



**THE INCIDENCE OF URO-GENITAL FISTULAE AT
DR GEORGE MUKHARI HOSPITAL**

[A THREE-YEAR REVIEW]

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OBSTETRICS AND GYNAECOLOGY

DISSERTATION

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DISSERTATION

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INDEX

<u>TOPIC</u>	<u>PAGE NUMBER</u>
DECLARATION	v
DEDICATION	vi
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	ix
ABSTRACT	1
INTRODUCTION	6
RELEVANCE OF THE STUDY	24
OBJECTIVES	24
STUDY DESIGN	25
SETTING	25
MATERIALS AND METHODS	25
DATA ANALYSIS	29
ETHICAL ISSUES	29
RESULTS	30
DISCUSSION	36
LIMITATIONS OF THIS STUDY	49
ACKNOWLEDGEMENTS	50
REFERENCES	51

DECLARATION

I, Sipiwo Kenneth Gqamlana declare that the work on which this dissertation is based, is original (except where acknowledgements indicate otherwise) and that neither the whole work nor part of it has been, is being or shall be submitted for another degree at this or any other University, Institution for Tertiary Education or Examination Body.

Signed: S.K. GQAMLANA

JUNE 2007

DEDICATION

The work of this study is dedicated first and foremost to the Almighty GOD, for providing me the wisdom and intellect with which I have been able to go through my life. I also dedicate this work to my parents and my entire family, for their fortitude in seeing me through life. Last but by no means the least, I dedicate this study to those women, whose lives might have been subjected to the painful reminder that we are all sometimes at the mercy of nature.

Signed: DR S.K. GQAMLANA

LIST OF TABLES

	<u>PAGE NUMBER</u>
TABLE 1: Age distribution of patients in this review	31
TABLE 2: Aetiological factors for the occurrence of fistulae at DGMH	32
TABLE 2: Surgical outcome of treatment for Incontinence [Evaluation: \geq 12 months]	35

LIST OF FIGURES

	<u>PAGE NUMBER</u>
<u>FIGURE 1:</u>	26
- Algorithm of diagnosis and management of uretero-vaginal fistula	
<u>FIGURE 2:</u>	33
- The mean age of women in this series based on their aetiological factors for fistula	
<u>FIGURE 3:</u>	34
- Percentage frequency of occurrence of different types of fistula	

LIST OF ABBREVIATIONS

DGMH	Dr. Geroge Mukhari Hospital
PID	Pelvic Inflammatory Disease
VVF	Vesico-vaginal Fistula
UNFPA	United Nations Funds for Population Activities
HIV	Human Immunodeficiency Virus
TAH	Total Abdominal Hysterectomy
BSO	Bilateral Salpingo-Oophorectomy
NVD	Normal Vaginal Delivery
C/S	Caesarean Section

ABSTRACT**THE INCIDENCE OF URO-GENITAL FISTULAE AT DR GEORGE MUKHARI
HOSPITAL - [A THREE-YEAR REVIEW]****BACKGROUND:**

Urogenital fistula is a gynaecological condition which arises as a consequence of an abnormal communication between the urinary system (comprising of ureters, urinary bladder and the urethra) and the vagina. The condition can be classified broadly as congenital or acquired fistula. The former is extremely rare but the latter broad category (acquired fistula); is a common gynaecological condition, which can arise as a result of obstetric, surgical, malignant and radiation causes.

The aetiology of urogenital fistulae is dependent on the availability and adequacy of obstetric care, malignancy rates and types of previous pelvic surgery that a woman had undergone. The true incidence of this condition is difficult to ascertain because of the pattern of causes between the developed world and the third world. While fistulae arising from obstetric causes are the predominant ones seen in the developing world, previous surgery is known to be the main cause of

fistulae in most middle and high income countries. This is particularly true for many parts of the third world, where the battle against poverty and illiteracy prevent many patients from seeking medical help. Apart from vaginal birth trauma, intervention with the use of forceps/vacuum for assisted vaginal delivery and the need for surgical intervention for delivery by caesarean section, surgical procedures such as hysterectomies and radiation therapy for malignancy are other contributory aetiological factors, for urogenital fistulae.

The annual worldwide incidence of urogenital fistulae is estimated to be 50,000 – 100,000 cases with the vast majority of these occurring in the developing world. The consequence of formation of fistula is the resultant urinary incontinence which the patient is subjected to. This often leads to physical and emotional pain, as the woman is rejected by her partner and family, due to the foul smelling product of incontinence. While some have advocated conservative management of this condition with a simple in-dwelling catheter, with the possibility of spontaneous resolution of the fistula, such an approach is known to alleviate the incontinence only in a small number of cases and is dependent on both the aetiological factor, the size of the fistula, as well as the area of the pelvic organ that is involved. Therefore, the

vast majority of the fistulae have to be resolved through surgical management.

Urogenital fistulae, present a challenge to the gynaecological surgeon and if the condition is left untreated the vulval skin is at considerable risk for ammoniacal dermatitis and vulval excoriation. The occurrence and management of this condition constitutes an increasingly common urogynaecological service at Dr George Mukhari hospital (DGMH). However, despite years of dealing with this condition, there has been no systematic evaluation of this problem in this hospital. It is for this reason that this review was undertaken.

OBJECTIVES:

The review has focused on establishing both the incidence, the type of fistulae as well as prevailing factors that are associated with occurrence of urogenital fistulae at DGMH. The review also evaluated the success and adequacy of the surgical modalities used at DGMH.

DESIGN:

It was a retrospective, case-review of urogenital fistulae which were managed over a three-year period

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SETTING:

The review was conducted at the Dr George Mukhari/MEDUNSA hospital complex – a tertiary referral center, situated approximately 32 kilometers from the city of Pretoria (South Africa).

METHODOLOGY:

All cases of urogenital fistulae which were managed between 1st June 2003 till 31st May 2006 (3-year review), were included in this review. The records of all patients treated during this period were retrieved for analysis. Information regarding pre-treatment assessment and diagnosis was extracted from each case file and entered into a data collection form. All the cases were managed surgically using either fistula repair, ureteric re-implantation or urinary diversion using the Wallace or Bricker's technique. Outcome measures for this review were: demographics of the women, history of pregnancy and mode of delivery, types of previous surgical management and causes of the fistulae. Other information gleaned from the files, included past history of radiation therapy, history of treatment for pelvic inflammatory disease (PID) and any other treatment for infections. Records (both

short-term and long-term) were assessed for post-operative outcomes – i.e. total correction of incontinence.

RESULTS:

Over the three-year review period, 50 cases of urogenital fistulae were managed at DGMH and all the 50 case files were available for analysis. The ages of the patients ranged widely from 22 to 85 years. Malignant conditions (46% carcinoma of the cervix and 2% of endometrial carcinoma), constituted the majority of all the aetiological factors. This was followed by 26% obstetric causes and 26% caused by previous surgical procedures. The odds ratio for a woman presenting with fistula, having an underlying malignant factor rather than obstetric or previous surgery was 1.8 (95% confidence interval: 1.70 – 2.35). There were 84% vesico-vaginal fistulae (VVF); 14% uretero-vaginal and 2% of urethro-vaginal fistulae. Twenty-two patients (44.9%) had urinary diversion while 6 (12.2%) patients needed ureteric re-implantation and the remaining 18 cases had fistula repair. Three patients with malignancy as aetiological factor, did not undergo surgical correction because of either an underlying cardiac condition or deterioration in their health prior to the operation. Surgical outcome, revealed complete success with a single surgical

intervention in 42 cases (85.7%), 3 of which had a nephrostomy, prior to definitive surgical management and 4 patients needed re-laparotomy. Only two patients were reported to have been treated for wound sepsis following surgery.

CONCLUSION:

Contrary to what is reported in the literature, obstetric cause for urogenital fistulae was over shadowed by the predominance of malignant conditions in our institution. The high success rate achieved with surgical management of fistulae has made this condition, an easily treatable gynecological problem in our hospital.

INTRODUCTION:

Urogenital fistulae have been of major concern to gynecological surgeons for more than a century. James Marion Sims ⁽¹⁾, one of the foremost pioneers of gynaecological repair of vesico-vaginal fistulae, declared in 1852: ***“I thought only of relieving the loveliest of all God’s creation, of one of the most loathsome maladies than can possibly befall poor human nature”*** This statement continues to reflect the pain and humiliation that patients who are afflicted with fistulae have, in terms

of physical, emotional and social anguish. Not only are they subjected to the constant dribble of urine, arising from incontinence, they are often rejected and ostracized by their partners and families (as a result of the foul smelling urinary dribble), a practice which often turns these patients into social outcasts ⁽²⁾. In the Niger Republic, urogenital fistulae are known to account for 63.3% of reasons for all divorces ⁽³⁾ and the situation is not likely to be any better in most third world countries.

Urogenital fistula arises as a result of an abnormal communication between the urinary system and the vagina (urinary incontinence). They present a major challenge in gynecological practice and if left untreated, the vulval skin is at risk for ammoniacal dermatitis and vulval excoriation.

Their true incidence is unknown, as many patients, especially those in the third world suffer in silence and isolation ⁽³⁾. The annual world-wide incidence is estimated to be 50,000 to 100,000, with the vast majority of these occurring in the developing world. The high incidence of fistulae in the developing world has been attributed to lack of adequate facilities and the non-availability of an enabling environment for effective obstetric services. In Nigeria alone, approximately

200,000 cases of fistulae are reported to be waiting for surgery in one year ⁽⁴⁾. A recent United Nation's report ⁽⁵⁾, estimates the world-wide prevalence of fistulae to be about 2 million women. In 2002, the United Nations Funds for Population Activities (UNFPA) ⁽⁶⁾, conducted a 6-month needs assessment in 9 African countries and estimated that there could be as many as 1 million women living with fistulae in Nigeria alone, and that the incidence rates could be as high as 2 to 3 per 1000 women in countries with high maternal mortality rates.

The aetiology of urogenital fistulae is varied but can simply be categorized into either congenital or acquired fistula. The former (congenital class) is extremely rare, while the latter broad category (acquired fistula) may arise from obstetric, surgical, malignant disease or radiation causes. In much of the developing world over 90% of fistulae are of obstetric etiology, whereas in the developed world over 70% follow pelvic surgery ^(7, 8,9,10,11). Certain social factors are also known to play a major role in the etiology of fistulae. ⁽¹²⁾

Obstetric fistulae: this is a common problem in countries with limited health care resources and shortage of skilled obstetric providers ⁽¹²⁾. The incidence of obstetric fistulae is known to be a direct indication of the quality of obstetric care in an area ⁽¹³⁾. Obstetric fistulae result from obstructed labour, accidental injury during Caesarean section, forceps delivery, craniotomy or symphysiotomy. Traditional surgical practices (including circumcision and gishiri cutting) ⁽¹⁴⁾ and complications of criminal abortion are also other causative factors.

They are mostly vesico-vaginal, majority of which result from prolonged and obstructed labour, whereby the fetal head becomes impacted in the pelvis. During normal labour, the bladder is displaced upwards, and the anterior vaginal wall, bladder base and urethra are compressed between the fetal head and posterior surface of the pubis. No harm results if this occurs for a short time, but in prolonged labour the intervening tissues are devitalized by ischemia. Usually the anterior vaginal wall and underlying bladder neck are affected, although sometimes the area of necrosis is higher, in which case the anterior lip of the cervix and the underlying trigone are involved. The devitalized area separates as a slough, usually between the third and

tenth day following delivery, with resulting fistulae formation and incontinence ⁽¹⁵⁾.

In the developed world, obstetric fistulae are mostly associated with operative delivery. Accidental injury to the vaginal wall during a difficult forceps delivery may involve damage to the underlying bladder wall, particularly if the tissues are devitalized by prolonged pressure. Forcible rotation with Kiellands forceps is particularly liable to produce such an injury through shearing stresses. The bladder is exposed following symphysiotomy, if the pubic bones are too widely separated by forced abduction of the thighs. In these circumstances, the unsupported bladder neck is very likely to be damaged, especially if the head is rotated and extracted with forceps. The posterior bladder wall may be accidentally incised during lower segment Caesarean section, or repair of ruptured uterus, particularly if the bladder is not reflected sufficiently far downwards before the lower segment is opened. The bladder may be torn during the reflection itself, especially if a previous operation has made it densely adherent to the lower segment. If the bladder injury goes undetected at the time, urinary leakage through the abdominal wound develops. This is usually followed by incontinence vaginally, when the urine finds its way

through the uterine incision. The abdominal leakage then dries up, as the bladder drains through the resulting vesico- cervical fistulae. Alternatively, sutures may be passed through the posterior bladder wall during repair of the uterine incision. Urinary incontinence in such cases is delayed until the intervening bladder tissue caught up in the sutures sloughs off.

Traditional surgical and medical practices also play a significant role in the aetiology of obstetric fistulae in several parts of Africa. In some tribes of Nigeria the practice of yankan gishiri is commonly employed to treat a wide variety of conditions, including obstructed labour, infertility, dyspareunia, amenorrhoea, goiter, backache, dysuria. The cut made with a razor blade or knife through the vaginal introitus, is sometimes superficial but may result in fistula formation. Since they are usually made by linear incision into healthy tissues, repair is often much easier than those resulting from pressure necrosis.

Infibulation is the most extreme form of genital mutilation as practiced by muslim cultures (Pharoanic circumcision) ⁽¹⁶⁾. It involves removal of labia minora, most of labia majora, mons veneris and often the clitoris, the introitus being reduced to pinhole size. The effect in labour is to produce a significant delay in the second stage. This will necessitate

wide episiotomy, often with an anterior incision to allow delivery, and contributing to development of both vesico vaginal and recto vaginal fistulae and 3rd degree tears. Obstructed labour is most often due to contracted pelvis. This usually results from stunting of growth by malnutrition and untreated infections in childhood and adolescence.

Where women retain a subservient role in society, and standard of education are limited, early marriage and absence of family planning services result in an early start to childbearing ^(17,18). Where first pregnancies occur soon after menarche, before growth of the pelvis is complete, this also contributes to obstruction in labour. Tahzib reported that 50% of cases of VVF seen in northern Nigeria were under 20 years, more than 50% were in their first pregnancy and only one in 500 had received formal education ⁽¹⁹⁾. Murphy from the same area reported 88% of patients had married at 15 years of age or less, 33% had delivered their first child before 15 years ⁽²⁰⁾. In different societies however, these factors do seem to have variable influence, and for example, in south east Nigeria ⁽²¹⁾, Ghana ⁽²²⁾ and north west frontier of Pakistan ⁽²³⁾, patients with fistulae seem to be somewhat older and of higher parity, higher literacy rate, and to be more likely to remain in a married relationship after the development of the fistula. It

is likely that the development of the fistulae here reflects other biosocial variations. It is clear that in these populations, uptake maybe poor even where skilled maternity care is available. Mistrust of hospital is common, fear of the family incurring high financial costs, antenatal care poorly attended, and delivery commonly conducted at home by elderly relatives or unskilled birth attendants. Where labour is prolonged, transfer to hospital may only be used as a last resort.

Surgical fistulae: Urogenital fistulae may follow a wide range of surgical procedures within the pelvis. As the urinary system is in close proximity to the uterus, the opportunity for injury is ever present in any type of pelvic surgery. These occasionally result from direct injury to the lower urinary tract, but mostly careless, hurried or rough surgical technique makes the injury most likely. Tissue devascularization during dissection, inadvertent suture placement, pelvic hematoma formation or infection developing post operatively result in tissue necrosis with leakage developing usually between 5 and 14 days later. Overdistension of the bladder post-op may be an additional factor in many of these latter cases.

It has recently been shown that there is a high incidence of abnormalities of the lower urinary tract function in fistulae patients ⁽²⁴⁾. It is not clear whether these abnormalities antedate the surgery or develop with, or as a consequence of the fistula. It is likely that patient with habit of infrequent voiding or those with insufficient detrusor contractility may be at increased risk of post operative urinary retention. If this is not recognized early and managed appropriately, the risk of fistulae formation may be increased.

Although it is important to remember that the majority of surgical fistulae follow apparently straight forward hysterectomy in skilled hands, several risk factors may be identified that make direct injury more likely. Anatomical distortions within the pelvis by ovarian tumour, fibroid, will increase the difficulty and abnormal adhesions between the bladder and uterus or cervix following previous surgery or associated with previous sepsis, endometriosis or malignancy, may make fistulae formation more likely. Pre-operative or post - operative radiotherapy may decrease vascularity and make the tissues in general less forgiving of poor technique.

Issues of training and surgical technique are also important. The ability to locate and if necessary, dissect out the ureter must be part of routine gynaecological training, as should the first-aid management of lower urinary tract injury when it arises. Use of gauze swabs to separate bladder from the cervix at Caesarean section or hysterectomy should be discouraged. Sharp dissection with knife or scissors does less harm especially where the tissues are abnormally adherent.

Malignant fistulae: excluding the effect of treatment, malignancy itself may result in genital tract fistulae ⁽¹²⁾. Cancer of cervix, vagina are most common malignancies to present this way. It may be a distressing part of terminal phase of malignant disease. It is nevertheless one deserving not simply compassion, but full consideration of the therapeutic or palliative possibilities.

Radiation fistulae: Some fistulae develop following radiotherapy of some inoperable types of cervical cancer. The ionising radiation causes obliterative endarteritis, this may in the long run result in fistulae formation long after the primary malignancy had been treated. Indeed, Hilton reports fistulae developing between one and 30years following radiotherapy in one of his series ⁽¹²⁾. The associated

devascularisation in the adjacent tissues means that ordinary surgical repair has a high likelihood of failure and modified surgical techniques are required ⁽²⁵⁾. The consensus in the literature appears to favour a waiting period of 6 to 12 months after completion of radiation treatment, before attempting repair of the fistulae. This delay is to allow some of necrotic tissue to slough off with time ⁽²⁶⁾ .

Other causes: these include infections (lymphogranuloma venereum, schistosomiasis, actinomycosis, measles, tuberculosis) trauma (penetrating trauma, coital injury, neglected pessary or other foreign bodies) and catheter related injury, In the developed world it is the non-infective causes that predominate.

Another traditional practice, as seen in several Arab countries is the packing of the vagina with salt ⁽²⁷⁾. This is supposed to restore the vagina to its nulliparous state, and to add to the husbands' sexual pleasure. It is also thought to be an antiseptic. These salts burn the vagina, resulting in inflammation, ulceration, fibrosis and to ultimately occlusion of the vagina or fistula development.

Presentation: Uncontrolled leakage of urine into the vagina. The drainage may be continuous in case of big fistulae, or intermittent with

very small ones. The time from initial insult to clinical presentation depends on the aetiology of the fistula. About 90% of fistulae associated with pelvic surgery are symptomatic within 7-30 days post-op. Increased abdominal, pelvic, or flank pain, prolonged ileus, and fever should alert the physician to possible urinoma or urine ascites.

Obstetric fistulae typically present in the first 24 hours of delivery, whilst radiation-induced may present 30 days to 30 years later, owing to slow, progressive devascularisation necrosis. These patients present with symptoms of radiation cystitis, hematuria and bladder contracture.

Diagnosis:⁽²⁸⁾ Full clinical examination. Bloods, including Urea, creatinine and Electrolytes, full blood count, urine for microscopy, culture and sensitivity. Full vaginal speculum examination for any discharges.

Confirm that the discharge is urinary: any fluid in the vagina collected for urea, creatinine and potassium, to exclude vaginitis .

Identify site of leakage: Dye test, retrograde filling of the bladder with methylene blue through a transurethral catheter, with placement of tampons in the vagina to help identify and locate the fistulae. If

tampons just wet, and not stained, then oral phenazopyridine or intravenous indigo carmine can be used to rule out a ureterovaginal, ureterouterine, or ureterocervical fistula.

Identify or exclude multiple or complex tracks: cystoscopy with carbon dioxide gas through the urethra, will produce air bubbles in the vagina at the fistula sites, if the latter was filled with water (flat tyre sign).

Colour Doppler ultrasonography: Volkmer et al showed a 92% pick up rate using contrast media. He found it to be of comparable sensitivity to both cystoscopy and cystography, while less invasive than cystoscopy, and without the radiation exposure of cystography.⁽²⁹⁾

Cytourethroscopy: to identify the fistula, determine the number and location and proximity to the ureteric orifices .

Intravenous urography: insensitive in VVF, but helps in knowing the upper urinary tract status .

Urodynamics: stress incontinence has been recognized to occur in 10-12% of patients following successful VVF repair. The abnormality was found highest in those with urethral and bladder neck fistulae. While the results of urodynamic investigations are unlikely to alter the

approach to treatment of the fistula, the awareness of functional abnormalities may lead to more realistic pre-operative counseling .

RCOG recommendations: Examination under anaesthesia, cystourethroscopy and dye testing remain the investigations of choice in suspected fistulae ⁽³⁰⁾ .

Management: Counselling; some of these patients may have been healthy and admitted with what was supposed to be a routine procedure, but ended up with a distressing condition. They need to be counseled and informed about the nature of the problem and why it occurred, and the management options. Surgical fistulae could well be prevented by the following measures;

1. good exposure, optimal lighting, visualization and traction
2. identification of the ureters
3. sharp dissection in the appropriate plane
4. use of indwelling catheter
5. wide dissection of bladder from cervix and upper vagina, +/-
1cm beyond planned line of resection
6. sparing use of electrocautery

Treatment:

Optimal timing for fistula repair still contentious. The timing of repair should be dictated by the overall medical condition of the patient and the tissue quality surrounding the fistula. Early management of critical importance and depends on etiology and site of the fistula. If surgical trauma is recognized within 24 hours post-op, immediate repair may be appropriate. The majority is, however, recognized between 5 and 14 days post-op, and they should be treated with continuous bladder drainage for 6 to 8 weeks. While shortening the waiting period is of both social and psychological benefit to the distressed patient, one should be careful not to trade these issues for compromise to surgical success. The benefit of delay is to allow slough to separate and inflammatory change to resolve. It may be necessary to wait 10 – 12 weeks for surgical, 12 weeks for obstetric and 12 months or more for radiation-induced fistulae, to ensure full resolution of tissue necrosis.

Skin care:

Adequate incontinence pads must be supplied. The skin must be treated with silicone cream to prevent or treat ammoniacal dermatitis. Oestrogen cream may assist with optimizing tissue vascularization and healing in the post menopausal or hypoestrogenic patient. Steroids have not been found to be of benefit. Acidification of urine with Vit C to minimize cystitis and formation of bladder calculi should be considered.

Surgery:

Indicated when conservative measures fail, that is, continuous bladder drainage. Approximately 10% of post hysterectomy fistula will close with bladder drainage and antibiotics. This is achieved in fistulae of only a few millimeters diameter. If it is still open 3 weeks after adequate drainage, it is unlikely to resolve without surgical intervention.

Various surgical techniques are available to the surgeon; vaginal or abdominal approach, electrocautery, use of interposition flaps or grafts, fibrin glue. For successful repair, the following principles should be observed.

Principles:

- Complete preoperative diagnosis
- Exposure
- Hemostasis
- Mobilization of tissue
- Tissue closure under no tension
- Watertight closure of bladder with any cystotomy repair
- Timing to avoid infection and inflammation of tissue
- Adequate blood supply at area of repair
- Continuous catheter drainage postoperatively

Route of repair:

Abdominal or vaginal? Choice must be mindful of anatomical relationships, extent of injury, and comorbidities. Where access is good and vaginal tissues sufficiently mobile, the vaginal route is most appropriate. If access is poor and the fistula cannot be brought down, the abdominal approach should be used.

Vaginal approach: minimal blood loss, low postoperative morbidity, shorter operative and post-op recovery time. Increased risk of dyspareunia, tenderness at site of the donor Martius graft, diminished vaginal length and caliber. Contraindicated if there are other abdominopelvic organ fistulae, eg, ureters.

Abdominal approach: if there's inadequate exposure of the fistula vaginally, or need for concomitant abdominal surgery, eg, ureteral reimplantation, complex VVF involving ureters or ureteric orifices. Risk of abdominal and pelvic adhesions.

Types of repair:

Fistula repair- with or without use of interposition grafts to support the fistulae; these serve to create an additional layer in the repair, to fill dead spaces or to bring in new blood supply to the area.

Ureteric reimplantation

Urinary diversion (ileal conduit) - especially in extensive bladder destruction, malignant and post radiation fistulae.

Following VVF repair, the patients should be delivered by Caeserean section in subsequent pregnancies.

RELEVANCE OF THIS REVIEW

Dr. George Mukhari hospital (DGMH), is a tertiary referral hospital that provides health care services to a mixture of both urban and rural communities. The treatment of patients with urogenital fistulae is increasingly becoming an important urogynaecological service at this hospital. However, despite years of dealing with this condition, the hospital lacks detailed documentation regarding this problem. Therefore, this review is designed to evaluate the incidence, the types as well as the prevailing predisposing factors for the formation of fistulae in the patients managed at DGMH. It will also be necessary to establish how certain pre-operative aetiological factors may have been associated with the success of the surgical repair for the incontinence.

OBJECTIVES: The objectives set for this review were:

1. To determine the incidence of urogenital fistulae at DGMH.
2. To evaluate the causes and types of fistulae at this hospital.
3. To establish the surgical modalities used for treatment and outline the outcome of surgical management.

STUDY DESIGN:

The study is a retrospective review of all cases of urogenital fistulae which were documented and managed at our hospital over a three-year period.

SETTING:

The review was conducted at both the gynaecological and urological units of Dr. George Mukhari/MEDUNSA hospital complex.

METHODOLOGY

All records of patients who were treated between 1st June 2003 and 31st May 2006, were retrieved for analysis. Information relating to the study was extracted from each case file and entered into a data collection form designed for ease of entry into a statistical programme. The diagnostic procedures consisted of a combination of relevant history, physical examination, the 3-swab test (in some instances) and appropriate radiological studies. Intravenous urography, retrograde pyelography and cystourethroscopy were used in delineating ureterovaginal and vesico-vaginal fistulae. The general approach for diagnosis is that published in Cambell-Walsh Urology textbook ⁽³¹⁾ – an algorithm of which is illustrated below.

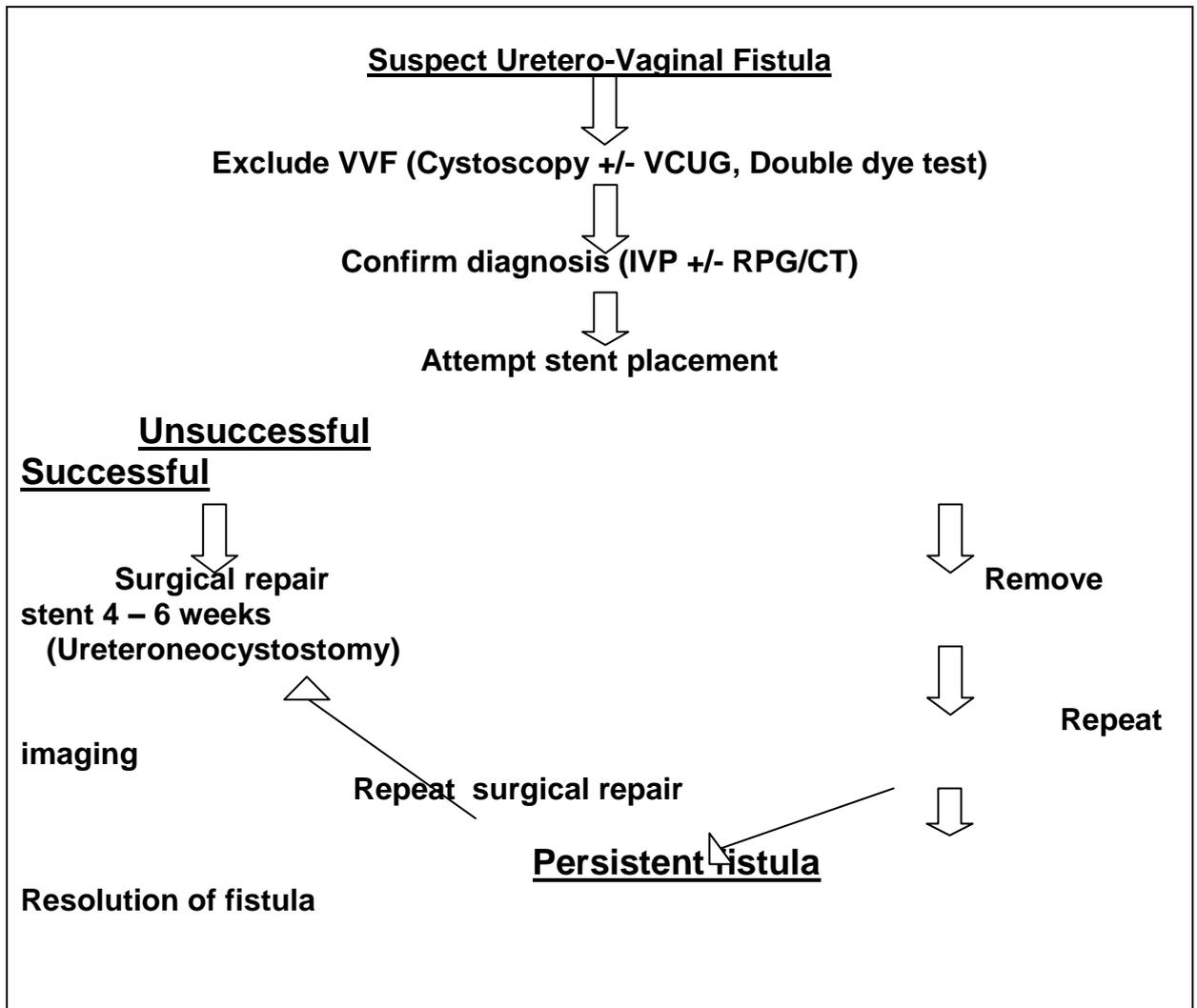


Figure 1: Algorithm for diagnosis and management of uretero-vaginal fistula
Key: CT = computed tomography; IVP = intravenous pyelography;
 RPG = retrograde Pyelography;
 VCUG = voiding cystourethrography; VVF = vesico-vaginal fistula.

The various radiological procedures allowed for thorough examination of the female pelvic anatomy with the aim of achieving: (a) observation of the female sphincter unit to assess its ability to function effectively, (b) assessment of the bladder to rule out any concomitant condition that may cause or be associated with incontinence, (c) identification of

possible extra-urethral causes of incontinence. All the patients, except two, had diagnostic procedures.

Urinary diversion was accomplished using either the Bricker or Wallace anastomosis. **Bricker anastomosis**: this is a refluxing end-to-side, ureter-small bowel anastomosis which is known to have a low complication rate. This method involves excising a small button of seromuscular tissue and mucosa, spatulating the ureter for 0.5 cm and suturing the full thickness of the ureter to the full thickness of the bowel (i.e. mucosa and seromuscular layer to ureteral wall) with either interrupted or running 5-0 PDS. The anastomosis is stented with a soft silastic catheter. **Wallace anastomosis**: This is a refluxing anastomosis in which the intestinal segment employed, may be either the small bowel or the colon. The end of one ureter is sutured to the end of the other ureter and this composite anastomosis is sutured to the end of the bowel. A fine suture is placed at the apex of each ureter with the knot tied to the outside.

The posterior medial ureteral walls are sutured together and the anterior lateral walls are sutured directly to the bowel with interrupted 5-0 PDS. Where the suture line of the end of the ureters, comes to the

bowel, a horizontal mattress suture is placed to make the anastomosis watertight.

All the patients except one, were operated through the abdominal approach, and all the patients with malignant or radiation-induced fistulae were treated by urinary diversion (ileal conduit), and no attempt to repair the fistulae was made in them. The duration of operation for fistula repair was 1 1/2hr -3hrs, diversion procedures, 2hrs -4hrs, and ureteric reimplantation, 1 1/2hr -2hrs, depending on previous surgery, or adhesions due to malignancy eg endometrial carcinoma. Most patients stayed 4 to 5 days post op. Only a few stayed longer due to prolonged ileus. Patients would be discharged home with the catheter still in situ, recalled after 14 days post op for catheter removal. A cystogram would then be done to see if the repair is intact, if it was a VVF.

The outcome measures were demographics of the women, history of previous pregnancies and mode of delivery, types of previous surgical procedure, types of fistulae, past history of any radiation therapy and any concurrent malignant disease. Information was also retrieved regarding past history of treatment of pelvic inflammatory disease and any other treatment for other infections. Records (both short-term and

long-term) of operative outcomes, were assessed for each patient. All efforts were put into ensuring at least 90 - 95% retrieval of records of patients treated during the three-year review period.

DATA ANALYSIS

Information from the data sheet was transferred into a computerized statistical programme (Epi-Info version 6.0) from which statistical analysis was conducted. Analysis was predominantly qualitative and descriptive, in which the incidence, types and causes of fistulae were reported as percentages. The Odds ratio and 95% Confidence Interval for the occurrence of fistulae, based on aetiological factors were calculated. Where quantitative variable was established, the mean \pm standard deviation was calculated and used to express significant differences between different aetiological groups. Differences were adjudged to be statistically significant, if the p-value, derived from calculating Student t-test, was equal to or less than 0.05.

ETHICAL ISSUES

Since this review was retrospectively conducted, no patient consent was required. However, the protocol for this review was submitted to the institutional review committee of the University of Limpopo

(MEDUNSA CAMPUS) and the Superintendent of the hospital (DGMH), for approval and use of patients' case files. The information gleaned from the file of each patient, was treated with the strictest possible confidentiality.

RESULTS

During the three years of this review (1st June 2003 – 31st May 2006), a total of 50 patients were managed at DGMH. All the 50 files were available for this review (a retrieval rate of 100%). One patient, who was reported to have had persistent incontinence, after two previous surgical repairs, declined another attempt for repair and was classified as a failed procedure in this series.

Three other patients who had malignancy could not undergo surgery due to either underlying cardiac condition or as a result of deteriorating health.

Table 1 below shows the age profile of the patients in this review.

Patients whose ages ranged between 22 and 30 yrs and those between 31 and 40 yrs made up 14% respectively. Women who were older than 40 yrs constituted 72% of all the cases.

Table 1: Age distribution of patients in this review

Age Range	Number	Percent
22 – 30 yrs	7	14
31 – 40 yrs	7	14
41 – 50 yrs	19	38
> 50	17	34

Table 2 illustrates the underlying aetiological factors associated with the formation of fistulae. Genital tract malignancy accounted for about half (48%) of the cases seen during the period of this review. This was made up of 46% with cervical cancer and 2% with endometrial carcinoma. Most of these patients were referrals from our outlying rural referring hospitals. The remaining 26 cases (52%) were equally divided between those who had previous gynaecological surgery

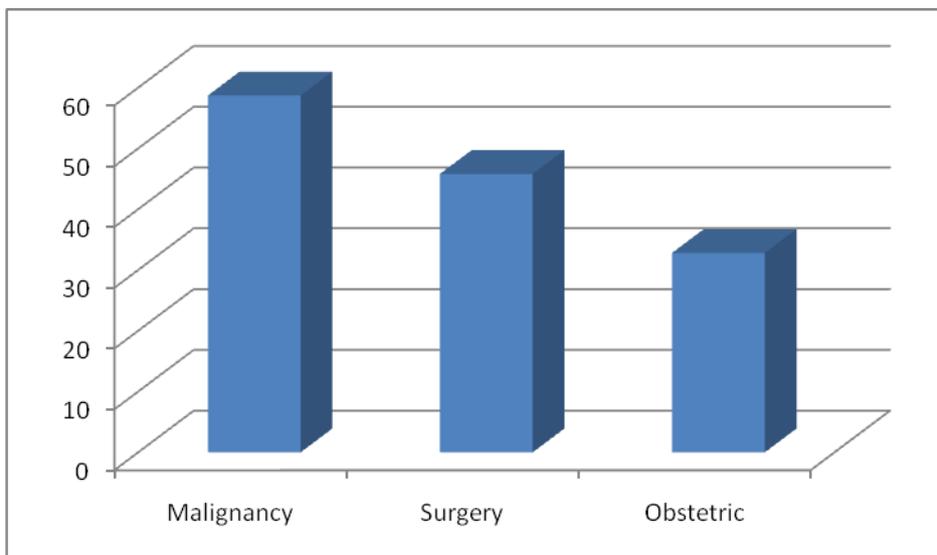
(done at DGMH) and those referred with a possible obstetric cause for their fistulae.

Table 2: Aetiological factors for the occurrence of fistulae at DGMH

Aetiological Factor	Number of Cases (N = 50)	Percentage
Malignancy: Cervical	23	46
Endometrial	1	2
Previous Surgery: TAH	6	12
TAH & BSO	7	14
Obstetric Factors: Vaginal delivery	5	10
Operative Delivery	8	16

The main reason for the gynaecological surgery was symptomatic fibroids – with pelvic pain and menorrhagia. There were 12 (92.3%) of such cases out of the 13 that had previous surgery as aetiological factor. It was also noted that caesarean section was the only cause of these fistulae among women who had operative delivery. Only one patient had an attempted vacuum delivery that failed. The Odds Ratio for any woman presenting with fistula to have an underlying malignant disease was 1.8 (95% Confidence Interval: 1.70 – 2.35), when compared with obstetric or previous surgery as aetiological factors.

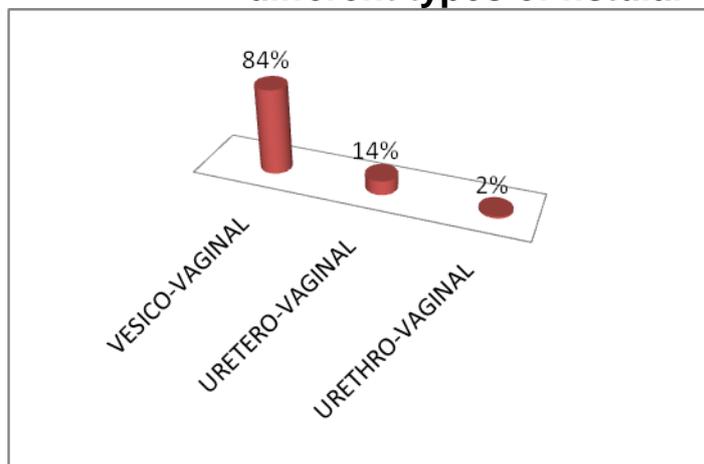
Figure 2: The mean age of women in this series based on their aetiological factors



In figure 2, women with malignant disease had age range of 33 – 85 and mean \pm Std. Dev of (58.7 \pm 14.3 yrs). This was statistically higher ($p < 0.05$), when compared with the group of women with previous surgery, who had age range of 37 – 70 (mean \pm Std. Dev; 45.8 \pm 7.9 yrs) and for women with obstetric causes, who were 32.8 \pm 9.7 yrs (mean \pm Std. Dev).

Figure 3 below shows the percentage frequency of occurrence of each of the three types of fistula seen at DGMH. The vast majority of the women (42 cases; 84%) had vesico-vaginal fistula; 14% (7 cases) had uretero-vaginal fistula and there was only one case (2%) of urethro-vaginal fistula. Four patients had repeat surgery to correct persistent incontinence, after failed attempts from the referral hospitals.

Figure 3: Percentage frequency of occurrence of different types of fistula.



Twenty-two (48%) patients had urinary diversion while 6 (13%) patients needed ureteric re-implantation and the remaining 18 cases (39%) had fistula repair. Twenty-one of the patients who underwent diversion had malignancy while one patient had bladder neck destruction. Seven of the patients with malignancy developed fistulation following radiotherapy.

**Table 3: Surgical outcome of treatment for incontinence
[Evaluation: \geq 12-months post-surgery]**

OUTCOME OF SURGERY	NUMBER (N = 46)	PERCENTAGE
Complete Success	44 patients	95.7
Re-Laparotomy	4 patients	8.7
Wound Sepsis	2 patients	4.3

The surgical outcome of the 46 women who underwent corrective repair procedures at this hospital, is shown in Table 3. Complete success was achieved in approximately 90% of the cases, four women needed repeat surgery. The only major complications encountered were two women who had to be treated for post operative wound sepsis. Another patient still presented with stress incontinence a few months later. One other patient had schistosomiasis present in the biopsy of the fistula

DISCUSSION

Whenever fistulae occur, they will always be the cause of physical, emotional and psychological anguish because of the constant urinary incontinence. This can be overwhelming for the patient, as a result of the burden of continual wetness, undesirable odors, vaginal and bladder infections and all the related discomfort. The anguish for the patients is often expressed by family members through neglect, abandonment and the high divorce rate as reported (63.3% of all divorces) in the Niger Republic⁽³⁾.

Reports in the literature are of the common opinion that fistula formation, arising from obstetric causes, are rare in the developed world, but they are still the predominant cause in the third world. In fact, 70 – 80% of fistulae seen in the developed world are commonly caused by injury to the bladder at the time of gynaecologic, urologic or other pelvic surgeries ^(9,32). Obstetric causes for fistulae have been virtually eliminated in the developed world, due partly to low birth rate, good labour monitoring and liberal use of C/S. This is not the case in most developing countries where obstetric causes still account for 65 – 85%

of fistulae. The main reason why obstetric causes for fistulae still predominate in the developing world reflects the relatively poor obstetric care in third world countries. It is also a reflection of the lack of proper social development and the cultural practice of early marriage in many third world countries. In East Africa, for example, fewer than 15% of pregnant women have been reported to utilize antenatal care ⁽³³⁾ and some of the resultant complications of child-birth result in fistulae and high maternal morbidity and mortality rates.

Our obstetric patients with an age range of 22 – 54 years were much older than those reported in the studies from Nigeria ^(17, 18), majority of who were below 20 years. This probably means that our patients had more developed pelvises than in the said studies. 8 of the 13 patients with obstetric fistulae developed following obstetric surgical intervention. These patients were managed at district hospitals, where more often junior doctors work under difficult conditions, with no senior back up, having done few Caeserean sections before. Strategies should be developed to intensify the training of interns before being released to those hospitals, coupled with strong outreach programs by the teaching hospitals to ensure that these community doctors are adequately skilled, and continually developed in these life saving procedures.

It was, however, surprising to find that rather than obstetric causes of fistulae being predominant in this series, it was malignant disease (carcinoma of the cervix and the endometrium), which accounted for 48% of the fistulae. It may be argued that since our setting at DGMH bears a typical third world scenario, obstetric causes should have been more prominent. An explanation could be that, the level of obstetric care, the awareness of our pregnant women to utilize antenatal facilities, together with free antenatal and delivery services, and the fact that the majority of our patients were way much older (72% >40yrs), may have determined the shift in etiological factors at DGMH, when compared with other developing countries, especially in Africa. On the other hand, it needs to be emphasized that the high rate of malignant disease being associated with fistulae in our hospital, (46% vs 12% in other centres) is a direct reflection of the delay by our patients to seek medical care for malignant diseases. It is an indictment to our primary health services. We are not doing enough to educate and motivate our patients to use these primary health facilities.

In this series, it was noted that women with malignant diseases were about twice as likely to develop fistulae in comparison with women whose fistulae formation might have been associated with previous

surgery or obstetric events. Radiation therapy on its own has been implicated as a possible etiological factor in fistula formation and seven of our patients developed fistulae following radiotherapy. We still have a lot to do in terms of educating our patients and developing effective screening sites and programmes in order to reduce this preventable tragedy.

Where pelvic surgery accounts for the majority of fistulae formation, it is most likely to be due to hysterectomy. Other instances when formation of a fistula may present as a sequelae of pelvic surgery are: general surgery procedures in the pelvis, anterior colporrhaphy or cystocele repair or other urologic procedures. 13(26%) of our patients developed fistulae following pelvic surgery, hysterectomy for benign causes. This could be due to most of our patients having dense adhesions or to the fact that most of these were at the hands of inexperienced registrars. This again calls for increased supervision of our junior doctors.

The operative approach to hysterectomy has also been reported to be a risk factor as bladder injuries are known to be at least three times more common during abdominal hysterectomy when compared with vaginal hysterectomy ^(34, 35). All the patients reviewed in this series, who have had previous surgery for hysterectomy as possible etiological factor for

their fistulae, had abdominal hysterectomy. Perhaps, it is now necessary to intensify the training of gynecologic surgeons, to include preference for vaginal hysterectomy. Several studies, including the CREST study, have indeed shown that vaginal hysterectomy has less perioperative complications, need for blood transfusion, surgical morbidity, discomfort and wound dehiscence ^(34,36,37,38). It also offers better approach for extremely obese and elderly patients with comorbidities and is cost effective too ⁽³⁹⁾ ACOG suggested that the choice of hysterectomy depends on the experience of the surgeon and the patients' anatomy, and developed their guidelines based on uterine size ⁽⁴⁰⁾.

Varma et al managed to increase their vaginal hysterectomy rate from 32% to 95% over a 5 year period ⁽⁴¹⁾. They concluded that the attitude of the surgeon is the major determinant of the route of hysterectomy, rather than the clinical situation, and that the number of vaginal hysterectomies can be increased if a deliberate decision was made to carry them out. Wood et al also came to a similar conclusion in their five year audit of 323 hysterectomies which found that 253(78,3%) were performed vaginally ⁽⁴²⁾.

Training, experience and surgeon preference play a major role in the type of surgery offered to a patient. With increased levels of training in

vaginal surgery, well defined guidelines and a concerted effort made to use the vaginal route where possible, the number of hysterectomies performed vaginally can be maximized ⁽⁴³⁾. This will in turn reduce the number of surgical fistulae. Then again, it should be noted that our patients present late, and with huge fibroids that can not be removed vaginally, or due to adhesions from a high prevalence of previous pelvic inflammatory disease, or the need for removal of ovaries. This is further compounded by the sometimes reluctance of our patients to have their wombs removed, delaying the operation or defaulting treatment till the fibroids have grown much bigger.

Risk factors for intra-operative injury to the bladder, is clearly a major factor for post-operative vesico-vaginal fistula (VVF). Other risk factors include uterine surgery (caesarean section), endometriosis, infections, and pelvic inflammatory disease. In the present review, 16% of the cases had C/S as an underlying risk factor. This figure, though lower in comparison with other third world countries, still constitutes a high percentage when compared with the developed world.

The incidence of urogenital fistulae varies from place to place and seem to be closely related to the level of antenatal care available, socio-economic development (which translates to adequate and effective

provision of logistics at medical centers) as well as the impact of cultural practices.

The most common form of fistula is the VVF, and its surgical repair demands correct initial diagnosis as well as its distinguishing factors.

For the management of VVF, pelvic examination with a speculum, to evaluate the extent of the fistula is mandatory. Confirmation can then be done by instillation of a vital blue dye into the bladder per urethra and then observing the discolouration of the vaginal drain. Cystoscopy - an endoscopic examination, has become another important procedure, because it enables the identification of an immature fistula which often appears as an area of localized bullous edema without a distinct ostium. Cysto-urethroscopy can also confirm but has the added advantage of being used to assess the size of the track, the presence of collateral fistula and the location of the urethral orifices, in relation to the fistula.

As much as 12% of post-surgical VVF have an associated urethral injury or ureterovaginal fistula ⁽⁴⁴⁾. Intravenous urography is usually sufficient for the purpose of confirming this injury and this was adequately described in the article by Gerber & Schoenberg ⁽⁴⁵⁾.

Ureteral fistula in the genital tract may connect with the vagina or much less commonly with the fallopian tube or the uterus. The risk factors are usually endometriosis, obesity, PID radiation therapy and pelvic malignant disease. Thus, except for oncologic cases, in which a segment of ureter is deliberately excised, many ureteral injuries are likely to be due to technical or iatrogenic factors ⁽³¹⁾. Most uretero-vaginal fistulae occur during procedures for benign (hysterectomy, C/S, cystocele repair) rather than for malignant indications ⁽⁴⁶⁾, this is also the case in this review, in which only a small proportion (14%) of the fistulae was identified as uretero-vaginal fistulae. Any injury to the ureter that exposes the ureter lumen (e.g. laceration) or results in delayed necrosis of a portion of the ureter (e.g. suture ligation) and subsequent urine extravasation may lead to a fistula.

Urethro-vaginal fistula occurs most commonly from vaginal surgery, including anti-incontinence surgery, anterior vaginal wall prolapse and urethral diverticulectomy ⁽⁴⁷⁾. The formation of urethro-vaginal fistula in the third world has similar etiological factors to VVF (obstructed labour).

In instances of obstructed labour, the lesion is due to extensive ischemic necrosis and this could extend beyond the bladder neck and become a combined urethral-vesicovaginal fistula. One patient in the present review had destruction of bladder base and vaginal stenosis. She was then offered cysto-caeco-appendicoplasty. Other causes of urethro-vaginal fistula are radiation therapy for pelvic malignant disease, trauma including pelvic fracture and vaginal neoplasm.

The symptom of this type of fistula is largely dependent on the size and location of the fistula along the urethral lumen. The question as to whether the patient will produce minimal urine leakage or continuous leakage is dependent on the size of the fistula. Proximal fistulae can be associated with stress incontinence, or if they are located at the bladder neck, continuous incontinence similar to that associated with VVF may result. Distal fistula beyond the sphincteric mechanism may be completely asymptomatic or may present as splayed urinary stream. Surgical repair of urethra-vaginal fistula is more difficult than repair of VVF. This is due to several factors: extensive soft tissue defects and the lack of local viable tissue for a multilayer repair. Repair usually involves the use of rotational vaginal wall flaps, but anteriorly and posteriorly based bladder flap tubes, have also been used effectively ^(48, 49). There

were two cases in this review, which were classified as having failed: one was a patient who had previous 2 attempts and when it was explained to her that she would need a caeco-appendicoplasty, she declined surgery. The other one was a patient who had four previous attempts from a referral hospital; she had another repair in our hospital but presented a few months later with stress incontinence. Stress incontinence is a recognized complication of VVF especially in those patients who have bladder neck destruction.

Unfortunately, there was no data pertaining to the size or actual site of the fistula in this review. This might have a bearing on the route of repair. All but one of our patients with obstetric fistulae were treated through the abdominal approach. On interviewing the surgeons, they said their experience has taught them to classify the fistulae as those above or below the ureteric orifices. They choose the transabdominal route over the vaginal one for those fistulae above the ureteric orifices, as it gave them adequate exposure, and therefore, satisfactory repair. This is however, in contrast to what is in the literature. In a series of 685 vesicovaginal fistulae patients by Kelly, a primary abdominal approach was used in only 10 patients, urethral reconstruction in 11,2% and ureteric reimplantation required in 5,8%⁽⁵⁰⁾. Elkins et al also stated that

the transvaginal approach can be used for repair of almost all fistulae, and that the transabdominal approach rarely, if ever, offered better exposure and was always associated with a marked increase in operative time and bleeding⁽⁵¹⁾. Was the bias towards the transabdominal route in our series due to the fact that the surgeons were urologists, as is most often their preferred route, or the fact that the obstetric fistulae due to prolonged labour presented with greater tissue destruction than the variety due to surgical intervention as seen in the developed world?

There is at present no generally accepted classification or staging of fistulae. Different authors form their own classifications based solely on the anatomical structures involved, or size of the fistula, or even one of convenience. This lack of agreement has prevented comparison between individual workers' results based on a common scientific classification.

All in all, the initial surgical repair provides the best opportunity to achieve successful repair of VVF, and therefore the surgeon must choose the type of surgery he is most comfortable and experienced with. Previously failed attempt at repair produces scar and anatomical distortion and may compromise potential reconstructive flaps. Although,

timing for repair of VVF is said to be crucial, optimal timing of VVF resulting from obstructed labour should be delayed for 3 – 6 months for definitive repair ⁽⁵²⁾. The delay allows for maximum demarcation of ischemic tissue and resolution of the associated oedema and inflammatory reaction. The usual problems to look out for during reconstructive surgery are: tissue composition forming the fistula, the size and extent of the fistula, the extent of ischemia of the surrounding tissues and implications for continence in those individuals with destruction of the bladder neck and proximal urethra. The healing process of surgical repair of urogenital fistulae, can also be compromised, by other factors. The reported association of urinary bilharzia ⁽⁵³⁾, in patients with vesico-vaginal fistulae, needs to be kept in mind, in relation to the anticipated process of post-operative healing. In one case, in this series, such an association was found when a cystoscopy and biopsy of the VVF (which had developed following TAH), showed evidence of urinary schistosomiasis.

21\50 of the fistulae were iatrogenic. Excluding the malignant fistulae, this gives a high surgical fistula rate (80%), comparable to that seen in developed countries. Could this mixed rate be due to South Africa having a relatively higher standard of living compared to its African

counterparts? Fistulae due to surgical complications are likely to rise as access to surgery increases, until smoothly functioning systems of supervision, and quality control are in place ⁽⁵⁴⁾. Moser once coined these iatrogenic complications “diseases of medical progress”⁽⁵⁵⁾. The relatively lower rate of obstetric fistulae due to prolonged labour is encouraging. Could it be the free antenatal and delivery services and improved access to health facilities implemented by our Government be bearing fruit? South Africa is indeed two countries in one. It would be interesting to see what a South African multicentre study would find.

The general principles of surgical repair of urinary tract fistulae are:

- a) Adequate exposure of the fistula track with debridement of devitalized and ischemic tissue.
- b) Removal of involved foreign bodies or synthetic materials from the region of the fistula.
- c) Careful dissection or anatomic separation of the involved organ cavities.
- d) Watertight closure.
- e) Use of well vascularized, healthy tissue flaps for repair, with atraumatic handling of the tissue.
- f) Multiple layer closure.
- g) Tension free with non-overlapping suture lines.
- h) Adequate urinary tract drainage or stenting after repair.

- i) Treatment and prevention of infections (appropriate use of antibiotics).
- j) Maintenance of haemostasis.

Women should be provided with knowledge about the procedure they are about to undergo, the expected benefits, risks and alternative options available, enabling them to make informed decisions.

LIMITATIONS OF THIS STUDY

Like most other retrospective studies, there were two areas of this review, in which inadequate or complete absence of information, could have affected the overall conclusion.

1. The review failed to find any documentation by the surgeons, as to the sizes and locations of the fistulae. Such an omission could have had direct bearing on the route of repair, and could have helped in better comparison with other studies.
2. The only evidence and information to prove that previous surgical attempt had failed at the referral hospitals, was the surgical scar on the patient. There was no information on neither the type, nor the

technical procedures adopted during surgery, and this has had a negative impact on the ability of this review, to compare the success of the different surgical approaches.

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