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Original Research Article

Evaluation of Factors for Effective Treatment and Recurrence in Obstetric Fistula Surgery

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Abstract

Background and Objectives: Obstetric fistulas (OF) arising from prolonged and obstructed labor remain a significant challenge in developing countries. This study aims to investigate the contributing factors influencing the recurrence and treatment outcomes of OF in a cohort of patients attending a tertiary care hospital in India.

Materials and Methods: A total of 100 patients who underwent surgical intervention for OF at an Indian hospital were enrolled in this study. These patients were closely monitored for a duration of 3 months as part of the post-operative follow-up. The efficacy of the treatment was evaluated based on the absence of incontinence or the necessity to use 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 initial dryness.

Results: Type I OF cases were predominant among the patients. Approximately 21% of the patients exhibited vaginal fibrosis during the surgical intervention. The pericervical region emerged as the most frequently encountered location of the fistula. Following the 3-month follow-up period, the recurrence rate was found to be 28%. Among the recurring cases, type IIBb OF was the most prevalent.

Conclusion: The presence of fibrosis, as well as the location of the fistula, particularly in the urethral region, were identified as independent factors significantly influencing the likelihood of recurrence of OF. Understanding these factors can contribute to improved management and treatment outcomes of OF, ultimately addressing this challenging obstetric condition in developing countries

Keywords: Developing Countries, Obstetric Labor Complications, Urinary Incontinence, Fistula, Female.

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Introduction

Obstetric fistulas (OF) resulting from prolonged and obstructed labor pose a significant challenge in developing countries. Surgical interventions aimed at treating OF may lead to persistent or recurrent vaginal urinary leakage, which can be attributed to unresolved fistulas or weakened urethral sphincter function causing stress incontinence. Additionally, conditions such as overactive bladder or reduced bladder capacity may contribute to ongoing incontinence. For patients, this outcome can be perceived as a failure, even if the fistula closure itself was successful. Existing literature reports fistula closure rates ranging from 72% to 92% [1-4].

Persistent incontinence following surgical fistula treatment can be linked to various contributing factors. Firstly, extensive loss of bladder tissue due to fetal compression during active labor presents challenges in achieving tension-free closure of the fistula. Secondly, fibrotic or ischemic alterations in the surrounding tissues can result in ongoing leakage and reduced bladder compliance. Finally, the deterioration of the bladder neck and urethral sphincter zone, along 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 comprehensive consideration in the treatment approach to improve patient outcomes [5-11]. Fistula closure success rates appear to be dependent on the type of OF, with larger OF and those involving the bladder neck and urethra showing poorer outcomes. However, the lack of an

internationally validated OF classification system makes it challenging to compare data across studies. Existing classification systems, such as the Waaldijk and Goh classifications, differ in their consideration of factors such as fibrosis, vaginal induration, scarring, and bladder capacity [12-14]. The objective of the study was to identify potential factors contributing to obstetric fistula treatment failures at a tertiary care hospital in India.

Material & Methods

In this retrospective analysis, medical records of 100 women admitted with obstetric fistulas (OF) were examined. Prior to surgery, comprehensive obstetric history evaluations and clinical examinations were conducted for each patient. Fistulas were initially classified based on their specific characteristics. Detailed information regarding fistula characteristics, intraoperative procedures, and surgical outcomes was documented during the surgical intervention. The final classification of the fistulas was determined using the Waaldijk classification system [12] while the patient was under anesthesia.

The Waaldijk classification system is based on the distance between the urethral opening and the distal margin of the fistula. Type I fistulas have a distance greater than 4 cm, indicating the preservation of the bladder neck and midurethra. Type II fistulas involve the urethral closure apparatus and can be further 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 ureter(s) were classified as Type III to allow for 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 with ureteric involvement [12]. Additionally, the size of the OF was categorized into four groups: small (≤2 cm), medium (2-4 cm), large (5-6 cm), and extensive (>6 cm). It is important to note that the presence of fibrosis was not considered in the Waaldijk classification.

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

Results

Table 1 presents the preoperative demographic and clinical attributes of individuals diagnosed with OF. The study cohort displayed an average age of 29.31 ± 9.71 years. Among the observed cases, type I fistulae were the most predominant, followed by type III. Remarkably, approximately 21% of patients manifested substantial fibrosis necessitating consideration during their surgical intervention. Furthermore, the peri-cervical region emerged as the most frequently encountered location for the manifestation of the fistula.

Table 1: Preoperative features of of patients

Characteristic	n	%
Etiology		
Idiopathic	16	16.00
Uterine C Section	51	51.00
After Hysterectomy	1	1.00
Road traffic injuries	2	2.00
obstructed labor without instrumentation	25	25.00
obstructed labor with vacuum	5	5.00
Waaldijk Class (Preoperative)		
I	57	57.00
IIA(a)	11	11.00
IIA(b)	4	4.00
IIB(a)	1	1.00
IIB(b)	7	7.00
III	20	20.00
OF Location		
Unknown	5	5.00

Peri-cervical	40	40.00
Mid-vaginal	24	24.00
Pericervical+mid-vaginal	6	6.00
Lateral	4	4.00
Trans-cervical	4	4.00
Urethral	13	13.00
Urethral+midvaginal	1	1.00
Urethral+Peri-cervical+midvaginal	3	3.00
OF Size (centimeter)		
≤2 cm	56	56.00
2-4 cm	19	19.00
5-6 cm	20	20.00
>6 cm	5	5.00
Anal sphincter rupture		
Yes	6	6.00
No	94	94.00
Related recto-vaginal fistula		
Yes	5	5.00
No	95	95.00
Tissue Fibrosis		
Yes	21	21.00
No	79	79.00

After the 3-month post-surgery follow-up, the comprehensive recurrence rate was determined to be approximately 28%, with type IIBb fistulas exhibiting the highest recurrence frequency among the subtypes. According to the Waaldijk classification system, approximately 69% of the patients achieved a full cure, as highlighted in Table 2.

Table 2: Surgical results in OF patients

Outcome	n	%
Completly cured	69	69.00
Persisting fistula		
Up-staged	1	1.00
Unchanged	13	13.00
Down-staged	7	7.00

Moreover, no statistically significant difference was observed in the treatment outcomes among patients with varying fistula etiologies. Nevertheless, both univariable and multivariable analyses revealed that fibrosis and the site of the fistula were identified as independent predictors for recurrence. Specifically, patients presenting with fibrosis demonstrated a 64% reduced probability of attaining successful post-surgery treatment compared to those without fibrosis, as outlined in Table 3.

Table 3: Statistical analysis for recurrence

	Univariate Analysis			Multivariate Analysis		
Predictor	**Odds' Ratio**	**95% CI**	**P value**	**Odds' Ratio**	**95% CI**	**P value**
Preoperative Waaldijk Class	1.02	0.88-1.19	0.42	Not included		
Fistula Size	1.14	0.97-1.28	0.36			
Location of OF	2.31	1.01-5.66	<0.05	2.86	1.15-6.64	<0.05
Fibrosis	2.19	1.34-4.62	<0.05	2.76	1.48-6.18	<0.05
Flap inter-position	1.89	0.62-13.15	0.58	Not included		
Urethra repair	1.61	0.78-3.41	0.34			
Ureteric reimplantation	1.92	1.01-4.02	0.28			

Similarly, individuals diagnosed with urethral fistulas displayed a 69% reduced probability of attaining successful treatment compared to patients with fistulas located at other sites (Table 4). In contrast, none of the intraoperative characteristics demonstrated predictive significance for recurrence or successful treatment in the cohort, as evident from the findings presented in Tables 3 and 4

Table 4: Statistical analysis for successful outcome of surgical treatment

	Univariate Analysis			Multivariate Analysis		
Predictor	**Odds' Ratio**	**95% CI**	**P value**	**Odds' Ratio**	**95% CI**	**P value**
Preoperative Waaldijk Class	1.03	0.89-1.21	0.42	Not included		
Fistula Size	0.85	0.57-1.11	0.27			
Location of OF	0.31	0.15-0.68	<0.05	0.29	0.12-0.61	<0.05
Fibrosis	0.43	0.20-0.79	<0.05	0.39	0.17-0.74	<0.05
Flap inter-position	0.53	0.09-3.17	0.51	Not included		
Urethra repair	0.72	0.28-1.68	0.31			
Ureteric reimplantation	0.69	0.34-1.49	0.37			

Discussion

Of primarily arises due to mechanical dystocia-obstetric causes [5-7]. Prolonged cephalic compression in the pelvis during the second phase of labor can result in local ischemia, leading to necrosis and subsequent fistula formation. The prognosis of OF is influenced not only by the successful implementation of surgical principles but also by various regional or contextual factors.

In our study, the mean age of patients before undergoing surgical fistula repair was 29.31 years, which is consistent 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. Delayed implementation of cesarean section may contribute to the initiation of OF. The United Nations Population Fund (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 healthcare facility [5]. Thus, 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 Waaldijk [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, 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 2.31 (P <0.05), while the OR for the location of the fistula was 2.19 (P <0.05). Notably, Kayondo 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. While 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. 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 results of this study emphasize the importance of considering fibrosis and the location of the fistula within the urethra as critical risk factors associated with the recurrence or persistence of OF, even after surgical treatment. Addressing these factors becomes imperative in alleviating the burden of persistent incontinence experienced by affected women. Based on these findings, there is a clear and urgent requirement for additional prospective research aimed at exploring and developing more effective surgical techniques that can optimize the outcomes of OF repair. By advancing our comprehension and refining surgical approaches, we have the potential to enhance success rates and achieve improved long-term outcomes for women grappling with this challenging condition.

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