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Case Report

Primary operative renal salvage of grade-4 blunt renal injury: A case report

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Abstract. We report a case of grade IV blunt renal injury in an hemodynamically unstable 12-year-old boy successfully treated by primary open surgery. Adequate surgical treatment in strictly defined cases of blunt renal injuries provide the long-term preservation of injured kidney without significant complications.

Key words: Severity blunt renal injury, children, hematuria, management

1. Introduction

Renal injuries represent about 10% of all blunt abdominal injuries (1) and blunt trauma accounts for 82-95% of all renal injury (2). Renal trauma in children occurs relatively frequently following blunt abdominal trauma due to the relative lack of perirenal fat and decreased protection from incompletely ossified ribs (3,4). Although the vast majority of blunt renal injuries initially should be managed nonoperatively, we report a case of hemodynamically unstable boy with grade IV blunt renal injury, successfully treated by primary open surgery.

2. Case report

An 12-year-old boy was admitted to our Emergency Centre with a history of blunt trauma of left posterior abdomen and left lumbar region after the fall on the stairs in the boy's school. Injury occurred two hours before admission to our institution. The boy had complained of a 2 large swelling and pain in his upper left quadrant. On physical examination, a mass was palpated, which almost entirely invaded the upper left quadrant and left flank. Clinically, the patient was pale and his pulse and blood pressure were 140 per minute and 90/50 mmHg, respectively. The patient presented with gross haematuria.

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Laboratory findings showed decreased levels of hemoglobin and hematocrit – 9.1g/dL and 23.9, respectively. Other laboratory tests (the prothrombin time, partial thromboplastin time, liver transaminases, pancreatic enzymes) were normal. The whole time, the patient was suffering from severe flank pain. Abdominal ultrasonography revealed a large retroperitoneal hematoma around the left kidney, a small subcapsular hematoma of the lower pole of the spleen (2x2 cm in diameter) and a hematoma of the large curvature of the stomach. Contrast-enhanced computed tomography scan showed major laceration of the upper pole of left kidney extending to the medulla with involvement of the collecting system (Figure 1).

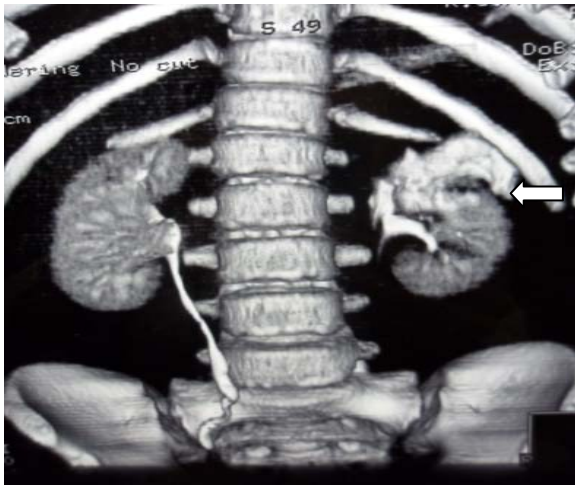

Fig. 1. Contrast-enhanced computed tomography scan shows leakage of contrast material caused by laceration of the collecting system (white arrow).

The renal injury was compatible with a grade 4 injury, as defined by the Renal Injury Scale of the American Association of Surgeons in Trauma (5). The opposite kidney was normal.

Initially, the patient was managed with attention to the basic ABCDs outlined in Advanced Trauma Life Support protocol. The indication for urgent surgical exploration was set for patient's hemodynamic instability and unrelenting gross hematuria. The goals of operative therapy were control of bleeding and possible preservation of renal tissue as well as the ability to address concurrent injuries. Our operative strategy has consisted of control of the renal vessels, outside of the Gerota fascia, at their junction with the aorta and cava. Upon entry in the left retroperitoneum was performed the decompression of the renal hematoma. It was revealed the avulsed fragment (upper half) of the left kidny (Figure 2).

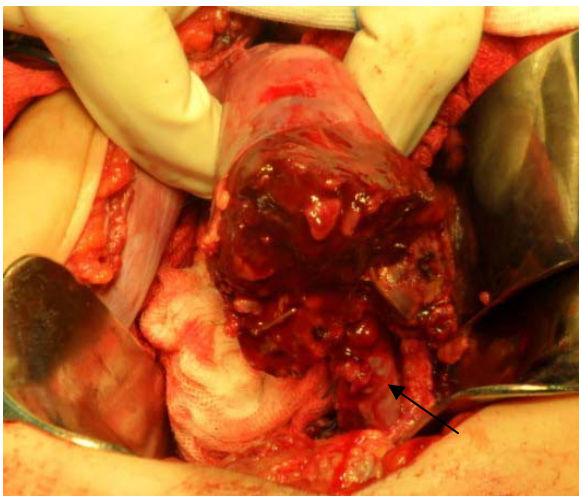

Fig. 2. The rest of the functional left kidney. Observe the renal vein (black arrow)

Consequently, we performed a partial nefrectomy (heminefrectomy) with collecting system repair and setting of topical thrombostatic agent on the place of resection.

The postoperative course was proceeded satisfactorily with presence of urinary extravasation (100 mL/day) to 9th postoperative day when it decreased significantly and then completely stopped spontaneously in 12th postoperative day. All the time, patient was hemodynamically stable and serial hematocrit measurements were normal. The patient was discharged at 15 postoperative day. At 12 month of follow-up renal radionuclide renal scans (RNRS) showed functional left kidney. The patient had no evidence of hypertension after one year of follow-up.

3. Discussion

Most blunt renal injuries in children are low-grade, so their treatment are usually consist of close observation and bed rest alone. Pediatric patients with high-grade renal injuries who are hemodynamically stable should be managed nonoperatively with surgery reserved only for those with ongoing bleeding (6). Nonoperative treatment of renal lacerations from blunt trauma associated with urinary extravasation is associated with few complications, which can usually be treated with endourological or percutaneous methods (7,8). Complications after renal trauma include urinary extravasation, urinoma, infected urinoma, secondary hemorrhage, perinephritic abscess, pseudoaneurysm, hypertension, arteriovenous fistula and pulmonary complications (9). Of these complications, extravasation of urine is the most common and occurs in almost all patients with grade IV parenchymal injury and grade V ureteropelvic junction avulsion.

In our case, the indication for urgent surgical exploration was based on hemodynamic instability of the child and unrelenting gross hematuria. Because hypotension is a late manifestation of hypovolemia in children, the clinical parameters for our decision were tachycardia and decreased blood perfusion in the skin. Our case report that transperitoneal approach in treatment of renal injury with control of the renal vessels may provide a safe partial nephrectomy.

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