Urinary Tract Trauma

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25.1 Introduction: The Context

Evaluating a child who has sustained abdominal injury is daily practice in a department of pediatric radiology. In this chapter, emphasis will be put on pediatric particularities of renal injuries. Obviously, renal trauma cannot be separated from associated traumatic lesions. This is especially true in organizing the imaging strategy.

Blunt abdominal trauma is much more frequent than penetrating ones. Various mechanisms may be involved, but discrepancy between the deceleration and severity of renal trauma can be encountered. For example, a relatively minor trauma can induce a severe renal fracture in cases of underlying kidney/urinary tract malformation (Fig. 25.1) or tumor (Fig. 25.2). The most severe lesions are usually observed following motor vehicle accidents, pedestrian crashes or sport injuries (biking, skiing, and horseback riding). On the other hand, minor trauma represents the most frequent situation: a fall while playing for toddlers, bathroom accidents for neonates and young children. Inflicted injury should always be kept in mind as a potential cause (Fig. 25.3).

Nowadays, in the vast majority of trauma patients, the management is non-operative and non-interventional. This principle was first applied in children; it is now becoming a rule in adult traumatology as well. A trend toward non-operative management naturally impacts on imaging strategies.

Conclusion

In cases of discrepancy between a relatively minor trauma and intense symptoms (pain, hematuria, and shock), underlying renal disease or malformation is likely.
Clinical Evaluation and Imaging Strategies

25.2.1 Children with Severe Trauma and Multiple Injuries

Clinical findings are frequently limited, and even may be misleading. The mechanism of trauma and level of deceleration are essential elements of the diagnosis and imaging strategy. The presence of abdominal (the “seat belt sign”) or lumbar ecchymoses correlates positively with severe intra-abdominal injuries. The gastrointestinal tract (duodenum) and the pancreas are more frequently involved in this situation (Sokolove et al. 2005). Skin lesions have to be considered in the imaging management since they may represent a contraindication to ultrasound examination. The localization of pain can point toward a specific organ lesion; for example, left upper quadrant pain points to the spleen and left kidney. Hemodynamic parameters (heart rate, blood pressure) are crucial in organizing the child’s management and imaging workup.

In cases of unstable, non-transportable children, surgery could be performed on an emergency basis. The role of imaging is extremely limited; a “focused assessment with sonography for trauma” (FAST) is