

## CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

### Emergency Pediatric Imaging Quiz – Case 2

A 5-year-old boy presented to the Emergency Department of our hospital with acute onset of left quadrant abdominal pain after being pushed, fallen and run over by his classmates. The boy's chest X-ray was normal. Urinalysis showed microscopic hematuria. Focused Assessment with Sonography in Trauma (FAST) ultrasound (US) exam was performed. Perinephric collection and upper pole renal cortex's irregularity of left kidney was identified (figures 1a, 1b, 1c). Signs of chronic non obstructive hydronephrosis of left kidney were also observed, possibly due to pelviureteric junction stenosis. The child was hemodynamically stable and it was transferred, after referral by surgeons, to our Computed Tomography (CT) department for emergency abdomen CT imaging. Focused non-enhanced (NECT) and contrast enhanced CT (CECT) was performed; two lacerations of left kidney's upper pole extending to the collecting system and one contusion of the lateral cortex of upper pole (downwards) was found. A perinephric collection with densities similar or slightly higher to urine was also shown (figures 2, 3a, 3b, 3c). No contrast extravasation consistent with active bleeding was noticed (figures 4a, 4b). The patient underwent conservative treatment; subsequent US exams showed shrinkage of the perinephric collection and the boy was discharged in good clinical condition after one week of hospitalization.

#### Comment

*The kidneys are injured in about 10% of patients with blunt trauma abdominal injuries. Renal injuries are graded by the American Association for the Surgery of Trauma (AAST) according to the depth of injury and the involvement of renal vessels or the collecting system in 5-grade severity scale. In the pediatric population,*

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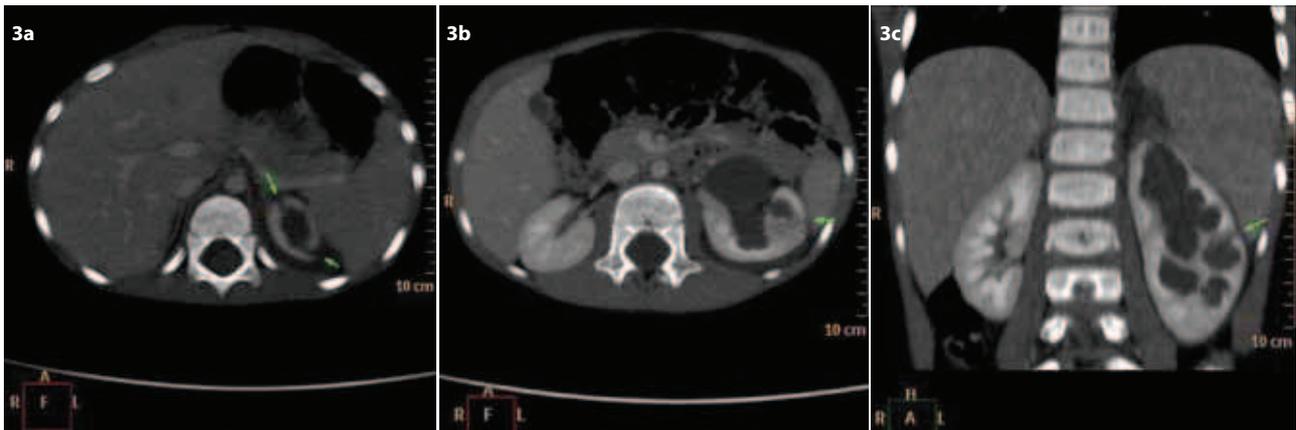
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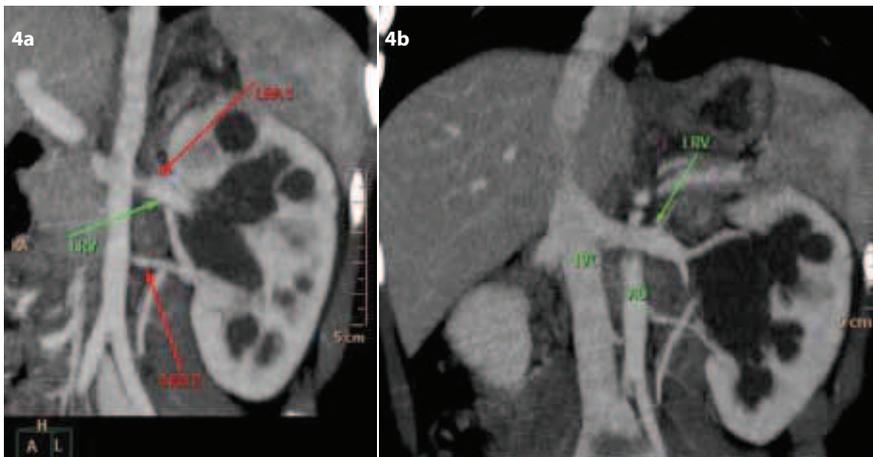
**Figure 2.** Contrast enhanced computed tomography (CECT) of upper abdomen (coronal view): Laceration of left kidney's upper pole with focal perinephric collection. Enlargement, pelvicalyceal dilatation and thinned cortex of left kidney when compared with the right kidney.



**Figure 1.** Focused Assessment with Sonography for Trauma (FAST) ultrasound (US) (longitudinal view of left kidney): **a.** Cortex irregularity of upper pole along with perinephric anechoic collection with hyperechoic stripes (hemorrhagic), **b.** small perirenal collection at the level of lower lobe, and **c.** color Doppler US reveals focal absence of vascularity in upper pole.



**Figure 3.** Contrast enhanced computed tomography (CECT) of upper abdomen: **a.** Two lacerations of left kidney upper pole, extending to the collecting system (arrows). Perinephric collection is noted; **b.** and **c.** contusion of upper pole (arrow). Pelvicalyceal dilatation and thinned cortex are also observed.



**Figure 4.** Contrast enhanced computed tomography (CECT) of upper abdomen (reconstructed images): **a.** Normal imaging of two left renal arteries, and **b.** normal imaging of left renal vein. No signs of thrombus or laceration of left renal vessels was identified. Of note, the inhomogenous spleen's enhancements during the early stage of IV contrast administration (pseudomas effect due to differential enhancement of the red and white pulp).

grade I–III blunt renal trauma resolve without intervention (grade I: hematuria, normal imaging or small contusions, nonexpanding subcapsular hematoma; grade II: perinephric hematomas confined to the retroperitoneum, superficial lacerations <1 cm in depth without communication with collecting system; grade III: renal lacerations >1 cm with no involvement of collective system). In the same population, most cases of grade IV blunt renal trauma can be treated conservatively (grade IV: lacerations extending through the kidney into the collecting system, involvement of renal vessels with contained hemorrhage, segmental infarctions, large hematomas compressing the kidney). When a symptomatic urinoma develops, percutaneous drainage provides the complete resolution of persistent urine leakage. Patients with complete renal fracture or significant urinary extravasation on initial radiographic imaging may be less likely to undergo spontaneous resolution. Patients with a persistent urinary leak can be successfully treated with internal drainage. Grade V injuries (shattered or devascularized kidney, ureteropelvic avul-

sions, complete laceration or thrombus of the main renal vessels) in most cases require open operative intervention.

## References

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**Diagnosis:** Renal trauma (cortical renal rupture and perinephric urinoma)