

Blunt renal trauma in occult congenital hydronephrosis

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ABSTRACT

Since the routine use of antenatal ultrasonography, congenital pelviureteric junction (PUJ) obstruction rarely presents as an incidental diagnosis following renal trauma. Gross haematuria following seemingly trivial trauma should arouse the suspicion of a pre-existing abnormality. We report a 14-year-old girl with previously asymptomatic and undetected PUJ obstruction who first presented with gross haematuria following a trivial fall. The diagnosis was established by an abdominal computed tomography that showed left chronic hydronephrosis, and was subsequently confirmed on a renal isotope scan. Since the pre-existing hydronephrosis has little impact on the recovery from the injury itself, the initial management was non-operative with an aim to conserve the kidney. As standard surgery has a good outcome, once the renal scan confirmed good renal function, a delayed Anderson-Hynes' pyeloplasty was performed following healing of the kidney laceration as seen on ultrasonography.

Keywords: haematuria, occult hydronephrosis, paediatric renal trauma, pelviureteric obstruction

Singapore Med J 2005; 46(1):28-30

INTRODUCTION

Gross haematuria following blunt renal trauma is one of the presentations of occult renal anomalies in children⁽¹⁾. In the emergent situation, the risks of operation include bleeding, need for nephrectomy, and surgical morbidity⁽²⁾. With the development of newer protocols, the treatment strategy has evolved from immediate surgery towards conservation of the functioning kidney. We report a case with previously asymptomatic and undetected PUJ obstruction who first presented with gross haematuria following a trivial fall. The diagnostic features at presentation and decision making in surgical management are discussed.

CASE REPORT

A previously-well 14-year-old Chinese girl presented with gross haematuria when she fell on her left flank

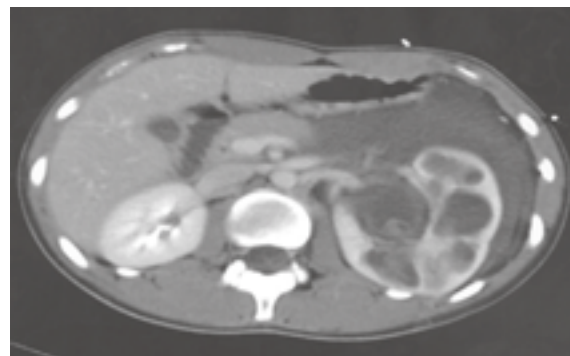


Fig. 1 Enhanced axial CT image shows left chronic hydronephrosis.

while jogging. Clinically, she was pale and her pulse and blood pressure (BP) were 83 per minute and 116/60 mmHg, respectively. There was tenderness and guarding over the left hypochondrial and lumbar regions. The rest of the abdomen was unremarkable. There were no external injuries. Her haemoglobin and haematocrit levels were 10.5g/dL and 31.9, respectively. Her urea and creatinine levels were 4.8 mmol/L and 84 µmol/L, respectively. The prothrombin time, partial thromboplastin time and serum amylase were normal.

Computed tomography (CT) showed severe left pelvicalyceal dilatation and a thinned cortex suggestive of left chronic hydronephrosis (Fig. 1). The ureter was collapsed. As per the American Association for the Surgery of Trauma classification⁽³⁾, a grade 2 injury was noted. There was a partial thickness corticomedullary laceration over the middle with an associated perirenal haematoma. This laceration was not communicating with the collecting system. The opposite kidney was normal. Apart from minimal free fluid in the pelvis, the rest of the abdomen as well as the lung bases were normal. Secondary survey did not reveal any associated congenital anomalies.

The patient was kept on strict complete bed rest. The patient continued to have gross haematuria. Daily monitoring of haemoglobin (Hb) levels showed an initial drop (from 10.5g/dL on admission, to 9.2g/dL after 48 hours and to 7.0g/dL after 96 hours) for which blood was transfused.

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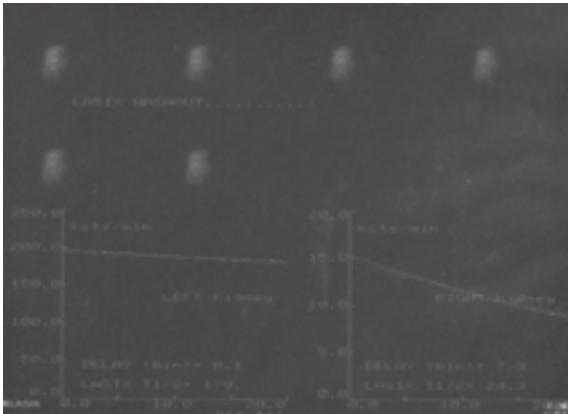


Fig. 2 DTPA renal scan shows left pelviureteric junction obstruction.

Thereafter, the Hb level remained constant at around 10g/dL. The BP remained stable throughout the admission. To prevent any infection within the extravasation, intravenous ceftriaxone was given for two weeks that was later converted to prophylactic oral cefaclor for six weeks.

Renal ultrasonography (US) obtained at two weeks showed fluid with minimal echogenic debris within the pelvis. The perinephric collection was smaller. She was discharged after 16 days when she was stable without any infection or haematuria. Repeat US two weeks post-injury showed that the renal laceration had healed with resolution of the perirenal haematoma. The renal pelvis measured 3.8cm at midpole and the parenchymal thickness was 5mm. Diethylene tetraamine pentaacetic acid (DTPA) renal scan with frusemide obtained after six weeks showed a left PUV obstruction (Fig. 2). The differential function was 55.3% and 44.7% on the right and left sides, respectively.

Eight weeks after the initial trauma the left kidney was explored. Since the kidney had a good cortical mass, an Anderson-Hynes' pyeloplasty was performed. A double-J stent, that was kept in place during the operation, was removed cystoscopically after one month. Histology showed congenital PUV obstruction. The pelvicalyceal dilatation was monitored with follow-up US at three monthly intervals. The renal pelvicalyceal dilatation decreased to 3cm. Her creatinine and blood pressures remain normal to date.

DISCUSSION

The kidney is affected in 10% of all blunt abdominal trauma⁽¹⁾. It is the most frequent urinary organ to suffer injury in blunt trauma⁽¹⁾. Even the normal paediatric kidney is predisposed to increased risk of injury due to various factors⁽²⁾. It is proportionately larger within the abdomen, and is less protected due

to a thinner perirenal fat cushion, underdeveloped flank muscles, and less ossification of the overlying ribs. Persistence of foetal lobulations will also allow easier disruption of the parenchyma. Furthermore, there is a predisposition for different types of injuries on each side. The right kidney is better protected under the liver, but has a larger bare area and is more mobile. Hence, it will escape minor crush forces, but will sustain a severe injury following a severe compression force. On the other hand, the left kidney is not covered by the liver, is less mobile due to its additional ligamentous attachments (splenorenal and phrenocolic) and has fewer bare areas. Hence, it is more prone to a higher number of minor injuries⁽⁴⁾.

The presence of an abnormality further predisposes the kidney to severe injury following even minor trauma^(5,6). The site of bleeding is often the arcuate renal artery at the margins of the dilated pelvis⁽⁷⁾. CT is recommended for detection and characterisation of the grade of injury, for qualitative assessment of renal function, and to rule out associated intra-abdominal injury that may warrant immediate surgery⁽⁴⁾. The finding of a dilated pelvis, cortical thinning and collapsed ureter is suggestive of a pre-existing PUV obstruction^(9,10).

The aim of management is to prevent mortality, conserve the kidney, and reduce immediate and long-term morbidity. Since blood pressure is not a reliable indicator in children⁽⁴⁾, serial haemoglobin and haematocrit levels are monitored to determine ongoing blood loss and the need for transfusion. The treatment of such patients can be either operative or nonoperative. Primary pyeloplasty at initial presentation has been performed for traumatic ureteropelvic disruptions⁽¹⁰⁾. However, different reports show that immediate surgery for haematuria after blunt renal trauma had a high nephrectomy rate^(7,11,12). Temporary percutaneous nephrostomy is indicated in patients with severe extravasation or expanding urinoma with adynamic ileus or flank discomfort. It is useful in estimating the split function of the traumatised kidney that helps in deciding to conserve the kidney⁽¹³⁾.

The general consensus for management in haemodynamically-stable patients is conservative; with monitoring and follow-up imaging as warranted from the grade of injury as seen on the initial CT^(2,14,15). Furthermore, the presence of incidental genitourinary anomalies in renal trauma does not seem to have an impact on recovery from the injury itself^(2,5,6,16). No consensus exists regarding the follow-up schedule. Based on observed healing pattern on CT, one particular protocol recommends only clinical follow-up for grade 1 and 2 injuries since

they heal completely; and CT and radioisotope scans for grade 3 injuries (due to high risk of complications) and grade 4 injuries (to determine residual renal function)⁽¹⁷⁾. Hence our initial treatment was non-operative to allow healing of the laceration, and to quantify the renal function and obstruction by follow-up US and radioisotope renal scan. Definitive surgical treatment of the PUJ obstruction was achieved by a dismembered (Anderson-Hynes) pyeloplasty. The long-term prognosis is expected to be good.

REFERENCES

- McAninch JW, Carroll PR, Klosterman PW, Dixon CM, Greenblatt CM. Renal reconstruction after injury. J Urol 1991; 145:932-37.
- Kuzmarov IW, Morehouse DD, Gibson S. Blunt renal trauma in the paediatric population: a retrospective study. J Urol 1981; 126:648-9.
- Moore EE, Shackford SR, Pachter HL, McAninch JW, Browner BD, Chamion HR. Organ injury scaling – spleen, liver and kidney. J Trauma 1989; 29:1664-6.
- Quinlan DM, Gearhart JP. Blunt renal trauma in childhood. Features indicating severe injury. Br J Urol 1990; 66:526-31.
- Cass AS. Renal trauma in multiple-injured child. Urology 1983; 21:487-92.
- Morse TS, Smith JP, Howard WHR, Rowe MI. Kidney injuries in children. J Urol 1967; 98:539-47.
- Giyanani VL, Gerlock AJ, Grozinger KT, Venable DD, Mirfakhraee M. Trauma of occult hydronephrotic kidney. Urology 1985; 25:8-12.
- Sebastia MC, Rodriguez-Dobao M, Quiroga S, Pallisa E, Martinez-Rodriguez M, Alvarez-Castells A. Renal trauma in occult ureteropelvic junction obstruction: CT findings. Eur Radiol 1999; 9: 611-5.
- Roy C, Tuchmann C, Pflieger D, Lang H, Saussine C, Jacqmin D. Post-traumatic rupture in ureteropelvic junction obstruction syndrome: two case reports. J Radiol 2001; 82:171-3.
- Hall SJ, Carpinito GA. Traumatic rupture of a renal pelvis obstructed at the ureteropelvic junction: case report. J Trauma 1994; 37: 850-2.
- Brower P, Paul J, Brosman SA. Urinary tract abnormalities presenting as a result of blunt abdominal trauma. J Trauma 1978; 18:719-22.
- Cass AS, Luxemburg M, Gleuch P, Smith CS. Clinical indication for radiographic evaluation of blunt renal trauma. J Urol 1986; 136:370-1.
- Sahlev M, Buchumensky V, Richter S, Nissenkorn I. Protective nephrostomy in the treatment of blunt trauma to a congenital hydronephrotic kidney: experience in three patients. Br J Urol 1997; 79:643-5.
- Cass AS. Blunt renal trauma in children. J Trauma 1983; 23:123-7.
- Peters PC, Sagalowsky AI. Genitourinary trauma. In: Walsh PC, Retik AB, Stamey TA, Vaughan ED (eds). Campbell's Urology. 6th ed. Philadelphia: WB Saunders, 1992: 2571-8.
- McAleer IM, Kaplan GW, Scherz HC, Packer MG, Lynch FP. Genitourinary trauma in the paediatric patient. Urology 1993; 42:563-8.
- Abdalati H, Bulas DI, Sivrit CJ, Majd M, Rushton HG, Eichelberger MR. Blunt renal trauma in children: healing of renal injuries and recommendations for imaging follow-up. Pediatr Radiol 1974; 24:573-6.

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