Case 12181

Ureteropelvic junction laceration following blunt trauma
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Section: Uroradiology & genital male imaging
Area of Interest: Kidney
Procedure: Diagnostic procedure
Imaging Technique: CT
Special Focus: Cysts Trauma Case Type: Clinical Cases
Authors: Tonolini Massimo, MD.
Patient: 75 years, male

Clinical History:

Elderly patient with history of diabetes, hypertension and previous aortocoronary bypass surgery presented to emergency department because of right-sided thoraco-abdominal trauma following a fall. Physical examination revealed extensive flank ecchymosis, in part attributed to oral anticoagulant therapy. Urgent laboratory tests revealed absent blood loss, normal renal function, microscopic haematuria.

Imaging Findings:

A previous CT (Fig. 1) obtained eight months earlier to investigate infrarenal aorta dilatation, revealed bilateral peripelvic renal cysts. Currently, chest radiographs (not shown) did not show traumatic rib fractures and bedside ultrasound excluded haemoperitoneum. Due to microscopic haematuria and anticoagulation, multidetector CT (Fig. 2) was requested to investigate suspected renal injuries. Ipsilateral to trauma, CT showed moderate perirenal and fascial fluid, plus dependent hyperattenuation consistent with acute blood in the renal pelvis and a peripelvic cyst, without contrast medium extravasation indicating active arterial bleeding. Additional excretory-phase CT acquisition showed normal parenchymal and collecting system opacification, medial perirenal extraluminal opacified urine originating from a breach at the ureteropelvic junction, and opacified proximal ureter; findings consistent with partial ureteropelvic junction laceration. No traumatic lesions were seen in the other abdomino-pelvic organs.

The patient was immediately treated with ureteral stenting, which remained in place for 6 weeks and allowed an uneventful course.

Discussion:

Ureteral and ureteropelvic junction (UPJ) injuries represent less than 1% of traumatic genitourinary lesions, mostly resulting from motor vehicle collision, are more frequent in children than in adults, and may exceptionally occur bilaterally. The mechanism involves sudden deceleration and trunk hyperextension causing ureteral stretching across the lumbar transverse processes, leading to UPJ avulsion (complete transection) or laceration (incomplete tear) at the UPJ [1-4].

However, UPJ injuries are diagnosed late (more than 48 hours) or missed in over 50% of cases, because of haemodynamic instability, coexistence of other injured viscera, and unreliability of clinical predictors (macroscopic haematuria is absent in nearly half of patients). Unfortunately, prompt detection and early treatment are crucial to prevent further complications such as urinoma superinfection, and to obviate the need for nephrectomy; conversely, delayed diagnosis is associated with poor urologic and overall outcomes [1-4].

Currently multidetector CT represents the mainstay for investigation of trauma patients, particularly for the detection
of clinically occult retroperitoneal injuries, as it provides accurate description and severity grading of lesions plus identification of contrast medium (CM) extravasation indicating active bleeding. According to the anatomical-surgical American Association for the Surgery of Trauma (AAST) organ injury scale, collecting system disruption configures grade V injury. In the trauma setting, comprehensive urinary tract imaging including excretory-phase CT acquisition (5-10 minutes after intravenous CM administration) is warranted in presence of haematuria, flank ecchymosis, fractures involving lower ribs, pelvis or thoraco-lumbar spine [5-8]. Furthermore, to avoid overlooking a clinically significant urinary tract disruption, subtle findings include perinephric stranding, fluid surrounding the kidney and ureter, and perinephric haematoma should be searched for in the initial portal venous phase CT acquisition. These findings indicate the need for additional delayed phase imaging, which allows detection of opacified urine leaking outside the collecting system. Ureteral and UPJ injuries are heralded by medial or circumferential perinephric extravasation of enhanced urine with normal nephrographic appearance. Alternatively, urine leakage may result from parenchymal lacerations with calyceal disruption, which typically occurs in the posterolateral perirenal space [4-9].

Finally, as this case exemplifies, UPJ laceration, heralded by ipsilateral ureter opacification distal to the point of injury, should be differentiated from complete avulsion. Although challenging (particularly when the ureter is unopacified or obscured by extensive urinoma), this differential diagnosis is clinically crucial since complete transection requires surgical repair, conversely partial tears may be treated conservatively with nephrostomy or J-stent implantation [4-9].

**Differential Diagnosis List:** Ureteropelvic junction laceration following blunt trauma., Ureteropelvic avulsion, Renal parenchymal laceration with calyceal disruption, Urinoma, Perinephric haematoma, Subcapsular haematoma

**Final Diagnosis:** Ureteropelvic junction laceration following blunt trauma.

**References:**


Description: Unenhanced (a) and post-contrast CT-angiographic (b) and delayed excretory (c) acquisitions revealed sizeable bilateral peripelvic renal cysts (*); normal renal size and parenchymal thickness for age, nephrographic appearance and collecting system opacification. Origin: Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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Description: Unenhanced (a) and post-contrast arterial-phase (b,c) images showed right-sided moderate perirenal and fascial fluid (thin arrows), dependent hyperattenuation (arrowheads) consistent with acute blood in the renal pelvis and a peripelvic cyst. **Origin:** Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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**Description:** Arterial-phase acquisition including MIP reformatted images (c) did not show contrast medium extravasation indicating acute bleeding. Note dependent hyperattenuation (arrowheads) consistent with acute blood in the renal pelvis and a peripelvic cyst. **Origin:** Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
Description: Delayed excretory-phase acquisition (d...g) showed medial perirenal extraluminal opacified urine (+) with normal parenchymal and collecting system opacification. Origin: Tonolini Massimo, Department of Radiology, “Luigi Sacco” University Hospital – Milan (Italy)
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