

Case Report

Ureteric Injury in Gynaecological Surgery: A Rare but Serious Event

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ABSTRACT

Single kidney and ectopic kidney are rare anomalies which are usually left sided. Ureteral injury, though rare is a serious complication. An understanding of the anatomy and course of ureter can minimize it. Early identification and proper management can prevent serious morbidity. Here we are presenting two cases of ureteric injury which were associated with congenital variations of right kidney.

Keywords: ureteric injury, pelvic kidney, single kidney, uretero-neocystostomy, uretero-ureteric anastomosis.

INTRODUCTION

The prevalence of unilateral renal agenesis is about 1: 1400 and it is usually discovered incidentally. If the mesonephric duct has failed to bud, the ureter will be absent. Alternatively, the ureter and renal pelvis are present but the kidney is absent. In either case, the solitary contralateral kidney is likely to be hypertrophied. It is usually symptomless and often discovered by accident. In approximately 1: 1000 people the kidney does not ascend. The incidence of pelvic kidney is 1: 3000. Ectopic kidneys are usually found near the pelvic brim and are usually left sided. The contralateral kidney is generally in its normal position. Disease in an ectopic kidney may present diagnostic problems and an unwary surgeon may be tempted to remove it as an unexplained pelvic mass.^[1]

Urologist's joke that gynaecologists perform only three operations: ligating the left ureter, ligating the right ureter and ligating both ureters. Although injury to the

urinary tract is one of the major concerns of the gynaecological surgeons during routine gynaecological procedures, actual injury is rare. These structures should be treated with care but not with the type of respect which results in never handling them.^[2]

Because of close proximity between ureter and genital organs, ureteric injury is not uncommon during gynaecological surgery. Overall incidence is 0.5-1% of all pelvic operations. About 75% of ureteral injury result from gynecological operations and 75% of them occur following abdominal gynaecological procedures.

Causes of ureteric injury may be congenital or acquired. The aberrant ureter may open into the vault of vagina, uterus or into the urethra. Acquired causes are common and usually follows trauma during pelvic surgery. Although commonly associated with difficult surgery like abdominal hysterectomy in cervical fibroid, broad ligament fibroid, endometriosis, ovarian malignancy or radical hysterectomy,

it may be injured even in an apparently simple hysterectomy – abdominal or vaginal (rare).

Important anatomical locations where ureteric injury is more common are (1) At the level of infundibulopelvic ligament – where ureter runs parallel to ovarian vessels at the same place. Ureter forms the posterior boundary of ovarian fossa. Any inflammatory or malignant process will involve the ureter. (2) Deep in the pelvis, below the level of ischial spine, where ureter lies lateral to the peritoneum of uterosacral ligament. (3) At the level of internal cervical os, 1.5 cm lateral to the cervix where uterine artery crosses the ureter from above. (4) Over the anterior vaginal fornix, within the ureteric tunnel of cardinal ligament (tunnel of Wertheim) where it turns anteriorly and medially to enter the bladder (5) where it traverses through the musculature of bladder (intravesical part). (6) Any congenital malformation (duplex ureter) makes it more vulnerable to injury at any of these sites.

Severity of ureteric injury may be any of the following types : (1) Simple kinking or angulation – causing obstruction (2) Ischemic injury resulting from trauma to ureteric sheath endangering its blood supply (3) Ligature incorporation (4) Crushing injury by clamps followed by necrosis (4) Transection – either partial or complete. (5) Segmental resection either accidental or planned. (6) Thermal injury during minimally invasive surgical procedures when diathermy (monopolar or bipolar) or laser energy is used. (7) Injury by staplers during laparoscopic surgery.

Injuries to the ureter are of two types; those diagnosed intraoperatively, those diagnosed postoperatively.

Intraoperative detection of ureteral laceration can be made by seeing the leakage of dye at the site, following intravenous injection of indigocarmine. When the ureter is ligated or kinked, gradually increasing ureteric dilatation will be noticed, instead of dye leakage.^[3]

When it is suspected that the ureter has been damaged at operation, whether by cutting, crushing or inclusion in a suture, then the ureter should be widely exposed so that a full inspection can be carried out. This is best done by separating the pelvic peritoneum from the pelvic sidewall and exposing the full length of the pelvic part of the ureter. It is not necessary to separate the ureter from the peritoneum for its full length as this would merely jeopardize its blood supply. An immediate repair of the damaged ureter gives a very good prospect of complete recovery without the need for further surgery. A urologist, if available, should be consulted for repair of any ureteric injury.

Injury to the distal ureter tends to occur in association with gynaecological surgery. It differs from injuries higher up the ureter in that it is often difficult to mobilize the ureter sufficiently to anastomose it without tension. In this situation, the method most used to deal with this problem is to produce a new point of entry into the bladder; the damaged distal portion remaining can be either ligated or resected. The ureter should be implanted using an anti reflux mechanism, which will require the bladder to be opened.^[2]

Signs and symptoms in postoperative period are subtle and often overlooked. Fever, flank pain, hematuria, abdominal distension, urine leakage (vaginally), peritonitis, ileus and retroperitoneal urinoma should raise the suspicion. Escape of urine through vagina following the operative procedure is suspicious. The patient has got urge to pass urine and can pass urine normally. Three - swab test differentiates it from VVF. If the urine in the vagina is unstained following three – swab test, indigo carmine is injected intravenously. If urine becomes blue (generally within 4-5 minutes) the diagnosis of ureterovaginal fistula is established. Cystoscopy should be performed to determine the side of ureterovaginal fistula is established. When a ureteric catheter is passed under cystoscopic guidance,

obstruction is met when the catheter tip reaches the site of injury. Excretory urography – confirms the side and site of fistula. The tract of ureterovaginal fistula is also outlined. Renal ultrasound is a noninvasive method. Hydronephrosis and retroperitoneal urinomas when seen, are helpful to the diagnosis (ureteral ligation). Computed tomography (CT) showing contrast extravasation is the most consistent to the diagnosis.^[3]

The management of the late diagnosed urinary tract damage is mainly the area of expertise of the experienced urologist; the gynaecologist should not delay in calling for a colleague's advice as further delay will seriously risk the function of the kidney.

The management of obstructive damage to the ureters can be divided into two phases:

Drainage of the obstructed renal tract is best performed by radiologically guided percutaneous nephrostomy. Ureteric catheters can sometimes be passed beyond the point of obstruction, especially when the blockage is due to extrinsic pressure.

Repair of the damage to the ureter needs to be carried out if the obstruction cannot be relieved by a stent. If there is enough ureteric length to obtain a tension free anastomosis to the bladder, a ureteroneocystotomy can be performed via either laparotomy or laparoscopy.^[2]

General principles of prevention of ureteral injury

The most important way to prevent ureteral injury is for the surgeon to constantly and unequivocally know where the ureter is located at all times. Often when we are called to assist a colleague in an operation in which ureteric injury has occurred, it is evident that the surgeon did not know where the ureter was and, therefore clamped, ligated, incised and transected it.

Starting at the round ligament, cut the peritoneum lateral to the ovarian vessels to the colon at the pelvic brim. There is nothing one can injure or cause to bleed in

this zone. Bluntly dissect the ovary and its vessels medially to enter this posterior retroperitoneal space. The large vessels and pelvic sidewall will be lateral and easily identified by palpation and visualization. The ureter will be seen adhered loosely to the medial peritoneum. It always crosses over the iliac artery at this pelvic brim just where the internal iliac artery arises. Gently caress the ureter with the sucker or pickups, and it will further identify itself with a peristaltic movement. In massively obese women with poor exposure, place your index finger in this retroperitoneal space and your thumb outside the peritoneum. The ureter can be identified by a distinct snap or click between one's fingers. Once identified, the ureter can easily be followed by using blunt dissection with a right angle clamp all the way to the uterine artery. Between the uterine artery and bladder; it can usually be followed by the palpation and snap technique.^[4]

To avoid blind clamping of blood vessels. Not to damage the sheath of ureter so that longitudinal vessels are not destroyed.

Preoperative intravenous urography is helpful in certain situation (pelvic tumours), to ascertain the course of the ureters. Any congenital anomaly is also revealed.

Placement of ureteral catheters (preoperative) to facilitate detection and dissection of ureters.^[3]

When using instruments that transmit energy to the tissues (e.g, electrocoagulation, whether monopolar or bipolar, argon beam coagulation or laser) the surgeon should know the zone of thermal injury for that instrument at that power setting. Although the mean distance of thermal damage with most of these instruments is approximately 2 mm, it may be as much as 5 mm; therefore, the use of such energy sources near the ureter has the potential for unrecognized injury and delayed necrosis.

Bleeding from the pedicle or vaginal angle should be controlled by a "superficial" 3-0 suture. One should place the suture very superficially so that it cannot be around the

ureter which is “very close “once the tissues have retracted. It is that deep suture that gets the ureter here. [4]

There is no data supporting the belief that preoperative IVP, CT scan or prophylactically placed stent placement decreases the probability of a ureteral injury.[4]

Here we are presenting two population based cases of ureteral injury, both of which were associated with congenital variations of right kidney which is extremely rare.

CASE REPORT 1

The patient 45 years old, diagnosed as a case of chronic pelvic inflammatory disease was posted for total abdominal hysterectomy and bilateral salpingo-oophorectomy. Transvaginal sonography was done along with other investigations required for a major surgery. Total abdominal hysterectomy and bilateral salpingo-oophorectomy was done. During operation there was slippage of uterine clamp on left side, but was reclamped and hemostasis secured. On second postoperative day urine output was found to be nil since OT. Immediately renal function test and ultrasonography of whole abdomen and pelvis was done. Blood urea and creatinine were raised. On ultrasonography, left kidney showed hydronephrosis and right kidney was not seen. Urologist was consulted and cystoureteroscopy done. Obstruction was met on left ureteroscopy and right ureteric orifice could not be delineated. Decision of laparotomy was taken after proper counselling of the patient. On third postoperative day, laparotomy was done, left ureter traced and found to be ligated with the left uterine artery. Ureter was mobilized and ureteroneocystostomy done after placing J-J stent. Right sided kidney was absent, right sided ureter was atrophic and functionless. One unit of blood transfusion was given. J-J stent was removed after 6 weeks.

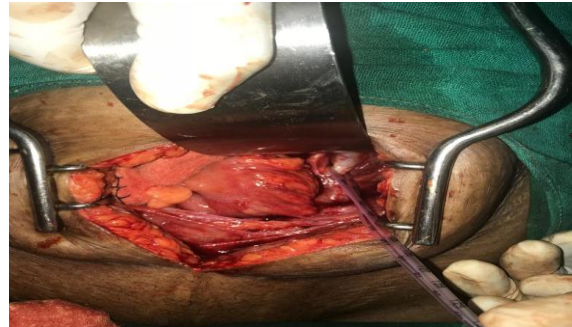


Fig 1 : Showing ligated left side ureter .The left ureter is dilated .

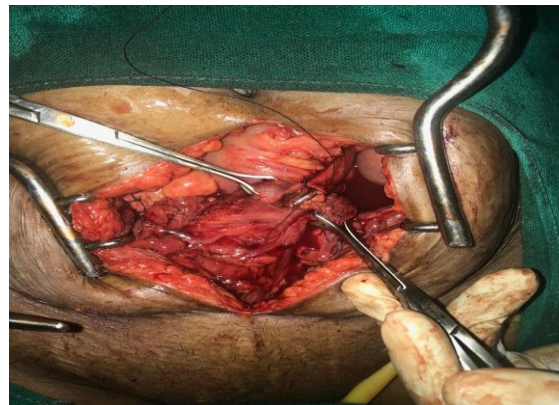


Fig 2 : Showing J – J stent in the proximal part of ureter and neocystostomy created in the bladder ,ready to be anastomosed.

CASE REPORT 2

The 44 yrs old patient was diagnosed as a case of right sided ovarian tumour of size 16x16 cm². Laparotomy was done. There were adhesions on the right side. With great difficulty, total abdominal hysterectomy and bilateral salpingo-oophorectomy was done. On second postoperative day, urine output was found to be nil and urine was coming from the intraperitoneal drain. Renal function tests and ultrasonography was done. Blood urea and serum creatinine were raised. On ultrasonography, left kidney was normal, right kidney was not seen. Urologist was consulted. Cystoscopy and ureteroscopy by 6 F sizes was done. Left ureteroscopy revealed left ureteric obstruction 6 cm above the left ureteric orifice and right ureteroscopy showed intraperitoneal contents entering few centimeters on right. On laparotomy, It was found that there was complete transection of the left ureter, urine was leaking in the

peritoneal cavity and lower part of left ureter was ligated. On right side distal part of ureter was seen ending into the urinary bladder with proximal end opening in the peritoneal cavity. Right sided kidney was not seen. It was inferred from the findings that at first laparotomy, the mass removed considering to be an ovarian tumour was actually right sided pelvic kidney which was later confirmed on histopathology. Left sided uretero- ureteric anastomosis was done after placing J-J stent. The J-J stent was removed after 6 weeks.

DISCUSSION

Before doing any major surgery on abdomen or pelvis, ultrasonography of whole abdomen and pelvis should be done. Surgeon should have a clear picture of the anatomy before surgery including the congenital variations.

Ultrasonography should be done with great precision. The sonologist should keep in mind the congenital variations of urinary tract. Second opinion should always be requested and CT scan/MRI should be done in case of any doubt.

During abdominal hysterectomy, reclamping of any pedicle after slippage of clamp or ligature should be done very carefully after identifying the structures. Mere looking at a major blood vessel spurting should not panic a surgeon. Only the vessel should be ligated.

No abdominal hysterectomy should be considered easy or simple because serious complications do occur in cases considered simple.

During laparotomy, the surgeon should identify the structures before putting clamps or removing any organ. Though in many cases we have seen that a big size abdominal mass poses obstacle.

Abdominal or pelvic surgery should be done keeping in mind the serious, but rare possibility of ureteric injury.

It is a good clinical practice to place intraperitoneal drain intraoperatively in cases where hemostasis are secured with difficulty, where surgery are difficult due to adhesions and where big ovarian tumours are removed, where there are attachment of pelvic masses with omentum, gut or lateral pelvic wall.

Ureteric injury should be identified immediately and managed with the help of a urologist. "A stitch in time saves nine" holds good in this context.

CONCLUSION

Avoidance of damage to the urinary tract depends on a thorough understanding of the pelvic anatomy of the ureters and bladder, congenital variations that may occur, and changes in the anatomy that may occur as a result of benign or malignant disease, or from previous surgery or adhesions. Trainers in surgical technique have a duty to demonstrate the care, attention and patience that are required to identify the course of the ureter in every single case.

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How to cite this article: Parashar M, Sharma RK, Kumar S. Ureteric injury in gynaecological surgery: a rare but serious event. Int J Health Sci Res. 2019; 9(6):397-401.
