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Obstetric Fistula Surgery: Indicators of Recurrence and Successful Treatment

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ABSTRACT

Obstetric fistulas (OF) resulting from prolonged and obstructed labor continue to pose a significant challenge in developing countries. Therefore, this study aimed to examine the contributing factors influencing the recurrence and successful treatment outcomes of OF. Data were gathered from 75 patients attending a tertiary care hospital in India. All patients underwent surgical intervention for OF and were subsequently monitored for a duration of 3 months as part of the follow-up. The efficacy of the treatment was assessed based on the absence of incontinence or the usage of dry pads. Recurrence of OF was defined as the persistent need for incontinence pads either immediately after the surgical procedure or following a period of dryness. The age of patients wax 28.21±8.91 years. Type I OF cases constituted the majority. Approximately 19% of the patients exhibited vaginal fibrosis during the course of surgery. The most frequently encountered location of the fistula was found to be pericervical. After a 3-month follow-up period, the recurrence was 27.5%. Among the recurring cases, type IIBb was the most prevalent. The study findings underscore that the presence of fibrosis and the location of the fistula, particularly in the urethral region, independently influence the likelihood of recurrence or persistence of OF

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Key Words
Fistula, urinary incontinence, female, pregnancy

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INTRODUCTION

Obstetric fistulas (OF) resulting from prolonged and obstructed labor continue to pose a significant challenge in developing countries. Surgical interventions to treat OF are at times associated with persistent or recurrent vaginal urinary leakage, which can be attributed to either an unresolved fistula or weakened urethral sphincter function leading to stress incontinence. Moreover, conditions like overactive bladder or reduced bladder capacity might also contribute to persistent incontinence. For patients, this outcome can be perceived as a failure, even if the fistula closure itself was successful. Studies in the literature have reported fistula closure rates ranging from 72-92%[1-4].

Persistent incontinence subsequent to surgical fistula treatment can be attributed to various contributing factors. Firstly, the extensive loss of bladder tissue resulting from fetal compression during active labor poses challenges to achieving tension-free closure of the fistula. Secondly, fibrotic or ischemic alterations in the surrounding tissues can lead to ongoing leakage and reduced bladder compliance. Finally, the deterioration of the bladder neck and urethral sphincter zone, coupled with the loss of urethral tissue, presents complexities in the repair process, particularly in cases involving urethral fistulas. These factors collectively influence the success of surgical interventions aimed at resolving OF, necessitating thorough consideration in the treatment approach to improve patient outcomes[5-11].

Fistula closure success rates appear to be reliant on on type of OF, with larger OF and those involving the bladder neck and urethra showing poorer outcomes. However, there is a dearth of an internationally validated OF classification system, which makes it difficult to compare data across studies. Existing classification systems, such as the Waaldijk and Goh classifications, differ in their consideration of factors like fibrosis, vaginal induration, scarring and bladder capacity[12-14].

The objective of this study was to identify the potential factors contributing to obstetric fistula treatment failures at a tertiary care hospital in India.

MATERIALS AND METHODS

A retrospective analysis was conducted, examining the medical records of 75 women who were admitted with OF. Prior to surgery, the patients underwent obstetric history evaluation and clinical examination. Fistulas were initially classified based on their characteristics. During surgery, detailed information regarding fistula characteristics, intraoperative procedures and surgical outcomes were documented. The final classification of the fistulas was determined using the Waaldijk classification system while the patient was under anesthesia.

The Waaldijk classification system is based on the distance amongst the urethral opening and the distal margin of fistula. Type I fistulas have a distance greater than 4 cm, indicating that the bladder neck and midurethra are intact. Type II fistulas involve the urethral closure apparatus and can be sub-divided into type IIA (involving the bladder neck region) and type IIB (involving both the bladder neck region and midurethra). Type III fistulas encompass other types, such as ureteric and intracervical fistulas. In this study, fistulas with intravaginal ureters were classified as Type III to facilitate separate evaluation, considering that the ureters were catheterized and reimplanted in a submucosal tunnel during vaginal repair. Alternatively, these fistulas could have been categorized as type IIBb having ureteric involvement[12]. Additionally, size of OF was categorized into four groups: Small ($\leq$2 cm), medium (2-4 cm), large (5-6 cm) and extensive (>6 cm). The presence of fibrosis was not part of the Waaldijk classification.

Three months after the surgery, the outcomes were assessed through clinical examination. Success was defined as wearing no pads or just a security pad at the 3 months follow-up (indicating a closed fistula and continence). Recurrence was demarcated as persistent urinary incontinence or a recurrence of incontinence after a time of dryness, either due to a failed fistula repair or sphincter weakness. The clinical examination allowed for differentiation between failed fistula closure and stress incontinence. The outcomes of surgery were categorized based on Waaldijk system as either a entirely cured fistula or a persistent fistula. Persistent fistulas were further categorized as downstaged (postoperative classification or size decreased), unchanged (no changes in the postoperative classification), or upstaged (postoperative classification or size increased).

RESULTS

Table 1 displays the preoperative characteristics of patients diagnosed with OF. The cohort had a mean age of 28.21±8.91 years. The most prevalent fistula type among the patients was type I, followed by type III. Approximately 20% of patients exhibited significant fibrosis during their surgical treatment. Additionally, the peri-cervical location was the most commonly observed site for the fistula.

At the 3-month post-surgery follow-up, the overall recurrence rate was found to be 29.33%, with type IIBb fistulas being the most frequently recurring subtype. Based on the Waaldijk classification system, 70.67% of the patients achieved a complete cure, as indicated in Table 2.

Furthermore, there was no statistically significant difference observed in the outcomes among patients with different fistula etiologies. However, both

univariable and multivariable analyses highlighted that fibrosis and the location of the fistula emerged as independent predictors for recurrence. Patients with fibrosis exhibited a 65% lower likelihood of achieving successful treatment after surgery compared to those without fibrosis (Table 3).

Similarly, patients with urethral fistulas were 71% less likely to attain successful treatment compared to patients with fistulas at other locations (Table 4). In contrast, none of the intraoperative characteristics were identified as predictors for recurrence or successful treatment in the cohort (Table 3 and 4).

DISCUSSIONS

OF primarily arise due to mechanical dystocia-obstetric causes[5-7]. Prolonged cephalic compression in the pelvis through the second phase of labor can lead to local ischemia, which, in turn, may induce necrosis and the subsequent formation of fistulas. The prognosis of OF is influenced not only by the successful implementation of surgical principles but also by a combination of multiple regional or contextual factors.

In our study, the mean age of patients before undergoing surgical fistula repair was 29.11 years (Table 1). This aligns with findings from other studies[15-17]. Access to appropriate obstetric care, such as cesarean section, is often limited to the affluent urban population, leaving the underprivileged, particularly in rural areas, at a higher risk of developing OF. One of the challenges lies in the delayed execution of cesarean section, which may contribute to the initiation of OF. The UNPF identifies three delays that contribute to fistula development: Delay in seeking medical attention, delay in reaching a medical facility and delay in receiving medical care once at the

Table 1: Preoperative features of OF patients

Variables	No.	Percentage
Age (years) (Mean±SD)	28.21±8.91	
Etiology		
Not known	12	16.00
Cesarean section	38	50.67
Following hysterectomy	1	1.33
Road traffic accident	1	1.33
Dystocia without instrumentation	19	25.33
Dystocia along with vacuum	4	5.33
Preoperative Waaldijk category		
I	43	57.33
IIA		
a	8	10.67
b	3	4.00
IIB		
a	1	1.33
b	5	6.67
III	15	20.00
Location of OF		
Not known	4	5.33
Peri-cervical	30	40.00
Mid-vaginal	18	24.00
Pericervical+mid-vaginal	4	5.33
Lateral	3	4.00
Trans-cervical	3	4.00
Urethral	10	13.33
Urethral+midvaginal	1	1.33
Urethral+peri-cervical+midvaginal	2	2.67
Size of OF (cm)		
Small (≤2 cm)	42	56.00
Medium (2-4 cm)	14	18.67
Large (5-6 cm)	15	20.00
Extensive (>6 cm)	4	5.33
Anal sphincter tearing		
Yes	3	4.00
No	72	96.00
Corresponding recto-vaginal fistula		
Yes	4	5.33
No	71	94.67
Presence of fibrosis		
Yes	15	20.00
No	60	80.00

Table 2: Surgical Outcome in OF patients

Surgical outcome	No.	Percentage
Complete cure	53	70.67
Persistent fistula		
Down-staged	12	16.00
Unchanged	9	12.00
Up-staged	1	1.33

Table 3: Statistical analyses for recurrence of OF

	Univariable analysis			Multivariable analysis		
Predictor	Odds' ratio	95% CI	p-value	Odds' ratio	95% CI	p-value
Preoperative category	0.92	0.74-1.11	0.34		Not included	
Size of OF	1.08	0.86-1.34	0.39			
Location of OF	2.76	1.18-6.10	<0.05	2.94	1.38-7.12	<0.05
Presence of Fibrosis	2.58	1.61-5.02	<0.05	2.89	1.27-6.18	<0.05
Flap inter-position	2.09	0.46-15.32	0.50		Not included	
Urethra repair	1.42	0.57-3.92	0.29			
Ureteric reimplantation	1.76	0.88-4.32	0.33			

Table 4: Statistical analyses for surgical success of treatment in OF

	Univariable analysis			Multivariable analysis		
Predictor	Odds' ratio	95% CI	p-value	Odds' ratio	95% CI	p-value
Preoperative category	0.97	0.80-1.18	0.48	Not included		
Size of OF	0.76	0.49-1.15	0.31			
Location of OF	0.29	0.12-0.71	<0.05	0.25	0.10-0.59	<0.05
Presence of fibrosis	0.37	0.17-0.78	<0.05	0.31	0.13-0.70	<0.05
Flap inter-position	0.48	0.06-3.49	0.43	Not included		
Urethra repair	0.62	0.24-1.59	0.26			
Ureteric reimplantation	0.71	0.29-1.68	0.39			

healthcare facility[5]. Hence, concerted efforts are required to ensure timely access to cesarean section for all individuals at risk of developing OF.

We were unable to replicate the fistula closure rates and continence rates reported by Pshak *et al*.[18]. He reports closure and continence rates exceeding 90% in nearly all types of fistulas. Conversely, other authors have reported fistula closure rates ranging between 82 and 92% at the first attempt, albeit with persistent stress incontinence rates of up to 33%[1,19].

Our study conducted a comparative analysis of fistula classification before and after surgical treatment, revealing a substantial proportion of patients achieving successful fistula closure following the intervention (70.67%). Among the 75 women included in our study, 12 individuals (16%) experienced recurrent fistulas. Within this group, a smaller subset of women (n = 9, 12%) reported recurrent fistulas accompanied by persistent leakage.

Upon examining the predictive factors associated with recurrences, our findings underscored the significance of fibrosis and the location of fistulas in influencing their occurrence. Specifically, fibrosis demonstrated an Odds Ratio (OR) of 2.58 ($p<0.05$), while the OR for the location of the fistula was 2.76 ($p<0.05$). Notably, Pshak *et al*.[18] also reported a significant association between unsuccessful fistula repair and the involvement of the urethra and vaginal scarring.

The presence of fibrosis plays a fundamental role in disrupting the normal mechanism of fistula closure. Although it is possible to repair all fistulas at the first attempt[5], certain cases may require multiple operations. Despite these efforts, some fistulas remain challenging to close satisfactorily. Factors such as bladder compliance loss due to fibrosis and excessive scarring have been cited as causes of unsuccessful fistula repair[20]. Additionally, a case report by Massinde and Kihunrwa in 2013 documented a large vesicovaginal fistula accompanied by significant surrounding fibrosis resulting from the presence of a large foreign body[21].

The location of OF plays a significant role in predicting the likelihood of recurrence. In our study, while large fistula size did not emerge as a significant predictor of recurrence, this might be attributed to the larger proportion of smaller fistulas in our sample. However, McFadden *et al*.[19] reported that there is a notable difference in the postoperative feat of OF repair between women having larger fistulas and those with smaller ones[20]. It is worth mentioning that some patients may experience incontinence due to sphincter destruction, particularly in cases of circumferential destruction of the midurethra, especially observed in type IIBb fistulas according to the Waaldijk classification. A similar observation was reported by Browning[21], who described an Odds Ratio (OR) of 8.4 for developing postoperative incontinence despite successful fistula closure, when the urethra was involved.

Recent studies have highlighted that access to cesarean section does not necessarily prevent the occurrence of obstetric fistulas[22,23]. To effectively prevent obstetric fistulas, it is crucial to ensure accessible general hospitals and improved obstetric care by addressing the various delays in intervention.

CONCLUSION

The findings of this study highlight the significance of fibrosis and the location of the fistula within the urethra as independent risk factors contributing to the recurrence or persistence of OF even after surgical treatment. Addressing these factors becomes crucial in preventing the burden of persistent incontinence in affected women. In light of these results, there is a pressing need for further prospective research to explore and develop more suitable surgical techniques that can improve the outcomes of OF repair. By advancing our understanding and refining surgical approaches, we can potentially enhance the success rates and long-term outcomes for women suffering from this challenging condition.

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