

# Urologic complications following obstetrics and gynecological surgery: Our experience in a tertiary care hospital

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## Abstract

**Introduction:** Urinary tract injuries are a known complication of obstetrical and gynecological surgeries because of their anatomical proximity. Delayed diagnosis and improper management leads to high morbidity and even mortality. This is our three year's experience of urological complications after obstetric and gynecological surgery, their treatment and follows up.

**Materials and Methods:** We reviewed all cases of urological injuries managed in our department that were deemed to be of obstetric and gynecological origins.

**Results:** Thirty seven women were treated in the department for urological complications secondary to obstetric and gynecological procedures from January 2012 to December 2014. The most common organ involved was urinary bladder, occurring in 54% patients followed by ureter in 35.13%. Vesicovaginal fistula (VVF) was the most common injury involving the bladder occurring in nineteen patients. Ureterovaginal fistula (UVF) occurred in nine patients and acute ureteric injury in three. Hysterectomy was the most common etiology occurring in 60% cases followed by obstetrical causes in 40% cases. All cases were successfully managed both with open surgery or laparoscopic surgery.

**Conclusion:** Although obstetrical causes are still important in developing countries, gynecological procedures especially laparoscopic surgeries are on the rise. In these procedures the suspicion of urological injuries should be kept in mind and intra-operative detection and early repair should be attempted. Delayed diagnosis and improper treatment leads to severe complications.

**Key Words:** Gynecological surgery, iatrogenic injuries, urological complications

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## INTRODUCTION

Operative injuries to the urinary tract are common in gynecological surgery due to the proximity of the urogenital organ systems. Urinary tract injury constitutes an estimated 0.2–1% of all gynecologic procedures and pelvic operations.<sup>[1]</sup>

Urinary tract injuries due to obstetric and gynecologic surgery are normally classified into two categories: Acute complications, such as bladder or ureteric injury that can be identified and repaired immediately during the operation, and chronic complications such as vesicovaginal fistula (VVF), ureterovaginal fistula (UVF) which can surface days to months after primary surgery. The rate of clinically apparent ureteral injuries ranges from 0.2% to 2.5% for routine gynecologic pelvic operation and 10–30% for radical procedures in malignant conditions.<sup>[2]</sup> Genitourinary fistula, although rare in the industrialized world, still continues to plague women in the third world countries like India. In developing countries, including India, 90% of these fistulas are a consequence of neglected and obstructed labor.<sup>[3]</sup> Complex minimally invasive endoscopic and

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laparoscopic procedures are being carried out increasingly by urologists to treat all these complications.

This study was performed to investigate the cause and management of urologic complications following obstetric and gynecologic surgery in order to prevent future occurrences of same.

## MATERIALS AND METHODS

From January 2012 to December 2014, 37 patients with genitourinary injuries following obstetric and gynecologic surgery were treated in the Department of Urology at a tertiary care hospital in Eastern India. A detailed history was taken and clinical examination performed in all patients.

While reviewing, we explored the site of injury, its etiologic characteristics, and the type of therapy undertaken and of course, the success rate of the therapeutic maneuver.

Urological complications were defined as laceration, transection, rupture, or ligation of the genitourinary tract found during surgery or as hydronephrosis, and leakage of contrast media out of the urinary tract found after surgery. Success of the repair was the criterion for successful treatment.

Patients were followed-up in the outpatient clinic at 1, 3, and 6 months with detailed history, physical examination, complete urinalyses, and urine cultures at each visit. Serum creatinine was done at 3 months follow-up. Patients with positive urine cultures received appropriate antibiotic therapy. Follow-up intravenous urography was performed 3 months after treatment.

## RESULTS

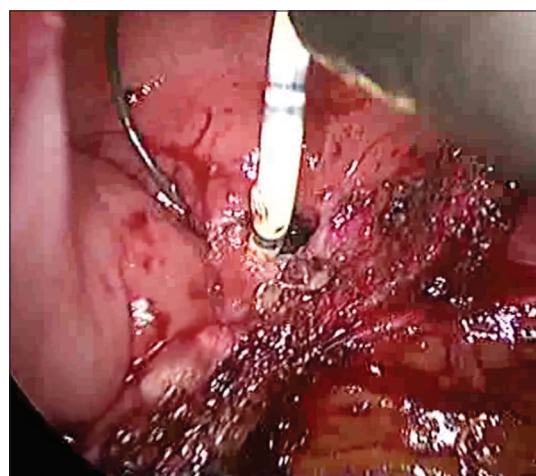
Mean age of the patients were 32 years (range: 19–58 years). Thirty-one out of 37 patients (83.78%) treated by us had delayed complications like fistulas. Acute complications of bladder and ureter occurred in 6 patients (16.21%). The most common type of injury involved bladder, occurring in 20 patients (54.05%), followed by ureter in 13 patients (35.13%), then bladder along with ureter in 3 patients (8.10%) and least in urethra 1 patient (2.7%). Of 20 patients of bladder injury, 19 patients (95%) were of VVF and 1 patient (5%) of acute bladder laceration.

Of 13 cases of ureteric injury, UVF occurred in 9 patients (69.23%), acute ureteric injury in 3 patients (23.07%), and ureteric stricture in 1 patient (7.69%). Nine patients had left ureteric injury and 4 had a right ureteric injury. In all cases of ureteric injury preoperative retrograde pyelography and retrograde double J (DJ) stenting was attempted first. After failure of the endourological procedure, surgery was undertaken in the same sitting.

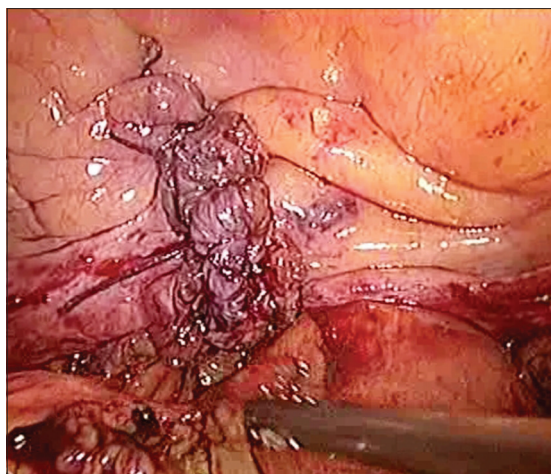
Hysterectomy was the cause of urological injury in 22 patients (59.45%) and 15 patients (40.54%) had obstetrical causes. In 22 cases of hysterectomy, 9 patients (40.9%) had undergone a laparoscopic hysterectomy. Of 22 patients, 15 had a history of surgery in the form of caesarean section in the past.

In our series, patients were treated with both open and laparoscopic procedures. In acute complications, one bladder injury was repaired using laparoscopic transabdominal repair with 100% success rate. Of 3 acute ureteric injuries, one had laceration which was managed successfully with primary repair plus DJ stenting. Two patients had complete transection which were repaired using open ureteroneocystostomy and DJ stenting. Two patients had combined bladder and ureteric injuries which were repaired successfully with open primary bladder repair and ureteroneocystostomy.

Of 19 cases of VVF, 11 were repaired using laparoscopic transabdominal repair, 7 were treated with open transabdominal O'Connor repair and 1 through vaginal route with martius flap. 18 patients (94.73%) were treated successfully. One case, which failed was earlier repaired using a laparoscopic approach which was later successfully managed using open transabdominal approach. All 9 cases of UVF were repaired by transabdominal laparoscopic ureteroneocystostomy. One case of combined VVF plus UVF was repaired by open transabdominal O'Connor bivalve repair. Figure 1 shows two VVFs after bivalving urinary bladder in Laparoscopic repair. These two fistulas were joined and repaired as one. Figure 2 shows completed VVF repair using a laparoscopic approach. Figure 3 shows VVF using vaginal approach. Figure 4 shows the closure of urinary bladder in VVF repair using vaginal approach.



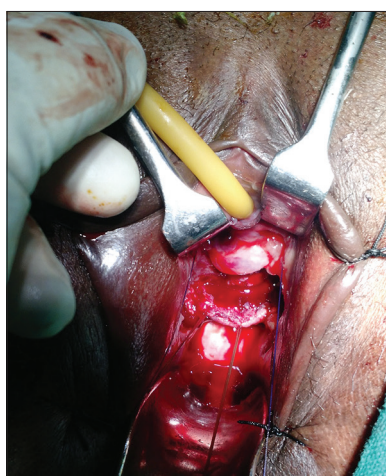
**Figure 1:** Two vesicovaginal fistula's seen in laparoscopic repair after bivalving urinary bladder (first with white guidewire, second with grey guidewire)



**Figure 2:** Completed repair of vesicovaginal fistula using laparoscopic approach



**Figure 3:** Vaginal approach used for delineating vesicovaginal fistula



**Figure 4:** After closure of urinary bladder in vesicovaginal fistula repair using vaginal approach

One case of urethra vaginal fistula was managed using the vaginal route with martius flap. One case of ureteric stricture was managed with primary ureteroureterostomy.

In follow-up, all patients were asymptomatic and with normal radiological findings.

## DISCUSSION

The anatomic proximity of the reproductive and lower urinary system predisposes it to iatrogenic injuries during obstetric and gynecological surgery. In our series, Table 1 shows the type of surgery performed and its relation to site of injury and Table 2 shows management.

The most commonly injured organ was urinary bladder in 54.05% patients. Bladder laceration was detected intraoperatively in one patient during laparoscopic hysterectomy which was then managed by primary laparoscopic repair. Two other cases of concomitant urinary bladder and ureteric injury were detected intraoperatively during radical abdominal hysterectomy for which open primary bladder repair and ureteroneocystostomy was done. All cases were successfully treated. Ureteral injury recognized at time of hysterectomy occurs most commonly with radical abdominal hysterectomy (7.7 per 1000) and total abdominal hysterectomy (1.2 per 1000) and least commonly with laparoscopic assisted vaginal hysterectomy (0 per 1000).<sup>[4]</sup>

Nineteen cases of bladder injury presented to us in the form of VVF. This is in contrast to most series where the most common form of injury is intra-operative detection of urinary bladder laceration and it is treated by primary bladder repair.<sup>[5]</sup> This difference may be because our hospital is a tertiary care referral center for East India and therefore only complex urological cases like fistulas which are difficult to treat in primary and secondary care centers are being referred to us.

Out of 19 cases of VVF, 18 cases were supratriangular and one case was intertriangular. Eleven patients (57.9%) had obstetrical causes like obstructed labor, caesarean section. Five patients (26.3%) had an open hysterectomy and 3 patients (15.8%) had a laparoscopic hysterectomy. In developing countries, obstetrical VVFs remain a major medical problem because of low standard of antenatal and obstetric care.<sup>[6]</sup> Obstetrical fistulas cause “field injury” to a larger area as compared to postsurgical patients therefore producing a larger fistula.<sup>[7]</sup>

Vesicovaginal fistula patients presented themselves to us after a varying period of 4 months to as long as 10 years after primary surgery. There is no consensus about the timing or surgical technique of fistula repair.<sup>[8]</sup> The classical view is to delay the repair for 3–6 months to allow the inflammation to subside. Eleven patients were treated with transabdominal transvesical laparoscopic VVF repair<sup>[9]</sup> while seven were treated with transabdominal open repair using O’Connor bivalve technique.<sup>[10]</sup> These include the two patients who

**Table 1: Type of surgery performed in patients with urinary tract injury**

Type of surgery	Total number of cases	Total number of injuries (%)	Site of injury	Number of cases
Transabdominal hysterectomy	1750	11 (0.62)	Bladder	5
			Ureter	4
			Bladder+ureter	2
Radical abdominal hysterectomy	54	2 (3.70)	Ureter	2
Vaginal hysterectomy	592	1 (0.16)	Ureter	1
Laparoscopic abdominal hysterectomy	295	9 (3.05)	Bladder	4
			Ureter	5
Obstetrical causes	6000	14 (0.23)	Bladder	11
			Ureter	1
			Bladder+ureter	1
			Urethra	1

**Table 2: Primary management of urinary tract injuries**

	Type of repair	Number of cases
Bladder	Primary repair	2
	End to end anastomosis	2
Ureter	Ureteroneocystostomy	4
	Open transabdominal O connor repair	7
VVF	Laparoscopic repair	11
	Transvaginal repair	1
UVF	Laparoscopic repair	9
Urethrovaginal fistula	Transvaginal repair	1

VVF: Vesicovaginal fistula, UVF: Ureterovaginal fistula

had a failed VVF repair and the one who was treated by transvaginal approach with martius flap.<sup>[11]</sup> In all the cases of abdominal surgery, omental flap interpositioning was done. Laparoscopic surgery advantages include decreased convalescence, shorter hospitalization times, and decreased pain requirements. The main drawback is the steep learning curve associated with laparoscopy.<sup>[12]</sup> In our patients undergoing laparoscopic VVF repair, fistula size ranged from 1 cm to 3.5 cm (mean:  $2.2 \pm 0.9$ ). Mean operative time was  $157 \pm 29.8$  min (range: 110–210) and estimated blood loss was  $73.8 \pm 18.2$  ml (range: 45–110). One patient in our series had a failed VVF repair after laparoscopic repair but was repaired after 3 months successfully using open transabdominal O'Connors bivalve technique.<sup>[10]</sup>

In our series, 9 patients with UVFs were treated using laparoscopic ureteroneocystostomy. Of these patients 5 underwent laparoscopic abdominal hysterectomy, 3 had an open abdominal hysterectomy and 1 had a vaginal hysterectomy. These patients presented themselves to us 2–8 weeks after the primary surgery with symptoms ranging from urinary incontinence in 8 patients and urosepsis in one patient. In all the cases, retrograde DJ stenting was tried initially, but because of failure in the process, laparoscopic repair was undertaken as soon as the patient condition permitted. In our series, mean operative time was 212 min (range: 170–310) and estimated blood loss was 108 ml (range: 70–150). In all the patients, DJ stent was removed after 4 weeks and voiding cystogram done at 3 months. All the cases were successfully managed.

The incidence of iatrogenic ureteral injuries in laparoscopy has increased owing to the increasing complexity of laparoscopic surgeries and retroperitoneal dissection. Gynecologic pelvic surgery is now the most common cause of iatrogenic ureteral injury. The risk of ureteric injury occurs to be the greatest during laparoscopic hysterectomy.<sup>[13]</sup> Open surgery for the reconstruction of the lower ureter has been described as a gold standard for management of lower ureteric obstruction. Although technically difficult, laparoscopic re-implantation has become a feasible option for management of such injuries. The laparoscopic Lich–Gregoir extravesical ureteroneocystostomy has the success rate 90–100%.<sup>[14]</sup> As compared to open surgery laparoscopic ureteric reimplantation has the advantage of less analgesic requirement, shorter hospital stay, and faster convalescence.<sup>[15]</sup>

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