

Original Research Article

Retrospective analysis of management of uretero vaginal fistula

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Abstract: Due to anatomic proximity of urogenital organs, urinary tract injury may lead to various complications including ureterovaginal fistula (UVF). We carried out a study to evaluate the etiopathogenesis, diagnostic and therapeutic aspects of ureterovaginal fistula along with outcome. The retrospective study was conducted at a tertiary care centre of eastern India, from January 2012 to January 2017. The etiopathogenesis, clinical presentation and various investigative procedures were recorded. Therapeutic procedures used to treat ureterovaginal fistula and their results were analysed. During our study period twenty eight cases of UVF were recorded. Two cases had concomitant vesicovaginal fistula (VVF) along with UVF. Out of 28, 23 cases were post hysterectomy, while 5 were due to obstetric injuries. Ten patients were treated by laparoscopic method, 12 by open repair, and 5 by endoscopic ureteric stenting and in one case percutaneous nephrostomy (PCN) resolved the fistula. Patients who required surgery were treated by ureteroneocystostomy with or without psoas hitch. Simultaneous VVF repair was done in two patients. Post-operative voiding cystogram showed no leakage in all 22 operated patients. Postoperative intravenous urography (IVU) at three months showed patent anastomosis in all but one patient. Early diagnosis and treatment of UVF produces excellent results. Endoscopic ureteric stenting should be tried in all patients, which if successful may avoid further surgery.

Keywords: Ureterovaginal fistula, ureteroscopy, ureteric stenting, percutaneous nephrostomy, ureteroneocystostomy

INTRODUCTION:

The pelvic ureter is intimately related to the female genital tract throughout its course, which makes ureter more vulnerable to injury during various gynaecological procedures and may lead to formation of UVF. Iatrogenic ureteral injury accounts for about 0.5% to 2.5% during major gynecological surgeries [1, 2]. Ureteral injuries might expose its lumen or might result in delayed necrosis of portion of ureter and subsequently urinary extravasation and fistula formation. Intra-operative diagnosis of injury leading to fistula formation detected only in about half of the cases [3, 4]. The most common presenting symptom is the onset of constant urinary incontinence one to four weeks after surgery along with normal act of micturition [5]. Diagnosis of UVF can be made by combination of history, clinical examination and appropriate radiological studies. An attempt at ureteric

stenting is always warranted whenever retrograde pyelogram (RGP) shows a UVF along with maintained continuity of ureter. Cystoscopy is must to exclude concomitant VVF. Avoidance of urosepsis and preservation of renal function needs prompt drainage of the affected upper urinary tract. When surgical reconstruction is performed it is good to perform anastomosis over ureteric stent and placement of pelvic drain to facilitate healing of anastomosis and prevention of urinoma and associated sepsis in cases of urinary leak.

MATERIAL AND METHODS:

We retrospectively reviewed data of patients who were diagnosed with ureterovaginal fistula and treated in our institute from January 2012 to January 2017. The patients were selected by nonprobability purposive sampling. During this period we reviewed

data of 28 patients who were diagnosed with ureterovaginal fistula. Two patients had concomitant vesicovaginal fistula. Possible etiology, clinical presentation of patients, investigations, operative procedures and outcomes were studied. Continuous urinary incontinence along with normal act of micturition was the chief complaint in patients with

UVF. Time of referral since the previous surgeries, which caused the ureteral injuries, varied from 1 to 8 weeks. Causative factors which lead to UVF was studied [Table-1]. Preoperative evaluation included routine investigations along with intravenous urography (IVU) and/or computed tomography (CT) urography when required [Figure-1].

Table-1: Causative factors of ureterovaginal fistula.

Causative factors, N (%)		N (%)
Gynecological procedures, 23 (82.1%)	Laparoscopic hysterectomy for benign tumors.	12(42.8 %)
	Open hysterectomy for benign tumors.	8 (28.5 %)
	Open hysterectomy for malignant tumors.	2 (7.1%)
	Vaginal hysterectomy for benign tumors	1(3.5%)
Obstetric surgeries, 5(17.8%)	Cesarean hysterectomy.	1 (3.5%)
	Cesarean section.	4 (14.2%)

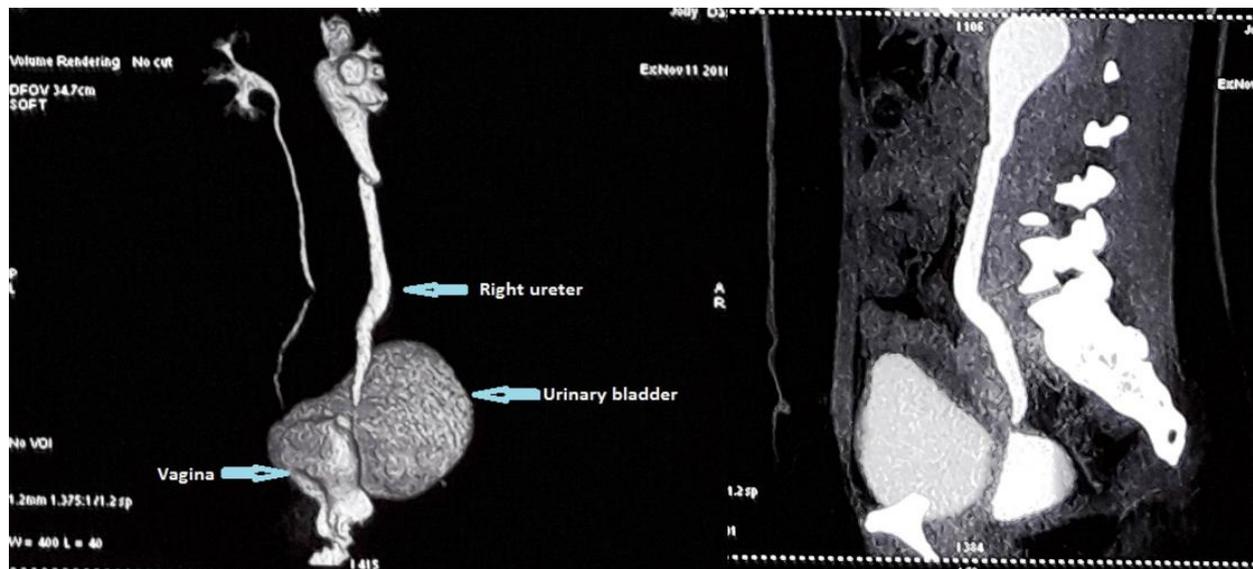


Fig 1: Computed tomography reconstructed and sagittal images depicting right ureterovaginal fistula with right side hydronephrosis and dilated ureter.

Vaginal speculum examination and cystoscopy was done to rule out concomitant VVF. RGP and antegrade study was done where PCN was present. In all patients, RGP and stenting were attempted at first. In difficult cases we used 4.5-6.5 Fr semi rigid ureteroscope (Richard Wolf @, Germany), with 3 Fr lumen of working channel compatible with 0.018 inch hydrophilic guide wire. Initially 3 Fr double J stent was placed which was later replaced by 4.5 Fr. Ureteric stenting was successful in eight patients. On follow up out of eight, in five patients successful ureteric stenting resulted in fistula closure. In seven patients, preoperative PCN was done because of moderate to gross hydronephrosis. On follow up nephrostogram

ureteral continuity was found patent in one of the patient. After failure of the endoscopic urological procedures, ureteric reimplantation was performed in all as soon as possible. Sterile urine was confirmed before surgery. In twelve patients fistula was treated by open ureteric re-implantation (Figure-2A) whereas ten patients underwent laparoscopic ureteric re-implantation (Figure-2B). In all patients modified Lich-Gregoir technique of extra vesical ureteral reimplantation was done, ureteric stent was used in all and whenever required psoas hitch was performed to bridge the gap between ureter and bladder [6]. Two of our patients presented with concomitant VVF and in them both VVF repair and ureteroneocystostomy was

done in single sitting. In all patients pelvic drain was placed. The drain was removed once the output was below 40 ml/day. Patients were discharged after the removal of the drain. Per urethral catheter was removed on the 10-14th postoperative day following cystogram, if there was no suspicion of leakage. Ureteric stent was removed after 6 weeks postoperatively. In patients who

were treated primarily via double J stent, stent was removed after 3 months. Complications were recorded according to the Clavien-Dindo grading system for the classification of surgical complications [7]. At 3 months of postoperative period, voiding cystogram and IVU were done [Figure-2C]. Further follow-up was done by ultrasonography at 6 monthly intervals.



Fig 2: A. Intraoperative image depicting open ureteric re-implantation over ureteric stent. B. Intraoperative image depicting laparoscopic psoas hitch ureteric re-implantation over ureteric stent. C. Postoperative intravenous pyelogram film of one of the patient post psoas hitch ureteric reimplantation, depicting patent anastomosis.

RESULTS:

To summarize, out of eight patients in whom ureteric stenting was successful, on follow up stenting alone resulted in fistula closure in five patients (success-70%). In seven patients in whom PCN was

done, on follow up fistula closed spontaneously in one patient. Finally twenty two patients underwent surgery (10 laparoscopic and 12 by open repair) and the procedure was successfully completed in all patients [Table-2].

Table-2: Different modalities that were used to treat ureterovaginal fistula.

Modality used to treat ureterovaginal fistula.	No. of cases, N (%) Total-28
Open ureteroneo cystostomy.	10 (35.7%)
Laparoscopic ureteroneo cystostomy.	10 (35.7%)
Open vesico aginal fistula repair with ureteroneocystostomy.	2 (7.1%)
Endoscopic ureteral stenting.	5 (17.8%)
Percutaneous nephrostomy.	1 (3.57%)

The mean interval between ureteral injury and repair was 46 days (range 21–82 days). The mean age was 34 years (range 21–48). Average hospital stay was 5.7 days. UVF was unilateral in all but one patient. Follow-up time was from 3 to 36 months. The DJ stent was removed after 6 weeks following surgical procedure in all patients except one, which was removed 4 weeks following repair due to recurrent pyelonephritis. Postoperative IVU was performed after 3 months, which showed patent anastomosis in all patients except for one who had no visualization of the ipsilateral renal moiety. Voiding cystogram done at 3 months showed no leakage in any patient but grade-I

reflux was observed in 2 patients. In the postoperative period, one patient had recurrent ipsilateral pyelonephritis, 2 weeks after surgery. In this patient, conservative treatment failed and the stent was removed 4 weeks after repair (Grade-IIIa complication, Clavien-Dindo system). Follow-up IVU at 3 months showed no visualization of repaired moiety of that patient and subsequent di-ethylene tri-amine penta-acetic acid (DTPA) renal scan showed poor function. Two patients had febrile urinary tract infection (UTI) (Grade-II, Clavien-Dindo system). Two patients had wound infection (Grade-I Clavien-Dindo system). Apart from these, no major complications were observed.

DISCUSSION:

Iatrogenic injury to ureter may lead to ureterovaginal fistula, which are most common during gynaecological procedures [1]. Pelvic portion of ureter or lower ureter is intimately related to the female genital tract throughout its course, as it passes lateral to uterosacral ligament, cervix and fornix of vagina. Because of this anatomical proximity lower ureter is the most common site of injury during various gynaecological procedures. The mechanism of injury resulting in iatrogenic postoperative ureterovaginal fistulae includes ureteral laceration, transection, crush injury, partial or complete suture ligation, and, finally, ischemia caused by operative devitalisation of the ureteral vascular supply. Urinary extravasation and subsequent extension along non anatomical planes created during surgery may lead to ureterovaginal fistula formation. During major gynaecological surgeries, the incidence of iatrogenic ureteral injury is estimated to be about 0.5% to 2.5% [1, 2]. 0.2% incidence of ureteral injury has been found associated with hysterectomy for benign diseases [8]. In cases of radical hysterectomy, incidence of immediate and delayed ureteral injury were found to be 1.3% and 2.4% respectively [9]. In our study we found more cases of ureteric injuries during laparoscopic surgery compared to open surgery. Among the obstetric procedures, caesarean section is the most common surgery leading to ureteric injury [10]. Unfortunately, intraoperative diagnosis of a genitourinary or GI injury is made in only about half of the cases that result in fistula [3, 4]. Previous pelvic surgeries, irradiation, obesity are few of the factors which may increase surgery duration and chances of ureteric injury. Other causes of UVF include radiation therapy, advanced malignant diseases, pelvic trauma or chronic inflammatory diseases of pelvic area [11]. In developing countries most of the unfortunate victims of this complication pass through a long period of continuous urinary leakage and are under great stress which leads to social and psychological problems. Patient may present with flank pain, urinary tract infection due to formation of urinoma or obstruction to urinary drainage [12]. However the most common presenting symptom is the onset of constant urinary incontinence 1 to 4 weeks after surgery along with normal act of micturition [5]. Relevant history, physical examination and appropriate radiological studies when used in combination, most of the UVF can be diagnosed and confirmed. Imaging modalities include IVU, CT urography, retrograde pyelography [5]. On imaging presence of normal drainage of urine from upper urinary tract along with normal ureter essentially rules out a ureteral injury, however, the finding of partial

ureteral obstruction associated with clinical finding of urinary drainage from the vagina strongly suggests the presence of an ureterovaginal fistula.

Cystoscopic evaluation and upper tract evaluation is mandatory in all cases of genitourinary fistula as 12% of established cases of VVF have an associated ureteral injury or ureterovaginal fistula [13, 14]. In our cohort out of 28 cases, two cases found to have VVF along with ureterovaginal fistula. Radiologic imaging such as IVU or CT scan usually demonstrates some degree of ureteral obstruction with ureteral dilation [15]. Antegrade pyelography after nephrostomy tube decompression of a partially obstructed ureter may be associated with similar findings. Resolution of urinary leakage, prevention of urinary tract infection and preservation of renal function is the management goal in these patients. This can be done by prompt drainage of the affected upper urinary tract with ureteric stenting or with PCN [16]. A retrograde pyelogram is helpful to diagnose ureteral injury and the placement of ureteral stent could be attempted at the same time [17]. Endoscopic ureteric stenting should be tried as soon as possible after diagnosis of ureterovaginal fistula which when successful may prevent surgery and associated morbidity. Success of closure of fistula after stenting increases when there is maintained ureteral continuity along with normal appearing ureter distal to fistula. According to various literatures success rate of these procedures vary from 6% to 100%, although the overall success rate in most of the studies is around 50% [11, 18]. In our cohort we found 70% success in fistula closure when stenting was successful. Primary treatment with percutaneous nephrostomy has been reported to be less effective in the treatment of ureterovaginal fistula. Schmeller *et al.*; reported 11 patients with ureterovaginal fistulas treated only by percutaneous nephrostomy, with 6 (55%) having persistent fistulas, while 2 (18%) having strictures [19]. In our series, of the seven patients treated initially by percutaneous nephrostomy alone, only one patient showed spontaneous fistula closure (success rate of 14%). We found that results of early surgical intervention are excellent without increase in morbidity and recent literature also suggests the same [3]. Surgical procedures include ureteroneo cystotomy which may require psoas hitch or rarely boari flap when the gap between ureter and bladder is more. Trans-vaginal repair of UVF is also possible when abdominal access is problematic [20]. Ureteroneocystostomy either laparoscopic or by open method has excellent results with minimal complications. Only in rare cases transuretero ureterostomy, ileal substitution of the ureter or renal auto-transplantation is required. However, we

emphasize on improvement in obstetric care, early diagnosis of ureteric injuries, and whenever possible minimal invasive treatment in form of ureteric stenting to prevent morbidity of surgery and delay in treatment.

CONCLUSION:

Undiagnosed ureteric injuries during various gynecologic and other pelvic surgeries may lead to ureterovaginal fistula. These can be prevented by improvement in obstetric care and profound training in various female pelvic surgeries. In experienced hands and with proper instruments endoscopic ureteric stenting can be regarded as one of the most effective minimally invasive approach to manage ureterovaginal fistula.

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