

Appendix interposition repair of right proximal ureteric injury

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Abstract

Background: The incidence of ureteric injury secondary to trauma is rare which account around 1% for the blunt injuries and less than 4% in penetrating injuries. It is normally detected from imaging studies that reveals evidence of contrast leakage or urinoma formation in patient with a polytrauma involving the intraabdominal injury.

Case presentation: This is a case report of a 28 years old lady who involved in a motor vehicle accident and sustained a polytrauma involving blunt intraabdominal injuries with a total transection of the right proximal ureter, perforation of small bowel and spine fracture. Following the accident she had underwent emergency laparotomy for the bowel and ureteric injury. For the ureteric injury she had underwent an appendix interposition repair in view of inadequate length of remaining of ureter for primary anastomosis. Post operatively, she recovered well without a major complication following the ureteric repair.

Conclusion: There are several methods advocated for the ureteric injury repair which is depending on the severity and site of the injury. An appendix transposition is one of the options can be applied especially if there is inadequate length of ureter is found during the repair as it associated with less morbidity and technically is easier to perform.

Keywords

traumatic ureteric injury; appendix interposition; proximal ureteric repair; urinoma

Abbreviations

CTU- Computed tomography urography; IVU – Intravenous urography

Introduction

Ureteric injury is a rare incidence to happen during a blunt trauma. This is due to the location of the ureter which is in the retroperitoneum space where it is well protected by bony pelvis, psoas muscle and the vertebra. It occurrence normally always associated with a significant traumatic injuries especially to

the nearby abdominal structures. It is required a high index of suspicion following a trauma especially if it involve with high acceleration and deceleration injury. It is commonly noted from the radiological investigation done following the trauma especially during the delayed phase of CT contrast images. The management of ureteric injury depend on the severity and site of injury to the ureter.

Case Presentation

A 28 years old lady had a car skidded and sustained a polytrauma. She was referred from a district hospital for further management. From an abdominal x-ray taken on arrival to our emergency department, noted there is prominent right renal pelvis which suggestive of retain contrast from the previous CT scan done earlier at the referral hospital (Figure 1).



Figure 1: A plain abdominal radiograph post CT scan showing a retained of contrast in the right pelvi-calyses system.

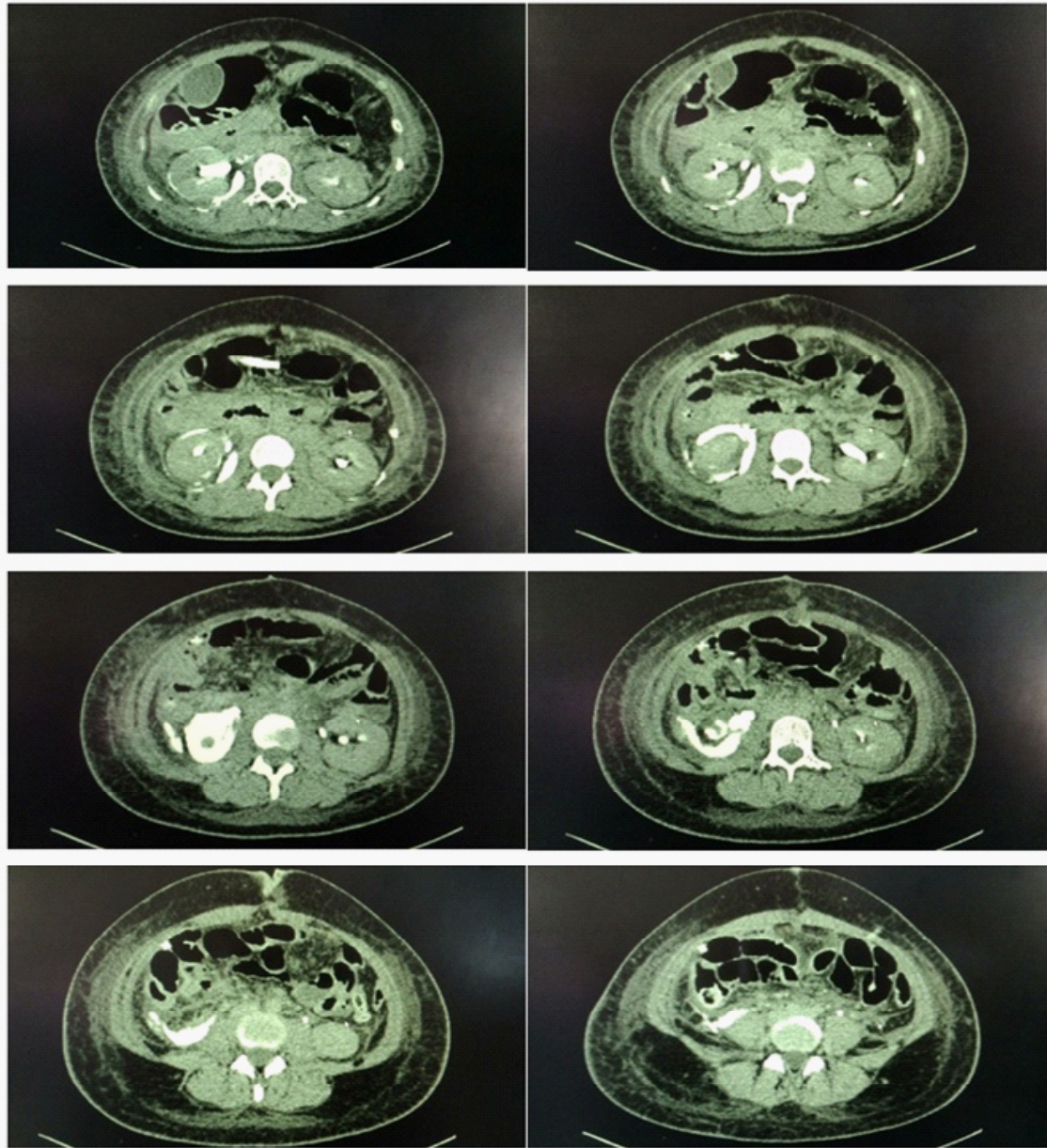


Figure 2: Series of CTU images during excretory phases showing leaking of contrast at the right proximal ureter.

Therefore she was planned for a CT urography to assess for possibility of the right ureteric injury. The CTU confirmed that she has a right proximal ureteric injury, with evidence of contrast extravasation around the right proximal ureter and there was no connection with the distal ureter (Figure 2 & 3). Besides the ureteric injury, she also has sustained multiple right ribs fracture with right pneumothorax, T12 compression fracture of the vertebrae body as well as bilateral closed fracture of tibia and intraabdominal injury which are small bowel perforation about 30cm from the duodenal-jejunal junction and bilateral grade 1 kidney injury.

She underwent an emergency exploratory laparotomy for the intraabdominal injuries and was referred to our urology unit for the right ureteric injury. Intra-operative findings noted that there was a total transection of the proximal third of the right ureter just below the pelvi-ureteric junction with the discrepancy almost 5cm in length. As the result, there was inadequate healthy tissue of the ureter left to proceed

with the primary end-to-end anastomosis or the uretero-ureterostomy procedure. As she is already having a small bowel resection and anastomosis due to small bowel perforation and she is still having a normal appendix. Therefore she was decided to undergo an appendix interposition repair for the ureteric injury in order to get enough length for the repair.

The procedure of appendix interposition is done by separating the appendix from its base and carefully preserved its blood supply from the base of cecum and the ileocolic artery. The base and the tip of the appendix are opened and cannulated with a small Ryle's tube and washed with povidone iodine to ensure its lumen is clean before anastomosis is begun. The appendix is orientated by placing the tip at the proximal anastomotic site and the base at the distal anastomotic site in order to maintain the iso-peristaltic movement of the appendix with the ureter which will help in the urine flow from the renal pelvis to the bladder. Both ends are then spatulated to give good surface for the anastomosis. Beside of that a double-J ureteric stent is inserted thru the ureter and appendix lumen to help and maintain the lumen during anastomosis (Figure 4).

Post operatively the stent is removed after 6 weeks and an intravenous urography (IVU) was performed 4 months later. The IVU showed there is right ureteric stenosis distal to repair site with moderate right hydronephrosis without right ureteric leakage. During the procedure both kidneys showed prompt and equal pyelogram features with contrast later filling up both ureters until the vesicoureteric junction (Figures 5). Otherwise she is well and no significant renal impairment noted from her blood investigation result and no complain of any loin pain.



Figure 3: A CTU image during excretory phase with 3D reconstruction showing the proximal right ureteric injury with contrast leakage and intact left ureter.

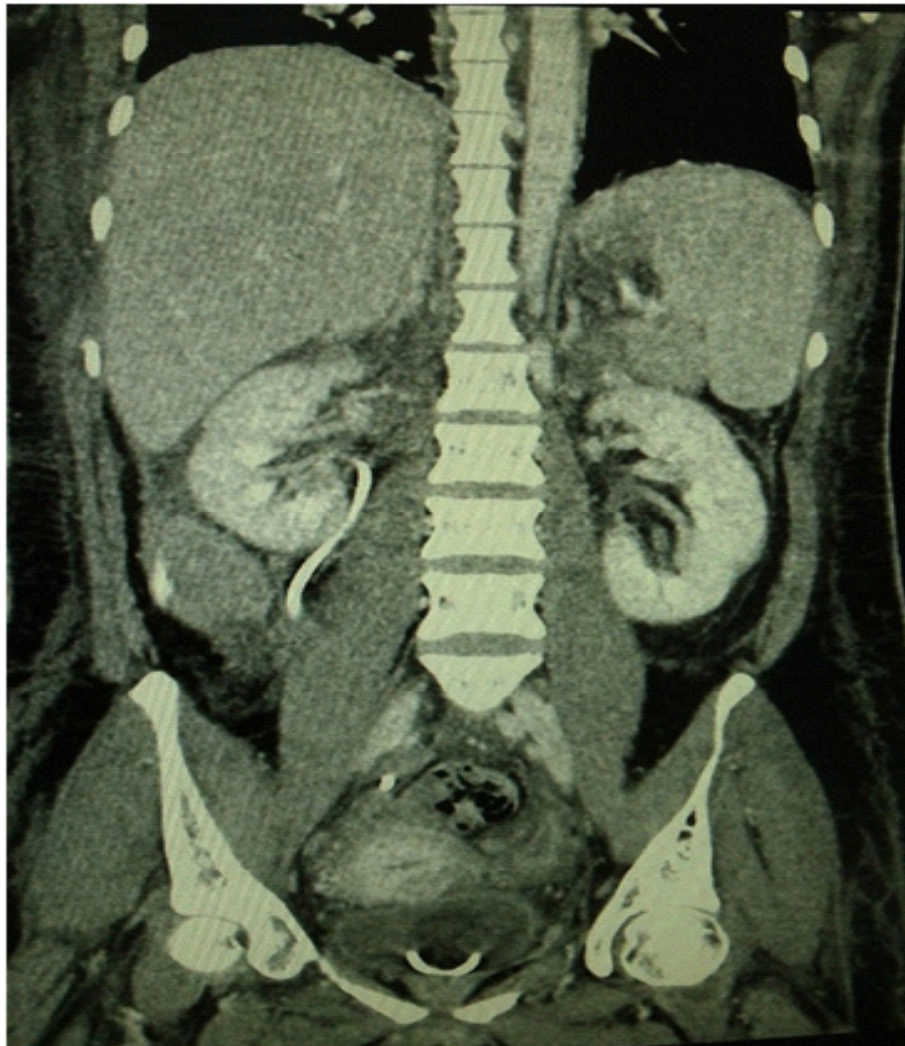


Figure 4: CT image post Appendix interposition repair showing the double J stent in-situ.

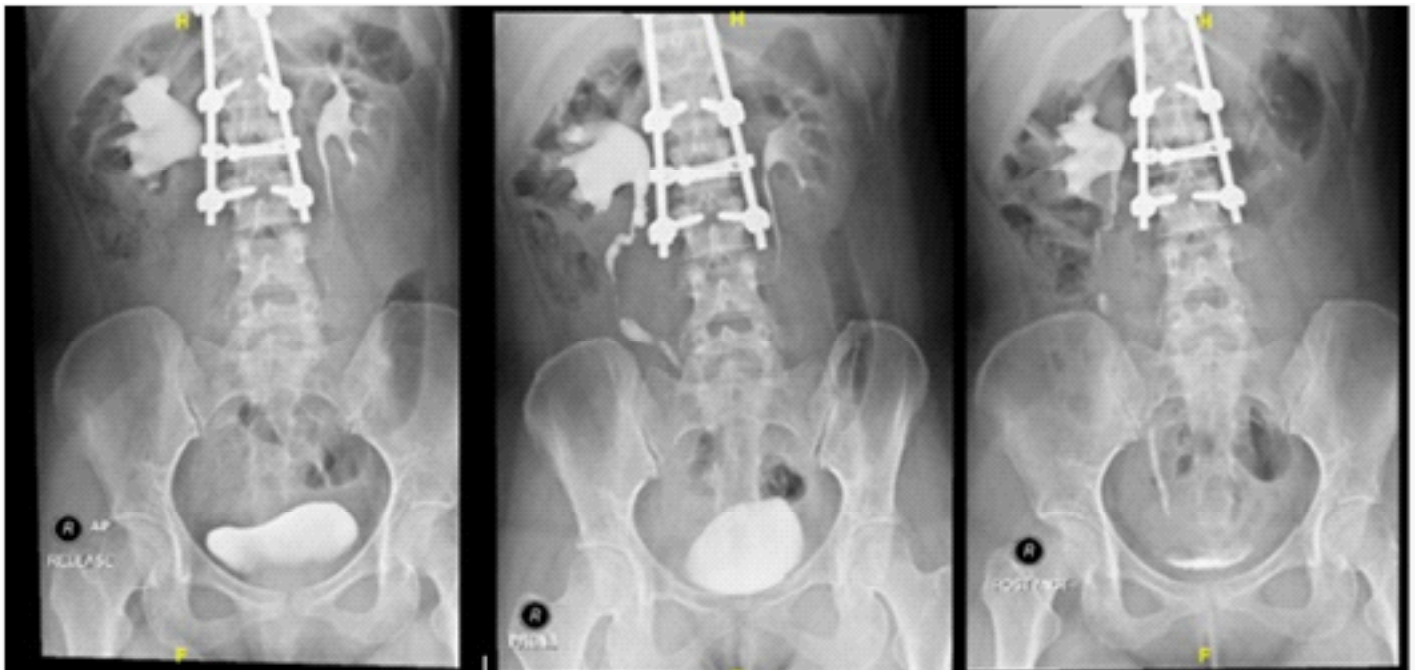


Figure 5: Series of IVU images done 4 months post appendix interposition repair findings of right ureteric stenosis distal to repair site with moderate right hydronephrosis without right ureteric leakage.

Discussion

The incidence of ureteric injury is relatively uncommon during a blunt injuries. It accounts around 1% of the blunt injury and less than 4% of the penetrating injury either stab wound or gunshot wound over the flank or loin areas. In trauma, the high deceleration injury is the commonest cause of the uretero-pelvic- junction disruption. Other than trauma it also could happen secondary to iatrogenic injury during endoscopic ureteric procedure or during pelvic surgeries [1,2].

The presentation of ureteric injury normally detected from an imaging study that may demonstrate contrast leakage or urinoma formation in post trauma patients. Clinically the patient might have haematuria from the urinary drainage, but most of the patient do not exhibit haematuria due to total transection of the ureter.

The management options for ureteric injuries depends on the location of the injuries either proximal, middle or distal ureter. The most common site happened is at the distal ureter. It can be repaired by primary end to end anastomosis if adequate length of ureter is preserved. However if it is not possible there are few options available for the repair such as psoas hitch or Boari flap procedure to compensate the inadequate length of the ureter. Besides of that the proximal ureter may be connected to the other site ureter thru transuretero-ureterostomy procedure [1,2,8].

For the more proximal ureteric injury such as in this patient the options are kidney mobilisation, interposition of ureter with small bowel or appendix to compensate the length if the primary end- to-end anastomosis is not possible. Beside of that the blood supply at the proximal ureter has poor vascularization and risk of anastomotic necrosis is high [3]. Therefore, the appendix interposition with its blood supply of ureteric repair is one of the best choice of repairing the proximal ureteric injury [7].

The technique of using the appendix as the substitute for ureteric repair has been introduced by Melnicoff since 1912 [4]. There are several advantages that makes the appendix as a good substitution for ureteric repair as its size and lumen is comparatively similar to the ureter, it also has good contractility for movement of urine, and most importantly in case of intraabdominal injury the use of appendix can avoid from additional bowel anastomosis compare to using the ileum as the substitution [5, 6]. Technically the appendix will be anastomosis with the tip at the proximal and base at the distal following the peristaltic movement for better urine drainage [8].

Other alternative for proximal ureteric injury repair is by autologous kidney transplant, but it is technically more difficult and associated with more morbidity to the patient as it will take longer operating time and more expertise to be available [8].

In conclusion, although the incidence of ureteric injury is rarely happen in trauma. In patient presented with polytrauma involving organs adjacent to the urinary tract especially the ureter needs to be reviewed carefully to avoid missed diagnosis of ureteric injury that will compromise the patient outcome.

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