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ORIGINAL ARTICLE

Prospective results after first-time surgery for obstetric fistulas in East African women

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Abstract The objective of this study was to document the complications, outcomes and causes of obstetric fistulas in East African women who underwent first-time surgical repair. Attention was also paid to social background and characteristics of the patients. Data were collected prospectively from patients operated on in the period from January 2001 to August 2003. Only patients who received first-time surgery and whose fistula had been caused by obstructed labour were included in the study. Eight hundred eighty-eight patients received fistula-related surgical treatment. A total of 639 of the patients with 647 fistulas underwent first-time repair. Our study comprised the 581 (90.9%) patients whose fistulas had been caused by obstructed labour. Their mean age was 27 years, 70% were shorter than 156 cm, and 30.8% had completed primary education. In 45.1%, the fistula patient was primigravida; perinatal survival was 11.5%. Mean duration between onset of the fistula and surgical treatment was 36.4 months. In 40.6%, the fistula patients lived separated from their partner. Overall closure rate of the fistulas was 93.8%. No variables were identified for success of closure using a multivariate analysis. Patients operated on within 3 months had a slightly better surgical outcome 93.9% versus 87.0%. Our population of East African obstetric fistula patients shared most of the demographic and physical features of fistula patients in the rest of the African continent. Early surgical repair (<3 months) seemed to improve the surgical outcome and can be expected to restore the social status of the patient.

Keywords Vesicovaginal fistula · Obstetric fistula · Obstructed labour · Developing country · Surgical repair

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Introduction

In Western society, urogenital/rectal fistulas are mostly caused by radiotherapy and/or surgery [1, 2]. However, in the developing countries, fistulas with obstetric cause are common. For example, fistulas that result from prolonged, obstructed labour remain a major problem especially in regions with limited medical care facilities.

Obstructed labour occurs when the presenting fetal part cannot pass through the pelvis. The presenting part then becomes wedged against the pelvic bones and compresses the soft tissues. If this process is not quickly relieved by obstetrical intervention, the blood supply to the entrapped tissues becomes compromised. Ultimately, the result is necrosis and fistula formation. In almost all these cases, the unborn baby dies. In addition to the grief over the loss of her baby, the woman starts to leak urine and/or faeces within a few days.

The obstetric fistulas clearly form an enormous problem, but true magnitude worldwide is unknown. In sub-Saharan Africa, more than 1,500,000 women were estimated to be suffering from obstetric fistulas (The Second Meeting of the Working Group for the Prevention and Treatment of Obstetric Fistulas, Addis Ababa, from 30th October–1st November 2002). Estimates of the incidence of obstetric

fistulas are 1–2 per 1,000 deliveries. After exclusion of maternal death, this means 50,000 to 100,000 new obstetric fistulas each year [3]. It is difficult to conduct population-based studies in developing countries, and scientific publications on obstetric fistulas are scarce. The few large scale surveys conducted in Nigeria [4–8], Ghana [9] and Ethiopia [10] showed that the patients tended to be young, they had married at a very young age, were short of stature and had received very little education. However, many exemptions to this "typical" patient have been reported.

The persistent urinary incontinence, as a result of the obstetric fistula, causes these women to become social outcasts. Many of them are divorced by their husbands and forced to leave their community. Owing to the social stigma attached to urinary/faecal incontinence, fistula victims suffer from immense psychosocial trauma.

To treat women who start leaking after vaginal or caesarean section (CS) delivery, a urinary catheter should be employed for at least 4–6 weeks [8, 11]. This regimen can cure up to 20% of the early stage fistulas [8]. However, once a fistula has fully developed, surgical closure is the only known therapy that is likely to be successful. Some patients do not seek treatment for many years after the development of the fistula(s). Success of surgical closure rates range between 70 and 95% [5, 6, 8, 10, 12]. The best chance of success is at the first attempt [7]. Nevertheless, much remains unclear of the demographic characteristics and the outcomes of the fistula patients. Virtually, no recent data are available on fistula repair surgery. There is still an ongoing need for scientific research in this area. Updated information might provide deeper insight into the problem and provide the necessary answers. In the absence of amenable opportunities to carry out large-scale epidemiological studies in developing countries, data need to be obtained from extensive patient series. Therefore, the purpose of this study was to record and analyse prospective data on the demographic characteristics and the outcome of surgical repair in East African women with obstetric fistulas.

Materials and methods

All the data were collected prospectively by the first author (T.R.) between January 2001 and August 2003 as part of the African Medical and Research Foundation (AMREF) flying doctors fistula project. The first author performed or directly supervised all the surgical repair procedures. Patients were operated on in 22 different hospitals in Kenya, Tanzania and Uganda.

Preoperative data were recorded on a specially designed case report form and entered in a SPSS 11.5 database. Only the women who underwent repair surgery for the first time were included in our study. Outcome of surgery was determined with the use multivariate analysis.

Records were made of patient characteristics (age, height, duration of leakage), marital status (as categorised in Table 3), obstetric history and cause of the fistula. The fistulas were classified according to their anatomical location and size as shown in Table 1. This classification was first used by Waaldijk [11, 13]. Figure 1 shows a diagram of the internal female genitals in the sagittal view. Type I fistula refers to fistula located more than 5 cm from the external urethral meatus. Type II fistula refers to any fistula located within 5 cm of the external meatus; these also involve the closure mechanism of the bladder. Type III fistula refers to a miscellaneous group consisting of uretero-vaginal and uretero-cervico-vaginal fistulas. The complexity of surgical repair increases with the degree of involvement of the urethra with or without circumferential defect. A circumferential defect means that the bladder neck has been destroyed on all sides, i.e. the anterior, posterior and lateral sides [14].

The severity of peroneal nerve injury was also assessed. Leg weakness and foot drop were seen frequently after the prolonged obstructed labour that caused the obstetric vesico-vaginal fistula [15]. All the patients were graded by means of the voluntary muscle testing scale. This test was used in a large study by Waaldijk and Elkins [15] to assess the extent of peroneal nerve injury. This test is also used in other muscle strength examinations, for example in leprosy. The patient was asked to dorsiflex her forefoot while pressure was exerted with the hand of the examiner. Normal function was documented as "5" on the case report form, while no apparent muscle function (i.e. complete foot drop) was recorded as "0". Graduations of muscle strength were documented subjectively by the same examiner and documented as "1–4" on the case report form. In addition, records were made of excoriation of the skin of the labia and medial aspect of the thighs caused by persistent urine leakage.

Surgery was performed using a vaginal or abdominal approach depending on the type of fistula and the preference

Table 1 Classification of vesico-vaginal fistulas adapted from Waaldijk [11]

Classification	Size (cm)
I Not involving the closure mechanism	Small <2
II Involving the closure mechanism	Medium 2–3
A Without (sub)total urethral involvement	Large 4–5
a Without circumferential defect	Extensive ≥6
b With circumferential defect	
B With (sub)total urethral Involvement	
a Without circumferential defect	
b With circumferential defect	
III Miscellaneous, e.g. ureter and other exceptional fistulas	

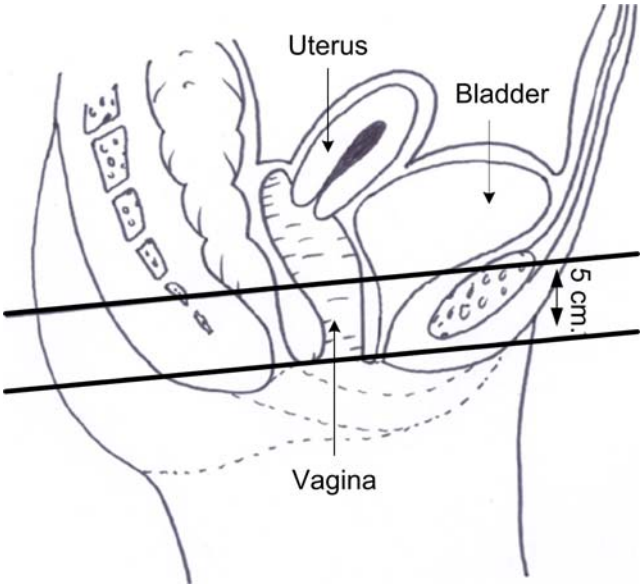

Fig. 1 Diagram of the internal genital in the sagittal plane. Type I fistula: located more than 5 cm from the external urethral meatus; type II fistula: located within 5 cm of the external urethral meatus (adapted from Waaldijk [11])

of the surgeon. Each fistula needs its own surgical approach. It is beyond the scope of this article to describe the details of the surgical approach for each fistula type. Details of this technique has been described elsewhere [11, 13]. Spinal anaesthesia with bupivacaine hydrochloride 0.5% was used in the vaginal repair operations. The patient was placed in the exaggerated lithotomy position with the legs flexed and slightly abducted in stirrups and her buttocks over the end of operating table. Careful examination of the fistula was carried out under anaesthesia. The labia minora were sutured onto the insides of the upper legs to provide optimal access to the vaginal cavity. In general, a circumferential incision should be made at the fistula edge. The anterior vagina wall should be widely dissected to provide a wide mobilisation of the bladder to enable single or multilayer tension-free closure. Closure of the fistula was checked by an intraoperative dye test: 60 cc of sterile methylene blue solution was injected into the bladder through a transurethral Foley catheter size 16 or 18. The patient was asked to cough to test whether there was any leakage at the fistula site. If the defect proved to be incompletely closed, extra sutures were placed and the test was repeated. Sometimes, episiotomies have been performed. They are left open intravaginally, and only the skin is closed. The vagina was packed tightly with gauzes to facilitate haemostasis.

The abdominal technique consisted of mobilisation with closure, followed by omentum interposition. It was used on fistula type III and sometimes on fistula type I. General anaesthesia was used in the abdominal repair operations.

In some cases, it was required to remove necrotic tissue before surgery. A medical officer usually performed the procedure during speculum examination. Before surgery, the patients were advised to drink at least 5–6 l of fluid per day and take sitz baths twice a day. After surgery, the patients were instructed to drink plenty fluids to prevent blockage of the catheter, and thus, decrease the risk of urinary tract infection.

In most cases, the hospitals removed the urinary catheter routinely after 14 days, but in some cases, the operating surgeon requested to leave it in situ for 21 days. Before removing the catheter, a nurse performed a second dye test. If there was leakage of urine, the test was considered to be positive, and the patient was scheduled for a second repair operation. If the dye test was negative, the catheter was removed, with the dye still inside the bladder. Then, the patient was asked to cough (stress test) to detect if there was urine leakage due to functional failure of the closure mechanism of the bladder.

Due to the non-existence of an Institutional Review Board, no approval for this study could be obtained.

Results

General data about the fistula

Between January 2001 and August 2003, 888 patients received fistula-related surgical treatment. A total of 639 patients with 647 fistulas were operated on and were, therefore, potential candidates for our analysis; eight of these patients had two separate urogenital fistulas. In 581 (90.9%) patients, the fistula had developed in association with obstructed labour and delivery. In four cases, the cause of the fistula was unclear, and they were therefore excluded. Table 2 shows the numbers and percentages of the vesico-vaginal fistulas according to cause, type and classification; 552 (95.0%) out of the 581 obstetric fistulas were isolated vesico-vaginal fistulas (VVF), 13 (2.2%) were VVFs

Table 2 Causes of vesico-vaginal fistulas operated on between 2001 and 2003

Cause	Classification	*N* (%)
Obstructed labour	I	122 (21.0)
	IIAa	327 (56.3)
	IIAb	61 (10.5)
	IIBa	21 (3.6)
	IIBb	8 (1.4)
	III	26 (4.5)
	RVF	16 (2.8)
	Subtotal	581 (90.9)
Hysterectomy		45 (7.1)
Miscellaneous		9 (1.4)
Unknown		4 (0.6)
Total		639 (100.0)

combined with a recto-vaginal fistula (RVF), 16 cases (2.8%) were isolated RVFs. Thus, a total of 29 RVFs were operated on. The 581 patients with obstetric VVF and RVF who underwent their first repair operation fistulas formed the basis of this report.

Patient characteristics and social status

The median age of the 581 first-time repair surgery patients was 25 years (range 14–65 years). Median height for all patients was 153 cm (range 126–172 cm). Seventy percent (70%) of the patients were shorter than 156 cm.

Some form of education had been received by 57.8% of the women; 30.8% had completed their primary school to year 7. Only 2.2% of our study population had been to secondary school. The partner of 65.4% of the patients had been to primary school; 34.5.4% had completed year 7, and 9.0% had been to secondary school.

The quality of the education differs widely between schools. It is unclear whether education was given on the dire consequences of prolonged obstructed labour.

The marital status of the patients at first-time repair surgery is shown in Table 3. In 40.6%, the patient had separated from her partner or was never married. In the group of patients operated on within 3 months of development of the fistula, 67% were living with their partner compared to 55% of the patients operated on outside 3 months (Fisher exact test, two sided P=0.037). However, when age and parity was brought into a multivariate model, this disappeared.

Table 3 Marital status at the time of intake for fistula repair surgery and place and type of delivery (n=581)

	N (%)
Marital status	
Married or living together	330 (56.8)
Separated	157 (27.0)
Widow	15 (2.6)
Never married	79 (13.6)
Place of delivery	
Hospital	460 (79.2)
Dispensary	11 (1.9)
Health centre	11 (1.9)
Home	93 (16.0)
On the way	6 (1.0)
Type of delivery	
Spontaneous vaginal delivery (SVD)	185 (31.8)
Vacuum	75 (12.9)
Forceps	13 (2.2)
Caesarean section (CS)	270 (46.5)
CS + hysterectomy[a]	38 (6.5)

[a] Owing to rupture of the uterus

Data concerning the occurrence of the VVF

Fistula formation occurred after a median of three deliveries (range 1–12). Median age of the patient at fistula onset was 22 years (range 13–46 years). Median duration was 11 months (range 0.25–516 months; Table 4).

Table 3 lists where the patient delivered her baby that led to the fistula and the type of delivery.

Most of the newborns were boys (65.1%). A total of 85.0% (n=494) of the babies were stillborn, 3.1% (n=18) of the newborns died within 1 week; in 0.3% (n=2), it was not clear whether the baby had survived or not. Overall, perinatal survival was therefore 11.5% (n=67). There was no significant difference in survival of the newborns between CS delivery (13.1%) and vaginal delivery (9.9%).

The patients were asked about the duration of labour until delivery. The mean duration of labour until delivery was 48 h (range 2–192 h). In 24% of the patients, labour took at least 2 days. The median interval between delivery and the start of the leakage was 4.9 days (range 0–48 days).

Pre-operative physical condition of the patient

Physical examination before surgery revealed excoration of the labia and medial aspect of the thighs in almost half (49.7%) of the patients. Vaginal stenosis was present in 17.6% of the women.

Unilateral or bilateral peroneal nerve damage was observed in 43.7% (n=254) of the women on a scale from 0 (paralysed) to 5 (normal strength); 7.1% (n=41) had a score of ≤2 in one or both legs. There was no statistical significant difference in peroneal paralysis frequency between women who delivered vaginally and who delivered by CS (43.9 versus 43.5%, respectively).

Type of repair

Most of the patients (n=509, 87.6%) underwent surgical repair via the vaginal approach. In 42.1%, mediolateral episiotomy was performed to achieve an optimal access to

Table 4 Duration of leakage before surgery

Category	*N* (%)
0–3 months	91 (15.7)
4–12 months	218 (37.5)
1–4 years	144 (24.8)
5–9 years	68 (11.7)
10–19 years	30 (5.2)
>20 years	18 (3.1)
Unknown	12 (2.0)
Total	581 (100.0)

the vagina. The transabdominal approach was used on 72 (12.4%) patients.

All 13 combined RVFs with a VVF were operated in the same procedures. The surgeon started with repairing the RVF to minimise contamination during the operation. Intestines were prepared with several enemas and preoperative doses of gentamycine and metronidazole. Occasionally, severe contamination with bowel content occurs during RVF repair. In these cases, the VVF will be done at a later stage, usually after 3–6 months.

Post-operative complications

There was no intraoperative or direct postoperative mortality. One patient (0.2%) died of meningitis after 30 days of hospitalisation. Complications occurred within 21 days of the operation in 17 patients (2.9%). These comprised haemorrhage of the vaginal wound (n=1), necrosis of the vagina (n=1), wound infection (n=5), urine retention (n=1), pyelonephritis (n=1), pneumonia (n=1) labial oedema (n=2), spinal headaches (n=1), fever of unknown origin (n=2), haematuria with fever (n=1) and malaria (n=1).

Surgical outcome

It was possible to close the fistula in all cases. This meant that the intraoperative dye test was negative in 100%.

The second dye test, performed 14 days postoperative, was also negative in 90.7% (n=513). Table 5 shows the surgical closure rates and the frequency of (stress) incontinence per fistula type. We analysed the data regarding closure rates with the use of multivariate analysis. Besides type of fistula, the size of the fistula, duration of leakage and the age of the patient were brought into a multivariate model. We were not able to determine any factors that were of significant influence in this multivariate analysis. Complete urine continence could not be achieved in 9.3% of the 513 patients who had negative postoperative dye test. When comparing type 1 fistula with the other types, there was a clear positive protective effect (χ^2=8.6; p<0.01) for the development of stress incontinence for type 1 fistula which is to be expected, as these do not involve the closure mechanism.

Patients operated on within 3 months of fistula development had slightly better surgical closure outcomes than patients operated on outside 3 months (93.9% versus 87.0%). However, the patients had no better outcome for urine continence if they were operated within 3 months (13.8 versus 19.8%).

The patients with a positive postoperative dye test (n=52) usually retained an indwelling catheter for a further 4 weeks. After this period, the dye test was negative in another 19 patients. The total closure rate, including the patients with prolonged catheter treatment, was 94.1% (532 out of the 565 patients). Successful surgical closure rates were the same in the CS delivery patients and the vaginal delivery patients.

The success rate of RVF repair was 93.8% at the time of discharge from hospital. Patients with combined RVF and VVF did not have significantly different outcome from the patients without RVF.

Table 5 Outcome of postoperative dye test and urinary continence (stress) test per fistula type

Classification	Total	14 days postoperative		
		Positive dye test	Positive urinary continence (stress) test	Total incontinent
	N	N (%)	*N* (%)	*N* (%)
I	122	8 (7.4)	2 (1.6)	10 (8.2)
IIaa	327	30 (8.9)	24 (7.3)	54 (16.5)
Iiab	61	10 (16.4)	15 (24.6)	25 (45.9)
IIba	21	3 (14.3)	3 (14.3)	6 (28.6)
IIBb	8	0 (0.0)	4 (50.0)	4 (50.0)
III	26	1 (4.0)	0 (0.0)	1 (4.0)
Total	565[a]	52 (9.2)	48 (9.3)	100 (17.7)

[a] Sixteen RVFs are not shown in this table.

Discussion

The present study addressed obstetric fistulas in a large series of East African patients. It is one of the biggest and most detailed series reported in the world literature. A large number of data were recorded on the background patient characteristics and the results of surgical repair. Our overall high surgical closure rate was comparable with percentages reported in the literature. Mortality was absent, and perioperative and postoperative morbidity was very low. Although anatomical closure had been accomplished, some of the patients were still suffering from urine incontinence. In these patients, the actual problem of urine loss could not be solved due to partial or total destruction of the closure mechanism of bladder and urethra. As expected, this is lower for type 1 fistulas which do not involve the closure mechanism. However, in many cases, this persistent incontinence was of much lower intensity than the constant urine loss from the fistula. Evaluation of the potential success of surgical repair in terms of continence is equally important as the anatomical closure of the fistula.

In general, our results confirmed the existing data on fistula patients, such as short stature, skin lesions, foot drop, divorced from partner, primigravida and labour of more than 2 days. However, some of our results differed from those reported in other large studies, especially those from Nigeria. Wall et al. [6] reported that 78% of his population had not received any formal education. In the present study,

58% of the women had received some form of education, 30% completed primary school, and some of them had been to secondary school. A high percentage of the partners also received primary education. We can only speculate about whether there are differences in the overall levels of education between Nigeria and East Africa or whether the situation is specifically related to our studied population. Insight into social status and education level may provide clues for the development of preventive measures.

Providing education about obstetric fistulas at schools will increase awareness of the problem and might lead to ways of reducing their occurrence. However, education, as Harrison [16] showed almost 25 years ago, is only a key factor in reducing maternal morbidity and mortality if emergency obstetric care is available. Knowledge about the problem will not help to rush a patient to competent obstetric care if no hospital facilities are available. As long as there is a lack of adequate obstetric facilities with sufficiently trained staff in the developing world, the problem of obstetric fistulas will continue to exist.

In the present study, 70% of the patients were shorter than 156 cm. Patient height is known to be loosely associated with pelvic capacity. In a case control study by Ampofo et al. [17], height was found to be related to the development of fistulas: 51.9% of the women with obstetric fistulas were shorter than 150 cm, but this applied to only 37.1% of the controls. The relative risk of VVF development in women with a height of 150 cm was calculated to be 1.83.

Another factor is awareness of the need to provide adequate treatment when a woman with obstructed labour arrives at a health centre. Nearly 80% of the patients in our study gave birth at "a hospital", but it was not always clear what obstetric care facilities had been available. Nevertheless, CS can be conducted at most health care facilities, although there are delays. Thadeus and Maine [18] reported that in developing countries, the outcome of obstructed labour and its complications were influenced by (1) delay in the decision to seek care; (2) delay in arrival at a health care facility; and (3) delay in the provision of adequate care. Our results showed that 46.5% of the babies were delivered by CS, but there was a high rate of fetal deaths. Thus, nearly half of the patients received obstetric care, but too late. Probably, the high rate of fetal death in the CS deliveries was due to the strategy that most doctors delivered the baby by CS, although there was strong evidence that the baby was dead. Doctors and health care workers in these clinics should receive optimal instructions about what to do in the case of obstructed labour and how to manage the first sign of a suspected fistula. Caesarean section will not always prevent fistula formation. The use of the partograph differentiates normal from abnormal progress and identifies those women likely to require intervention [19].

In the present study, most of the newborn babies were boys. Wall et al. [6] also found a high percentage (71%) of male babies in a study in Nigeria. Boys generally have a heavier birth weight than girls, which might explain their predominance in obstructed labour. Another possible contributing factor is a relatively larger number of male conceptions than female conceptions as was seen in northern Nigeria [20, 21]. These findings suggest that women with a small pelvis and a male fetus are predisposed towards obstructed labour.

A urinary catheter should be employed for at least 4–6 weeks in women who start leaking after vaginal delivery or CS [8, 11]. At the same time, the women should take 5–6 l of fluid daily, have sit baths twice a day and undergo an in speculum examination for removal of necrotic tissue if necessary. This regimen can cure up to 20% of the fistulas [8] without surgical repair. Once a fistula has developed, early surgical repair is recommended. In our opinion, the woman should not be kept waiting for several months, as is advocated by some textbooks. In the present study, early surgical management closed the fistula in 93.9% of the patients who were treated within 3 months. In another study, the success rate of early treatments was up to 95% [8]. The social consequences of obstetric fistulas are devastating for women in the developing countries. Many of them are abandoned by their husband or partner. Our results argue in favour of early surgical treatment for obstetric fistulas.

Conclusions

Obstetric fistula patients in East Africa shared most of the demographic and physical features of obstetric fistula patients in the rest of the African continent. High success rates were achieved with early surgical repair of obstetric fistulas (<3 months). Restoration of urinary/faecal continence can be expected to be beneficial to the social status of the obstetric fistula patient.

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