



Research Article

IATROGENIC UROLOGIC INJURIES IN PELVIC SURGERIES: A RETROSPECTIVE STUDY

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ARTICLE INFO

Article History:

Received 4th July, 2018

Received in revised form 25th August, 2018

Accepted 23rd September, 2018

Published online 28th October, 2018

Key words:

Ureteric and bladder injuries, Iatrogenic, Abdomino-pelvic operations, Management, Outcomes.

ABSTRACT

Purpose: To study the incidence of ureter & bladder injuries detected intra-operatively/post operatively following pelvic surgeries in the gynecology and oncology departments of our institution. This study describes our experience in the management of ureteric/bladder injuries following pelvic operations and outcome of management of this condition in our local setting.

Methods: This is a retrospective descriptive study of patients with iatrogenic injuries to the ureter and bladder following pelvic surgeries that were managed in our urology department, Government Royapettah Hospital, from September 2016-April 2018. Analysis of the patient diagnosis, indication for surgery, type of surgery, time at diagnosis of injury, presenting features and the type of management was done.

Results: A total of 12 ureteric injuries and 9 bladder injuries were identified out of 299 pelvic surgeries performed in the study period. All bladder injuries were diagnosed and managed intra-operatively. 80% of ureteric injuries were diagnosed post-operatively with fever, flank pain and leakage of urine being the most common presentation. Duration of symptoms ranged from immediate post-op period to upto 6 months after surgery. 45% were diagnosed with ureteric stricture, 33% with uretero-vaginal fistula and 22 % were diagnosed intra-operatively. Incidence of ureteric injuries in simple hysterectomy for benign causes was 1.8%, and for Wertheim's hysterectomy for malignancy was 6%. Incidence of ureteric injuries following laparoscopic hysterectomy was 7%. Ureteric injury following APR was found to be 7%. We performed ureteroneocystomy for 4 cases, boari flap for 2 cases, transuretero-ureterostomy in 1 case, nephrectomy in 1 case and uretero-colonic anastomosis in 1 patient. Post operative complications observed were surgical site infection in 33% and urosepsis in 11% of patients. Mortality was nil.

Conclusions: Laparoscopic and Wertheim's hysterectomy were most commonly associated with ureteric injuries. Meticulous surgical technique as well as identification of the course of the ureter and associated anatomic locations where injury is most likely to occur is important to decrease the risk of ureteric injury. Timely recognition of ureteric injury and its management is associated with good outcome.

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INTRODUCTION

Ureteric and bladder injury is a serious concern during pelvic surgery and represents one of the most dreaded complications during gynecologic operations, with an overall incidence ranging from 0.5% to almost 30%(3). The rate of ureteral injury is increased when technically demanding laparoscopic and radical pelvic surgeries. Ureteral injury may be recognized intraoperatively and treated without any complications, or it may be overlooked and present in the immediate or late postoperative period, leading to substantial morbidity, threatening kidney viability, and justifying medicolegal litigation. Surgical reconstruction constitutes the mainstream therapy of choice for patients presenting with symptoms suggestive of ureteral obstruction in the postoperative period. These procedures include end-to-end ureteroureteral anastomosis, ureteral reimplantation, ureteroneocystotomy, or some combination (6).

The risk factors for iatrogenic ureteric injury include nature and indication of the abdominal or pelvic surgery, patient related factors such as: pelvic adhesions from previous surgeries, history of pelvic radiation, enlarged uterus, pelvic malignancy, pelvic endometriosis, and anatomical abnormalities (4,5). Experience of the operating surgeon may also be an important risk factor. During abdomino-pelvic surgery, ureteric injury may be in the form of crush injury by a clamp, inadvertent diathermy injury, suture ligation, transaction, resection of a segment of ureter, kinking of ureter, and devascularization of a segment of ureter due to extensive dissection close to ureter.

Patient may develop urinary fistula with adjacent organ or end up with non-functioning kidney. The most important determinant of outcome of ureteric injuries is the interval between the injury and repair: the longer the interval, the worse the outcome. Prompt intraoperative identification and appropriate correction decrease morbidity and eliminate mortality. However, most cases of ureteric injuries are recognized late. Patients may present with flank pain, fever, prolonged ileus, ascites, urinary incontinence, anuria and azotemia with 5% patients present very late with hydronephrosis and non-functioning kidney.

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This study was designed to describe our experiences in the management and outcome of iatrogenic ureteric injuries, highlighting the causes, clinical presentation and treatment outcome of iatrogenic ureteric injuries in our setting.

METHODOLOGY

This retrospective descriptive study analyses iatrogenic urological injuries managed in the department of urology, Government Royapettah Hospital between June 2016 to January 2018. Informed consent was obtained from all patients to analyse their data.

All patients presenting to our department post operatively and intra-operative call overs for urological injuries during pelvic surgeries were included in the study. patient symptoms, time duration to presentation, type and technique of pelvic surgery performed, indication for the procedure, any risk factors like bulky uterus(>12wks),endometriosis, prior pelvic radiation and surgeries like c-section were noted. nature of injury and its sequelae were diagnosed by abdomino-pelvic scans and CECT with urogram, and corrected surgically with appropriate procedures. outcomes of management were measured by length of hospital stay, complications and mortality.

RESULTS

A total of 299 patients underwent pelvic surgeries in our hospital during our study period out of which 12 patients had ureteric injury and 9 patients had bladder injury. All the bladder injuries and 2 ureteric injuries were identified intra-operatively and primary repair was performed.

Most common procedure associated with ureteric and bladder injuries was hysterectomy. Incidence of ureteric injuries with simple hysterectomy was 2% and for wertheim’s hysterectomy was 6.2%.Incidence with laproscopic surgery was 8.4% and with open technique was 2.5%. Incidence of bladder injury was 2.14% and was associated with hysterectomy. Abdomino-perineal resections were associated with 7.6% of ureteric injuries.

Table 1 Etiology in Ureteric Injuries

Surgery	Frequency	Percentage
Tah with BSO	165	2%
Wertheim’s Hysrectomy	82	6.2%
Abdomino Perineal Resection	13	7.5%

Table 2 Surgery Charecteristics

Variable	Frequency	percentage
Laproscopy	54	8.4%
Open surgery	178	2.5%

Known risk factors for ureteric injuries were observed in 77.7% of the patients

Table 3 Risk Factors

Variable	Frequency	Percentage
Prior Pelvic Surgery	89	32%
Prior Pelvic Radiation	56	19%
Adverse uterine pathology like cancer, Bulky Uterus, Endometriosis etc.	84	30%

Out of these patients one patient had obstructed non functioning kidney.11% were diagnosed with bilateral ureteric stricture with oliguria and azotemia.44 % patients had ureteric stricture, 33% patients were diagnosed with ureterovaginal fistula. Distal ureter was most frequently involved site in 77%

of cases. Suture ligation was observed in open technique and thermal injury in laparoscopic surgery.

Table 4 Injury Characteristics

Variable	Frequency	percentage
Intra-operatively Detected	3	22%
Post-operative Diagnosis	9	77%
Unilateral-Right	7	66%
Unilateral-Left	3	22%
Bilateral	2	11%
Mid-Ureter	3	22%
Distal Ureter	9	77%
Ureteric Stricture	7	44%
Uretero-Vaginal Fistula	5	33%

Most common presenting symptom was fever observed in 55%of patients followed by flank pain in 44%, urine leak through vagina in 33%, azotemia in 22% and hematuria in 11% of patients with most symptoms overlapping.

Table 5 Patient Presentation

Variable	frequency	percentage
Fever	5	55%
Loin pain	4	44%
Azotemia	2	22%
Urine Leak Through Vagina	3	33%
Hematuria	1	11%
Non Functioning Kidney	1	11%

Pre-operative assessment included Ultrasound scan, Intravenous urography (IVU), Computed tomography (CT) scan, examination under anaesthesia, dye test and cystoscopy as indicate d. All the injuries were repaired as soon as possible after diagnosis was made and stabilizationof their conditi on done. Ureteroneocystostomy was the most frequent reconstructive surgery performed in 45.0% of cases.

Table 6 Procedures Performed For Ureteric Injuries

Surgery	Frequency	Percentage
Uretero-Neocystostomy	6	44%
Boari Flap	2	22%
Trans-Ureteroureterostomy	2	11%
Nephrectomy	1	11%
Uretero-Colonic Anastomosis	1	11%

Post operative complications observed were surgical site infections in 33% and urosepsis in 11%.Mortality in this group of patients was nil. Patients were followed up for a period ranging between two and twelve months. Follow up evaluation mainly consisted of clinical evaluation and abdomino-pelvic ultrasound scan with IVU and cystoscopy when indicated.

DISCUSSION

Iatrogenic Injury to the ureter is the most common complication of abdomino- pelvic surgery, ranging from less than 1 to 10 percent of procedures, depending on the complexity of the procedure.(1)

Table 7 Incidence of Ureteric Injuries

Surgery	RCOG	Our study
Abdominal hysterectomy	0.4-3%	2%
Wertheim’s hysterectomy	1-30%	6.2%
Laparoscopic hysterectomy	0.2-6%	8.4%
Colorectal surgery	0.15-10%	7%

In this study, the incidence of ureteric injury following pelvic surgeries was 3.07%, a figure comparable to those in the

literature(6). Surgeries performed for malignancy like wertheim's hysterectomy and abdomino-perineal resections had high incidence of ureteric injuries-6.2% and 7% respectively. Laparoscopic hysterectomy had a higher incidence of injuries than open transabdominal procedure. In our series, gross pelvic adhesions from previous surgeries, previous history of pelvic inflammatory diseases and massive intraoperative bleeding during operations for large pelvic tumours were reported to be risk factors for iatrogenic ureteric injuries.

Most ureteric injuries occur in the distal most part of the ureter where it is closely related to the uterine vessels. (5) In this study, 77% injuries occurred in the distal portion of the ureter, which is in agreement with other studies. The distal portion of the ureter is not only embryologically related to the female genital organs but is also involved in diseases affecting them. (7,8) At the base of the cardinal ligament where it crosses the uterine artery, the ureter is just 12 mm from the vagina and as it moves towards the bladder it becomes even closer to the vagina, and this predisposes the ureter to injury during surgical procedures in the pelvis.

Bilateral ureteric injuries have been reported in literature to occur in 5-10% of patients in this study the incidence was noted to be 11%. (8,11) The left ureter has a greater proximity to the cervix compared to the right ureter, and is thus more liable to injury, however in our study right ureter was most commonly injured. Imaging is essential for diagnosis especially in cases where bilateral lesions are suspected. In this study, pre-operative assessment included Ultrasound scan, Intravenous urography (IVU), Computed tomography (CT) scan, examination under anaesthesia, dye test and cystoscopy as indicated. (11)

Many authors have suggested that early recognition and management of ureteric injuries is associated with better outcome (6,10). Intra-operative diagnosis was made in only 22% of the patients, and 77% were identified post-operatively. Missed injury with presentation of nonfunctioning kidney was seen in 11% of patients.

In the present study, percutaneous nephrostomy was performed in only 2 patients representing 22% of cases. However, nephrostomy tube in this study was used only to stabilize the patients and all of these patients required additional definitive procedures. Various reconstructive surgical options include ureteroneocystostomy, Boari flap, Psoas hitch, end to end ureteroureterostomy and trans-ureteroureterostomy. Other options include ileal segment replacement, appendix interposition and auto-transplantation. (6)

In our study ureteroneocystostomy was the most common procedure performed. Boari flap repair was done in 2 patients and transuretero-ureterostomy, nephrectomy and ureterocolonic anastomosis were performed in one patient each respectively. All patients were stented.

In our study the most common complication was surgical site infection seen in 22% patients followed by urosepsis. All patients recovered well in the post operative period. Mortality in the study group was nil.

The outcome of our management was generally good, with a 92.7% success rate and no complications that were detected during the follow up period. This may be related to the fact

that the all reconstructive procedures were performed by experienced urologists.

The potential limitation of this study is its retrospective nature, with incomplete data regarding the detailed operative procedure and post operative management of the primary surgery.

CONCLUSION

Our experience in this study shows that iatrogenic ureteric injuries are still common in our environment and total abdominal hysterectomy accounts for most cases. The majority of injuries are a result of complications of abdomino-pelvic operations by general practitioners in the peripheral hospitals.

Meticulous surgical technique as well as identification of the course of the ureter and associated anatomic locations where injury is most likely to occur is important to decrease the risk of ureteric injury. Early recognition and prompt repair of ureteric injuries is the key to a successful outcome. Treatment of these injuries by experienced team may minimize longterm consequences.

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