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Vesicovaginal Fistula Repair: A Single-Centre Experience

Arif Hamid, Sajad Malik, Natasha Thakur, Rouf Khawaja, M Saleem Wani

Abstract: ***The aim of the study was to evaluate the demographic profile and outcome of surgical repair in patients with a vesicovaginal fistula. Between June 2010 and March 2017, 46 patients of Vesicovaginal fistula (VVF) underwent surgical repair of the fistula. Patients with a previous unsuccessful repair were also included; however patients with associated or isolated urethrovaginal fistulas were not included in the study. The etiological, clinical, and surgical treatment data of these patients was analyzed. The age of the patients ranged between 26 and 55 years (mean 37 years) with parity varying from 1-7 (mean 4). The most common cause of VVF was total abdominal hysterectomy followed by caesarean section. The location of majority (69.57%) of the fistulas was supra-trigonal. In about two third of the patients (65.22%) repair was performed through transabdominal transvesical route. Success rate of surgery in the study was 86.96%. Vesicovaginal fistula is an extremely distressing condition for the patient and an equally challenging problem for the surgeon. The success rate of repair is reasonably good in experienced hands; however the focus and effort should be more towards prevention of fistula formation.***

Keywords: Fistula; transabdominal; transvaginal; repair; vesicovaginal.

1. Introduction

Vesicovaginal fistula (VVF) is an abnormal communication between bladder and vagina that causes continuous leakage of urine into the vaginal vault. As a clinical entity VVF is believed to have been known to the physicians of ancient Egypt, with examples present in mummies from 2000 BC. [1] The first record of VVF is found in the writing of ancient Hindu Medicine, the Vedas and Upvedas. In 1675, John Fatio was the first to achieve successful repair of VVF. [2]

A new era in the surgical treatment of VVF occurred in the 19th century. In 1834, de Lamballe was the first to emphasize tension-free closure. He also observed that newly acquired fistula without indurated margins might be cured by prolonged catheterization. [3] Marion Sims, in 1852 published his classic work, which formally established the technique of VVF repair· [4] He standardized and defined the surgical principles of VVF repair that are currently practiced. Trendenburg in 1881 to 1890 described the transabdominal transvesical technique of VVF repair. [5] In 1896, Kelly described a vaginal method of closing a large bladder defect. [6] He also advocated the use of preoperative ureteral catheterization to minimize risk of ureteral injury. Latzko, in 1942 described in detail the principles of his operation of partial colpocleisis, which is considered by some to be the gold standard for the surgical treatment of post-hysterectomy VVF. [7] Continued evolution of surgical treatment of fistulas has been due to the work of physicians like Raz (1993), [8] Arrowsmith (1994) [9] and Elkins (1994). [10]

In developing countries, obstetric trauma remains the leading cause of vesicovaginal fistulas. Commonly the initial event that leads to fistula formation is prolonged and obstructed labour, which results in pressure necrosis. In the developed countries with more modern obstetric care, the commonest cause of VVF remains iatrogenic injury at the time of gynecologic or urologic surgery. Patients undergoing total abdominal hysterectomy are at particular risk. The actual incidence of VVF is not known. In developing countries, this condition may follow 1-2/1000 deliveries, with annual worldwide incidence of up to 50,000 cases. [11] However, the incidence of post-hysterectomy VVF is estimated to be less than 1%. [12]

The objective of this study was to describe the profile and success rate of VVF repair in a tertiary care urological centre.

2. Patients and Methods

This retrospective study included patients of VVF diagnosed & managed in the Urology department of our institution between June 2010 and March 2017. Patients with a previous unsuccessful repair were also included in the study; however patients with associated or isolated urethrovaginal fistulas were excluded from the study. A total of 46 patients were included in the study.

Evaluation of cases was done by gynecological and urological examination. Initial assessment was done by vaginal examination and occasional three swabs test. Cystourethroscopy was performed in all cases to assess the site, size and other characteristics of the fistula. Apart from routine investigations, intravenous urography and retrograde pyelography was done in selected cases. Antibiotics effective against common urinary pathogens were used in all patients. The nature of the disease, operative procedures required, & the expected results were fully explained to the patients and an informed written consent was obtained from each patient/ family. VVF repair was performed via transabdominal, transvaginal, and combined abdominal & vaginal routes. Per-urethral Foley catheter was used in all cases, with additional suprapubic catheter in selected cases. A betadine vaginal pack was kept overnight in all patients. Post-operative antibiotics and anticholinergics were used for 7-10 days. Catheter was removed at 3 weeks after the surgery and final results were assessed. Patients were advised to avoid coitus for three months. Follow-up visits were planned after six weeks and three months. Elective caesarean section was advised for future pregnancy.

All the clinical details, operative data, and post-procedure results of each patient were recorded in a proforma. Statistical analysis of the complete data was done by contingency tables method. No institute ethics committee approval was obtained as this was a retrospective study, primarily involving data analysis.

3. Results

A total of 46 patients of VVF were managed during the study period. The age of the patients ranged between 26 and 48 years, with a mean of 37 years. The parity ranged between 1 and 7 (mean 4). Six patients (13.04%) had a previous unsuccessful repair. Twenty six patients (56.52%) had an obstetric cause of VVF, with12 patients having VVF after caesarean section and 8 following prolonged / difficult labour. In 18 patients VVF occurred after gynecologic surgeries, with post-abdominal hysterectomy VVF in14 (30.43%) patients. Two patients had a post-radiation fistula (Table I). In 32 patients (69.57%) the fistula was supra-trigonal while 14 patients (30.43%) had a trigonal fistula. In 6 patients, VVF margin was in close proximity to a ureteric orifice, and in 6 patients the fistula extended up to bladder neck. The fistula size was less than 1cm, 1-2cms, and more than 2cms in 26, 16, and 4 patients respectively. Thirty four (73.92%) patients had a simple VVF while complicated fistula was seen in 12 patients (>2cms fistula in 4 patients; previous failed repair in 6 patients; and two post-radiation fistulas). Thirty (65.22%) patients underwent a transabdominal transvesical repair, 12 underwent transvaginal repair, and in 4 patients combined abdominal & vaginal repair was performed. Primary multilayer repair with or without omentum / fibro fatty tissue interposition was done in 22 (47.83%) patients, either through transabdominal or transvaginal route. O'Connor repair was performed in 18 (39.13%) patients. Martius flap interposition was done in 6 (13.04%) patients undergoing repair via transvaginal route. In four patients, unilateral ureteric reimplantation was performed because of close proximity of fistula margins to the ureteric orifice (Table II). Successful fistula repair was achieved in 40 (86.96%) patients while 6 (13.04%) had a failed repair. Three out of these 6 failure patients had complicated fistulas (two recurrent & one post-radiation fistula). All these failed cases were subsequently managed with additional reconstructive procedures. Postoperative complications included persistent leakage of urine, urge/stress incontinence, wound sepsis, and wound dehiscence (Table III).

4. Discussion

Vesicovaginal fistula is a condition caused by the interplay of numerous physical factors and influenced by the social, cultural and economic condition of the patient. This interplay determines the status of women, their health, nutrition, fertility and susceptibility to VVF. [13] As a result, the frequency, etiology and prevention of VVF vary from country to country and even within various regions of the same country. [14, 15, 16]

Obstetric trauma still accounts for the majority of fistulas in developing countries. [17] Prolonged labour induces tissue necrosis of the bladder base and urethra, resulting in tissue loss, which may be substantial at times. On the other hand, the most common cause of VVF in industrialized nations is routine abdominal or vaginal hysterectomy. Nearly 75% of genitourinary fistulas are subsequent to this cause. [18, 19] Post-hysterectomy fistulas are thought to be caused by tissue necrosis resulting from inadvertent suture incorporation of vaginal tissue from the cuff closure into an unappreciated bladder wall injury. Factors thought to contribute to post-hysterectomy VVF include prior caesarean section, endometriosis, and prior pelvic radiation. In the present study, obstetric trauma accounted for about 56% of cases while gynecologic surgical procedure accounted for nearly 40% of the cases. Fourteen patients (about 30%) had a fistula following total abdominal hysterectomy. The relatively lower incidence of obstetric trauma related VVF in this part of the developing world, as seen in the present study, probably denotes better obstetric care available to patients of this region. Relatively higher incidence of post-hysterectomy VVF (nearly 40%) observed in this study is at least in part due to such procedures being performed by relatively inexperienced surgeons at centers with inadequate infrastructure and improper patient care.

Tancer, [20] in a retrospective study of 151 urogenital fistulas observed that 91% of the fistulas occurred after gynecologic procedures, with total abdominal hysterectomy being the most common antecedent procedure, resulting in vault fistula. Tancer suggested few measures to prevent bladder injury during total abdominal hysterectomy, including use of a two-way indwelling catheter, sharp dissection to isolate the bladder, an extra peritoneal cystostomy during difficult dissection, retrograde filling of bladder when injury is suspected, and repair of an overt bladder injury only after mobilization of the injured area.

The timing of repair remains controversial. Previously, several authors have advocated a waiting period of at least 3 to 6 months after the inciting event or previous attempt at repair, as inflammatory or necrotic fistula margins have been judged responsible for surgical failure. In the present study, repair was performed at least 3 months after the inciting event. O'Connor & Sakol [21] and Lee & Symmonds, [19] have recommended similar waiting periods to allow the tissues to "clean up", lose their edema, and obtain good muscularity and pliability. More recently, some authors have reported good results with early intervention. [22, 23]

Surgery is the mainstay of therapy for urogenital fistulas. Principles of surgery include wide mobilization of bladder, excision of all scar tissue, tension-free layer closure of bladder and vagina, non-traumatizing technique, and good hemostasis with complete bladder drainage post-operatively. Most authors agree that the best chance at closure of the fistula is the first attempt, although staged procedures have been described. Surgical approaches include transabdominal, transvaginal, and combined

abdominal & vaginal approaches. The approach chosen depends on several factors; including location of fistula, quality of tissue, and surgeon's experience. Transvaginal surgery is more rapid, associated with less morbidity and resulting in quicker recovery & good cosmetic results. Transabdominal approach is preferred in patients with poorly visualized fistula tracts, narrow or immobile vagina, or fistulas in close proximity to ureteric orifices. All approaches should lend themselves to the possibility of interposition grafts. During transabdominal approach, interposition of omentum/fat produces better results. Similarity Martius flap (fibro fatty tissue of labia majora) interposition and use of other interposition flaps during transvaginal repair improves the outcome. For more complicated fistulas, a combined abdominal & vaginal approach may be used. In the present study, 30 patients (65.22%) were managed via transabdominal approach, 12 via transvaginal and 4 with combined abdominal & vaginal approach. The higher incidence of transabdominal approach in the present series, compared to other series, [24, 25] is possibly because of most of the high fistulas being referred to a urology centre and also reflects the urologist's preference for this approach Similarly most gynecologists are more comfortable with the familiar transvaginal route. Apart from the nature of the fistula, surgeon's experience significantly affects the overall outcome.

A success rate of nearly 87% (86.96% precisely) was seen in the present study. Demirel et al, [26] reported a success rate of 88%, using predominantly (nearly 70% of patients) transabdominal approach. Kristensen and Lose [27] reported a success rate of 94% in their series of 18 patients, all managed via transabdominal route. A failure rate of about 13% (6 patients) was seen in the present study. These patients included 2 with a post-radiation fistula and the patients managed without tissue interposition. These patients were subsequently managed with additional reconstructive procedures. None of the patients in the present series managed with O'Connor technique and Martius flap interposition, had a failure of repair. Persky et al, [28] observed a failure rate of 14% in their series. A failure rate of 12% was reported by Wein et al, [29] in their series of 34 patients, all managed via transabdominal route. Apart from abdominal wound dehiscence in 2 patients, no major post-operative complication was seen in the present study.

Recent years have witnessed the use of minimally invasive approaches for VVF repair. Laparoscopic transabdominal approach is also being used currently for VVF repair and many authors have reported their results. [30, 31, 32, 33] Intravesical as well as extravesical techniques of laparoscopic repair have been defined. Most of these studies have shown good results and these authors claim several advantages of the laparoscopic approach, including shorter hospital stay, more rapid post-operative recovery, and better cosmetic results than the traditional abdominal approach. In 2011, Dogra and Saini [34] reported their experience of laser welding of small fistula. They concluded that laser welding was a simple, safe, and efficacious procedure in a select group of patients. Guntaka et al, [35] reported their experience of transvesicoscopic repair of VVF, which represents an additional modification to the laparoscopic transabdominal approach with all the advantages of laparoscopy. More recently Robotic - assisted approach for VVF repair has been used, enabling further improvement in repair technique with good surgical outcome. [36, 37, 38, 39]

All the minimally invasive techniques of fistula repair may have reasonable advantages with good overall results, but their availability and cost, especially in the developing countries may be a limiting factor. Although several surgical approaches for fistula repair are currently available, with comparable results; however the experience of the operating surgeon still continues to be one of the most important factors affecting the surgical outcome.

5. Conclusion

Vesicovaginal fistula is an extremely distressing condition for the patient and an equally challenging problem for the surgeon. Differences of opinion exist regarding timing and route of repair. However, the final success of any fistula repair ultimately depends on the surgeon's experience, judgment, and appropriateness of technique. Excellent results can be achieved with a wide exposure and tension-free closure of vascularized flaps together with judicious interposition of pedicled omentum and other fibro fatty tissues. Although the success rate of repair in most of the series, including the present study, is high, yet the effort should be focused on prevention.

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Table I: Etiology of VVF

Cause	No.	%
OBSTETRIC CAUSE	**26**	**56.52**
***** *Prolonged/difficult labour*	8	17.40
***** *Instrumental delivery*	6	13.04
***** *Caesarean section*	12	26.08
SURGICAL PROCEDURES	**18**	**39.13**
***** *Total abdominal hysterectomy*	14	30.43
***** *Vaginal hysterectomy*	4	08.70
OTHERS	**2**	**04.34**
****Post-radiation*	2	04.34

Table II: Operative procedures

Operative procedure	No.	%
Primary multilayer repair	22	47.83
O'Connor repair	18	39.13
Martius flap interposition	6	13.04
Ureteric reimplantation	4	08.70

Table III: Repair statistics in 46 patients

	No.	%
Surgical approach		
• *Transabdominal*	30	65.22
• *Transvaginal*	12	26.08
• *Combined abdominal and vaginal*	4	08.70
Success rate		
• *Successful*	40	86.96
• *Failure*	6	13.04
Complications		
• *Leakage*	6	13.04
• *Urge/stress incontinence*	13	28.26
• *Wound sepsis*	5	10.87
• *Wound dehiscence*	2	04.34