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## GYNAECOLOGY

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# The 11 Years-Experience in Vesicovaginal Fistula management

Abdul Rouf Khawaja, MS DNB (Urology) SKIMS INDIA,<sup>1</sup>

Farzana Bashir, MD(OBG) GMC SGR INDIA,<sup>2</sup>

Tanveer iqbal Dar, MS DNB (Urology)GMC SGR INDIA,<sup>1</sup>

Arsheed Iqbal, MD (Radiodiagnosis) GMC SGR INDIA,<sup>1</sup>

Sajid Bazaz, MS DNB (Urology) SGRH DELHI,<sup>1</sup>

Ajay Kumar Sharma, MCh (Urology) SGRH DELHI.<sup>1</sup>

<sup>1</sup> Consultant,

<sup>2</sup> Senior resident, Department of Urology, Sir Ganga Ram Hospital New Delhi, India, 110060

### ABSTRACT

**Objective:** To explore the selective use of intraoperative cystoscopy/dye test and treatment options for Vesico Vaginal fistula (VVF) in our institute.

**Materials and Methods:** From March 2002 to March 2013, thirty one patients of VVF were admitted in the Department of urology in our institute. 27 patients were repaired by transabdominal route while as 4 patients were managed conservatively. Out of the 27 patients, 19, 3, and 5 patients were operated by open, laparoscopic, and Robotic assisted laparoscopic repair respectively. Student's t-test and Chi-square tests were used to evaluate the data. A  $p < 0.05$  was taken as statistically significant.

**Results:** Most common aetiology was hysterectomy for benign conditions (80.06%). Most of VVF were supratrigonal in location ( $n=23$ ) and 27 of the 31 VVFs were repaired by transabdominal route by standard O'Connor technique with omental interposition. A success rate of 96.29% was achieved after first repair by transabdominal route ( $p < 0.0001$ ). Four patients with small intraoperative injury ( $< 5$  mm) which were detected on intraoperative cystoscopy and dye test and were managed by Bilateral ureteric catheterization with 100% success ( $p = 0.005$ ) at 6 weeks.

**Conclusion:** VVF resulting from difficult hysterectomy can be prevented by meticulous pelvic dissection with high anticipation of bladder injury. Use of intraoperative cystoscopy or methylene blue dye in bladder recognizes injury at the earliest and allows intraoperative repair which is almost always successful. Also robotic assistance to laparoscopy should be preferred when available due to its minimally invasive nature and advanced degree of freedom which makes complex suturing very easy especially in narrow pelvic cavity.

**Keywords:** Vesicovaginal fistula, (VVF) transabdominal approach, robotic, laparoscopic repair

**Correspondence to:** Dr. Abdul Rouf Khawaja, Assistant Professor Urology, Sheri Kashmir Institute of Medical Sciences Srinagar Jand k 190011, E-mail: roufkhawaja@rediffmail.com, Tel. 9419087992

## Introduction

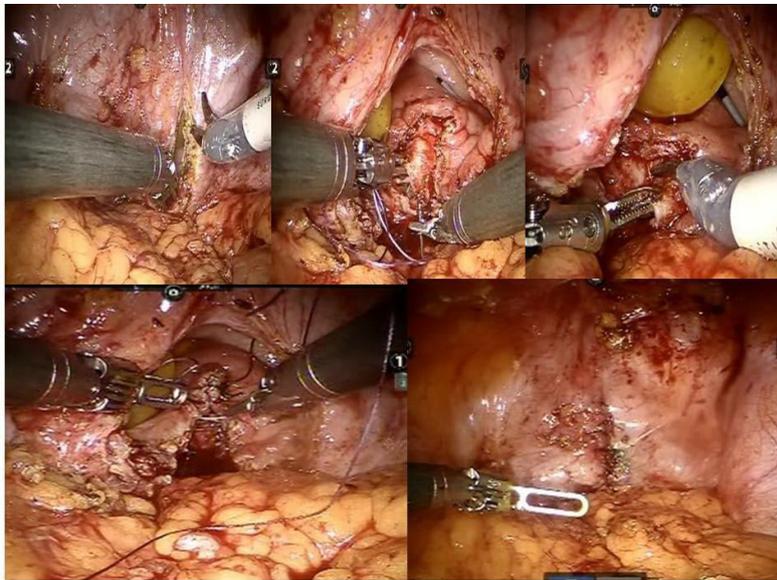
Vesicovaginal fistula (VVF) represents a significant morbidity in female urology and its impact lies in the social distress that results from the persistent leakage of urine. The overwhelming majority of VVF result from iatrogenic causes, the most common being hysterectomy<sup>(1-3)</sup>. Other etiologies include pelvic surgeries, pelvic malignancies, trauma, radiation necrosis as well as obstetric trauma<sup>(2-7)</sup>. World health organization estimates that in developing countries, 5-million women each year suffer maternal morbidity, obstetric fistulae being on top of the list. Management of such fistulae continues to be a challenge, testing the ingenuity and versatility of the operating surgeon. However robotic assistance to laparoscopic surgery is emerging as an option to repair complex surgeries with ease in narrow pelvic cavity.

The aim of this study is to review our clinical experience and to explore the selective use of intraoperative cystoscopy in management of vesicovaginal fistulae over an 11 year period. The selective use of intraoperative cystoscopy/ dye study can be helpful in cases with extensive pelvic adhesions for detection of iatrogenic bladder injuries and treatment strategies.

## Material and methods

This was a prospective study carried out in the department of urology, Sir Ganga Ram Hospital, New Delhi from March 2002 to March 2013. All 31 patients were preoperatively assessed with age, parity, history, physical examination and antecedent event leading to fistula. Laboratory tests like complete blood picture, kidney function test, urine routine and culture were done in all patients. Abdominal ultrasonography and intravenous urography for assessing upper urinary tracts, optional contrast enhanced computed tomography (CECT) KUB, Cystography and Cystoscopy were carried out to evaluate the extent of fistula size, number and site, and to decide the need for operation. The methylene blue dye test was carried out with the help of a tampon inserted into vagina when the fistula was not obviously seen on cystoscopy. Vaginoscopy was

carried out in all patients. 27 patients were operated by o' Conor technique bivalving urinary bladder up to the fistula, separating the bladder from vagina, excision of all fibrotic tissue, closure in four non overlapping water tight layers with omental interposition (19 by open, 3 by laparoscopy and 5 by robotic assisted laparoscopic repair). Closure of the bladder mucosa and muscle layers was carried out by separate suturing with continuous 3-0 vicryl, nonoverlapping suture. Both mucosal and detrusor muscle layer were sutured in watertight fashion. The vaginal mucosa was sutured separately with interrupted 2-0 vicryl suture. Repair was reinforced with omental flap based on right gastroepiploic artery. Foley catheter was indwelled and removed after cystogram at 3 weeks postoperatively. Earlier we used supra pubic catheter drainage as well but in most of the patients only transurethral foley catheter with bilateral ureteric catheterization was indwelled. At 3 weeks a cystogram was done. Contrast was instilled in bladder through per urethral catheter under gravity with both AP view and oblique views for detection of any persistent fistula. Per urethral foley catheter was removed first followed by suprapubic foley catheter removal. In patients with bilateral ureteric catheterization with per urethral foley catheter, both were removed simultaneously on normal cystogram. All patients were examined after an average of 3 month. Robotic assisted laparoscopic VVF repair is duplication of open o' Conor method (Fig.1) using three arms of robot with port placement at umbilicus (camera), and two working ports on either side about 2 cm below umbilicus on lateral border of rectus sheath. The patient is placed in 15-20 degrees trendelenburg position with abducted limbs.



Legend to the figures

**Fig. 1.** Various plates showing robotic assisted VVF repair

## Results

Majority of the patients with VVF were between 35-45 years (83.9%, Table 1) and presented with total

incontinence of urine. Most common etiology was hysterectomy for benign conditions (80.06%, Table 2).

**Table 1.** Distribution of women with VVF according to age group (n=31)

Age Groups	Number of cases	%
25 - 35yrs.	2	6.5%
35 - 45yrs	26	83.9%
> 45yrs	3	9.7%
Total	31	100%

**Table 2.** Etiology of VVF (n=31)

Etiology	Number of cases	%
Hysterectomy for Benign conditions	25	80.6%
Repeated LSCS	3	9.7%
Obstructed labour	1	3.2%
Forceps Delivery	2	6.5%

**Table 3.** Location of VVF (n=31)

Number of patients	Location of fistula	Diameter	Surgical Technique
4 (intraoperative injury)	Trigonal-1	Less than 5mm	B/LUreteric Catheterization
	Supratrigonal-3	Less than 5mm	
19	Supratrigonal	8-10mm	Transabdominal oconnor Technique
3	Supratrigonal	10mm	Transabdominal oconnor Technique
5	Trigonal-4	8-10mm	Transabdominal oconnor Technique

B/L-Bilateral

**Table 4.** Outcome of VVF Repair (n=31)

Surgical Technique	Number of pts	Success	Failure	P
B/L Ureteric Catheterization	4	4 (100%)	0 (0%)	0.005
Abdominal Approach (omental interposition)	27	26 (96.29%)	1 (3.70.%)	< 0.0001

## Discussion

Regarding to etiology, most cases of VVF are the result of Gynecological procedures like Hysterectomy for Benign conditions. A small group of patients were repeated Lower segment cesarean section. Goodwin reported that 75% of his cases were a result of gynecological surgeries<sup>(8)</sup> and Lee reported that 82% resulted from gynecological surgery, and only 8% from obstetric complications<sup>(9)</sup>. This is consistent with 80.6% of cases secondary to gynecologic surgery in our series. Most gynecologists seem to favour the trans vaginal repair<sup>(10,11)</sup>, while urologists prefer the trans abdominal repair<sup>(2,3,12)</sup>. The trans vaginal repair for low lying fistula being a less invasive repair, has obvious advantages in terms of cosmesis and patient discomfort, less post-operative hospitalization as well as peri-operative bleeding<sup>(13)</sup>. The abdominal approach, however, due to its strengths in the optimal exposure of the fistula as well as intraoperative assessment of complex fistulae or cases with concomitant ureteral obstruction, is preferred by others. The approach used depends very much on the preference and experience of the surgeon. Suffice it to say that whatever the approach, whether trans vaginal or abdominal, the results are similar. The

more important determinants of a successful repair are the principles of a tension-free, layered repair and adequate postoperative bladder drainage. The use of interpositional grafts is likely to contribute towards better outcome. Obstetric fistulas are usually larger than post-hysterectomy fistulas and are located more distally<sup>(14)</sup>. The main symptom of VVF is leakage of urine from the vagina, apparent only when the bladder is full, or constantly in the presence of a large fistula. After gynecological surgery, leakage usually appears after removal of the urinary catheter<sup>(15)</sup>. The most important clinical examination in the evaluation of VVF is cystoscopy with vaginal examination. Urinary tract injury occurs in about 0.02% to 1.3% of hysterectomies and about 75% of these urinary tract injuries are seen in uncomplicated hysterectomies. In our series, only four patients had intraoperative cystoscopy/dye study done, for anticipation of bladder injury in difficult hysterectomy with extensive pelvic adhesions. In three cases injury was recognized on cystoscopy. In one patient injury was recognized on instillation of methylene blue dye intravesically. Methylene blue dye test is helpful in the diagnosis of small VVF. We believe thermal injury to bladder by cautery will be difficult to

detect on cystoscopy, however on instillation of methylene blue dye in bladder to its maximal volume while applying external compression on bladder will stain tissue in operative field. VVF can be treated conservatively or with surgical repair. However the timing of repair remains controversial. There is no consensus regarding the definition of late (2-4 months) and early (1-3 months) repair of VVF<sup>(16,17)</sup>. Patients with intraoperative bladder injury will have prolonged post operative course like fever, leucocytosis, ileus with irritative symptoms of bladder. In our series majority of the patients (n=27) were repaired by trans abdominal route with a success in 26 patients (95.65%) and one failure. In literature, the success rate repaired by trans abdominal route is 94-98%<sup>(4,9)</sup> and by trans vaginal route 82%<sup>(11)</sup>. Dyes are excellent way to detect the fistula and intra operative injuries<sup>(18)</sup>. In a study by Patel et al<sup>(19)</sup>, concluded that the routine use of cystoscopy at the time of gynecologic surgery allows for timely diagnosis of urinary tract injuries, is a cost-effective and cost-saving manner. In our series majority of VVF were supratrigonal and the abdominal approach was preferred by using Standard O'Connor technique. In our centre da Vinci robot system was available in year 2011 and only few cases were done particularly when fistula size was > 10-12 mm with narrow pelvic cavity.

Laparoscopic repair of genitourinary fistulas has not gained widespread support among urologists and gynecologists because this procedure is technically demanding, complex, and highly skilled procedure. The "robot" has an amphidextrous joint (EndoWrist, 7 degrees of freedom), which reduces the error rate required to complete a particular designated task<sup>(20)</sup>. The da Vinci<sup>®</sup> and Zeus<sup>™</sup> surgical robot systems are two such examples of the online master-slave systems in which the surgeon is placed at a remote console and the operative site is displayed on a highly magnified (10–15 times), three-dimensional realistic display (stereoscopic depth perception). The first report of robot-assisted laparoscopic repair of VVF was initially described by Melamud et al. in 2005<sup>(21)</sup> Later, Sundaram et al. published a report describing their technique of a purely robot-assisted repair of VVF in five of their cases<sup>(22)</sup>. Accurate and ergonomic placement of ports

is a vital factors to the success of any robot-assisted laparoscopic surgery to avoid instrument collision and technical mishaps<sup>(23)</sup>. Hemal et al. also described their robot-assisted laparoscopic technique for repair of recurrent supratrigonal VVF<sup>(23)</sup>. They concluded that even recurrent supra trigonal fistulas could be repaired successfully laparoscopically<sup>(24)</sup>.

We have da Vinci robot system in our institute and performed VVF repair in a layered fashion with omental interposition. Standard O'Connor technique was used in all the patients. All the patients operated laparoscopically with and without robotic assistance recovered without any recurrence.

## Conclusion

VVF resulting from difficult hysterectomy can be prevented by meticulous pelvic dissection with high anticipation of bladder injury. Use of intraoperative cystoscopy or methylene blue dye in bladder recognizes injury at the earliest and allows intra operative repair which is almost always successful. Also robotic assistance to laparoscopy should be preferred when available due to its minimally invasive nature and advanced degree of freedom which makes complex suturing very easy especially in narrow pelvic cavity.

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## Conflict of interest

No conflict of interest in our study

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