Traumatic rupture of a horseshoe kidney with left-sided hydronephrosis in a 15 year-old patient

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Abstract

Aim: To present the clinical and imagistic features of a case involving a 15 year- old male who presented with abdominal trauma and hematuria after an accidental fall. The CT investigation revealed a ruptured horseshoe kidney. The patient required surgery after initial ICU monitoring.

Material: A 15- year old patient was admitted with clinical picture of acute abdomen and total haematuria after a 3-meter fall. The CT Abdomen revealed rupture of a horseshoe kidney and hydronephrosis on the left side. The patient was admitted on the ICU ward for monitoring. Later he required surgery due to haemodinamic instability.

Results: Surgery confirmed the presence of a horseshoe kidney with rupture on the left side, which also had grade IV hydronephrosis, as well as massive free blood inside the abdomen and splenic contusion. Left heminephrectomy and isthmus suture with #1 Vicryl stitches were performed. The postoperative course was uneventful. The patient was discharged on POD #9.

Conclusions: Specific features of the case include the association between a ruptured horseshoe kidney, not known before the accident, and grade IV hydronephrosis on the left kidney. The patient required surgery, which consisted of left heminephrectomy. Surgery became necessary because of the haemodynamic instability and led to an appropriate management of the case.

Key words: horseshoe kidney, hydronephrosis, rupture

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Introduction

The horseshoe kidney is a rare condition, with an estimated incidence of 2.5% in the general population. Males are twice more frequent affected as females. In 1/3 – 1/2 of the cases, the condition is incidentally identified following an acute abdominal trauma. Treating a patient with a previously undiagnosed ruptured horseshoe kidney may represent a serious surgical challenge. We present the case of a 15 year- old patient who presented in similar conditions with a ruptured horseshoe kidney, which was also found to have a left-sided hydronephrosis.

Materials and Method

A 15- year old male patient presented at our local hospital on 10/ 19/ 2010, 4 hours after sustaining a left abdominal fall trauma. The clinical presentation was dominated by left abdominal pain and signs of peritoneal perforation. Haematuria became obvious after placing a urinary catheter.

Routine investigations, including CBC, urinalysis, renal function tests, pulmonary X-Ray (which showed elevated left diaphragm) were performed after admission, while the patient was hemodinamically stable. The abdominal CT examination identified a horseshoe kidney with ruptured left side, large amount (1. 5- 2 L) of intra- abdominal free fluid, and small amount of free fluid around the spleen (Fig. 1).

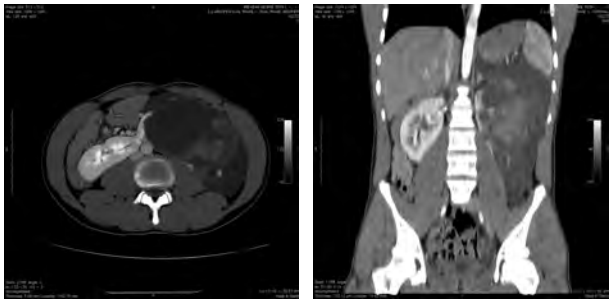


Fig. 1. Abdominal CT aspect at admition
(a- axial incidence showing the renal istmus; b- coronal incidence)

The patient was admitted on ICU for routine clinical monitoring. During admission, he developed haemodinamic instability, with systolic BP decreasing to 60 mm Hg and persistent tachycardia of 120- 130 bpm. Hematuria and abdominal distension also persisted. Emergent surgery was decided under general anesthesia under these circumstances. Given the history, clinical data and abdominal CT picture, the main surgeon decided to perform a left pararectal exploratory laparotomy, which would offer full exposure to both left side of the horseshoe kidney and spleen.

During surgery, a horseshoe kidney with complete rupture of the left side, which also presented grad IV hydronephrosis, was identified. Free urine and blood mixture in amount of 1500 mL was evacuated. As no option for conservative management was available, left (hemi) nephrectomy with careful ligation of two vascular pedicles, originating from distal aorta and left common iliac artery, respectively, was performed. The procedure also included partial excision of the renal isthmus, corresponding to left kidney, followed by suture with 'U- shaped' #1 Vicryl stitches.

A small blood layer surrounding the spleen was also identified, but it required no further procedure. The incision was closed in a standard fashion, leaving two drains behind.

Results

The patient did well after surgery, with stable vital signs, normal diuresis and kidney function tests. He had a short febrile episode of 38ºC on POD #2, but no residual abdominal collections were identified by US or abdominal CT. There were no complications following surgery. The drains were removed on POD #3. The patient was discharged on POD #9 in good general condition, afebrile, with normal diuresis and bowel movements, and healed incision.

A clinical postoperative check was performed after 3 months; at 9 months after surgery the patient presented with healed incision (Fig. 2), normal lab values, and CT findings showing: compensatory hypertrophy of a functional right kidney, with minimal pyelic hypertrophy and ascending orientation of the proximal right ureter (Fig. 3).

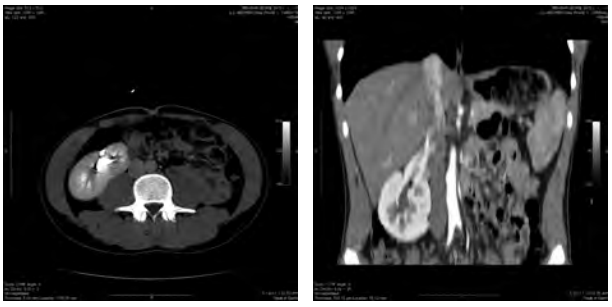


Fig. 2. Abdominal CT aspect at 9 months after surgery
(a- axial incidence; b- coronal incidence)



Fig. 3. Postoperative scar healed at 9 months

Discussion

The horseshoe kidney is a rare condition, in which the kidney is predisposed to rupture during abdominal trauma because of its abnormal form and position. In most cases, the kidney is being traumatized by compression against the vertebral column (e.g.: seatbelt compression during car collisions, etc.); the lack of proper protection on behalf of the thoracic cage can also represent an issue (1). Clinical and anatomical studies have shown that 70% of horseshoe kidneys are supplied by a combination of simple and multiple hilar blood vessels, while in 30% of the cases there is a combination of separate hilar vessels. The isthmus is vascularized by a single blood vessel coming from aorta in 65% of cases (2). Several cases with blood vessels coming from the inferior mesenteric artery, common iliac artery, internal or external iliac artery, or sacral artery have also been described (3).

The traumatic rupture of a horseshoe kidney is a rare event in practice, and careful initial assessment and haemodynamic monitoring are essential for choosing a correct approach to the patient. Abdominal US may be used as initial diagnostic tool. CT Abdomen remains the gold- standard diagnostic procedure, but intravenous pyelography (IVP) and MRI can also be considered for diagnostic purpose.

Conservative management is recommended initially, and according to literature data only 10% of the cases require surgery, mostly because of significant bleeding and haemodinamic instability.

Conclusions

We present a 15- year old male patient admitted in our hospital following an abdominal trauma secondary to a fall. The CT Abdomen revealed a horseshoe kidney with rupture on the left side and massive fluid leak inside the abdomen. The case has some specific features: **1.** co- existence of two congenital kidney malformations: horseshoe kidney and left hydronephrosis, which was confirmed during surgery; **2.** the clinical presentation was dominated by haemodinamic instability, haematuria and persistent peritoneal signs which, in conjunction with the CT data, finally required surgery to be performed; **3.** the postoperative course was uneventful with normal findings at 3 and 9 months after surgery, respectively, which confirmed the opportunity of the surgical treatment. We consider that a competent clinical and radiological assessment at the time of presentation is mandatory in order to obtain a good outcome in such cases.

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Rezumat

Introducere: Rinichiul în potcoavă este o afectiune rar întalnita în patologia generala. Afecțiunea poate fi diagnosticata întamplator, în urma unui traumatism abdominal. Autorii prezinta cazul unui pacient de 15 ani internat în urgenta cu ruptura post- traumatica de rinichi în potcoava, care prezenta ca malformatie asociata hidronefroza grad IV pe hemirinichiul stang.
Material si metoda: Pacient de 15 ani se interneaza cu tablou clinic de abdomen acut şi hematurie totala dupa un traumatism prin cadere de la 3 metri. Examenul CT abdominal evidentiaza ruptura unui rinichi în potcoava si hidronefroza pe hemirinichiul stang. Pacientul este internat pe sectia ATI pentru monitorizare clinica si hemodinamica, ulterior se decide interventia chirurgicala datorita instabilitatii hemodinamice.
Rezultate: Intraoperator se deceleaza ruptura hemirinichiului stang, care prezinta de asemenea hidronefroza grad IV, precum si hemoperitoneu masiv si contuzie splenica. Se practica heminefrectomie stanga si istmorafie cu fire resorbabile Vicryl 1. Evolutia postoperatorie favorabila, pacientul se externeaza la 9 zile postoperator.
Concluzii: Cazul prezentat prezinta particularitatea asocierii rinichiului în potcoava, nedecelat anterior traumatismului toraco- abdominal, cu hidronefroza grad IV pe partea stanga (care a necesitat heminefrectomie). Interventia chirurgicala a fost impusa de tabloul clinic si a permis rezolvarea cazului.

Cuvinte cheie: rinichi in potcoava, hifronefroza, ruptura