Original Article

Management of Iatrogenic Ureteral Injuries Analysis Report at Urology Department, Nishtar Hospital Multan

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ABSTRACT

Objective: To review the etiology, diagnosis and treatment of iatrogenic ureteral injuries.

Place and Duration of study: The study was carried out at Department of Urology, Nishtar Hospital, Multan from December 2007 to December 2010.

Patients and methods: A total of 24 adult patients were included in the study. All patients were evaluated in terms of clinical presentation, physical examination and investigations. Different techniques including open repair and endoscopic maneuvers were performed as treatment modalities for ureteric injuries.

Results:- Out of 24 patients, 13 patients were female and 11 patients were males. Age of patients ranged from 20 years to 60 years. Out of 13 female patients, eleven developed lower ureteral injuries secondary to obstetrics and gynaecological procedures. Remaining two female patients had ureteral injuries following ureteroscopy for lower ureteral stones.

Eleven female patients had different symptoms including partial or total incontinence of urine, flank pain, symptoms of UTI, high grade fever, sepsis, anuria and urinary leakage. Patients who underwent URS or URS in situ lithotripsy had lower ureteral stones. Most of them had lumbar pain, symptoms of UTI, frequency, urgency and difficulty in micturation. Two patients had retention of urine for which they were catheterized. One had broken segment of DJ stent. Different techniques were employed, ureter re-implantation for distal ureteral injuries was performed in ten patients. For minor lacerations and suspected urinary leakage following URS for stone disintegration at lower ureter, ureteric catheter or DJ stent was placed.

Conclusion: Iatrogenic uretral injuries are rare following gynaecological, obstetrical and endourological procedures but are liable to occur due to inherent anatomic factors. Prompt diagnosis and institution of appropriate corrective surgical procedures often result satisfactory outcome.

Key Words: Iatrogenic, URS, Insitu lithotripsy,

INTRODUCTION

Ureteric injury is one of the most serious complications of gynaecological operations in the pelvis. It has a frequency ranging from 0.5% to 1.5% for all major pelvic operations.[1] Some other studies report gynaecological surgery as the traditional cause of more than 50% of iatrogenic injuries, followed by general surgical procedures.[2]

Recent data suggests that with the introduction of laparoscopic hysterectomy, ureteric injury rate has doubled from 0.3% to 0.7% since abandoning staples in favour of bipolar diathermy to secure uterine vascular pedicles.[3] However in the last ten to fifteen years, with increase in complex minimally invasive endoscopic procedures being carried out by urologists for pyelo-ureteric disorders, for example URS + Dormia basket, disintegration of ureteric calculi now account for most of ureteric injuries.[4] Most ureteric injuries are unsuspected and diagnosed postoperatively. Ureteral injuries consequent to gynaecologic surgery if diagnosed intraoperatively, decrease postoperative morbidity, minimize loss of renal function and reduce subsequent need for nephrectomy. Early recognition also decreases the incidence of ureterovaginal fistula as compared to postoperative diagnosis with delayed repair.[5]We report our experience in the management of twenty six iatrogenic ureteric injuries over three years period. We analysed the etiology, types of ureteric injuries and management on the final outcome of the injury.

PATIENTS AND METHODS

The present study includes twenty four patients treated for ureteric injuries due to variety of reasons, gynaecological, obstetric and following ureteroscopy for stone removal. The patients who had gynaecological surgery(Hysterectomy) for pelvic malignancy, previous pelvic irradiation and pelvic inflammatory disease were not included in the study. Median age of the patients was 35(Range 20-60) years.

About 11 patients were referred from peripheral hospitals. Nine of them were operated upon by qualified surgeons while two of them by inexperienced surgeons. Almost all patients underwent detailed history, physical examination, complete urine examination, urine culture and sensitivity, complete blood count, blood urea, serum creatinine and ultrasonography. Some patients also underwent intravenous urography. Antegrade pyelography and radioisotope study was carried out when indicated. Mean time since injury and presentation was about 3 weeks(Range 1day-1year).

Six patients had ureterovaginal fistula while two patients had complete bilateral ureteric obstruction. The cause of bilateral ureteric obstruction was found to be suture ligation.

Six patients developed mucosal injuries while four had ureteral perforations (Partial or complete). False passage was found in four patients. In one petient, ureteric avulsion occurred in an attempt to disintegrate lower ureteral calculi with in situ lithotripsy. Six patients developed mucosal injuries and false passages were seen in four patients. Four patients had ureteral perofrations (partial or complete). These injuries were recognized intraoperatively. In cases of mucosal injuries, 4 – 6 Fr ureteric catheter was inserted to rest the ureter and facilitate healing. These catheters were removed 2 – 3 days later in the ward. One patient with small mucosal injury did not require urological intervention and was treated conservatively. In patients with ureteric perforations, DJ stent was placed for about one month and then removed. In one patient, ureteric avulsion occurred following URS that was recognized and ureteroneocystostomy was carried out at the same time. Six patients who had ureterovaginal fistula underwent ureteroneocystostomy with stent insertion to promote healing and secure patency. In three lower ureteric injuries where segment of lower ureter was nonviable, ureteroneocystostomy with Boari flap formation was undertaken. One patient with partial urinary incontinence, only stent was placed and fistula resolved within four weeks. One patient developing unilateral ureteric ligation of ureter underwent PCN.

Two patients referred from peripheral hospitals had bilateral ligation of lower ureter and they presented with anuria. One patient was stable enough to proceed for exploration and ureteroneocystostomy was performed with Psoas hitch to ensure tension free anastomosis. The other patient who had severe renal impairment due to ureteric obstruction was hemodialysed and later on ureteroneocystostomy was performed.

RESULTS

There were twenty six iartrogenic ureteral injuries in 24 patients during the three years period. The majority of injuries were caused by urological procedures especially lithoclastic disintegration of ureteric calculi and other ureteroscopic procedures. Table 1 shows the causes of iatrogenic injuries in this series. Eleven patients developed ureteric injuries consequent to gynaecological and obstetrical surgery. Two patients on ultrasonography and clinical assessment had bilateral ureteric obstruction. Table 2 shows the types of ureteric injuries encountered. One serious complication occurred was uereteric avulsion that required reconstructive surgery i.e. ureteroneocystostomy with Boari flap formation. Major reconstructive treatment offered included ureteroneocystostomy with Psoas hitch in eight lower ureteric injuries. In three patients, Boari flap formation was carried out. One patient showed spontaneous resolution of lower ureteric obstruction on PCN contrast study. Ureteral minor injuries including mucosal, small perforations and false passages were managed by DJ stent insertion or ureteric catheter placement. In follow up of these patients, no residual hydroureter and hydronephrosis were seen. In one patient with UVF, there was continuous leakage of urine after uretero-neocystostomy. So, re-exploration and Boari flap formation was undertaken. Two patients had respiratory tract infection that settled with treatment. Table 3 & 4 summarize the treatment and outcome of treatment of the ureteric injuries.

Table 1: Causes of iatrogenic Ureteral injuries

Types	Number	Percentage
Obstetrics and gynaecologic surgery	**11**	**42%**
Abdominal Hysterectomy	08	
Ceasarian Section	03	
Urological Surgery	**15**	**58%**
Lithoclast	07	
Ureteroscopy	03	
Dormia Basket	03	
Insertion of "J" stent	02	

Table 2: Types of Ureteric injuries

Nature	Number	Percentage
Injury to mucosa	06	23.0%
Perforations (complete or partial)	04	15.5%
Ureteric avulsion	01	4.0%
False passages	04	15.5%
Ureterovaginal fistula	06	23.0%
Ureteric ligation	05	19.0%

Table 3: Treatment of Iatrogenic Ureteral Injuries

Treatment	Number	Percentage
DJ stent insertion/ureteric catheter placement	13	50%
PCN	01	4%
Psoas hitch	08	31%
Boari Flap	03	11%
Spontaneous resolution	01	04%
Total	26	100%

Table 4: Outcome of Management of Ureteric Injuries

Outcome	Number	Percentage
Successful resolution	25	96.2%
Ureteric stricture	01	3.8%

DISCUSSION

Ureteric injuries are among the most important complications associated with the major pelvic gynecologic surgery. Most of these injuries occur in distal portion of the ureter where it passes beneath the uterine vessels. Other common sites are the area of ureterovesical junction and the base of infundibulo-pelvic ligament[6]. Any gynaecological procedure can cause ureteric injury but abdominal hysterectomy is the most common procedure associated with ureteric injury. The rate of bilateral ureteric injury is increased when it is performed for malignancy, conditions causing induration and distortion of pelvic anatomy for example huge fibroid or previous pelvic inflammatory disease[7].

In the present study ureteric injuries occurred consequent to gynaecological surgery done for benign conditions. Eleven patients were referred from peripheral hospitals where surgery had been performed by inexperienced surgeons. Ureteric injury following gynaecological procedures is due to entrapment or ligation of the ureter by a suture. Intra-operative bleeding with difficult hemostasis is pre-dominant risk factor contributing to the injuries. However in 4 out of 11 cases, referring gynaecologists described the operation as routine. This is consistent with the literature where half of the injuries had no identifiable pre-disposing factors[8]. Some patients present with pain, fever and vaginal discharge [9]. Patients who develop bilateral ureteric injuries present with oliguria or anuria. In the present study, pre-dominant symptoms were urinary incontinence, loin pain and anuria in patients complicated from gynaecological surgery. Ureteric injury may be recognized intra-operatively. Short defects may be managed by end to end anastomosis. For larger defects ureteroneocystostomy with stent placement gives good results. Sometimes Boari flap can be used to bring the bladder close to the cut end of the ureter [10]. Psoas hitch procedure can be used where flap is not rotated. These bladder reconstructions help to achieve tension free ureteroneocystostomy.

Intra-operative recognition and repair of ureteric injury is paramount to avoid and repair the permanent damage associated with unrecognized injuries but most of the injuries are unsuspected and diagnosed post-operatively [11]. In the present study, the diagnosis was made post-operatively. If the diagnosis is made post-operatively, then either endoscopic or open surgical procedure can be carried out. If the extent of injury is in question or for minor injury, retrograde ureteric stents can be placed. Other endoscopic procedures include balloon dilatation, endo-uretrotomy with cold knife or hot electrode. When a stent placement is possible, as many as 73% of the patients will not require open surgery [12]. Some authors suggest stent placement or percutaneous nephrostomy as the first line of therapy [13] , others recommend open repair. Where open surgery is needed, the timing of repair has been debatable. Recent studies suggest similar outcome after immediate and delayed repairs[14].

Prevention of the ureteric injury should be the primary aim during major pelvic surgery. All necessary precautions should be undertaken, including careful dissection and recognition of the ureters[15]. Some investigators have suggested the role of prophylactic ureteric stenting but studies fail to show decreased incidence of ureteric injuries. In some patients early identification of ureteric injury is possible with use of stents. According to recent data, ureteric injuries also result at laparoscopic hysterectomy due to surgical inexperience and technique development[16]. In Codrane review, it was found that ureteric injury rate was higher with laparoscopic hysterectomy than the abdominal hysterectomy[17].

With greater use of the minimally invasive techniques in urology, the incidence of ureteric injury has increased. This view has been confirmed by findings in this study. Ureteroscopy is now-a-days one of the techniques most widely used for upper tract pathology. Studies show different ureteric injuries like mucosal injury, false passages, bleeding, ureteral perforations and ureteric avulsion as intra-operative complications[18]. In the present study, these injuries were also seen as intraoperative complications following lithoclast disintegeration of ureteral stones, URS as diagnostic procedure and stent insertion.

Treatment options for ureteric injuries in this series included ureteric catheter placement or J stent insertion in cases of ureteric mucosal injury, ureteric perforations and false passages. As reported by others and our experience in this study, most of these injuries healed without any serious sequelae[19].

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