

Predicting the risk of failure of closure of obstetric fistula and residual urinary incontinence using a classification system

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Abstract The aim of this study is to assess the possibility of predicting the risk of failure of closure and post-fistula urinary incontinence. Women attending the fistula clinics were assessed pre-operatively, and fistulae were staged prospectively, using a previously published classification system. Assessment for fistula closure and residual urinary incontinence was performed, prior to discharge. Of the 987 women who were assessed, 960 had successful closure of their fistulae. Of those with successful closure, 229 complained of urinary incontinence following surgery. Women with fistulae located closest to the external urinary meatus had the highest rate of urinary incontinence following fistula closure. Women with significant vaginal scarring and circumferential fistulae also had significantly higher rates of urinary incontinence and higher risk of failure of closure. The classification used is able to predict women at risk of post-fistula urinary incontinence and failure of closure.

Keywords Genito-urinary fistula · Classification · Closure

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Introduction

Childbirth injury is the most common cause of genito-urinary fistulae worldwide. In experienced hands, the successful closure rate from surgery is high at more than 80% [1]. It is well established that normal labour and delivery are associated with pelvic floor injury. The average length of labour for a woman who develops a fistula is about 3.5 days [2]. If data from normal deliveries may be extrapolated, then women who suffer prolonged obstructed labours are likely to have more severe pelvic floor injuries and dysfunction.

The reported risk of post-fistula urinary incontinence varies. A woman with a ‘simple’ fistula involving the urethra has been reported to have a 50% risk of post-fistula incontinence compared to a 100% risk in those with ‘complex’ fistulae [3]. Preventative surgery may be performed at time of fistula surgery to reduce the risk of post-fistula urinary incontinence [3]. It would therefore be useful if the risk of post-fistula incontinence could be predicted and the woman counselled prior to surgery [4]. As follow-up of these women may be difficult, this may provide the clinician with information to selectively follow up women at risk of incontinence.

The aim of this study is to assess the possibility of predicting the risk of failure of closure and post-fistula urinary incontinence in women who have had a successful fistula closure, using a previously described classification for fistulae.

Materials and methods

This is a prospective follow-up of women with genito-urinary fistula, recruited from the Addis Ababa Hospital

and the Bahirdar Hamlin Fistula Unit, Ethiopia, from September 2004 to February 2007. All women were admitted under the care of one surgeon (Browning). Approval for the study was obtained from the respective directors of the fistula units. There was no ethics committee in either hospital at the time of commencement of the study.

Pre-operatively, all women were assessed and fistulae classified using a previously described classification, using fixed reference points [5] (Table 1). All women underwent vaginal fistula repair. An indwelling urethral catheter was inserted for a period of 10–21 days, depending on the site of the fistula and operative findings such as significant scarring.

The women remained in hospital for the duration of the catheterisation and at least 2 days following removal of catheter. The length of stay in the hospital compound after catheter removal depended on availability of a friend or relative to accompany the woman and/or transportation. For example, the bus to the woman's village may only be available once a week or, during the rainy season, roads may be impassable, and therefore transportation was not possible.

Prior to discharge, the women were assessed in the outpatients by an experienced member of the nursing staff. The women are assessed for closure of the fistula. The women are also questioned by an independent observer regarding urinary continence by asking the generic question 'Are you wet or dry on walking/sitting?' Women responding that they are wet are considered incontinent.

Table 1 Summary of classification according to Goh [2] with the three parameters

Classification	Characteristic
Type: distance from fixed reference point (external urinary meatus)	
1	Distal edge of fistula >3.5 cm from external urinary meatus
2	Distal edge 2.5–3.5 cm
3	Distal edge 1.5–2.5 cm
4	Distal edge <1.5 cm
Size: largest diameter in centimetres	
A	<1.5 cm
B	1.5–3 cm
C	>3 cm
Special considerations	
I	None or mild fibrosis and/or vaginal length >6 cm, normal capacity
Ii	Moderate or severe fibrosis and/or marked reduction in vaginal length and/or capacity
Iii	Special circumstances, e.g. post-irradiation, ureteric involvement, circumferential fistula, previous repair

The Chi-squared test for significance was utilised in fistula classification parameters (type, size and special considerations) and outcomes of repair (successful closure continent, successful closure incontinent and failed repair). Logistic regression was used to adjust the inter-correlation between independent variables and in this case between type, size and special considerations.

Results

A total of 1,024 women presented with obstetric genital tract fistulae. Of these, 174 had been included in another study [4]. Thirty-three women were excluded from the study as they had only a recto-vaginal fistula without concomitant genito-urinary fistula, and another four were excluded as there was no bladder tissue found during examination in the operating theatre. A total of 987 women had genito-urinary fistula and were included in the study, of which 78 (7.9%) had a concomitant recto-vaginal fistula. The mean age of the women at time of fistula surgery was 29 years (range 14–75; mode=30, median=26), and the women on average laboured for 3 days (range 1–12; mode=3, median=3). The mean time from obstetric injury to presentation with fistula was 48.5 months (range 1.5–600; mode=3, median=11 months).

Of the 987 women with genito-urinary fistulae, the mean parity was 3 (range 1–12; mode=1, median=2). One hundred and seventy-eight (18%) of the women had an emergency caesarean section following admission with obstructed labour. Only four (0.4%) women had an instrumental delivery. Five hundred and nine (51.6%) of women delivered at home, and the remaining 296 (30%) delivered spontaneously at a government institution (health centre or hospital) after admission with obstructed labour. In the labour that was associated with the fistula, only 66 women (6.7%) delivered live-born babies of which 12 died in the neonatal period. It was not possible to obtain accurate reasons for the neonatal deaths as the women delivered in their villages.

Table 2 summarises the classification of the 987 fistulae together with outcomes. Successful closure of the genito-urinary fistula was achieved in 960 women (97.3%). Following successful fistula closure, 731 women (76.1%) did not complain of urinary incontinence.

The types of fistula (types 1–4) and size of the fistula did not differ significantly in terms of successful closure (Chi-squared $p>0.7$). Amongst those with successful fistula closure, there are significant differences in women who are continent, with type 1 fistula most likely to be continent and type 4 least likely ($p<0.01$). Special considerations (classification type i–iii) such as scarring or circumferential fistulae are significant factors for incontinence ($p<0.01$) and failure of closure ($p<0.05$; Table 3).

Table 2 Classification of genito-urinary fistulae and outcomes

	Number (n=987)	Successful closure (continent)	Successful closure (incontinent)	Failed repair
Fistula type				
1	356	335	11	10
2	182	143	36	3
3	171	111	55	5
4	278	142	127	9
Fistula size				
A	247	215	26	6
B	245	190	54	1
C	495	326	149	20
Special considerations				
I	456	412	35	9
ii	137	101	33	3
iii	394	218	161	15
Total	987	731	229	27

Figure 1 represents the corrected odds ratio for urinary continence following successful closure of fistula. Women with type 1 fistulae are more likely to be continent compared to those with types 2–4. There is also a tendency towards decreasing continence from type 2 to 4 fistulae. Size b and c fistulae appear significantly less likely to be continent compared to size a. In the special consideration parameter, type iii is less likely to be continent than type i.

Discussion

Female genital tract fistulae continue to be a cause of morbidity in women worldwide [1]. Even after successful closure

Table 3 Analysis of classification parameters with outcomes of fistula surgery

	Closed/failed	Continent/incontinent after fistula closure
Total (n=987)	960/27	731/229
Type of fistula (type 1–4)	<i>p</i> =0.77	<i>p</i> <0.001
Type 1 (n=356)	346/10	335/11
Type 2 (n=182)	179/3	143/36
Type 3 (n=171)	166/5	111/55
Type 4 (n=278)	269/9	142/127
Size of fistula (a–c)	<i>p</i> =0.35	<i>p</i> =0.08
Size a (n=247)	241/6	215/26
Size b (n=245)	244/1	190/54
Size c (n=495)	475/20	326/149
Special considerations (i–iii)	<i>p</i> =0.04	<i>p</i> <0.01
i (456)	447/9	412/35
ii (137)	134/3	101/33
iii (394)	379/15	218/161

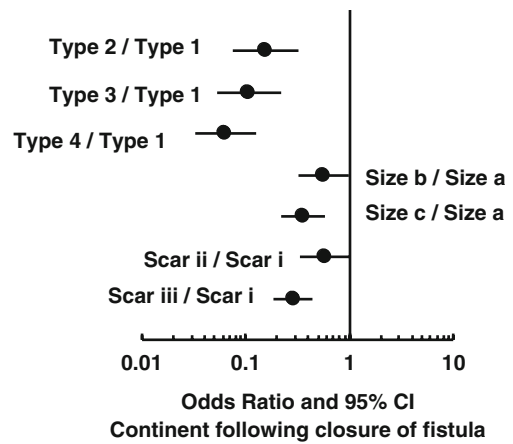


Fig. 1 Corrected odds ratio for continence following successful closure of fistula, using type (I), Size (a) and special considerations (i) as baselines

of the fistula, urinary incontinence is a significant problem. Many women with fistulae are unable to return or afford to return for follow-up after fistula surgery. It would be useful to be able to predict those women who are at higher risk of residual urinary incontinence. Women who are at higher risk could be counseled pre-operatively. Post-operatively, these women could be flagged and offered follow-up assistance such as transport funding back to the hospital.

The results of this study confirms that a previously described fistula classification system, using fixed reference points [5], is able to predict women who are at higher risk of ongoing urinary incontinence following successful surgical closure of the fistula. This study represents a prospective review of a large number of women with genito-urinary fistulae. In this study, the location of the fistula was not associated with a risk of unsuccessful anatomical closure. This may be due to the small numbers of failed repairs. It does, however, demonstrate that the risk of residual urinary incontinence is location dependent. There is a higher risk of ongoing urinary incontinence the closer the fistulae is to the external urinary meatus with a progression of decreasing continence from type 2 to 4 fistulae. A review of urethrovaginal fistulae [6] demonstrated that there is a high successful closure rate, but risk of urinary incontinence is more than 50%.

The size of the fistulae is also related to risk of residual incontinence, with an increased risk of incontinence in women with fistulae larger than 1.5 cm in diameter. The woman is also more likely to complain of urinary incontinence if she has a type iii fistula, rather than the woman with no or minimal vaginal scarring. A recent review has also been shown that women with the ‘circumferential fistula’ (type iii fistula) is at a higher risk of ongoing urinary incontinence [7].

In many developing countries, obstetric fistula is endemic. Unfortunately, resources are limited as is financial

assistance. Specialised units with experienced clinicians are not common, and women usually have to travel significant distances to reach specialised units. In Ethiopia, for example, all the gynaecology trainees obtain some fistula management training and are able to surgically manage the ‘simple’ fistulae. Therefore, a system that is able to predict those women who are higher risk of ongoing urinary incontinence would be a useful tool to triage women and refer the ones at high risk to specialised units.

Conclusion

A previously described fistula classification is used to predict the women at risk of unsuccessful closure of the fistula and ongoing urinary incontinence following fistula repair. The risk of unsuccessful closure is significantly related to ‘other parameters’ such as marked vaginal scarring, circumferential fistulae and previous repairs. This study demonstrates that the risk of residual urinary incontinence is associated with the site and ‘other parameters’ such as a circumferential fistula. There was a

tendency of increasing risk of residual urinary incontinence with the larger fistulae.

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Conflicts of interest None.

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