

Pediatric renal trauma: Conservative management**Manisha Albal¹, Avinash Rode², Prasad Yogendra Bansod² and Vedvati Albal²**¹Department Pediatrics Surgery, NKP Salve Institute of Medical Sciences, Nagpur, India²Department of General Surgery, NKP Salve Institute of Medical Sciences, Nagpur, India***Correspondence Info:**

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E-mail: rabbu7288@gmail.com**Abstract**

The kidney is the most common genitourinary organ injured from external trauma, occurring in 1% to 5% of all injuries. Non operative management of renal injuries with renal salvage as the primary aim has gained much support in the past decades; though paediatric data is limited. Here we present a case of unilateral complete transection managed conservatively and the renal salvage was possible with retaining normal function.

Keywords: Blunt renal trauma; renal transection.**1.Introduction**

The kidney is the most common genitourinary organ injured from external trauma, occurring in 1% to 5% of all injuries[1]. Non operative management of renal injuries with renal salvage as the primary aim has gained much support in the past decades; though paediatric data is limited. Here we present a case of unilateral complete transection managed conservatively and the renal salvage was possible with retaining normal function

2. Case Report

A 3 year old male child was referred with a history of being run over by a car an hour ago. There was no history of unconsciousness, haematuria, hematemesis or bleeding from any site. On clinical examination patient was fully conscious and had tachycardia and pallor, but was haemodynamically stable. Respiratory findings were within normal limits.

Patient was put on primary baseline management ensuring hemodynamic stability with careful monitoring of serial haematocrit and renal function.

Patients X-ray abdomen was normal and ultrasound revealed a perinephric hematoma around left kidney with small splenic capsule tear and minimal free fluid in the abdomen. Renal function tests were normal and no frank haematuria on catheterization.

After 72 hrs a repeat ultrasound showed same findings. Patient was started on oral diet as he was haemodynamically stable with adequate renal functions, which he tolerated well.

On 5th day after the injury, reddish tinge was noted in the urine and microscopy showed few RBC's.

Contrast enhanced CT scan was done which showed complete renal transection of left side. (Figure 1)

Figure 1: CT scan

As the patient was stable, Conservative management was continued for 10 days thereafter and was discharged home.

A follow-up renal imaging study was done after an interval of 3 months which revealed a normally functioning kidney on left side. (Figure 2)

Figure 2: CT scan after an interval of 3 months

3. Discussion

The kidney is the most common genitourinary organ injured from external trauma, occurring in 1% to 5% of all injuries. Blunt traumas are more frequent than penetrating and occur in urban setting, mostly as a result of falls from height, motor vehicular accidents and blunt assaults. Around 2% of blunt injuries require exploration against 50 % penetrating trauma[1].

During the last 3 decades management of high grade renal injury in adults has gradually shifted from immediate surgical intervention to initial observation consisting of intensive care monitoring followed by surgical intervention only when indicated by deteriorating clinical signs

Children under 16 require increased suspicion for renal injury because of anatomic and physiologic differences from adults. They have relatively large kidneys, underdeveloped Gerota's fascia and less perirenal fat, incomplete ossification of the lower ribs, and kidneys that are located in the abdomen and are less protected by the ribs.

Guidelines for management of paediatric high grade renal injuries are currently based on limited paediatric data and algorithms from adults, for whom initial nonoperative management is associated with decreased nephrectomy risk.

Renal injuries are defined as vascular or parenchymal, with vascular injuries consisting of main renal artery or vein injury with contained haemorrhage and avulsion of the renal hilum, and parenchymal injuries consisting of laceration extending through the main renal cortex, medulla and

collecting system with urine leak, and completely shattered kidney[4].

Decisions regarding whether to image are predicated on mechanism (blunt/penetrating), presence of haematuria (gross/microscopic), and shock although Shock is an unreliable indicator of injury extent in children because they can have a robust catecholamine response to stress that can mask severe blood loss

In adults, blunt trauma with gross haematuria should prompt imaging, as should blunt trauma with microscopic haematuria and shock. Major acceleration or deceleration injuries such as a fall from a great height or a high-speed motor vehicle accident should prompt imaging.

Penetrating injuries, any degree of haematuria or injury location suspicious for renal trauma prompt imaging. Lower thresholds to image children exist given their anatomic differences. Any paediatric trauma (younger than 16 years) with any degree of significant haematuria (greater than 50 red blood cells per high-powered field) should be imaged.

Majority of renal injuries can be managed nonoperative. Improvements in the reliability of staging imaging have resulted in increased nonoperative management. Surgeons have increasingly managed other solid organ injuries such as spleen and liver nonoperative, there has been a rise in the nonoperative management of kidney injuries.

After appropriate staging, patients are typically managed with bed rest, hemodynamic monitoring, and serial haematocrits. Some evidence suggests that bed rest can be avoided unless haematuria increases or resumes after ambulation. Transfusions should be given as needed, but when more than 6 units are needed or hemodynamic instability develops, repeat imaging and possible embolization or surgical exploration may be needed.

Conservatively managed kidneys with collecting system injuries should be reimaged 3 to 5 days later to evaluate persistent urine leak or urinoma formation. Patients with large leaks are typically managed with indwelling stents, while large or infected urinomas are drained percutaneously. Patients with a urine leak, Foley catheter drainage is used to decompress the urinary system, and antibiotic therapy is used to prevent infected urinomas.

Angiography and embolization are recommended for (1) patients with persistent bleeding from a segmental renal artery, (2) unstable patients with a Grade III or IV renal injury, (3) treating a pseudo aneurysm or arteriovenous malformation, (4) cases of persistent gross

haematuria, and (5) a rapidly declining haematocrit requiring 2 units of blood.

Absolute indications for renal exploration include expanding, pulsatile, uncontained retroperitoneal hematomas; renal pedicle avulsion; persistent, life-threatening haemorrhage or shock; and ureteropelvic junction disruption.

Relative indications for renal exploration include urinary extravasation with nonviable tissue; concurrent colon/pancreas/trauma exploration with incomplete staging or Grade III or greater concurrent renal injury; Reno vascular hypertension; and failed embolization.

Whenever surgery is inevitable, organ preservation is the target of the surgery.

Complications after renal trauma are rare. They usually occur within the first month after trauma.

Early complications like urinoma formation and prolonged urinary extravasation are the most common and result from collecting system injury. When urinomas become infected, an abscess may form. Large urinomas or abscesses require percutaneous drainage. Prolonged urinary extravasation can typically be managed with a ureteral stent.

Late complications include delayed bleeding, abscess formation, urinary fistula, hypertension, and hydronephrosis. Delayed bleeding is typically caused by a pseudo aneurysm or arteriovenous fistula, either from the initial injury or the repair, and presents 2 to 4 weeks after surgery. Abscess formation is treated by percutaneous drainage and systemic antibiotics.

A delayed urinary fistula should be evaluated to determine its location. Concurrent ureteral stricture or injury may be discovered. An indwelling stent and/or percutaneous drainage of the kidney should be used with a delayed definitive repair 3 to 6 months later. Hypertension is a rare, long-term complication that results from either parenchyma compression (Page kidney) or arterial stenosis (Goldblatt kidney) and chronic up regulation

of the renin/angiotensin axis. Hypertension is usually controlled medically, although severe renal compression secondary to a hematoma detected in the postoperative period may benefit from immediate surgical decompression. Hydronephrosis may develop after perinephric fibrosis that involves injuries to the ureteropelvic junction or lower pole of the kidney. Interposition of the omentum or perinephric fat between the injured kidney and the ureter is recommended to prevent such a complication.

Initial conservative therapy has been explored in the paediatric population, although most studies to date are small, single institution series. These studies are supportive of conservative management currently the guidelines for management of high grade paediatric renal trauma are based on these limited data, and practice varies by practitioner and facility. To establish relevant guidelines, there is a need for additional studies to support the development of evidence-based recommendations.

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