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**ORIGINAL ARTICLE**

# Ureteric Injuries During Gynecological Procedures and Repair

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## ABSTRACT

**Introduction:** Injury to the ureter is a risk of any pelvic or abdominal surgery. The anatomic proximity of the lower urinary tract and the female reproductive system renders the ureter vulnerable to injury during obstetric and Gynecologic procedures. Ureterovaginal fistula is an uncommon but serious sequela of unrecognized distal ureteral injury during pelvic surgeries because of their common embryologic origin.

**Method:** This study involved a series of 25 patients, who developed ureterovaginal fistula after Obstetric and Gynecologic procedures managed in urology department Muhammad Islam teaching hospital Gujranwala. These patients were managed with open Ureteroneocystostomy, within 2 weeks of primary procedure. In this study we present our postoperative result of 6 months of follow up.

**Results:** All patients were cured (100%) with complete cessation of urinary fistula with complete restoration of renal function and complete restoration of urinary anatomy.

**Conclusion:** The results of our study showed that the patient with Ureteric injury should be evaluated and intervened at the earliest. Early identification and repair of ureterovaginal fistulas results in a high quality of life, less postoperative complications, and a high success rate and preservation of renal function.

**keywords:** Ureteric injury, ureterovaginal fistula.

## INTRODUCTION

Injury to the ureter is a risk of any abdominal surgery, including Laparoscopy and ureteroscopy.

Ureterovaginal fistula (UVF) is an uncommon but serious sequel of unrecognized distal ureteral injury during pelvic surgeries. Ureteral injuries can occur during general, colorectal, vascular and genitourinary endoscopic operations. However, gynecologic surgery accounts for approximately two- thirds of all ureteral injuries[1]. The estimated incidence of ureteral injury during major gynecologic surgery is 0.5% to 2.5%, and abdominal hysterectomy accounts for over half of the total[2,3]. And among the obstetric procedures, cesarean section is clearly the most common[4]

## METHODE

The is the retrospective study and includes a series of 25 cases presented with UVF consequent upon gynecologic and obstetric procedures, which were referred to Urology department Muhammad Islam teaching hospital Gujranwala. for management, between Oct 2019 to Jan 2021. Median age of the patients was 43 years. Indications for surgery, among 5 patients were Fibroid Uterus for which Elective abdominal hysterectomy was carried out and 20 patient had undergone emergency cesarean section for obstructed labor. No operation had been performed for malignant disease and no patient received prior radiotherapy. Median time since the time of injury and presentation was about 2 weeks. Predominant presenting symptoms were urinary incontinence and unexplained unilateral loin pain. Upon referral, all the patients detail history and clinical examination performed, which revealed well healed surgical scar of recent operation, renal punch positive at offended side. All patients main complaint was continuous urinary incontinence within 2 weeks of surgery. All the patients were not septic on presentation and renal function tests (S. creatinine) were normal range. Initial radiological investigation was ultrasound which showed unilateral hydronephrosis in all cases, and one of the cases showed small pelvic collection.

Cystoscopy was done in all the patients which were completely normal in all three cases (Vesicovaginal fistula was ruled out). Retrograde pyelogram studies in all showed, contrast revealing few millimeters of distal ureter and rest of the contrast would spill out of the urinary tract with no visualization of rest of the upper tract. And even a guide wire could not be negotiated beyond that point of distal ureter. Next radiological investigation was Intravenous Urogram (IVU), which showed well excreting both kidneys, with contrast reaching lower end of ureter and sudden cut off of contrast at one of the ureter between lower end of SI joint and its corresponding Vesicoureteric junction. With this investigation, the level of obstruction was well defined.

All patients were carried out with surgical exploration through a little lateral extension of existing Pfannstiel incision which was given during previous procedure. The approach was completely retroperitoneal, identifying the dilated ureter, tracing it to the level where it was ligated with a suture, possibly, mass ligated with a bleeding vessel laterally, during previous Gynecologic and Obstetric procedure. The distal most part of ureter was freed and reimplantation of ureter into the bladder was done with Double J stent to protect the anastomosis. Antireflux mechanism surgery was used in all cases. Drain at the level of reimplantation and Foley's catherization of bladder.

## RESULTS

All patients' urinary incontinence ceased within first 24 hours of surgery. Drain removed within 72 hours postoperatively. And Double J sent was removed after 4 weeks. Patients were followed up to 6 months. Upon the follow up, Intravenous Urogram was done which showed normal study in all cases, no residual hydronephrosis and no reflux.

## DISSCUSSIONS

Injury to the ureter is a known complication of pelvic or abdominal surgery, including Laparoscopy and ureteroscopy. The incidence of ureteral injury is estimated to be about 0.5%-1.5%.The most common etiology for ureterovaginal fistulae is iatrogenic surgical injury to the distal ureter, which is most commonly caused by gynecologic procedures[5].The majority of Ureterovaginal Fistulae occur during procedures for benign rather than malignant indication, hysterectomy being the most common cause.^3 Iatrogenic Ureteric injuries are a potential complication of any open or endoscopic pelvic

Operation. A review of published studies showed that during open abdominal and pelvic surgery, iatrogenic injury to ureter typically occurs during the abdominal hysterectomy (ligation of the ovarian vessels and uterine vessels), radical hysterectomy, ligation of the inferior mesenteric artery, abdominal perineal resection (division of the lateral ligaments of the rectum), mobilization of the ureter, peritonealization of the pelvic floor, and attempting to control profuse pelvic bleeding[5]. Approximately 90% of the Ureteric

injuries occur in distal portion of the ureter where it passes beneath the uterine vessel[3]. The incidence of the injury tends to be related to the difficulty of operation or inexperience the surgeon[6]. Although any gynecological procedure can cause urinary tract injury, and is more common after abdominal hysterectomy[7].

Main risk factors are enlarged uterus, pelvic adhesions and massive hemorrhage[8]. Endometriosis reduces the mobility of the ureter and distorts the normal anatomy and makes it liable to injury[9,10]. The rate of injury is much higher in malignant conditions, about 10 % after Radical hysterectomy[10]. This is because of distortion of anatomy, extensive mobilization of the ureter and bladder from cervix and vaginal wall and resulting devascularization[6]. In our present small series, none of the operation was carried out for malignant condition. The other known risk factors are pelvic irradiation and previous pelvic surgeries.

The nonspecific early signs and symptoms of ureteral injury are often masked in the immediate postoperative period by analgesics. Thus, unexplained fever with or without flank tenderness and any rise in serum creatinine level requires radiographic examination of urinary tract[11]. Any urinary incontinence, in postoperative period of any pelvic surgery should alert the surgeons about any type of fistulous communication formed with urinary tract. When a ureteral injury is suspected, the initial study should include IVU and further retrograde pyelography as indicated. Cystoscopic examination is useful to exclude any bladder injury, leading to Vesicovaginal fistula. Once the site of damage is identified with anatomic details, the management of ureteral injury should be done as soon as possible. The surgery should not be delayed unless the patient is septic, or there is extensive hematoma or abscess formation at the site of injury. In these situations, it is preferable to provide percutaneous nephrostomy drainage of the renal pelvis or retrograde ureteral stenting placement (if possible), and delay surgery until the hemorrhage or infection is resolved. The status of the ipsilateral and contralateral kidneys, the length of the injured segment, the type of the injury, the level of injury and the status of the bladder for possible use in repair must be assessed preoperatively.

The repair can be done endoscopically, open surgical methods, laparoscopically and few emerging technology. Of course, less invasive techniques are preferable. Every effort should be made to treat a UVF endourologically rather than resort to an open operation. Selzman A A et al[12], published the successful treatment of 7 patients with UVF, in whom a self retaining internal stent was placed in either a retrograde or antegrade manner for minimum of 4 to 8 weeks. Reddy C J et al[13], had similar success treating UVF by internal stenting endoscopically. Tsai C K et al.[14], treated nine patients successfully, in which they reestablished ureteral continuity using technique combining ureteroscopy and a fluoroscopically guided antegrade snare. The affected ureteral segment was then dilated and stented using reversed endopyeolotomy stent.

The well known and the most time tested method is, of course, open surgical methods. It is best to first remove any offending agent, such as clamps or ligatures to proceed with the planned operation, and then return to assess the damage. This allows for accurate evaluation of ischemic tissue and prevents undue traction on the repair. An injured ureter can be managed either with debridement followed by placement of a Double J stent and primary repair for a partial laceration or crush injury, or by using ureteroneocystostomy to repair a distal segment with complete laceration or transaction damage. Psoas hitch and a Boari bladder flap technique is recommended for a high pelvic ureteral injury with a missing or devascularized section of distal ureter. If the lesion occurs above the pelvic brim then depending on the length of the defect, the options for the repair include end to end anastomosis of ureter, transureteroureterostomy or ileal substitution [15].

Laparoscopic urologic applications offer patients minimal postoperative pain, decreased hospitalization, a shorter convalescence, and better cosmosis [16]. Modi et al. [17], treated six patients with UVF, in whom endoscopic management had failed underwent laparoscopic ureteroneocystostomy with a psoas hitch and conclude that laparoscopic ureteroneocystostomy is a safe and feasible minimally invasive option for patients with gynecologic distal ureteral injury.

The most reliable methods to avoid iatrogenic Ureteric injury are generous surgical exposure, meticulous surgical technique, and to clearly identify the ureter throughout the operative field [5]. For anticipated difficult pelvic masses, previous pelvic surgery, infection or irradiation, the use of preoperative Ureteric radiographic imaging by IVU or contrast CT has been widely advocated. However, others report that preoperative imaging did not help to prevent Ureteric damage [18,19]. And, neither Ureteric stent placement nor pelvic imaging is recommended routinely[5]. However, stent placement clearly helps to identify a Ureteric injury when it occurs [20]. Intraoperative hemorrhage is a clear and main risk factor for ureteric injury. Sudden hemorrhage should never be treated with blind cautery or suturing, but rather direct pressure, sharp dissection and exposure of the bleeding vessels, followed by accurate and precise suturing. Greater blood loss, long operative times, more transfusions, and longer hospitalization are associated with ureteric injury [21,22].

## CONCLUSIONS

Ureteral injury is not an uncommon complication of pelvic surgery. Hysterectomy is the most common cause, so early identification and management is crucial. Open surgical repair if any iatrogenic ureteral injury will continue to be most suitable option for the majority of patients.

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