

TRAUMATIC INTRAPERITONEAL RUPTURE OF THE KIDNEY IN CHILDREN

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ABSTRACT

Background: About 10% of all injuries seen in the emergency room involve the genitourinary system to some extent. Renal injuries are the most common injuries of the urinary system. A blunt trauma directed to the abdomen, flank, or back is the most common mechanism. A kidney with a pre-existing abnormality is at increased risk for injury. The objective of the study is early detection of intraperitoneal rupture of the kidney in cases of acute abdomen and also to confirm the fact that the severity of patients' symptoms is disproportionate to the degree of injury in children suffering from renal abnormalities.

Patients & methods: A total of 15 patients were included in the study from 2004-2009. The age range was 3-13 years. Five patients were girls & ten were boys. A brief history was taken and a thorough physical examination was done. Hemoglobin, packed cell volume and urinalysis were done. Imaging by ultrasonography and computerized tomography (CT) with contrast were done in these patients. Emergency laparotomy was performed in all patients.

Results: Intraperitoneal rupture of the kidney with urine peritonitis (uoperitoneum) was found in all patients. Seven patients had left sided renal injuries while eight patients had right sided injuries. A thin renal parenchyma with extravasation of contrast media into the peritoneal cavity were found in CT of all patients. Nephrectomy was the decided surgical treatment in every patient.

Conclusion: It can be concluded that children with hydronephrotic kidneys are more prone to intra-peritoneal rupture from minor trauma and a high index of suspicion is needed to diagnose those patients with intraperitoneal rupture of the kidney.

INTRODUCTION

About 10% of all injuries seen in the emergency room involve the genitourinary system to some extent. Renal injuries are the most common injuries of the urinary system. A blunt trauma directed to the abdomen, flank, or back is the most common mechanism. Trauma may result from motor vehicle accidents, fights, falls, and contact sports.^[1] The proportion of all renal injuries which are blunt-Europe 97%, USA 90%, South Africa 25-85% and it depends on whether from urban or non-urban community. In children, there is proportionately less perirenal fat to cushion the kidneys against injury, and thus renal injuries occur with lesser degrees of trauma.^[2] A kidney with a pre-existing abnormality is at increased risk for injury.^[3] An underlying renal disorder may be first brought to medical attention because the severity of the patient's symptoms is disproportionate to the degree of injury suffered. Trauma to an abnormal kidney occurs more frequently in children than in adults. Such injuries include disruption of the renal pelvis or ureteropelvic junction in patients with hydronephrosis or an extra-renal pelvis, intra-cystic hemorrhage or

rupture of a renal cyst with or without communication with the collecting system, rupture of a tumor, laceration of poorly protected ectopic or horseshoe kidneys, and finally laceration of fragile, infected kidneys.^[4] In general, hematuria (>5 red blood cells per high power field) is present in over 95% of patients who sustain renal trauma.^[5] However, the absence of hematuria does not preclude significant renal injuries^[6] and also the degree of hematuria correlates poorly with the degree of renal injury and should not determine clinical decision making.^[7] Computed tomography (CT) has replaced excretory urography as the primary modality for the assessment of suspected renal injuries. CT is more sensitive and specific than urography in the detection and characterization of suspected renal injury^[8-10] and has become the imaging method of choice for the assessment of blunt abdominal injuries in major trauma centers in the United States.^[11] Ultrasonography is useful in detecting hemoperitoneum in patients with suspected intraperitoneal injury but has limited value in evaluating those with suspected extra peritoneal injury.^[12] This study was carried out to assess

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the early identification of intraperitoneal rupture of the kidney in cases of acute abdomen and to confirm the fact that the severity of patient's symptoms is disproportionate to the degree of injury in children suffering from renal abnormalities.

PATIENTS AND METHODS

A total of 15 patients were included in the study. All of them were below 14 years. The age range was 3-13 years (mean age was 6.93±3.28 SD). Five patients were girls and ten patients were boys (Table-1). The patients were received by the emergency unit of Basrah General Hospital from 2004 till 2009. A brief history about the mechanism of trauma and the presenting symptoms were taken. All patients had vague abdominal pain, nausea and vomiting. Abdominal distension and tenderness were common finding on physical examination. General urine examination and a baseline packed cell volume were performed. Ultrasonography was the initial imaging method done followed by contrast enhanced computerized tomography (CT).

RESULTS

Intraperitoneal rupture of the kidney was found in all patients during explorative laparotomies. A thin renal parenchyma of long standing obstruction with uroperitoneum were the most common findings in these patients. No associated other abdominal organ injury was detected. Seven patients had left sided while eight patients had right sided renal injuries. Due to serious injury of the diseased hydronephrosed kidney, nephrectomy was the decided surgical treatment. The mechanisms of injury were a fall from height on the abdomen from a very low distance (which was disproportional to the severity of injury) in 5 patients while minor blunt trauma (minor blow to the abdomen) occurred in 10 patients.

Table 1. Characteristics of the studied patients

Variable	No. (%)
Sex	
Boys	10 (66.7 %)
Girls	5 (33.3 %)
Side	
Right	8 (53.3 %)
Left	7 (46.7 %)
Mechanism of injury	
Fall from height	5 (33.3 %)
Minor blow to the abdomen	10 (66.7 %)

DISCUSSION

kidneys with existing pathological conditions such as hydronephrosis or malignant tumors are more readily ruptured from mild trauma.^[1] This fact correlates with the findings of this study and it is clear that fall from height (from a low distance) and minor blow to the abdomen were the commonest mechanisms of injury. Ekwueme from Department of Surgery, University of Nigeria had reported two cases of intraperitoneal rupture of hydronephrosed kidneys.^[13] Three cases with congenital pelviureteric junction (PUJ) obstruction reported by Rifat, Baghdad, presented with acute abdomen due to spontaneous rupture of the kidney and all had uroperitoneum. This underlying pathology should be born in mind when dealing with cases of acute abdomen.^[14] In this study, the rupture occurred without trauma and this gives a hint that minor trauma is enough to produce injury of a diseased kidney. All patients required emergency explorations. Definitive treatment was not undertaken and nephrostomy drainage was the reasonable answer to shorten the operative time, deferring the plasty after dealing with the coexisting emergency condition.^[14] In this study, nephrectomy was done in all patients due to serious injury of the kidney. A case of spontaneous rupture of pyonephrotic kidney into

the peritoneal cavity with subsequent peritonitis is reported by Balas, et al. The patient was treated successfully by nephrectomy with drainage of the retroperitoneal space and peritoneal cavity. This complication is extremely rare and is disclosed during an emergency abdominal exploration for peritonitis.^[15] All patients had vague abdominal symptoms with no clear lateralization to one side but rather central and strongly linked to their gastrointestinal system, this fact is well known since the autonomic nervous system transmits visceral pain. Confusion about the source of the pain is not uncommon and is related to the diffuse spreading of strong stimuli to other areas of similar autonomic innervations as the celiac ganglion serves both kidneys and stomach.^[16] The hydronephrotic kidney tends to project posteriorly unlike neoplastic one which tends to enlarge anteriorly.^[17] The results of the current study do not agree with this fact as the trauma was directed to the abdomen anteriorly which means that hydronephrotic kidney tends to enlarge anteriorly.

In conclusion, from this study it can be concluded that children with hydronephrotic kidneys are more prone to intra peritoneal rupture from minor trauma and this should be born in mind when dealing with cases of acute abdomen.

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