheter and should be carefully handled during shifting. Urine

collected in the urobag should be measured and recorded in the chart and reported to the postoperative ward nurse. The Foley catheter and/or ureteric catheters are secured by suturing at the mons pubis or by strapping to the thigh, and they should drain properly into the urobag. Check that the operation site is dry. The operating theater nurse should hand over the patient properly to the postoperative ward nurse.

The Three Ds of Postoperative Care

The three Ds of postoperative care are drink, dry, and drain.

- Make sure that the patient drinks.
- Make sure that the patient is dry.
- Make sure that all drainages are draining.

Intensive care is usually needed only for 12–24 hours with liberal use of analgesics. Morphine or morphine derivatives are used cautiously because these interfere with breathing. The morning after surgery, the patients must be mobilized like in any other operation; besides being good for their general health, mobilization is also good for prevention or treatment of contractures. Abundant fluid intake is needed to ensure adequate urine output.

Immediate Postoperative Care: The First 24 Hours

Regular observations and timely, appropriate action are important. The nurse or midwife must:

- Ensure that the patient's postoperative bed is prepared to receive her upon her return from the operating theater. A sphygmomanometer, stethoscope, and IV drip stand should be ready, as should a vital sign chart with the woman's name, card number, and the date clearly marked with the surgeon's name in the chart.
- Check the vital signs regularly. The patient's temperature, pulse, respiration, and blood pressure should be checked every 15 minutes for the first hour, then, if stable, every half an hour for an additional 4 hours, and finally every 4 hours for 24 hours if she is well and has no signs of hemodynamic instability. If there is any cause for concern, the surgeon must be notified immediately.
- Ensure that the surgeon's instructions for IV fluids are followed and regularly monitor the woman's fluid input and output, recording this information on her fluid-balance chart.
- Regularly check for bleeding from both the Foley catheter and, if present, the ureteric catheters. The woman's vagina, vaginal pack, and the graft site, if used, should also be checked for bleeding or any hematoma formation.
- Ensure that the woman receives analgesics, antibiotics, and other medications according to the local protocol.
- Keep the patient lying flat in the bed if surgery was performed under spinal anesthesia to reduce the risk of post-spinal headache.

Later Postoperative Management

After the first 24 hours post-surgery, the patient's vital signs should be checked and recorded regularly, according to the protocol or as instructed by her surgeon. Pain medications and antibiotics will be given as directed by the surgeon or according to the protocol.

Psychological Support

After surgery, the patient will feel good if she is dry, but she may be very anxious for the fear of leakage again. She will need strong psychological support and counseling during this time. Listening, answering questions, and spending time talking to these patients helps make them comfortable.

Fluids

- Initially, the patient will receive IV fluids, as prescribed by the surgeon.
- Oral fluid intake is started as instructed by the surgeon. When the patient starts oral fluid intake, she should be encouraged to drink enough fluid to produce 2–3 liters of clear urine per 24 hours. Many patients may be reluctant to drink this amount, as they have been accustomed to drinking little to reduce their wetness. They may be afraid that drinking too much will spoil the repair. They should be reassured that this is not so. Concentrated urine predisposes to urinary infection and to accumulation of debris, which predisposes to blockage of the catheter. More fluid intake helps to prevent ascending urinary tract infections and prevent catheter blockage.

Diet

All patients should be started on a fluid diet the day after the operation and encouraged to drink copiously. Usually, patients who have had VVF repair will commence with a light diet the second day after surgery, and a patient who has had RVF or complex fistula repair will follow the prescribed diet protocol. Women who have had a colostomy can follow the diet of the VVF patient. The nurse must instruct the woman and her family clearly about the diet.

Postoperative Mobilization, Physiotherapy, and Pelvic Floor Exercises

The patient should be mobilized as soon as possible according to the instruction of the surgeon. The timing and techniques on physiotherapy should be adapted for each woman on an individual basis according to her needs. These should be planned after admission and assessment of the woman and her needs and in consultation with the surgeon and physiotherapist.

Checking for Possible Complications

Each woman should be regularly checked to:

- Look for bleeding from the Foley catheter and, if present, the ureteric catheters. Her vagina and the graft site, if used, should also be checked for bleeding. If problems are noted, her surgeon should be informed.
- Ensure that she has good urinary drainage from the Foley catheter and ureteric catheters, as these may become blocked and require flushing.

Perineal and Vaginal Care

The perineum should be cleaned regularly, especially after each bowel movement, to prevent contamination of the wound. Separate instruments or utensils should be used for each case, and prior handwashing is very important. During perineal care, wipe the perineum, starting from the external urethra toward the perineum. Betadine can be used for cleaning. Sometimes, there is a dirty discharge, especially when fat graft is used. Unless it is cleaned regularly, there is a risk of ascending infection.

Twice-daily perineal washing is essential after the vaginal pack is removed. This can be achieved by regular use of sitz baths or daily perineal care and catheter care. The catheters should have a gentle wipe around, ensuring that no crust has formed. It is important not to pull the catheters during cleaning.

CATHETER CARE AFTER FISTULA SURGERY

Care of the Foley and ureteric catheters is the most important postoperative management aspect of OF surgery. The most vital concern of the catheter is the free flow of urine. If the bladder begins to fill, it will stretch the operation site and may cause disruption or breakdown of the wound. Thus, continuous

drainage of the bladder is most important in the postoperative period. Free drainage into the drainage bag must be monitored by the postoperative nurse; the surgeon and the patient’s visitors must be instructed about this monitoring. Keeping the bladder at rest is very vital for the success of fistula surgery to prevent tension over the suture line and disruption of the suture.

Ureteric Catheters

Most catheters used to protect the ureters will be removed at the conclusion of the operation. However, if the repair has been very close to a ureteric orifice or the ureter has been re-implanted into the bladder, the surgeon may leave the ureteric catheter *in situ* to prevent obstruction to the kidney while healing takes place. It is removed on the surgeon’s instructions, usually around the seventh postoperative day, but sometimes after as many as 10 days. The catheter(s) may be left to drain into a separate bottle, but this hampers early mobility.

Important Principles of Catheter Care

- Nothing must pull on the catheter.
- The catheter must not become blocked or fall out.

The catheter may be secured in the operating theater with a suture to the mons pubis. This prevents accidental traction on the catheter as the patient is moved from the theater to the ward as well as when shifting the patient into bed.

A catheter strapped to the thigh often comes off, and the catheter may be kinked when the patient turns. Note that there must be slack in the catheter between the urethral orifice and the strapping.

CATHETER PROBLEMS³

Blocked Catheter	Nursing Care
<p>The following three signs indicate a blocked catheter:</p> <ul style="list-style-type: none"> ● The patient’s abdomen is distended and tender, and she feels the urge to pass urine either on her own or upon gentle pressure on her abdomen. ● The patient is wet from urine leaking around the catheter or through the repair. ● Urine stops dripping into the basin (if an open system is used). <p>Blockage can occur at any time and requires immediate attention to reduce pressure on the operative site.</p> <p>Maintaining catheter care, including hourly checking of urinary bags if they are used, helps prevent blockage.</p>	<p>Examine the catheter for twists or kinks, which can block urine flow. If the urinary catheter is blocked:</p> <ol style="list-style-type: none"> 1. Immediately flush the catheter gently and carefully three times with 20 ml normal sterile saline (sodium chloride 9%); withdraw the fluid after each flush. Alternative sterile solutions are water for injection or boric solution (chlorinated lime 1.25 g) and boric acid solution (B.P. 1988: Eusol) mixed with 100 ml purified water. 2. After the third flush, connect the urine bag and observe the flow. 3. If the flushing is done and nothing comes out on withdrawal, the catheter is not in the bladder. 4. Check the flow and color of urine after flushing. 5. After flushing, inform the doctor if there is hematuria or anuria. The catheter may need to be changed, as per the doctor’s order. 6. Encourage the patient to drink at least 5 liters of water per day.

URINARY DRAINAGE BAGS

Closed drainage is ideal but does require supervision, nursing care, and good-quality bags. The main problem is that the bags may become over-full, especially at night if there are inadequate numbers of nurses on duty. The patient or her attendant can be given a bucket for emptying urine near the bedside and instructed how and when to do so. Urinary bags pose problems in that they are supervised by staff rather than by patients, and identifying and resolving any catheter blockages may be delayed. Catheter blockages must also be resolved using aseptic techniques.

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Should urinary bags be used, a well-trained nursing staff is needed to ensure that these do not block, as this will lead to wound breakdown and fistula recurrence. The nurse should perform regular, hourly checks of each patient's urinary bag to ensure that the urine is flowing; that the bags are emptied; and that the contents are quickly examined for quantity, smell, and appearance. The nurse should follow clear instructions about emptying and measuring the urine output from a urobag so that blocked catheters are diagnosed and corrected without any delay.

ENSURING DRYNESS THROUGHOUT THE POSTOPERATIVE PERIOD

The patient must be dry for successful healing. There are several possible causes of wetness:

- The catheter is blocked.
- The repair has failed.
- There is urethral leakage.
- A second fistula has been missed.

REMOVAL OF THE CATHETER

After confirmation by blue test that the fistula has healed, the surgeon will recommend catheter removal. Sometimes, calcification or sticky tissue may lead to difficulty in removing the catheter. Extreme care and gentleness are necessary while removing the catheter.

PROBLEMS AFTER CATHETER REMOVAL

If the patient can void, but is wet on standing although dry in bed, this suggests a lesser degree of stress incontinence that may improve spontaneously with the help of pelvic floor exercises. Further evaluation by the surgeon's team is necessary if this happens.

REMOVING THE VAGINAL PACK

The patient's vaginal pack should be gently pulled out on the first to third postoperative day as instructed by the surgeon. If two or more packs have been inserted, a note should be made at the time of insertion so that the carer will know to ensure that the correct number is removed. Once the pack(s) is removed, the patient will need daily perineal care until she is ambulant, when she can be taught to do it herself.

THE LABIAL PRESSURE PAD

A labial pressure pad is used if the woman has had a repair using a Martius graft. In general, it is removed on the fifth postoperative day. Removal is by using a sterile technique to cut and remove the sutures holding the pressure pad over the labium majorum, from where the fat graft was taken. The area should then be carefully cleaned. Any problems with a Martius graft are usually due to the development of hematomas. These can be released by removing the suture closest to the hematoma and allowing free drainage. Ice and analgesia may help relieve the discomfort.

REMOVAL OF SUTURES

Nonabsorbable sutures should be removed, using an aseptic technique, when the tissues are healed and the surgeon feels it is appropriate to do so.

BOWEL CARE

Constipation in the postoperative period is very common because of long-term bed rest. The patient may need laxatives to prevent undue straining. Once she starts to take food, advise her to consume fibrous food and plenty of water.

RESUMPTION OF ACTIVITY OR AMBULATION

The patient is on bed rest until the vaginal pack is removed, but she can move her limbs in the bed and should do deep-breathing exercises. The advantages of exercise include prevention of deep vein thrombosis, improved sense of well-being, and reduced risk of collection of debris and blockage of the catheter.

General Postoperative Exercise for Mobility

Particularly while on bed rest, the following exercises can help the patient regain mobility:

- Have the patient place one hand on the abdomen and slowly breathe in, letting the abdomen rise up under the hand. She should then slowly breathe out, letting her abdomen sink down.
- Have the patient keep her knees together and gently rock them from side to side, using small movements only.
- Have the patient tighten her lower abdominal muscles and lift her buttocks up off the bed (as though to have a bedpan put in place). She should hold this position for 5 seconds and then slowly lower back onto the bed. Then, instruct her to lie on her back, with her legs straight.
- Have the patient bend and stretch her feet up and down from the ankles.
- Have the patient rotate her feet first one way and then the other.
- Have the patient bend one knee up to the chest and then straighten. Repeat with the other leg.
- Have the patient tighten her thigh muscles, feel her knees straighten, and then release. She should straighten one leg and lift it a short distance off the bed then lower it down slowly and repeat with the other leg.
- Have the patient squeeze the buttocks tight, count to five, and then release.

Those exercises should be done very gently during the immediate postoperative period. These steps need to be done 10 to 20 times each. Kegel exercises should be taught to the woman as and when instructed by the surgeon.

PREDISCHARGE PATIENT EDUCATION

Prior to discharge, the patient and her partner and family members, if present, should receive basic health and nutritional education to ensure that she maintains her overall general health. Further, she and her partner should receive full advice on family planning, contraception, and the management of any subsequent pregnancies. She should also be put in touch with any organizations near her home that can offer support and advice. The issue of social reintegration should be considered depending on the woman's particular circumstances.

Abnormal Signs

The patient must seek medical care if she has any of these signs:

- Urine or stool leaking continuously
- Fever

Care of Women with Obstetric Fistula

- Foul-smelling vaginal discharge
- Pain with urination
- Chills
- The need to urinate more frequently or more urgently than normal
- Dizziness, lightheadedness, or fainting
- Severe genital pain
- Nausea or vomiting
- Bleeding that is twice as heavy as a normal period
- Feeling very sad and/or feeling unable to take care of herself

Sexual Intercourse

The patient should be advised not to have intercourse for 6 months to allow for complete healing to take place and not to become pregnant for 2 years following this period. This should also be explained to her partner, if possible. Once intercourse has resumed, it should be gentle, and with consideration for the woman.

Future Pregnancies and the Importance of Antenatal Care

Women, and their partners and families, should be advised of the importance of having adequate antenatal care from a trained health-care professional in subsequent pregnancies. Further, they should deliver in a hospital equipped to undertake cesarean sections. If they live far away from such a hospital, they should wait near the hospital before delivery in case labor begins and the facility is not easily reached.

Pelvic Floor Exercises

The patient should be instructed about pelvic floor muscles exercises, which will strengthen the pelvic floor and help to prevent urinary incontinence. Exercises used to strengthen these muscles are called Kegel exercises. To do these exercises, squeeze and lift up the muscles inside the pelvis as though trying to stop the flow of urine or flatus, hold for up to 5 seconds, and then release. Rest for 5 seconds and then repeat. Instruct the patient to do this for about 5 minutes three times a day. This exercise is simple and can be done anywhere, even in the kitchen while preparing meals or while watching television.

The Take-Home Card

Each woman should be given a card to take home with details of her history, a diagram of the injury, and a summary of the operation undertaken to repair it. Thereafter, any time she goes to a clinic for maternity care, she can present this card so that those caring for her will be able to take necessary precautions on her behalf to avoid further injuries in childbirth.

Return for Follow-Up Consultation

The patient should be instructed to attend regular follow-up visits according to the surgeon's advice. The patient should be advised to bring the discharge summary sheet to follow-up appointments.

Reintegration and Rehabilitation

Much has been written about counseling and helping to reintegrate fistula patients into the community. Many patients are very poor and certainly appreciate financial help; however, in practice, if the patient is dry, she will reintegrate, if wet, she may not.

Those patients who are cured must be educated about the cause of their fistula and understand how fistulae should be prevented. They can then become educators for their own community.

Reintegration could involve one or a combination of the following:

- Social reintegration, including reduction of associated stigma/discrimination
- Development of vocational training and support
- Physical rehabilitation
- Counseling and emotional support

KEY POINTS

- Counseling plays a critical role at every level of the care of women suffering with OF in order to provide support and maximize the success of the surgical procedure, allow the return to normal function, and prevent recurrence.
- Preventive counseling is most effective at the preconception, antenatal, and postnatal periods, providing education to the patient and her family regarding obstructed labor and causes of fistula.
- Supportive counseling should be active throughout the peri- and postoperative periods (reassurance and support, diet, medication, and bowel and bladder care), including catheter surveillance and care, as well as at discharge with emphasis on the need for antenatal care and access to cesarean delivery.
- Reintegrative counseling should address physical rehabilitation, self-sufficiency (income-generating skills), and family and community education regarding pregnancy spacing, causes and consequences of obstructed labor, and the need to provide for timely and appropriate antenatal care and cesarean delivery.
- The 3 Ds of postoperative care, which refer to drinking (water), draining (bladder), and dryness (no leakage), should be considered during postoperative care.

REFERENCES

1. Fistula Care. *Counseling the Obstetric Fistula Patient: A Training Curriculum*. New York: EngenderHealth; 2012.
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3. Hancock B. *Practical Obstetric Fistula Surgery*. London: Royal Society of Medicine Press Ltd; 2009. Available online at http://www.glowm.com/resources/glowm/pdf/POFS/POFS_full.pdf

APPENDIX 1

INFORMED CONSENT FOR FISTULA REPAIR

DEFINITION

Informed consent involves communication between a client and a provider to confirm that the client has made an informed and voluntary choice to use or receive a medical service, procedure, or surgery.

MORE ABOUT INFORMED CONSENT

Informed consent is one component of the counseling process (covered in Chapter V of the reference manual). The outcome of counseling is an informed decision.

Informed consent uses simple language, terms, and visual aids that the client understands.

Informed consent can be obtained only after the client has been given adequate and relevant information, in a language and terms she understands, about:

- The nature of her condition, the causes, and the medical procedure
- The risks and benefits of fistula repair surgery
- Alternatives to fistula repair surgery

Voluntary consent cannot be obtained by means of special inducement (incentive or disincentive), force, fraud, deceit, duress, bias, or other forms of coercion or misrepresentation, including unwarranted deferral or repeated postponement of surgery.

The concept of informed consent may be culturally unfamiliar to clients. The provider needs to clearly and simply explain it.

Just because the client signs a consent form does not necessarily mean that she requests the procedure with full knowledge of the facts.

Documenting informed consent helps to ensure that the process has occurred and that the health care facility is complying with legal requirements.

Although nurses can obtain and document informed consent, the primary responsibility for ensuring informed consent rests with the surgeon who performs the repair.

The surgeon who performs the repair is responsible for providing answers to client questions that the nurse or midwife is unable to answer.

When staff members do not speak the client's language, an interpreter should be available to ensure that the client understands the informed consent process.

Five Elements of Informed Consent

Information should be presented in simple language and with simple illustrations that the client can easily understand. The five elements of informed consent include treatment options, procedure details, associated risks, potential outcomes, and options to decide for or against the procedure.

Treatment Options

- The repair procedure indicated for the client
- Whether the procedure can be done at the facility or whether the client will have to be referred to another location
- The costs associated with the procedure (e.g., transportation, follow-up visits)

Procedure Details

- The type of surgery to be performed
- The benefits of the procedure
- Whether more than one procedure will be needed
- Anesthesia to be used
- Pain management
- The expected postoperative course
- Follow-up, including the need for sexual abstinence for a time and for family planning
- The possibility of postoperative side effects

Associated Risks

- Risks associated with any surgical procedure (e.g., bleeding, infection, death)
- Risks specific to fistula repair (e.g., damage to nearby organs)
- Infertility, which may or not be a result of repair surgery

Potential Outcomes

- If the procedure succeeds, the client will have no more leaking and associated discomfort. If she becomes pregnant again, she will need to receive antenatal care and deliver by cesarean section.
- If the procedure does not succeed, leaking will continue, sometimes to a lesser degree.
- Some women experience infertility after repair surgery. Some women experience narrowing of the vagina after repair, leading to pain during intercourse. If this occurs, the client may need additional treatment; in a few cases, the condition may not be treatable.

Options to Decide for or against the Procedure

- If the client decides to have the procedure: The nurse confirms her understanding of the procedure, the benefits, the risks, the potential outcomes, the need to abstain from sexual intercourse for a period of time after repair surgery (usually 6 months), and the need to delay pregnancy for at least 2 year after surgery by using family planning.
- If the client decides not to have the procedure: The nurse or midwife confirms that she understands the procedure and understands available options. The nurse or midwife assures the client that she will not lose any health benefits that she has received before and that she can still have the repair in the future if she changes her mind. The nurse/midwife assesses any other health needs the client has and refers her appropriately.

THE INFORMED CONSENT FORM

Informed consent forms should be available in the most common languages of the facility's service area and, to the extent possible, in other languages.

The nurse or midwife reads the entire form aloud to the client. If the client can read, she should have a form to read along with the nurse or midwife. If the client cannot read, a witness should have a form to read along with. If the witness cannot read, he or she should at least be present when the form is read aloud to the client.

After asking if the client understands the information on the form and if she requests the procedure, the nurse or midwife then obtains the required signature or marks.

- For clients who can read and write, the informed consent form must be signed by (a) the client and (b) the operating doctor or his or her designated assistant.
- For clients who cannot read or write, the informed consent form must be signed by (a) the client, using a thumbprint or mark, and (b) the operating doctor or his or her designated assistant. In such cases, it is advisable for the client to have a witness (e.g., a support person of her choosing) present during the informed consent process, to ensure recollection of information. The witness should also sign the consent form in the designated area.

The signature of the doctor or assistant means that the person has verified the client's signature, thumb print, or mark and has established that the fistula repair client understands and agrees to undergo the surgery.

Each signature must be dated, and the date of each signature must be before or on the day of surgery.

REFERENCE

Fistula Care Project. 2010. *How to use the informed consent materials*. New York: EngenderHealth.

फिस्टुला शल्यक्रियाको लागि मन्जुरीनामा (Informed Consent Form)

म/मेरो विरामी वर्ष.....को श्री.....लाई फिस्टुला रोगको शल्यक्रियाद्वारा उपचार गराउन मञ्जुर छु ।

१. म/मेरो विरामीलाई गर्ने उपचार शल्यक्रिया हो । यसको बारेमा बृहत्तरूपमा हामीहरूलाई जानकारी गराईएको छ

- शल्यक्रिया ढाडमा सूई लगाइ या पूर्णरूपमा वेहोश गराई गरिनेछ ।
- सम्पूर्ण उपचार खर्च निःशुल्क हुनेछ ।
- शल्यक्रिया पेट चिरी वा नचिरी पिसाबको थैली/पिसाबको नली/दिसाको नली चिरेर गरिनेछ ।
- शल्यक्रिया एक पटक वा पटक पटक गर्न पर्ने आवश्यकता पर्नसक्छ ।
- शल्यक्रियाको कार्यमा रगत बग्ने, शरीरका अन्य अंगहरूमा चोट पुग्ने, संक्रमण हुने र मृत्यु सम्मको जोखिम हुनसक्छन् ।
- शल्यक्रियापछि कम्तिमा २ हप्ता पिसाबको नली (Catheter) लगाउनु पर्ने हुन्छ ।

२. शल्यक्रियापछि प्राय जसो महिलालाई ठीक हुने भएता पनि सबैलाई ठीक नहुनसक्छ र अर्को शल्यक्रियाको आवश्यकता पनि हुन सक्छ ।

३. शल्यक्रिया पश्चात पिसाब र दिसा चुहिने ठीक भएता पनि यौन सम्पर्क राख्न कठिनाई हुने, बाँझोपनमा सुधार नहुने सम्भावना रहन्छ ।

४. शल्यक्रिया पछि ६ महिनासम्म श्रीमान र श्रीमतीको विचमा शारीरिक सम्पर्क राख्न नहुने साथै २ वर्षसम्म बच्चा जन्माउन नमिल्ने हुन्छ । त्यसैले ६ महिना देखि २ वर्षसम्मको समयवाधिसम्म भरपर्दो परिवार नियोजनको साधनको प्रयोग गर्नुपर्छ ।

५. भविष्यमा गर्भवती भएमा स्वास्थ्यकर्मीद्वारा नियमित जाँच गराई शल्यक्रिया मार्फत प्रसूती गराउन पर्छ ।

६. यस शल्यक्रियालाई मैले अस्वीकार गर्न सक्छु तर यसो गरेमा मलाई औषधी उपचार, स्वास्थ्य र अन्य सेवा सुविधाहरूबाट बञ्चित गरिने छैन ।

यसरी सम्पूर्ण तथ्यहरूसँग अवगत भई म स्वयं आफ्नो इच्छाले कसैको करकाप, दबाव वा कुनै विशेष प्रलोभनमा नपरी स्वतन्त्र रूपले फिस्टुलाको शल्यक्रियाका लागि अनुरोध गर्दछु । उपचारको क्रममा केही व्यवधान अथवा कुनै भवितव्य परि विरामीको मृत्यु भएमा त्यसको जिम्मेवार म आफै हुनेछु । उपचारमा संलग्न कुनै पनि चिकित्सक वा संस्था वा टिमलाई कुनै दोष दिने छैन भनी सही छाप गर्दछु । यस मन्जुरीनामाको एक प्रति आफूले बुझिलिएको छु ।

विरामीको औलाको छाप

दायाँ

बायाँ



विरामीको सहि:.....

नाम:.....

मिति

मञ्जुरीनामा दिनेको नाम:.....

नाता:

ठेगाना:.....

सहि:.....

मिति:.....

मञ्जुरीनामा लिनेको :

ठेगाना:.....

सहि:.....

मिति:.....

APPENDIX 2

OBSTETRIC FISTULA DEMOGRAPHICS AND FISTULA-SPECIFIC HISTORY FORM

DEMOGRAPHICS HISTORY

Age	Parity	Last Menses	Age married
Age of marriage (coitarche)	Age of first pregnancy	District/village mobile no:	Marital status
Social history: <ul style="list-style-type: none"> • Currently living with • Financial support • Household activities • Religious activities 	Who brought her to the facility? How she was brought (open-ended question)? Nearest Health Facility: PHC, SHP Distance in kilometers/hours	Education level: <ul style="list-style-type: none"> • Unable to read and write • Literate • Primary • Secondary 	Contraception: past/present
Obstructed labor sequelae: <ul style="list-style-type: none"> • Foot drop • Saddle anesthesia • Amenorrhea Others: _____	Coexisting medical conditions: <ul style="list-style-type: none"> • Diabetes • Hypertension • Tuberculosis • Chronic pulmonary disease • HIV, HBV • Other: _____ • Smoker • Alcohol • Drugs 	Surgical history: <ul style="list-style-type: none"> • Cesarean section • Ruptured uterus • Cesarean hysterectomy • Vaginal hysterectomy • Abdominal hysterectomy • USO/BSO • Colostomy • Urostomy • Other diversion • Abdominal trauma • Other 	Obstetric history: Gravida: _____ Para: _____ Abortion: _____ Preterm births: _____ Term births: _____ Stillborn: _____ Liveborn: _____ Neonatal death: _____ # Spontaneous vaginal births: _____ # Vacuum/forceps births: _____ # Cesarean births: _____ Years since last delivery: _____ Neonatal status last delivery: _____
Fistula history: Incontinence _____ : Urine _____ : Feces _____ : Both urine and feces Months or years since onset fistula: _____ Yrs _____ Months # Weeks catheterized: _____	Fistula event: _____ : Obstetric _____ : Gynecologic _____ : Other	Clinical event(s) related to fistula (all that apply): _____ : Obstructed labor _____ : C/S hysterectomy _____ : Spontaneous vaginal birth _____ : GYN abdominal hysterectomy _____ : GYN vaginal hysterectomy _____ : Vacuum vaginal birth	Labor duration: _____ : <1 day labor _____ : 1–2 days labor _____ : >2 days labor: _____ days Where delivered: _____ : Home _____ : Birthing facility _____ : In a hospital

Informed Consent for Fistula Repair

		___ : Forceps vaginal birth ___ : Hemorrhage ___ : 3 rd -degree perineal tear ___ : 4 th -degree perineal tear ___ : Sexual trauma ___ : Uterine rupture ___ : Other trauma (car crash, fall, etc.) ___ : Cesarean section
		___ : Other

Birth attendant: ___ : None ___ : Family or friend ___ : Traditional birth attendant ___ : Certified midwife/nurse/SBA ___ : Obstetrician ___ : Other doctor ___ : Paramedics ___ : Student (MD/nurse/midwife) ___ : Someone officially trained, pt unsure ___ : Other _____ _____	Labor complications ___ : None ___ : Placenta previa >> percreta ___ : Preeclampsia ___ : PROM ___ : Fetal macrosomia ___ : Eclampsia ___ : Fever/infection ___ : Abnormal lie ___ : Hemorrhage ___ : Fetal distress/ meconium ___ : Ruptured uterus ___ : Prolapsed cord ___ : Obstructed labor Others: _____	Prior fistula management (all that apply) ___ : # Prior fistula surgeries ___ : Catheter treatment ___ : Location prior fistula surgery ___ : Nepal ___ : Outside of Nepal _____ ___ : General govt. hospital, no fistula special services ___ : Fistula camp ___ : location/year _____ / _____ ___ : Fistula referral hospital govt. or NGO ___ : Private hospital _____	Delivery (resulting in fistula): ___ : Vaginal spontaneous ___ : Cesarean section ___ : Cesarean hysterectomy ___ : Forceps ___ : Vacuum ___ : Destructive surgery ___ : Traditional manipulations _____
Type of prior fistula surgery (all that apply) ___ : Vaginal ___ : Uterus involved ___ : Abdominal ___ : Combined vaginal/abdominal ___ : Ureteric reimplantation, unilateral ___ : Ureteric reimplantation, bilateral ___ : Urethral reconstruction ___ : Marius graft ___ : Anal sphincteroplasty ___ : Labial graft ___ : Vesicovaginal ___ : Buttock rotational graft ___ : Rectovaginal ___ : Other rotational graft ___ : Omental graft ___ : Other graft -----	Prior fistula surgeon category ___ : Fistula specialist ___ : OB-GYN ___ : General surgeon ___ : Urologist ___ : MDGP ___ : Other or unknown _____	Prior fistula management (all that apply) ___ : # Prior fistula surgeries ___ : Catheter treatment ___ : Location prior fistula surgery ___ : Nepal ___ : Outside of Nepal _____ ___ : General govt. hospital, no fistula special services ___ : Fistula camp ___ : location/year _____ / _____ ___ : Fistula referral hospital govt. or NGO ___ : Private hospital _____	Delivery (resulting in fistula): ___ : Vaginal spontaneous ___ : Cesarean section ___ : Cesarean hysterectomy ___ : Forceps ___ : Vacuum ___ : Destructive surgery ___ : Traditional manipulations _____

OUTCOME PRIOR, MOST RECENT FISTULA SURGERY

Overview	Urine storage	Urine evacuation	Fecal storage	Fecal evacuation	Upper urinary tract
___: Recurrence -After being dry -After delivery -Persistence ___: Closed, incontinent	___: Leak with sudden cough/lift/sneeze (SUI) ___: Leak with walking or standing up from sitting ___: Leak with no activity ___: Leak with urgency (OAB) ___: Nocturia (OAB) ___: Frequency (OAB) ___: Enuresis (OAB, neurogenic) ___: Constant dribble (Atony/overflow)	___: Normal voiding ___: Frequent voiding ___: Painful voiding ___: Difficulty initiating or maintaining void ___: Stop/start void ___: Incomplete emptying ___: Urinary retention	___: Flatus incontinence ___: Loose stool incontinence ___: Solid stool incontinence	___: Frequent defecation ___: Painful defecation ___: Incomplete defecation ___: Strain to defecate ___: Splint to defecate	___: Unilateral hydronephrosis ___: Bilateral hydronephrosis ___: Unilateral compromise renal function ___: Bilateral compromise renal function

APPENDIX 3

PHYSICAL EXAM AND SURGICAL PLANNING TEMPLATE

DATE:

Height: _____ cm Weight: _____ kg BMI: _____

Vitals: BP: _____ mm Hg Pulse: _____ bpm Temp _____ °C

Skin: ____: Normal ____: Tenting ____: Edema

WHO Thinness Scale:

Grade 1: BMI 17.0–18.5 (mild)
Grade 2: BMI 16–16.99 (moderate)
Grade 3: BMI <16 (severe)

Head and Neck:

Scalp: Thyroid; Bruit: Adenopathy:

Lungs: Auscultation:

Heart: ____: Regular rate/rhythm ____: Normal S1S2 Percussion: ____: Abnormal _____

Abdomen:

____: Hernias, scars _____
____: Normal bowel sounds ____: Guarding/rebound _____

Extremities: ____: Foot drop: ____: Unilateral (side) _____ ____: Bilateral

Deep tendon reflexes: Patellar: Antecubital: Achilles:

Radial:

Muscle Tone: Testing of bilateral lower limb muscle
Right Left

Vulva: Skin: Scars:
Urethra: ____: Intact ____: Short

____: Stenotic ____: UVF _____
____: Urethrocele / hypermobility
____: Frank SUI supine:

Voluntary Muscle Testing (VMT) Score:

No function: Grade 0
Muscle twitch: Grade 1
Minimal movement: Grade 2
Active half-range motion without gravity (supine): Grade 3
Active full range motion with minor weakness: Grade 4
Normal: Grade 5

Bladder: ____: Intact: ____ VVF: ____: Cystocele, Grade ____ Modified POPQ

Vagina: Depth, width: / Presence of rugae ____
Elasticity/fibrosis: _____ Other: _____
Levator tone grading ____:

Intact muscles/avulsion ____: ____: _____

Uterus:

Cervix contour Os visible in vagina: Y / N
Cervical motion tenderness: Y / N Uterine size: _____ wks
Uterine fundus tender: Y/N Prolapsed: __ Modified POPQ

Adnexa: ____: Normal/nonpalpable ____: Tender ____: Mass _____

Rectum/Anus: ____: Normal ____: Flaccid ____: Anismus:
____: Sphincter defect: ____: Rectocele, Modified POPQ

____: 4th-degree defect: ____:

RVF: _____

Perineum: ____ normal/ ____ Ulcer/ ____ short

GENITOURINARY BLUE TEST

Blue test supplies:

- 14–16 French red rubber catheter
- 60 ml catheter tip syringe
- Saline irrigation
- Methylene blue
- Vaginal retractor or speculum
- Add sterile urine cup and urine dipstick cystitis screen

NB: A negative blue test with definite, clear urine per vagina indicates a ureteric fistula. It is possible to have a positive blue test and a second, concomitant ureteric fistula. A positive blue test never rules out a ureteric fistula.

Screening Exam Blue Test for Vesicovaginal Fistula Evaluation		
Blue test findings: all that apply	Positive (dye per vagina)	Negative (no dye)
	Number	No dye but still urine in vagina

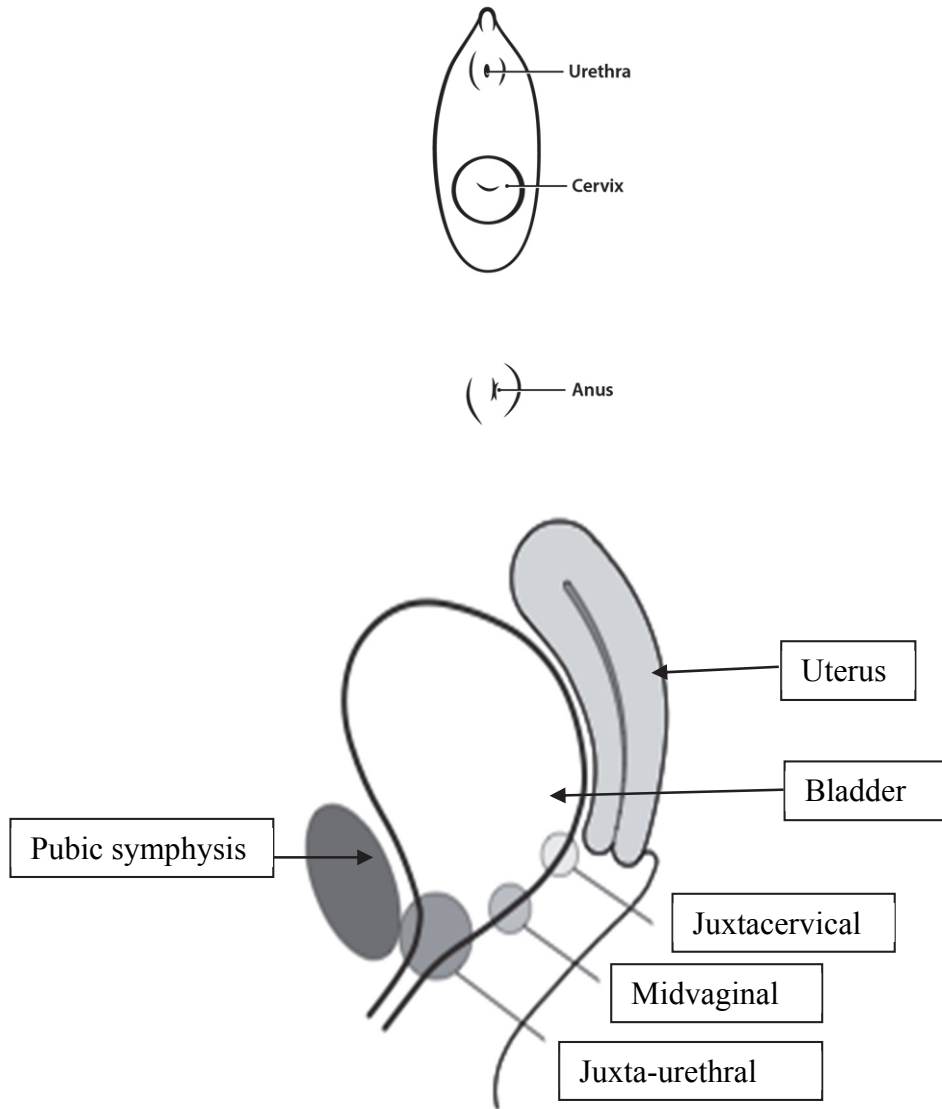
Summary of Findings (Follow Goh system)

- Distal edge of fistula (from urethral meatus [hymen in RVF]):
- Largest diameter
- Fibrosis of vagina (mild/moderate/severe–severe/special consideration)

Fistula and Pelvic Floor Function Assessment: All that Apply

___ : One fistula	> 1 fistula: ___#	___ : Bladder dysfunction post-fistula
___ : Genitourinary fistula	___ : Genito-intestinal fistula	___ : Colorectal dysfunction post-fistula

FISTULA STAGING



Surgical Plan: All That Apply

<input type="checkbox"/> : EUA/blue test	<input type="checkbox"/> : Cystoscopy	<input type="checkbox"/> : Stents needed
<input type="checkbox"/> : Vaginal approach	<input type="checkbox"/> : Abdominal approach	<input type="checkbox"/> : Combined surgical access
<input type="checkbox"/> : Ureteric reimplantation	<input type="checkbox"/> : Hysterectomy	<input type="checkbox"/> : Adnexal surgery
<input type="checkbox"/> : Urinary diversion	<input type="checkbox"/> : Other	

Physical Exam and Surgical Planning Template

APPENDIX 4

SURGICAL NURSING CARE ORDERS/PERIOPERATIVE CARE

PREOPERATIVE INSTRUCTIONS

Before surgery:

- ___: Informed consent
- ___: Tab tinidazole 2 gm stat night before surgery
- ___: Tab lorazepam 1 mg night before surgery
- ___: 3 Liters fluid intake day prior to surgery
- ___: Other dietary specifications
- ___: No semisolid food for 6 hours prior to surgery
- ___: Medicines morning of surgery with sip of water _____

- ___: Bowel preparation:
 - Oral bowel stimulant: _____

 - Enema timing: _____
 - Enema solution: _____
 - Rectal suppository: _____

- ___: Shower
 - ___: Night before
 - ___: Morning of surgery
- ___: DO NOT SHAVE PERINEUM, MONS, OR ABDOMEN
- ___: Other _____
- ___: Other _____

At theater

- ___ Gentamycin 2 mg per kg intravenously ½ an hour before surgery
- ___ Metronidazole 500 mg intravenously if fecal contamination/RVF repair/diversion procedure

POSTOPERATIVE CARE

Postoperation fistula orders:

___: Antibiotics as per protocol

Analgesia:

___: Paracetamol _____

___: Narcotic _____

Stool management:

___: Softener _____

___: Stimulant _____

Bladder antispasmodic:

___: Oxybutynin 5 mg po BID

___: Other anticholinergic _____

Wound healing optimization:

___: One multivitamin with zinc daily, with meal

___: Locally available high-protein diet

___: Iron supplementation: ___ mg daily on empty stomach ___
(with meals if nauseating)

___: Local estrogen as per requirement application to
___: vulvar/labial skin ___: intravaginal space

___: Kegel exercises twice daily
___: Sustained 5–10 second holds, 10 repetitions 3 sets/day
___: Quick 1-second pulse contractions, 30 repetitions 3 sets/day

___: Diabetes medications _____

___: Hypertension medications _____

___: Pulmonary medications _____

___: Other medications _____

POSTOPERATIVE CARE

Urinary drainage management: Estimated bladder capacity is _____ ml
____: Keep catheter taped under no tension at all times
____: Monitor urine output hourly in the first 48 hours, then every 3 hours thereafter, for urinary retention
____: If catheter not draining and patient in retention, flush catheter with _____ ml normal saline

Contact responsible specialist if flush fails to restore urine flow per catheter
____: Maintain Foley until further notice
____: Remove Foley on day _____
____: Record stent urine output separately (right and/or left) from catheter
____: Flush stent with 5 ml normal saline if no urine output; notify responsible specialist if patient has flank pain and if flushing does not restore urine output from stent

Perineal care:
____: Vaginal packing yes/no Remove on day _____
____: Flush vaginal orifice/perineum with 60 ml normal saline BID/TID/QID
____: Apply coconut oil/zinc oxide ointment to vulvar dermatitis after each perineal care
____: Sitz bath (warm water with salt) twice daily

Diet:
____: NPO for 6 hours after surgery
____: Oral fluid after 6 hours after surgery
____: Regular diet
____: High-residue diet (fruits and vegetables) in RVF repair

Activity:
____: Mobility as early as possible
____: Bed rest if needed only
____: Out of bed to chair with assistance, on day -----
____: Out of bed, full activity on day ____

Notify responsible specialist if:
- Urinary retention unresponsive to flushing
- Inadequate urine output (<60 ml/hr) without evidence of retention
- Fever
- Unexplained heavy bleeding
- Sudden, severe increase in pain
- Fecal impaction
- Evidence of wound breakdown
- Purulent discharge
- Bladder spasms
- Urinary incontinence
- Fecal incontinence

____: Other _____

APPENDIX 5

PATIENT TRIAGE AND CASE LIST

	Name	ID #	Age	Address	Tel No.	Diagnoses	Fistula stage(s)	Surgery date	Operation(s) performed	Comments
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
13										
14										

APPENDIX 6

BLADDER DIARY

Name: _____ Date: _____

	Voiding time	Voided volume	Incontinence time	Incontinence symptoms/activities	Comments
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

APPENDIX 7

PAD TEST

Patient Name:.....

Date:.....

Instructions: Do the pad test the day before your next visit. Drink plenty of fluids and engage in activities related to your incontinence on this day. Wear as few pads as possible, so that each pad is maximally wet. If you only use one pad for the whole day, this is fine. Do not use more than four pads, unless each pad is soaked.

When finished with a pad, seal it in a plastic bag to keep it from drying out. Bring all wet pads with one clean, unused pad from the same box, to the visit on the next day.

Dry pad weight: _____ gm

Wet pad weights:

1. _____ gm – dry pad weight = net urine loss: _____ gm

2. _____ gm – dry pad weight = net urine loss: _____ gm

3. _____ gm – dry pad weight = net urine loss: _____ gm

4. _____ gm – dry pad weight = net urine loss: _____ gm

Total net weight urine loss in 24 hours: _____ gm

Pad Test

APPENDIX 8

SIMPLE CYSTOMETRICS

Patient Name:

Date:.....

Before catheter insertion	Storage phase	Emptying phase ☐ (all that apply)	Diagnoses (all that apply)
Demonstration SUI prior to catheter: ____: Yes ____: No Urine quality: ____: Clear ____: Cloudy ____: Bloody Dipstick urinalysis:	Volume emptied from bladder prior to fill: ____ml Volume @ 1st sensation fullness: ____ ml Maximum fill volume: ____ ml Presence of detrusor instability during filling: ____: Yes, @ ____: ml ____: No Stress incontinence demonstrated: ____: supine ____: standing	Voided volume: ____ml ____: Dribbling flow ____: Intermittent flow ____: Stop/start flow ____: Incomplete flow ____: Retention Postvoid residual: ____ ml	____: Overactive bladder ____: Urge incontinence ____: Low-capacity bladder ____: Atonic bladder ____: Urinary retention ____: Overflow incontinence ____: Voiding dysfunction ____: Other

Supplies for simple Cystometrics:

- Red rubber catheter 14–18 French caliber
- Betadine
- Water-based lubricant
- 60 ml catheter tip syringe or irrigation syringe
- Kidney basin
- Sterile urine specimen cup, urinalysis dipsticks
- Normal saline irrigant

APPENDIX 9

KEGEL ASSESSMENT AND INSTRUCTION

Name:.....

Date:.....

5-SECOND KEGEL SCORE TEST

	0	1	2	3
Pressure	None	Weak	Moderate	Strong
Duration	None	<1 second	1–5 seconds	>5 seconds
Displacement	None	Slight rotation	Full rotation	Gripped

Score: _____/9

KEGEL EXERCISE INSTRUCTIONS FOR PATIENT

SLOW TWITCH: Contract to your maximum effort, hold for a count of _____, slowly release down to baseline, and immediately repeat the contraction cycle. Do _____ sets of _____ contractions per day.

FAST TWITCH: Contract and relax at rapid, 1-second intervals. Do _____ sets of _____ fast contractions per day.

COMBO SLOW/FAST: Contract slowly to your maximum. At each count of _____, add an extra “pulse” contraction. Do _____ sets of _____ combo slow/fast contractions/day.

INSTRUCTIONS FOR EXAMINING CLINICIAN*

During the bimanual portion of the gynecologic checkup, evaluate the pressure, duration, and vaginal axis displacement generated by the patient during Kegel contraction of the levator ani muscles as follows:

Pressure:

None: no pressure found with women who cannot isolate the muscles or with severe levator atrophy

Weak: flicker-like contraction that generates minimal or no resistance around the examining fingers

Moderate: definite but unsustainable resistance

Strong: sustained resistance to examining fingers

Duration:

Evaluate baseline tone before Kegel effort. Record the time of maximal Kegel contraction effort:

None

<1 second duration

1–5 seconds duration

>5 second duration

Simple Cystometrics

Displacement:

With exam fingertips applied to the anterior vaginal wall, evaluate the vaginal axis during Kegel as fingers are elevated toward the pubic symphysis as follows:

None: no elevation of examining fingers

Slight: elevation/rotation distal exam fingers only

Whole: elevation/rotation full-length fingers, without overriding/overlapping fingers

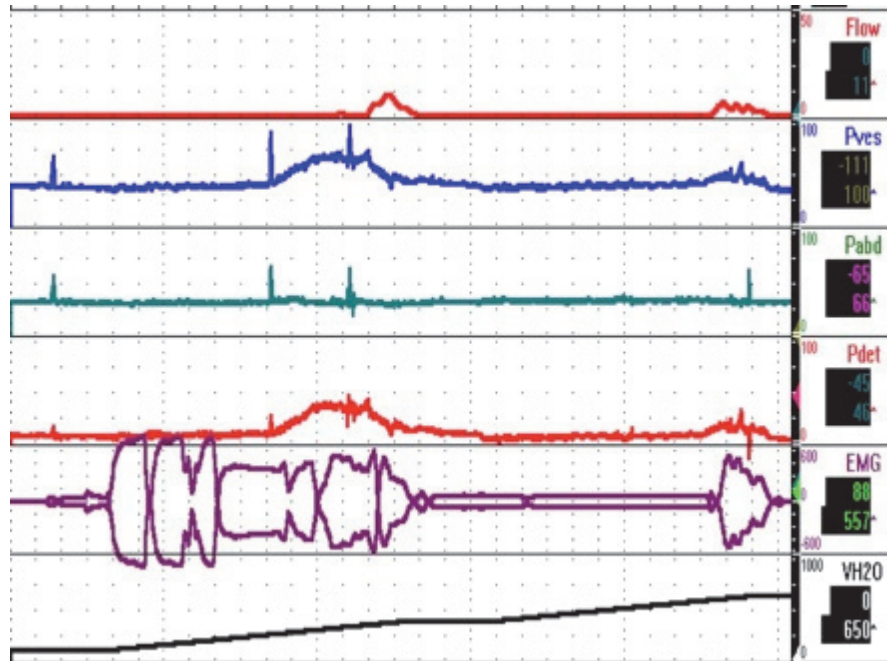
Gripped: elevation/rotation full-length fingers that causes fingers to override or overlap each other

*Romanzi LJ, Polaneczky M, Glazer HI. Simple test of pelvic muscle contraction during pelvic examination: correlation to surface electromyography. *NeuroUrolUrodyn* 1999;18: 608-12.

APPENDIX 10

URODYNAMICS

The true utility of multichannel urodynamics (UDS) is in the calculation of bladder compliance and in the evaluation of voiding dysfunction. Multichannel UDS involves direct measurement of intravesical and abdominal pressures. The pressure transducer is typically in the tip of the catheter or may be external transducers to which the catheters are attached. Intravesical pressure measurement always



comes from transducer placement in the bladder. Abdominal pressure may come from transducer placement vaginally or rectally. The pressure read from the bladder lumen is a combination of abdominal pressure and pressure generated by the detrusor muscle itself. The computer program then subtracts abdominal from vesical pressure to yield the “true detrusor pressure” or what historically was referred to as the “subtracted detrusor pressure.” This gives three main pressure reads on the screen—abdominal, vesical, and the computer-generated detrusor pressure. A pressure reading for urethral pressure profilometry (UPP) may also be done, but this is an expensive and uncomfortable addition to the armamentarium. While popular among UPP-trained urogynecologists, a pressure reading actually correlates to nothing meaningful, such as outcomes of stress incontinence operations, while adding a lot of time, expensive equipment, and patient discomfort to the testing scenario. It is mentioned here for the sake of completeness, but UPP testing is not recommended for the launch of a UDS unit in a fistula program setting.

To these vesical, abdominal, and detrusor pressure readouts, a flowmeter line is typically added in which the pattern and quantity of urine voided are illustrated. A surface electromyography (sEMG) line may also be added, with data obtained through EKG patches attached to an EMG cable—two patches placed one on either side of the perineum/perianal skin and one to the thigh or knee as a grounding read. sEMG reads are helpful, particularly when evaluating neurogenic bladders in patients with spinal cord injury, spina bifida, multiple sclerosis, and the like. For the evaluation of the intact pelvic floor or postrepair obstetric fistula patient, it is not mandatory and is mentioned here only for completeness.

UDS evaluations involve two phases: evaluation of lower urinary tract behavior during filling and evaluation of lower urinary tract behavior during voiding. The filling phase includes evaluation of incontinence; the voiding phase involves evaluation of voiding dysfunction, including end-stage atonic bladder and urinary retention.

Filling phase UDS: As the patient experiences filling, her sensations of first urge, moderate urge, and severe urge are marked through program prompts by the evaluator. Unstable bladder contractions will show in the subtracted detrusor pressure reading, although patients may or may not be aware of unstable

Urodynamics

contractions.⁴⁷ If aware, they typically state: “I can’t hold it any longer” or something similar. If they are unaware, ask if they have an “urge to urinate”—if they say no, record this. If they say yes, turn off the flow and remind them to report any bladder sensations as the test proceeds. Patients with severe detrusor instability will find further filling impossible and must then be allowed to void. Mark this as a void associated with bladder instability, a UDS event that may be added to the “events” list if not included at baseline programming.

If filling proceeds without further, or without any, unstable detrusor contractions, stop when the patient states that her bladder is 100% full. This is cystometric capacity volume. At capacity, evaluation for stress incontinence may take place. The patient is usually seated on a UDS commode chair mounted over the flowmeter beaker. Separate the labia for direct visualization of the meatus. Have the patient perform the Valsalva maneuver. If no leak occurs around the catheter, have her cover her mouth with a cloth and cough intensely and repeatedly. Any leakage with Valsalva or cough is marked as a “leak point pressure” (LPP). Some UDS experts use the vesical pressure, others the abdominal pressure. Whichever pressure your unit selects for LPP evaluation, be consistent. Given that some women will not leak around the catheter, but will leak readily when the vesical catheter is removed, leave the catheter in for now.

Bladder compliance is the change in bladder volume divided by the change in bladder pressure. In normal compliance, the bladder acts as a low-pressure urine reservoir regardless of low- or high-fill volume. With a low compliance bladder, vesical pressure increases sharply and steadily with increased fill volume. In postfistula patients, a low-capacity/poor compliance bladder is a common source of incontinence. When this has been determined, a sling will not help the patient achieve continence, and continence will be possible only when bladder compliance is restored to normal with bladder augmentation or, possibly, with the use of anticholinergic medications. Technically, anticholinergic medications ought not to work on a truly fibrotic, small bladder, but no harm comes from a 5–7 day trial of therapy.

Voiding phase UDS: Once the first fill LPP evaluation is completed, the voiding phase evaluation begins. The patient is instructed to prepare to void with catheters in place. She is reminded that the catheter in the bladder is tiny and can be easily voided around without removal. She may benefit from hearing running water (as possible) or putting her fingertips in a bowl of water. If she cannot void, tell her to try anyway. If her bladder generates a voluntary detrusor contraction, the UDS program will register it, even if there is no flow. The ability or inability to mount a voluntary detrusor contraction is a crucial component of a UDS test.

Evaluation of the voiding phase hinges on the urinary flow rate. Low urinary flow rates come from either bladder outlet obstruction or impaired detrusor contractility. High urinary flow rates rarely reflect pathology and are a female variant of normal.

Women with atonic bladders will have high bladder compliance during filling, tend toward high cystometric capacity volumes, and will be unable to generate a detrusor contraction or a urinary flow rate.

Some women are Valsalva voiders, or “lazy bladder” voiders, who have unconsciously developed the habit of pushing the urine out, rather than waiting for a normal voiding contraction to empty the bladder. These patients will say, “I can’t go without pushing.” If so, let them push.

Patients with obstructed bladders will generate high detrusor pressures during voiding even though the flow rate is very slow. Obstructed voiding is, by definition, “high pressure/low flow.” By comparing detrusor pressure to flow rate, this may be determined. Most women void efficiently at 15–30 cm H₂O detrusor pressure. The minimum allowable maximum flow rate for female voiding is 15 ml/seconds. So, for instance, if a woman generates detrusor pressures to 50 cm H₂O, with a flow rate of 8 ml/second, she is obstructed. If she generates detrusor pressure to 50 cm H₂O and voids 45 ml/second, she is fine (the label for this is “supervoider”).

Some women have bladders that no longer contract efficiently, a condition called impaired detrusor contractility. Relatively uncommon outside a geriatric patient setting, the prevalence in the postfistula dysfunctional voiding population is unknown. Impaired detrusor contractility is demonstrated when detrusor pressure remains at baseline or does not rise to a minimum of 15 cm H₂O detrusor pressure with flow rates that do not reach 15 ml/sec during voiding attempts. Impaired detrusor contractility is, by definition, “low pressure/low flow.”

Double-check filling and/or repeat LPP: Once a baseline fills and a void evaluation has been done, if no stress incontinence occurred at LPP evaluation with the vesical catheter in place, it is time to check for stress incontinence with the vesical catheter removed. If bladder volume is low or empty after a successful voiding, quickly repeat the fill to 150 ml or moderate sensation fullness based on cystometric capacity data, whichever is lower. With LPP bladder volume established, the vesical catheter may be removed. If the vesical catheter is removed very slowly, a “poor man’s UPP” curve will demonstrate on the vesical pressure and detrusor pressure lines, from which the maximum urethral closure pressure (highest amplitude on the vesical catheter withdrawal curve) may be determined, and this at no extra expense to the UDS investment.

With the vesical catheter removed, again separate the labia, visualize the meatus, have the patient perform the Valsalva maneuver and/or cough and record any leaks and LPP data. If the patient gives a strong history of stress incontinence symptoms but has not demonstrated stress incontinence as yet, consider reinserting the catheter to fill to a volume closer to capacity and/or, using a hand mirror to visualize the meatus, repeat the Valsalva/cough evaluation with the patient standing with one foot on a stool, holding her dress up.

With the filling/voiding, second fill as needed, second LPP as needed completed, the UDS test is finished. UDS diagnoses are determined by the physician based on interactive findings with the patient. A voluntary detrusor contraction looks the same as an unstable detrusor contraction. Physician observation during the testing, patient interaction, and communication are what make UDS testing of value. Looking at the tracing posttesting without being present during the UDS is utterly without value.

APPENDIX 11

FISTULA REPAIR KITS

FISTULA REPAIR KIT 1: SURGICAL INSTRUMENTS

Items	Quantity in a kit
Leaflet	1
Kidney dish, metal large, 32 cm (500 ml)	1
Auvard weighted speculum, 125 × 40 mm	2
Sims speculum, medium	1
Sims speculum, large	1
Thorek scissors, 19 cm	1
Fistula scissors, 20 mm (strong and sharp)	1
Tissue scissors Boyd, 17 cm, rough	1
Metzenbaum scissors, curved, 24 cm	1
Needle holder, Mayo-Hegar, 20 cm, straight	1
Needle holder, Mayo-Hegar, 18 cm, straight	1
Blade holder 7, Swann Morton, 159 mm	1
Blade holder 4, Swann Morton, 12 cm	1
Dissecting forceps, 1 × 2 teeth, 20 cm	1
Dissecting forceps, fine serrated jaw, 20 cm	1
Suture scissors, curved, 18 cm (sharp)	1
Probe with eye, malleable, 20 cm	1
Uterine sound, malleable, 30 cm	1
Female metal catheter, 16 cm (12 FG)	1
Langenbeck retractor, 13 × 44 mm blade	2
Vulsellum forceps, curved, 230 mm	1
Deschamps aneurysm needle, very sharp, curved left (slender needle, half-circle, measures +/- 40 mm, handle measures 210–230 mm)	1
Deschamps aneurysm needle, very sharp, curved right (slender needle, half-circle, measures +/- 40 mm, handle measures 210–230 mm)	1
Mixer artery forceps, 23 cm	2
Allis forceps, ¾ teeth, 20 cm	4
Allis forceps, ¾ teeth 15 cm	2
Mayo safety pin forceps holder, 114 mm	2
Shaedel safety pin forceps holder, 90 mm	6
Foerster sponge-holding forceps, 241 mm	2
Mosquito's forceps, curved, 13 cm	10
Spencer-Wells artery forceps, curved, 205 mm	4
Towel clamp, Backhaus, 89 mm	4
Towel clips, Backhaus, 127 mm	6
Dilators, uterine, Hegar, set of 16 dilators, sizes 3–18	1
Gallipot, approx. 100 ml	2
Metal ruler in cm	1
Kitting service	1

FISTULA REPAIR KIT 2: SUPPLEMENTARY ITEMS

Items	Quantity in a kit
Leaflet	1
Ureteric catheters, size CH 5, with metal guide wire	6
Ureteric catheters, size CH 6 with metal guide wire	6
Urine bags with tap below to empty	25
Foley catheters CH 14	1
Foley catheters CH 16	10
Foley catheters CH 18	20
Foley catheters CH 20	5
Blades, size 11	30
Blades, size 15	5
Bladder syringe 60–100 ml (with long nozzle, not with luer lock), disposable	25
Spinal needles, size 22	1
Spinal needles, size 25	1
Transparent colostomy bags, pocket vidables with filter	20
Absorbable polyglactin suture USP size 0 for closure of VVF	1
Absorbable polyglactin suture USP size 2-0 for closure of VVF	1
Absorbable polyglactin suture USP size 3-0 for bladder closure (abdominally)	1
Absorbable polyglactin suture USP size 4-0 for re-implantation (abdominally and/or vaginally)	1
Absorbable polydioxanone suture USP size 1 for refixation of the pubocervical fascia	1
Nonabsorbable polyamide suture USP size 1 for closure of the abdominal fascia	1
Nonabsorbable polyamide suture size USP 2-0 for skin closure	1
Bobbin of 150 cm of absorbable polyglactin suture USP size 2-0 (without needle)	1
Suture needle, semi-circle with spring eye, size 14	3
Kitting service	1
Methylene blue vials (for dye test), injectable USP grade of 1%, vial size 10 cc	20
Bupivacaine hydrochloride 0.5% heavy, 4 ml vials	2

