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Original research article

A retrospective comparative assessment of the outcome of laparoscopic versus open surgical repair for vesico-vaginal fistula

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ABSTRACT

Aim: The aim of the present study was to evaluate the outcome of laparoscopic versus open VVF repair for vesico-vaginal fistula.

Methods: A retrospectively reviewed the data of patients who underwent VVF repair in the Department of Urology, for the period of 2 years. There were forty patients who underwent laparoscopic VVF repair (group 1) and sixty who had open VVF repair (group 2) during this period.

Results: 40 patients with recurrent VVF (group I), offered robot-assisted VVF repair were included in the present study. 60 patients (group II) matched in all possible parameters with those of recurrent VVF with previous open surgical repair, which were performed in the same time period, were taken as controls. All the patients in group I (robotic repair) were successfully managed (100% success rate) as compared with 93.34% in group II. Although success rate was higher for robotic repair, it was not statistically significant. Mean blood loss was significantly less (mean 89 mL) in group I than in group II (168 mL). The mean hospital stay was also significantly less in group I (mean 3.7 days) compared with group II (mean 5.5 days). None of the patients had complications in group I, whereas 6 patients in group II developed complications. None of the patients in either group developed incontinence.

Conclusion: The present study showed that laparoscopic VVF repair results in reduced patient morbidity and shorter hospital stay without compromising the results. So, laparoscopic repair may be a more attractive treatment option for patients with post gynecology surgery VVF.

Keywords: Laparoscopy; Open surgery; Vesicovaginal fistula

INTRODUCTION

Vesico-vaginal fistula (VVF) is an abnormal communication between the epithelium of the bladder and that of the vagina which leads to continuous/total involuntary leakage of urine. The wet feeling and foul smell associated with leakage of urine cause social out casting of the patients. The most common etiology for VVF in developing countries is obstructed labor[1] and in developed countries it is abdominal hysterectomy.[2]

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It is a condition that not only affects the health of the woman but also imposes a great deal of social embarrassment and psychological trauma on the patient. It is considered as one of the most dehumanizing conditions that affects and reduces the quality of life of women. [3] Most VVF are the outcomes of pelvic surgeries, where 90% occur after hysterectomy. [4] In developed nations, gynaecologic surgery is the most common cause of VVF, particularly as a complication of abdominal hysterectomy. It is estimated that VVF occurs after 1 in 1800 abdominal hysterectomies. [5] There are various techniques of VVF repair, and all of them can be performed either through abdominal or vaginal route. The abdominal route is preferred, especially for recurrent VVF, as it provides reproducible and durable results.[6,7] The disadvantage of the abdominal route is the associated morbidity and complication, which are much higher than those found in the vaginal route. The utilisation of minimally invasive strategies is increased in an effort to decrease the morbidity related with open transabdominal VVF repair. [8] VVF can be repaired by two routes: vaginal and abdominal. The abdominal route repair has been performed predominantly by open surgery (laparotomy) and has been found to be associated with more morbidities; these morbidities can be minimised/ avoided via minimal access surgery. [9] Minimal access surgery has reformed the field of gynaecology; becoming established in everyday practice and is gradually becoming the norm and gold standard in gynaecological practice and in diagnosis and treatment of various gynaecological conditions including repair of VVF. Laparoscopic repair of VVF has been conducted with remarkable success.[10]

With the use of laparoscopy for VVF repair, this disadvantage can be overcome. Here we present our comparative analysis of laparoscopic versus open VVF repair.

MATERIAL & METHODS

A retrospectively reviewed the data of patients who underwent VVF repair in the Department of Urology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India for the period of 2 years. There were forty patients who underwent laparoscopic VVF repair (group 1) and sixty who had open VVF repair (group 2) during this period.

Inclusion criteria

- VVF which were caused by gynaecological surgery were included in our study.

Exclusion criteria

- Patients with recurrent fistula, VVF with a concomitant ureterovaginal fistula, VVF due to obstructed labour and multiple fistulas were excluded.

METHODOLOGY

All patients had undergone gynaecological surgery for benign diseases. Detailed history and physical including pelvic and per-speculum vaginal examination findings were noted from the hospital records. Patients generally had a history of urinary drainage per vagina after a gynaecological surgery. All the patients had urine routine examination and culture, renal function test, abdominal ultrasonography, intravenous urography (to rule out ureterovaginal fistula), and cystourethroscopy and vaginoscopy to assess the site, number, size of the fistula, proximity to

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ureteric orifices or bladder neck for the feasibility of a transvaginal repair. Patients who could not be operated through the vaginal route due to reasons like high up supratrigonal fistula, narrow vagina etc, underwent repair by an abdominal route and were included in this study.

Surgical technique

1) Open repair

The patient was placed in a low lithotomy position with access to the vagina in the sterile operative field. The abdomen was opened by a lower midline incision. All the patients were approached through transperitoneal route. Adhesions, if present between the bladder, bowel, or vaginal cuff were lysed. The bladder was opened vertically, and the cystotomy was extended down to the fistula. Bilateral ureteric orifices were identified and confirmed by inserting 6fr infant feeding tube through both the ureteric orifices. The plane between the bladder and the vagina was developed, and the fistulous tract was excised. The anterior vaginal wall was repaired with 2-0 polyethylglycol interrupted stitches. Omental flap was interposed between the bladder and vagina from above. The bladder was repaired in two layers in a continuous manner with 3-0 polyglactin suture over 20 Fr supra-pubic and 16 Fr Foley's urethral catheters. An abdominal drain was placed in the pelvis and the abdomen was closed in layers. Postoperatively patients were put on analgesics, antibiotics and anticholinergics. The drain was removed when the output was less than 50 mL in 24 hours. The abdominal sutures were removed after 8-10 days postoperatively. Due to concerns regarding wound infection and their management, patients were discharged only after abdominal suture removal i.e., after 10 days, if their surgical scar was healthy. The suprapubic catheter was removed at 3 weeks postoperatively. It was removed after 3 weeks as there was bivalving of urinary bladder leading to a large surgical incision on urinary bladder, which takes time to heal. Seven days after the removal of suprapubic catheter, per urethral catheter was removed and a micturating cystourethrogram was performed in all the patients to look for contrast extravasation. In patients with contrast extravasation, per urethral foleys catheter was reinserted and removed after 2 to 3 weeks.

) Laparoscopic repair

Under general anesthesia, the patient was first placed in lithotomy position. Cystoscopy was performed and ureteric catheters were placed bilaterally. A different coloured ureteric catheter was placed through the fistulous tract from the bladder and brought out off the vagina for easy identification of fistula. A 20 Fr Foley catheter was placed and both ureteric catheters were secured to it. The vagina was packed with Vaseline soaked gauze to prevent leakage during bladder filling and escape of CO2 during laparoscopy. Then the patient was placed in supine position with 15 to 30 degrees Trendelenburg tilt. Initial 10 mm trocar was placed at the infra-umbilical site by open method. Two working ports, 10 mm at right iliac fossa and 5 mm at left iliac fossa over the spino-umbilical line were placed under vision following the creation of pneumoperitoneum. Another 5 mm trocar was placed in lower abdomen according to the requirement. After adhesiolysis bladder was filled with about 200 to 250 mL saline to see the outline. Near midline, a limited cystotomy of about 2 cm was performed just above the vaginal vault. Then the fistula was identified by the different colored ureteric catheter/guidewire. The

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cystotomy was then extended up to the fistula. A plane was created between bladder and vagina for about 1 to 1.5 cm all around the fistulous opening. Vaginal opening was repaired with 2-0 polyglactin in a single layer continuous manner placing the suture line horizontally. The repair was augmented with either omentum or epiploic appendix of sigmoid colon according to availability.

Cystotomy was closed with 2-0 polyglactin suture in a single layer continuous manner in a vertical orientation to get a non-overlapping suture line with respect to the vaginal suture line. Then the bladder was filled with about 150 mL of saline mixed with methylene blue to assess watertight repair. Interrupted sutures with 2-0 polyglactin were taken according to the necessity where the leak was identified. An 18 Fr Ryle's tube was kept in the pelvis as a drain. No suprapubic catheter was placed. The 10mm trocars sites were closed with 2-0 polyglactin. Oral liquids were allowed in the evening of the surgery according to the patient's tolerance. Oral anticholinergics were given till the removal of Foleys catheter.

Patients were ambulated from postoperative day 1. Ureteral catheters were removed 48hrs after surgery. The drain was removed once the output was below 50 mL/day. Patients were discharged after removal of the drain i.e., generally 3rd or 4th postoperative day. Per urethral catheter was removed on the 10th postoperative day, following a cystogram, if there was no suspicion of leakage. Per urethral catheter was removed earlier here as there was a limited cystostomy made laproscopically and a small surgical incision, which takes less time to heal. All patients were followed up postoperatively every 3 months in the first year and every 6 months thereafter. In follow-up, patients had a detailed history and physical examination with emphasis on detecting urinary leakage. If patients had no history, symptoms or signs of urinary leakage they were considered as successful repair.

Statistical analysis

Demographic and non-parametric outcome variables between groups were assessed using chi-square and Fisher's exact tests. Unpaired Student's t-test was used for comparison of parametric data between the two groups. A $P<0.05$ was considered statistically significant. We used IBM SPSS ver. 20.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Table 1: Demographic Profile of Both the Groups

Parameters	*Group I (n=40)*	*Group II (n =60)*	p-*Value*
Mean age	27.3 (16–46)	27.5 (18–44)	>0.05
Parity			
Primi-para	28 (70%)	40 (66.66%)	>0.05
Multi-para	12 (30%)	20 (33.34%)	
Previous delivery (in obst VVF)	*n* =20	*n* =30	
Hospital	5 (25%)	7 (23.34%)	>0.05
Home with TBA	5 (25%)	9 (30%)	
Home with untrained BA	10 (50%)	14 (46.66%)	
Cause of VVF			>0.05

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Obstructed labor	20 (50%)	42 (70%)	
Post hysterectomy	14 (35%)	16 (26.66%)	
Post cesarean	6 (15%)	2 (3.34%)	
Previous surgical repair			
Abdominal route	26 (65%)	40 (66.66%)	>0.05
Vaginal repair	14 (35%)	20 (33.34%)	
UTI	16 (40%)	15 (50%)	>0.05
Mean pre-op hemoglobin (gm=dL)	9.4 (5–14)	9.7 (5.8–14)	>0.05
Mean size of fistula (cm)	2.8 (1.5–6)	3.0 cm (1–6.5)	>0.05
Time interval since last repair	6 months (3–14)	7.4 (4–14)	>0.05

40 patients with recurrent VVF (group I), offered robot-assisted VVF repair were included in the present study. 60 patients (group II) matched in all possible parameters with those of recurrent VVF with previous open surgical repair, which were performed in the same time period, were taken as controls. Patients in both the groups were evaluated by assessing relevant clinical details; performing urine routine examination and culture, renal function test, three swab test, USG–kidney, ureter, and bladder radiograph, intravenous urogram (to look for upper tract and rule out uretero-vaginal fistula), and cystourethroscopy (to assess the site, size, number, relation to ureteric orifices, bladder neck, and the condition of surrounding tissues).

Table 2: Comparative Results between Group I and Group II

Parameters	*Group I*	*Group II*	p-*Value*
Success rate	40 (100%)	56 (93.34%)	>0.05
Mean operative time (minutes)	142 (110–180)	145.5 (100–210)	>0.05
Mean blood loss (mL)	89 (50–200)	168 (110–400)	<0.05
Mean hospital stay (days)	3.7 (2–5)	5.5 (4–10)	<0.05
Interposition tissue Omentum	24 (60%)	42 (70%)	>0.05
Peritoneum	10 (25%)	18 (30%)	>0.05
Epiploic of the sigmoid colon	6 (15%)	Nil	—
Complications	0	6 (10%)	>0.05

All the patients in group I (robotic repair) were successfully managed (100% success rate) as compared with 93.34% in group II. Although success rate was higher for robotic repair, it was not statistically significant. Mean blood loss was significantly less (mean 89 mL) in group I than in group II (168 mL). The mean hospital stay was also significantly less in group I (mean 3.7 days) compared with group II (mean 5.5 days). None of the patients had complications in group I, whereas 6 patients in group II developed complications. None of the patients in either group developed incontinence.

DISCUSSION

Vesicovaginal fistula (VVF) is a devastating and debilitating condition for all women. Due to continuous urinary leakage and smell of urine, the women becomes a social outcast. It is the most common type of urogenital fistula. In developed countries it is most commonly caused by an abdominal hysterectomy, while in developing countries poor obstetric care is the leading

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cause of VVF.[2,11] Various approaches of VVF repair have been described and these can be performed either by an abdominal or vaginal route. The abdominal route is preferred in recurrent fistulas, radiation fistulas, small capacity bladder requiring augmentation, associated ureteric injury requiring reimplantation and high up supratrigonal fistulas.[12,13] The utilisation of minimally invasive strategies is increased in an effort to decrease the morbidity related with open transabdominal VVF repair.[8] VVF that are seen in low-resourced countries occur as an effect of persistent obstructed labour because of the tissue ischaemia, as the bladder gets compressed between the pubic symphysis and the foetus. In well-resourced countries, it often occurs due to the iatrogenic injury, with over 60% subsequent to hysterectomy.[14] The conventional methods for VVF repair including transvaginal method for low lying fistulae and transabdominal repair for supra trigonal VVF.[15] Laparoscopic repair for VVF was first reported by Nezhat et al[16] in 1994; whereas recurrent VVF laparoscopic repair was first reported by Miklos et al.[17] Although the laparoscopic VVF repair has many advantages in form of excellent results along with reduced morbidity, its biggest drawback is the steep learning curve associated with it. This drawback has been overcome by incorporating the assistance of robots for VVF repair.

40 patients with recurrent VVF (group I), offered robot-assisted VVF repair were included in the present study. 60 patients (group II) matched in all possible parameters with those of recurrent VVF with previous open surgical repair, which were performed in the same time period, were taken as controls. All the patients in group I (robotic repair) were successfully managed (100% success rate) as compared with 93.34% in group II. Although success rate was higher for robotic repair, it was not statistically significant. Mean blood loss was significantly less (mean 89 mL) in group I than in group II (168 mL). The mean hospital stay was also significantly less in group I (mean 3.7 days) compared with group II (mean 5.5 days). None of the patients had complications in group I, whereas 6 patients in group II developed complications. None of the patients in either group developed incontinence. Transabdominal repair of VVF can be performed either by transvesical transperitoneal or extra peritoneal approaches.[18,19] We utilized a transabdominal transvesical approach with limited cystostomy in laparoscopic procedures. This approach was first described as a mini O' Connor technique by Rizvi et al.[20] Utilizing this technique one avoids extensive peritoneal mobilization of the bladder and reduces the operative time too. Laparoscopic surgery is beneficial over open surgery as the patient has less postoperative pain and, therefore, lesser analgesic requirements, faster recovery and shorter hospital stay.[21,22]

Open transabdominal and transvaginal approaches to VVF repair have long been established. The decision about which surgical approach to use for VVF repair is often based upon surgeon experience and preference.[23] In a bid to provide assistance in making this decision, our series demonstrates an evolution in practice for a single surgeon from a predominantly abdominal approach to a predominantly vaginal approach. This progression was made in a bid to reduce the exposure of patients to the greater morbidity seen with an abdominal approach, as identified by previous studies.[24] The right time for surgery in patients with VVF is still unclear. One study by Blaivas et al[25] concluded that early repair of the VVF has the advantage of shortening period of discomfort for the patient.

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CONCLUSION

The present study suggested that robotic repair of recurrent VVF results in reduced morbidity and excellent success rate. The suturing part of repair becomes very easy by its use. It is an excellent option for recurrent fistulas, which are otherwise difficult to manage; but the cost is a major hindrance to its routine use for VVF repair.

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