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Trauma and reconstruction

Delayed presentation of grade-IV renal injury post blunt trauma

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ABSTRACT

High-grade renal injuries are relatively uncommon in blunt trauma. They typically occur in the context of multisystem injuries. When present, these renal injuries are usually identified at the time of hospital presentation. Here, we present a case of delayed presentation of American Association for the Surgery of Trauma (AAST) grade-IV renal injury in a 61-year-old female who sustained multisystem injuries during a high-speed motor vehicle accident. To our knowledge, this is the first report case of delayed presentation of grade-IV renal injury. This case highlights the importance of serial examination and repeated imaging in complex trauma patients.

Introduction

Renal injuries occur in 5% of all major trauma patients. Although relatively uncommon, they can be associated with significant morbidity and mortality.[1] Currently, the AAST renal injury classification system is the most widely used instrument to grade and standardise reporting of renal injuries.[2] Briefly, it is composed of 5 grades (I-V) in ascending order of severity based on parenchymal injury depth, renal vessels and collecting system involvement. It is a useful tool to predict clinical outcomes and the potential need for nephrectomy in patients with renal trauma.[2] Most renal injuries resulting from blunt trauma and are typically low to moderate grade (AAST grade I-III). High grade (grade-IV and V) renal injuries occur infrequently, with a reported incidence of 1%–2% of all traumas, and are usually recognised on presentation.[3] Most blunt renal trauma can be successfully managed non-operatively with supportive care, observation and repeated imaging. Surgery is usually indicated following penetrating injuries and in those with haemodynamic instability despite volume resuscitation.[4] Over the past 20 years, advances in radiographic imaging technology, especially computerised tomography (CT), have resulted in an improved ability to identify previously undetectable renal injuries.[5]

Here, we describe a unique case of a 61-year-old female who sustained an AAST grade-IV kidney injury in a high-speed motor vehicle accident, which only manifested 3 days post hospital presentation.

Case report

A 61-year-old female with no significant past medical history was the driver of a sedan involved in a high-speed (combined speed > 200kph) head-on collision with another motor vehicle. On arrival to hospital, she had a patent airway, respiratory rate of 20, oxygen saturation of 90% on room air, blood pressure of 120/60 mmHg, heart rate of 80 and a Glasgow coma score (GCS) of 15. Examination of her head, neck, chest, abdomen and upper limb were unremarkable. She had marked tenderness over her right pelvis, and a swollen right calf. Additionally, there were no other injuries identified on tertiary survey the following day.

She underwent CT evaluation of her brain, chest, abdomen and pelvis. X-rays of peripheral long bones were also performed. Her CT abdomen and pelvis demonstrated multiple bilateral pelvic fractures. Additionally, free fluid was noted in her peritoneal cavity with no clear source of fluid identified. Importantly, no free intraperitoneal gas was seen. The liver, spleen, pancreas and kidneys were of normal appearance and the kidneys were excreting contrast promptly (Fig. 1, Fig. 2). Although no evidence of peripheral long bone fractures were found on x-rays, she developed clinical and objective evidence of compartment syndrome in her right calf (posterior compartment pressures of 55 mmHg). Therefore, based on clinical and radiological findings, a diagnostic laparotomy and a right lower limb four compartment fasciotomy were performed.

Laparoscopy findings were of a sigmoid mesocolon tear with no active bleeding or bowel ischaemia. She had no other injuries identified in the stomach, small bowel, bladder, colon, liver or spleen. Furthermore, no significant retroperitoneal haematoma was seen.

On day 3 of her admission, she reported increasing left flank pain. Repeat CT of her abdomen and pelvis demonstrated a contrast collection around the left renal pelvis and proximal ureter indicating an evolving urinoma and associated grade-IV injury to the collecting

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Fig. 1. Initial axial CT abdomen and pelvis.

Fig. 2. Initial contrast coronal CT scan demonstrating contrast in the renal pelvis and bladder.

system (Fig. 3). There was no evidence of injury to the renal artery or parenchymal laceration. The remaining renal collecting system and ureters appeared normal. Following urological consultation, she was

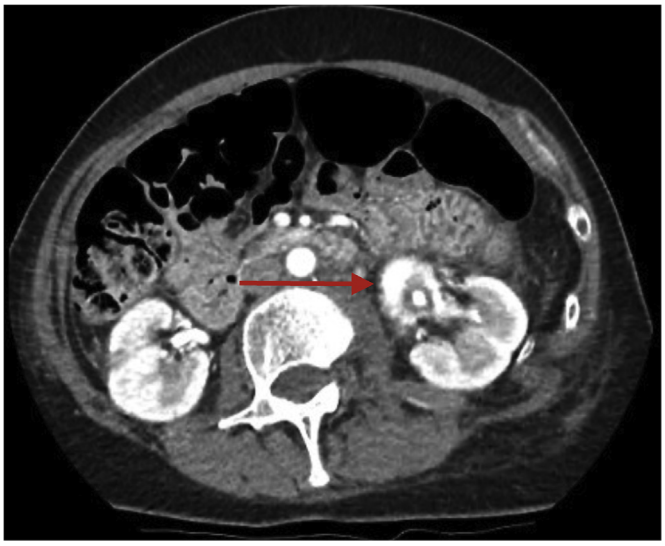

Fig. 3. Axial CT abdomen and pelvis day 3 post injury demonstrating contrast collection around left renal pelvis and proximal ureter.

managed non-operatively. Follow-up CT imaging 6 days after presentation demonstrated no significant interval change and ultrasound imaging 14 days post presentation demonstrated no perinephric collections with mild prominence of both renal collecting systems.

Discussion

High-grade renal injuries are uncommon in blunt trauma and are typically diagnosed on presentation.[5] We hypothesize that our patient's grade-IV renal injury resulted from rapid deceleration, leading to a shearing disruption between the relatively fixed kidney and the relatively free ureter at the renal hilum. Interest in our case lies in the rarity of delayed presentation of a high-grade renal injury post blunt trauma which highlights the need to be cognisant that not all renal injuries are detectable at presentation, indicating the need for a low threshold for re-imaging and close follow up of these patients. The delayed presentation of this injury may mean that renal injuries may be underrepresented in trauma literature.

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