Trauma and reconstruction

Bilateral penetrating renal trauma in 9 Years old syrian girl: A case report

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Abstract

Although retroperitoneal is a protected place, the kidney is the most common organ to be injured by genitourinary system trauma. In this paper, we present an extremely rare case of bilateral penetrating renal trauma in a 9-year-old girl caused by a gunshot. A laparotomy was done which showed grade IV and V injury to the left and right kidney respectively. After that, three days of intensive care unit admission were eventually. Finally, we discharged the girl in good health. In Conclusion, dealing with such cases should be urgent to avoid life-threatening injuries, and to save renal parenchyma.

Introduction

Trauma to the genitourinary system in children is not uncommon and can result in unacceptable morbidity and mortality. It has been observed that 3% of children seen in the trauma unit sustained significant injuries to the genitourinary tract. Injuries may be as a result of blunt trauma after falls, car accidents and assaults, or from penetrating injuries as a result of sharp objects: knives or from gunshot wounds.

The management of BPRT remains challenging, placing particular emphasis on renal parenchymal preservation.

Bilateral penetrating renal trauma (BPRT) is extremely rare and sporadically reported in the previous literature. We described a case of bilateral penetrating renal trauma in a child.

Case presentation

A 9-year-old girl was admitted to the emergency department at Aleppo University Hospital with a history of a gunshot in the left flank. The patient was brought to the hospital after 3 h of the accident since it happened in a small remote rural area in the countryside where there was no medical center. On examination, the patient had no significant medical history. However, she was pale and lethargic with no active bleeding. Also, there were two holes; one is the entrance hole in the left flank and the other was an exit hole in the right flank. Her blood pressure was 70/40 mm/Hg, Pulse 126/min, and respiratory rate was 22/min. other reported signs included free airway, cold extremities, and response just to pain stimulation. The Foley placement revealed gross hematuria. Laboratories showed a hemoglobin value of 8 mg/dl. Other laboratories are (creatinine 3.1 mg/dl and urea 143mmol/l). Due to instability, two large access venues were obtained and the patient was taken to the operating room immediately. She underwent to urgent laparotomy.

By midline abdominal approach, we found a moderate amount of free blood in the intra-abdomen and pelvis. Spleen, liver, small intestine, and stomach were all normal. There was a 2 cm single hole in the ascending colon. Retroperitoneal exploration revealed grade V injury to the right kidney and grade IV injury to the left kidney according to the American Association for the Surgery of Trauma (ASTT).

Immediately, we performed right simple nephrectomy (Fig. 1) and we started left renal reconstruction (Fig. 2). During the surgery, the patient received 250 ml of blood and one packed fresh frozen plasma. The duration of the reconstruction was 86 minutes. Finally, we inserted double j. After that, we admitted the patient to the intensive care unit (ICU) for observation. This took three days long. In ICU, we observed vital signs, abdominal status, urine output, abdominal & pelvis ultrasound, left retroperitoneal drainage, and laboratories including (complete blood count, creatinine, urea, potassium, sodium, and glucose) daily (Table 1). After 72 hours of admission to ICU, the patient was extubated and transferred to the urology ward for observation. On the second day, we discharged the patient and controlled for reassessment after one week. On the first visit after discharge, we found the patient in good health. Serial radiology and laboratory were negative. The patient’s family preferred to complete the next evaluation in their town. After which, we did not see the patient.

Discussion

In children, the kidney is commonly injured following blunt trauma because of many anatomical reasons: less perirenal fat, thinner
abdominal muscles, lack of ossification of the rib cage, larger kidney size, and fetal kidney lobulations, making them more vulnerable to injury.\(^3\)

Penetrating trauma can affect the kidneys especially when the superior abdomen is involved. Isolated penetrating kidney injuries are rare and renal vascular injuries are more frequent than in blunt trauma.\(^3\)

For patients with suspected renal trauma, initial assessment including airway, breathing, and circulation is necessary. In cases of hemodynamic instability and severe hemorrhage, immediate exploration may be considered preferentially.\(^7\) Our patient was unstable due to late admission and serious injury, so she was sent to the operation room immediately.

Most patients with penetrating renal trauma treated surgically. However, the recent systemic reviews recommend conservative management.

Currently, the gold standard imaging for hemodynamically stable patients with penetrating renal trauma is intravenous contrast-medium enhanced CT. It has replaced intravenous pyelography in virtue of its wide availability, superior anatomical, and functional information, and the ability to identify associated injuries.\(^2\)

The most common renal trauma classification is the American Association for the Surgery of Trauma (AAST) classification (Fig. 1), an anatomic description, scaled from 1 to 5, representing the least to the most severe injury. The AAST classification was validated by five studies.

The AAST grade of renal injury, the overall injury severity of the patient, and the requirement of blood transfusion were the primary factors in determining the patient’s need for nephrectomy and overall outcome. The AAST grade is a predictor for morbidity in blunt and penetrating renal injury, and mortality in blunt injury. The AAST grade has a statistically significant correlation with the need for surgery (from 0 to 93%) and the risk for nephrectomy (0–86%). Moreover, patients with gunshot injury have higher AAST grades than those with blunt trauma.\(^4\)

This girl had a grade IV injury in her left kidney, grade V in her right kidney. According to our hospital records, this is the first case of a pediatric patient with bilateral penetrating renal trauma by gunshot in the left flank treated by right simple nephrectomy and left renal reconstruction.

Admitting to the intensive care unit after surgery should be done for all such patients. During ICU admission; laboratories including complete blood count, renal function tests, and abdominal status should be observed. Serial imaging by complete abdominal ultrasound is also recommended. Follow-up later is crucial for treating any deterioration in kidney function tests.

### Conclusion

Pediatric penetrating kidney injury secondary to gunshot trauma can be life-threatening and require urgent management. Following the American Association for the Surgery of Trauma (AAST) classification is the best procedure currently in expecting the clinical course for the trauma patients.

### References

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| Table 1 |
| --- |
| Laboratories during intensive care unit admission. |
| | Day 1 | Day 2 | Day 3 |
| Glucose | 101 mg/dl | 98 mg/dl | 107 mg/dl |
| Hemoglobin | 10.2 mg/dl | 9.5 mg/dl | 9.7 mg/dl |
| Wight blood cells | \(1.8 \times 10^9\) | \(1.3 \times 10^9\) | \(1.1 \times 10^9\) |
| Platelets | \(190 \times 10^5\) | \(172 \times 10^5\) | \(170 \times 10^5\) |
| Creatinine | 3.9 mg/dl | 2.8 mg/dl | 1.6 mg/dl |
| Urea | 178 mg/dl | 136 mg/dl | 81 mg/dl |
| Sodium | 141 mEq/L | 130 mEq/L | 139 mEq/L |
| Potassium | 4.8 mmol/L | 3.1 mmol/L | 3.7 mmol/L |

Fig. 1. Right renal injury grade V before nephrectomy.

Fig. 2. Left renal injury before renal reconstruction.

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