RENAL TRAUMA DETECTION-ROLE OF ULTRASONOGRAPHY

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INTRODUCTION

Renal injuries are the most common injuries of the urinary system. Although well protected by lumbar muscles, ribs, vertebral bodies and viscera, the kidneys have a limited mobility, consequently, parenchymal damage and vascular injuries can easily occur.

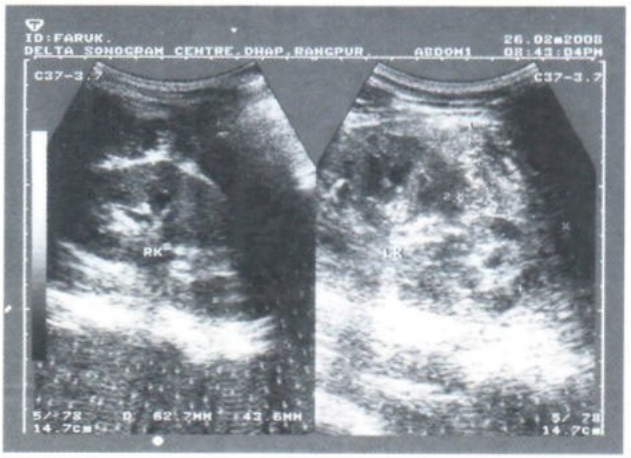
Trauma is generally caused by falls, road traffic accidents, blows, sporting accidents, stab wounds and gunshot wounds. Spontaneous rupture of the kidney is uncommon; nevertheless most urologists will have seen at least two or three cases during a lifetime of urological practice.[1]

Renal trauma can be classified as either blunt (non penetrating) or penetrating, and both can be divided into two major classifications, the major and minor injuries.[2]

CASE NO.1

A young men aged about 22 years was admitted into the hospital with a history of blunt trauma in the left upper abdomen followed by hugely distended abdomen and frank haematuria.

On examination patient pulse was 100 beats/min, B.P. was 125/75 mm of Hg. The patient was severely anaemic with a severe tenderness in the left upper abdomen. His temperature was normal. He was sent to the Centre for nuclear medicine and ultrasound, Rangpur for renal scan. Ultrasounds were performed by using Toshiba Just Vision-400 Ultrasound machine using 3.5 to 5 MHz probes. Ultrasound revealed huge haemoperitonium and huge enlarged left kidney with altered size, shape with loss of normal cortico-medullary differentiations and mild free echogenic fluid collection around the left kidney. Retained clot was present in urinary bladder along with a retained catheter. Right kidney was normal in size, shape and position. Cortex, medulla and sinuses were well outlined.



CASE NO.1

CASE NO.2

A young female aged about 18 years was admitted into the hospital with a history of blunt injury in the right upper abdomen for 15 days, having a severe rise of temperature with features of acute abdomen and frank haematuria.

On examination patient pulse was 105 /min,

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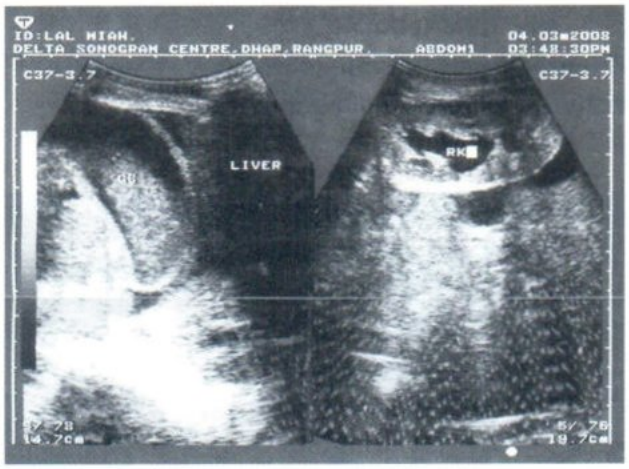
B.P was 120/70mm of Hg. The patient was severely anaemic with a severe tenderness in the right upper abdomen. Her temperature was 103^0. She was sent to the Centre for nuclear medicine and ultrasound, Rangpur for scanning. Ultrasounds were performed by using Toshiba Just Vision-400 Ultrasound machine using 3.5 to 5 MHz probes. Ultrasound reveals huge haemoperitonium and hugely enlarged right kidney with altered size, shape and loss of normal cortico-medullary differentiations and mild free echogenic fluid collection around the right kidney. Retained clot was present in urinary bladder along with a retaining catheter. Left kidney was normal in size, shape and position.Cortex, medulla and sinuses were well outlined.



CASE NO.2

MODE OF INJURY

Blunt renal trauma can be classified according to the severity of injury and the most common is the renal contusion. Blunt trauma in the region of 12^{th} rib compresses the kidney against the lumbar spine, and the injuries will commonly involve the waist or lower pole of the kidney, where the 12^{th} rib makes its impact. The kidney can be damaged from a blow in the abdomen anteriorly, just below the rib cage, particularly in road traffic accidents, e.g. the victim is thrown onto the steering column or some other projecting object. Abdomonal injuries due to seat belts include 11% which involve the urinary tract and half of those are renal.[3]

Penetrating injuries (usually from gunshot or stab wounds) account for 20% of renal traumas in an urban setting. The damage from a bullet will depend not only on direction, but also on the velocity of the missile. Low-velocity missiles will penetrate all structures in their path. With high-velocity missiles it is necessary to assume that the shock wave will have damaged an area around the track of the missile. A knife or stilleto stab can readily cut the cortex of the kidney if the weapon is driven more than 3 inches into the victim. Although a peri-renal hematomas usually develops, the patient may not show haematuria unless the weapon has reached the calvces or renal pelvis.[4]

There is also the possibility of iatrogenic injuries, that can occur in the passage of a catheter up the ureter (damage of renal pelvis), when a renal biopsy is done or when there is an infection carried indirectly into the renal pelvis.

Frequency

In United States Renal trauma is the most frequent urologic trauma, occurring in 8-10% of patients with considerable blunt or penetrating abdominal trauma. Blunt trauma is the overwhelming cause of 80% of renal injuries.[5] Among patients with gross hematuria, notable renal trauma is present in 25%; however, less than 1% of patients with microhematiria have substantial renal injury.[6,7]

In other countries, particularly in the developed countries, the most common cause of renal trauma is motor vehicle accidents with significant blunt abdominal trauma accounting for most renal injuries.[8]

But in developing countries main cause of renal trauma is accidental fall and Blunt trauma.

DISCUSSION

Mortality and morbidity rates for renal injuries vary with the severity of renal injury, the degree of injury to other organs, and the treatment plan utilized. Thus, treatment options must be weighed

against related mortalities and morbidities. In the evaluation for treatment options, the injury grade is correlated with the apparent need for surgery to repair or remove the injured kidney.[9]

Ultrasonography is the initial diagnostic choice for the detection of renal anatomy and many pathology. The ability of the kidney ultrasound to detect its normal anatomy, congenital variants as well as different pathological conditions depends on the size, shape & type of the lesions.10

Kidney ultrasound is very good at discovering kidney cysts, renal mass, congenital variants of the kidneys, polycystic kidney diseases, peri/para-nephric abscess and perinephric haematoma resulting from ruptured of the kidney.

Now a days ultrasound is available almost all the corners of the country. The opportunity of diagnosis of kidney details has now increased in many folds. Though traumatic rupture of the kidney is rare but tends to be very serious and progress rapidly, resulting in end-stage even death in many undiagnosed cases.[11]

Traumatic rupture of the kidney is fortunately for the doctors and the patient a rare entity.

Although sonography can depict free fluid in the abdomen and pelvis, it cannot be used to make the clinically important distinction between extravasated urine, blood, or other types of fluid. Moreover, ultrasonography cannot depict the source of the bleeding. A variety of groups also have proposed the use of ultrasound to search for solid-organ injury, but sufficient sensitivities and specificities have not been demonstrated to data.[12,13]

Ultrasonography may demonstrate renal laceration, a change in echogenicity of an injured kidney, or a decrease in the usual perinephric echogenicity if perinephric fluid or hemorrhage is present. However, if sonograms are negative and if noteworthy hematuria is present, or if the sonogram is positive, CT is still indicated for evaluation of the injury if the patient is stable.14 For this reason, the use of sonography is probably best reserved for the rapid evaluation for intraperitoneal fluid in the unstable patient who may require urgent surgery.

CONCLUSION

The ultrasonography is easier, cost effective, hazardless initial method of investigation for kidney details. Some authors believe that every patient should undergo an ultrasonic scanning because it may show the size of a possible perirenal hematoma and monitor whether its extending or resolving.

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