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POST-HYSTERECTOMY URETERIC INJURIES: PRESENTATION AND OUTCOME OF MANAGEMENT IN A TERTIARY CARE CENTRE

Urology

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ABSTRACT

The ureter is especially susceptible to injury during vascular, gynecologic, urologic, and colonic operations. Total abdominal hysterectomy is the operation most commonly responsible for a ureteral injury. Many ureteral injuries are likely due to technical or iatrogenic factors. The morbidity associated with such injury may be serious, resulting in increased hospital stay, compromise of the original surgical outcome, secondary invasive interventions, reoperation, potential loss of renal function, and deterioration of the patient's quality of life. Endourological techniques are highly successful in treating posthysterectomy ureteral injuries

Methods: This study involved patients referred and managed in the department of urology for posthysterectomy ureteric injuries for benign conditions during 2 years from March 2017 to February 2019. During this period, a total of 14 patients with 16 ureteric injuries were treated.

Results: There were 16 iatrogenic ureteric injuries in 14 patients over a 2-year period. Hysterectomy was the cause of injury in all the cases, among whom 12 were abdominal, and 2 were vaginal hysterectomies. Surgical procedures undertaken were JJ stenting, ureteric reimplantation & Laparotomy with bladder injury repair with bilateral ureteric reimplantation.

Conclusion: Posthysterectomy ureteric injury is not an uncommon complication of pelvic surgery. Simple hysterectomy for benign diseases is the most common cause of injury. The patient with ureteric injury should be evaluated and intervened at the earliest. Patients presenting early, within 2 weeks after hysterectomy have higher chances of success with endourological procedures, obviating the need for open surgery.

KEYWORDS

post-hysterectomy, ureter injury, endo-urological repair

INTRODUCTION

Injury to the ureter is a risk of any pelvic or abdominal surgery, including laparoscopy and ureteroscopy. The ureter is especially susceptible to injury during vascular, gynecologic, urologic, and colonic operations. Gynecological surgery remains the most common cause of ureteral injuries; total abdominal hysterectomy is the operation most commonly responsible for a ureteral injury.[1] Other rare causes are secondary to cervicocystopexies both pubic or vaginal, ovarian surgeries, and uterine aspiration.[2] The overall incidence of ureteral injury varies between 0.5% and 10%. Damage to the ureter after external violence is quite rare, occurring in <4% of all penetrating and < 1% of all cases of blunt trauma. Analysis of 13 published studies concluded that the following procedures contribute to iatrogenic ureteral injuries: hysterectomy (54%), colorectal surgery (14%), pelvic procedures such as ovarian tumor removal (8%), transabdominal urethropexy (8%), and abdominal vascular surgery (6%). The total incidence of ureteral injury after gynecologic surgery is reported to be 0.5% to 1.5%, and after abdominoperineal colon resection, it ranges from 0.3% to 5.7%. Currently, the reported rate of ureteral injury varies between 0.5% (experienced surgeons) and 14% (inexperienced surgeons) after laparoscopic hysterectomy presently, laparoscopic assisted vaginal hysterectomy is the most common cause of iatrogenic ureteric injury worldwide, however, in developing, countries open gynecological surgeries still remain the most common cause. Risk factors for the development of ureterovaginal fistulae include endometriosis, obesity, pelvic inflammatory disease, as well as radiation therapy and pelvic malignancy. Nevertheless, Symmonds has noted that the patient with a ureteral injury following gynecologic surgery is typically one who had an uncomplicated, technically easy hysterectomy for the minimal disease. Thus, except for those oncologic cases where a segment of ureter is deliberately excised, many ureteral injuries are likely due to technical or iatrogenic factors.[3] The morbidity associated with such injury may be serious, resulting in increased hospital stay, compromise of the original surgical outcome, secondary invasive interventions, reoperation, potential loss of renal function, and deterioration of the patient's quality of life. To decrease the incidence of iatrogenic ureteral injury, a sound knowledge of abdominal and pelvic anatomy is essential. Loss of continuity of the ureter may result from division or laceration, or from ischemic necrosis related to clamping, ligation, or damage to the blood supply of the ureter.[4] Traditionally, most ureterovaginal fistulas have been repaired by ureteroneocystostomy.[5] Endourological techniques are highly successful in treating posthysterectomy ureteral injuries.[6]

MATERIAL AND METHODS

This study involved patients referred and managed in the department of urology for posthysterectomy ureteric injuries for benign conditions during 2 years from March 2017 to February 2019. During this period, a total of 14 patients with 16 ureteric injuries were treated. The mean age was 38.5 years (24–60-year-old).

All 14 patients suspected to have genitourinary injuries underwent, pretreatment evaluations including history and physical examination. Information was sought on, primary surgery done, intraoperative difficulties and postoperative complications. The various investigations done included: ultrasound of the urinary tract, serum creatinine, urine culture and sensitivity, intravenous urogram (IVU)/computed tomography (CT) scan, cystoscopy and retrograde pyelography (RGP) [Figures [Figures 1–7].

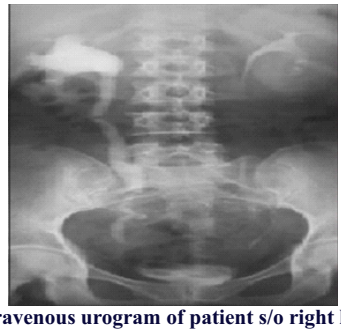

Figure 1. Intravenous urogram of patient s/o right lower ureteric injury

Figure 2. Intravenous urogram of patient with left ureterovaginal fistula post-hysterectomy showing leak

Figure 3. Retrograde pyelogram showing in initial difficulty in passing guidewire in patient with left ureterovaginal fistula

Figure 4. After manipulation of scope guide wire passed across the stricture

Figure 5. Left nephrostogram in patient in whom percutaneous nephrostomy was done for pyonephrosis s/o left ureterovesicular junction stricture

Figure 6. Postoperative intravenous urogram of patient who underwent laparotomy and B/l ureteric reimplantation

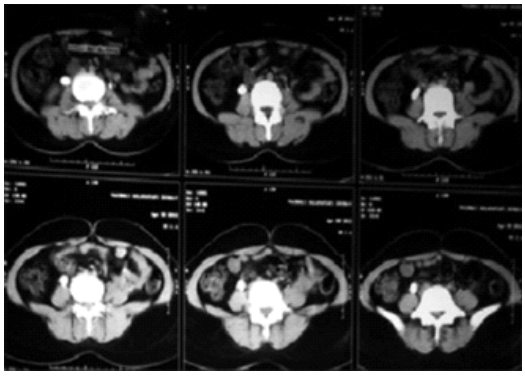

Figure 7. Computed tomography kidney, ureter, bladder of patient with right hydroureter and right ureterovaginal fistula

Table 1. Clinical and radiological findings

S.No	Clinical presentation	Radiological Findings
1	Anuria with b/l flank pain after abdominal hysterectomy	USG abd- b/l altered echogenicity with mild HUN
2	Urinary incontinence with leak per vagina after 11 days of abdominal hysterectomy	IVU- contrast in the lt distal ureter with abrupt cut off with collection posterosuperior to urinary bladder
3	Lt flank pain, vomiting, fever with chills h/o abdominal hysterectomy 2 weeks back	USG- Moderate HDN, collection around Lt paracolic gutter Lt PCN & Nephrostogram- complete obstruction at the level of lt lower ureter
4	Leak per vagina after vaginal hysterectomy 1 months back	USG- Lt HDUN IVU-Lt HDUN till bladder base
5	Urinary leak after 2 weeks of abdominal hysterectomy	USG- Rt HDUN with diffuse decreased cortical echogenecity IVU-Rt HDUN till lower end with obstruction at S1, S2
6	Pain Rt flank with h/o abdominal hysterectomy 45 days back	IVU-Rt HDUN due to lower ureteric obstruction
7	Pain Rt flank with fever,h/o vaginal hysterectomy 10 days back	USG- Rt HDN, Rt perinephric inflammatory mass or abscess
8	Continuous urinary leak, h/o abdominal hysterectomy 1 weeks back	CT- Rt HDUN with ureterovaginal fistula
9	Pain Lt flank with h/o abdominal hysterectomy 02 days back	USG-Lt HDUN due to lower ureteric obstruction

10	Pain Rt flank with h/o abdominal hysterectomy 04 days back	USG-Rt HDUN due to lower ureteric obstruction
11	Pain Lt flank & urinary incontinence with h/o abdominal hysterectomy 10 days back	USG-Lt HDUN due to lower ureteric obstruction
12	Anuria with b/l flank pain after vaginal hysterectomy o4 days back	USG-b/l HDUN with increased cortical echogenicity
13	Pain Rt flank with h/o abdominal hysterectomy 04 days back	USG-Rt HDUN due to lower ureteric obstruction
14	Pain lt flank with h/o abdominal hysterectomy 04 days back	USG-Lt HDUN due to lower ureteric obstruction

USG: Ultrasonography, HD: Hydronephrosis, HDUN: Hydroureteronephrosis, b/I: Bilateral, IVU: Intravenous urogram, PCS: Pelvicalyceal system, PCN: Percutaneous nephrostomy, VUJ: Vesicoureteral junction, HDN: Hydronephrosis, HN: Hydronephrosis, CT: Computed tomography

Table 2. Surgical procedure undertaken

Surgical management	Number of affected ureters	Percentage
DJ stenting	11	68.75%
Ureteric reimplantation	03	18.75%
Laparotomy with bladder injury repair with b/l ureteric reimplantation	02	12.5%

DISCUSSION

Injury to ureter is a known complication of pelvic or abdominal surgery, including laparoscopy and ureteroscopy.[7] The incidence of iatrogenic ureteral injury during major gynecologic surgery is estimated to be about 0.5%–1.5%. The most common etiology for ureterovaginal fistulae is a surgical injury to the distal ureter, which is most commonly caused by gynecologic procedures. The vast majority of ureterovaginal fistulae occur during procedures for benign rather than malignant indications, hysterectomy being the most common cause.[3] Iatrogenic ureteric injuries have increased markedly during the past two decades. Gynecological laparoscopic procedures account for more than half of the injuries, and the most common location is the lower ureter.[8] The injury or fistula may become apparent either immediately or much more commonly, in a delayed fashion several days to weeks after surgery. Constitutional symptoms may result from hydronephrosis secondary to ureteral obstruction or urinary extravasation into the retroperitoneal space. The clinical history of ureterovaginal fistula is usually straightforward. Typically, a gynecologic procedure, such as hysterectomy, is involved. Poor intraoperative exposures, coupled with heavy bleeding at the operative site, are often the risk factors. The presence of normal upper tracts on imaging essentially rules out ureteral injury; however, the finding of partial ureteral obstruction associated with urinary leakage from the vagina strongly suggests the presence of an ureterovaginal fistula.[9] Various investigations such as USG abdomen, three gauze test, IVU, Cystoscopy and RGP, CT urography, and magnetic resonance (MR) urography can be used to confirm the clinical diagnosis. USG abdomen shows hydroureteronephrosis/ pyonephrosis. Three gauze test differentiates vesicovaginal fistula (VVF), ureterovaginal fistula, and stress incontinence. In this test, 100 ml of 1:5 diluted methylene blue solution is instilled into the bladder through an urethral catheter after placing three dry sterile swabs in the upper, middle, and lower third of the vagina. The patient is then asked to walk around for 10 min, after which the swabs are removed and examined. If the lower swab is wet and stained blue, it indicates stress incontinence. If the upper swabs are wet and blue, that indicates VVF, and if the upper swabs are wet but not stained blue, it is an indication of ureterovaginal fistula. IVU demonstrates ureteric injury and hydroureteronephrosis, with cutoff of the contrast at the injured site of the ureter and contrast leak. CT and MR urography are used increasingly for detection of ureteric injuries and demonstrates hydroureteronephrosis due to ureteric stricture and ureterovaginal fistula. An RGP is helpful to diagnose ureteral injury, and the placement of ureteral stent could be attempted at the same time.[10] In our series, open hysterectomy done for benign diseases was the cause of ureteric injury in all the patients. The presenting symptoms were leak per vagina, abdominal pain, fever, and anuria. JJ stenting was possible in patients who presented early (<2 weeks). Leak resolved completely in whom stenting was possible (100% success in all ten patients). In those patients where stenting was not possible underwent ureteric reimplantation because of failed antegrade stenting or failure to do PCN. If we look into the literature [Table 3] Selzman *et al*. reported that ureterovaginal fistulas resolved in all seven patients treated with an internal ureteral stent.[6] Al-Awadi *et al*. reported a success rate of 59.4% with "JJ" stent insertion in their series of 75 patients with ureteral injuries.[11] A combined ureteroscopic and fluoroscopic technique to re-establish ureteral integrity has been reported to be a successful treatment.[15] Early intervention is recommended in the treatment of the iatrogenic ureterovaginal fistula, to minimize morbidity, discomfort, and cost.[16] JJ stenting should be attempted in all patients presenting with ureteric injuries. If unsuccessful, these are the candidates for PCN or ureteric reimplantation depending on the clinical situation.

Table 3. Literature review

Study	Number of patients	Success rate with JJ stents %
Selzman *etal* [6]	07	100
Al-Awadi *etal* [11]	75	59.4
Turner *etal* [12]	10	50
Koukouras *etal* [13]	25	56
Ku *etal* [14]	17	64.7
Our study	14	71.4

CONCLUSION

Posthysterectomy ureteric injury is not an uncommon complication of pelvic surgery. Simple hysterectomy for benign diseases is the most common cause of injury. The patient with ureteric injury should be evaluated and intervened at the earliest. Patients presenting early, within 2 weeks after hysterectomy have higher chances of success with endourological procedures, obviating the need for open surgery.

REFERENCES

1. McVary KT, Marshall FF. In: Urinary fistulae. Adult and Pediatric Urology. 4th ed. Gillenwater JY, editor. Philadelphia: Lippincott Williams and Wilkins; 2002. pp. 1271–95.
2. Mteta KA, Mbwambo J, Mvungi M. Iatrogenic ureteric and bladder injuries in obstetric and gynaecologic surgeries. East Afr Med J. 2006;83:79–85.
3. Rovner ES. In: Urinary tract fistulae. Campbell-Walsh Urology. 10th ed. Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA, editors. Philadelphia: Elsevier Saunders; 2012. pp. 2242–6.
4. Ross G., Jr . In: Ureterovaginal fistula. Current Urologic Therapy. 3rd ed. Seidman EJ, Hannon PM, editors. Philadelphia: W. B. Saunders; 1994. pp. 242–5.
5. Mandal AK, Sharma SK, Vaidyanathan S, Goswami AK. Ureterovaginal fistula: Summary of 18 years' experience. Br J Urol. 1990;65:453–6.
6. Selzman AA, Spirnak JP, Kursh ED. The changing management of ureterovaginal fistulas. J Urol. 1995;153(3 Pt 1):626–8.
7. Watterson JD, Mahoney JE, Futter NG, Gaffield J. Iatrogenic ureteric injuries: Approaches to etiology and management. Can J Surg. 1998;41:379–82.
8. Parpala-Spårman T, Paananen I, Santala M, Ohtonen P, Hellström P. Increasing numbers of ureteric injuries after the introduction of laparoscopic surgery. Scand J Urol Nephrol.2008;42:422–7.
9. Gerber GS, Schoenberg HW. Female urinary tract fistulas. J Urol. 1993;149:229–36.
10. Flynn JT, Tiptaft RC, Woodhouse CR, Paris AM, Blandy JP. The early and aggressive repair of iatrogenic ureteric injuries. Br J Urol. 1979;51:454–7.
11. Al-Awadi K, Kehinde EO, Al-Hunayan A, Al-Khayat A. Iatrogenic ureteric injuries: Incidence, aetiological factors and the effect of early management on subsequent outcome. Int Urol Nephrol. 2005;37:235–41.
12. Turner WH, Cranston DW, Davies AH, Fellows GJ, Smith JC. Double J stents in the treatment of gynaecological injury to the ureter. J R Soc Med. 1990;83:623–4.
13. Koukouras D, Petsas T, Liatsikos E, Kallidonis P, Sdralis EK, Adonakis G, et al. Percutaneous minimally invasive management of iatrogenic ureteral injuries. J Endourol.2010;24:1921–7.
14. Ku JH, Kim ME, Jeon YS, Lee NK, Park YH. Minimally invasive management of ureteral injuries recognized late after obstetric and gynaecologic surgery. Injury. 2003;34:480–3.
15. Beaghler MA, Taylor FC, McLaughlin KP. A combined antegrade and retrograde technique for reestablishing ureteral continuity. Tech Urol. 1997;3:44–8.
16. Elabd S, Ghoniem G, Elsharaby M, Emran M, Elgamasy A, Felfela T, et al. Use of endoscopy in the management of postoperative ureterovaginal fistula. Int Urogynecol J Pelvic Floor Dysfunct. 1997;8:185–90.