ORIGINAL RESEARCH PAPER

General Surgery

URINOMA FOLLOWING BLUNT TRAUMA ABDOMEN: A CASE REPORT

KEY WORDS: Renal trauma; Urinoma; Nephrectomy

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ABSTRACT

Introduction: Urinoma is a rare and unique condition that refers to extravasation of urine from a disruption of the urinary collecting system at any level from the calix to the urethra followed by formation of an encapsulated collection of extravasated urine. Kidneys are the most common organs of genitourinary system to be injured after trauma though there is very less chance of urinoma formation after trauma (<1%). **Case presentation:** We experienced a case of urinoma in a 17 years old male presenting to our hospital who suffered from deceleration injury following a road traffic accident 3 months back. He had history of frank haematuria initially and presented with a progressively increasing lump in right hypochondrium and lumbar region. Haemoglobin, urinalysis, urine output, kidney function test and all other biochemical examinations were within normal limits. Imaging findings were consistent with AAST Grade IV right renal injury affecting the renal pelvis with urinoma formation. **Discussion:** The Organ Injury Scaling system of the American Association for the Surgery of Trauma (AAST) describes an objective grading system for urologic injuries (Fig. 6). Cross-sectional imaging, specifically contrast-enhanced CT scan, is the preferred study to evaluate the renal injuries. Proper imaging should include arteriovenous phases with delayed imaging to evaluate the urinary collecting structures. **Conclusion:** In general, lower grade injuries, grades I to III, in hemodynamically stable patients are managed nonoperatively. Grade IV injuries are more controversial, and many are managed nonoperatively. High-grade injuries, grades IV and V, may undergo surgical exploration.

Introduction:

Genitourinary trauma, though of lower incidence i.e less than 1% [1], poses a major cause of significant morbidity and mortality in case of blunt abdominal trauma. The kidneys are most commonly involved organ that involves injuries to the genitourinary system. Blunt trauma is more common than penetrating trauma when we review kidney injury [2]. Isolated renal injury after blunt trauma is rare and urinoma formation after renal trauma is believed to be even lower (0.1%).This rate is increased after high grade renal trauma [3]. We report a case of 17 years old male presenting to our facility with history of blunt trauma to abdomen in a road traffic accident 3 months back with high grade injury to right kidney and urinoma formation.

Case presentation:

A 17 years old male suffered from deceleration injury following a road traffic accident 3 months back. He gave history of frank haematuria and subsequently diagnosed as grade IV renal laceration. He was then managed conservatively in an outside hospital and subsequently the haematuria subsided. Then he developed a progressively increasing painless lump in right hypochondrium and lumbar region.

At the time of presentation to us, patient was hemodynamically stable. Abdominal examination revealed a 15 x20 cm firm, immobile, non-ballotable, lump with dull note on percussion, over right hypochondrium and lumbar regions. No other palpable lump was found. There was no guarding, rigidity or tenderness; abdomen was soft. Contusions and ecchymoses were absent. Normal bowel sounds were audible.

Examination of other systems, per rectal examination and hernial sites were within normal limits.

Initial laboratory evaluation revealed Hemoglobin of 11.7 g/dL. Urine output was satisfactory. Urinalysis revealed no apparent abnormality. All other biochemical examinations, including coagulation profile, serum electrolytes and Renal Function Test (RFT) were within normal limits.

His prior abdominal ultrasonography and Contrast Enhanced Computed Tomography (CECT) of whole abdomen done at the time of injury revealed hemoperitoneum and a 6.3 x 6.5 cm hematoma in lower pole of right kidney with loss of cortico-medullary differentiation [Fig 1].

Fig 1: Axial film of CECT whole abdomen showing Grade IV renal laceration and perinephric hematoma

His post admission abdominal ultrasonography and CECT revealed 18 x 16 x 12 cm3 cystic space occupying lesion in right hypochondrium likely arising from right kidney. Right kidney not separately visualised; suggestive of urinoma. There were few solid echoes at hilar region. No ascites and lymphadenopathy were found [Fig 2].

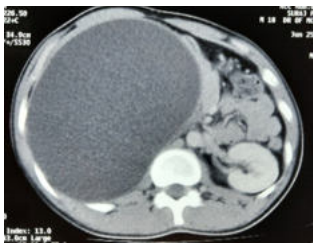

Fig 2: CECT Whole abdomen in axial cut showing the urinoma

His Tc 99m -DTPA SCAN and CT Urogram revealed negligible tracer accumulation in right kidney with severely impaired function [Fig 3&4].

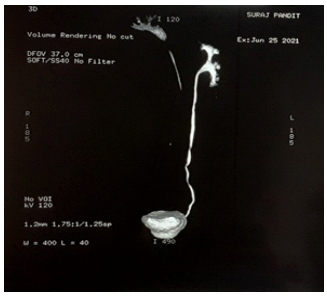

Fig 3: CT urogram showing negligible contrast enhancement in right kidney

Fig 4: CT urogram reconstructed negative image

Based on these findings, a diagnosis of isolated right AAST Grade IV renal injury with urinoma formation was made. Although our patient remained hemodynamically stable, he continued to experience abdominal fullness due to the presence of urinoma . Urology opinion was taken and right sided simple nephrectomy was done by a team comprising of both general surgeons and urologists. The right kidney was accessed through retroperitoneal approach by a posterolateral thoracoabdominal incision. Twelfth rib was cut for better access. A large cystic mass found in the region of right kidney which was almost dissolved except in its upper pole. The remnant renal tissue was conglomerated with a hematoma [Fig 5]. Right ureter could not be traced distally. The specimen removed en bloc and a retroperitoneal drain was placed.

Post operative period was uneventful. The drain was omitted on post operative day 7 and subsequently discharged on post-operative day 10 with resolution of his existing symptoms. He is being followed-up on an out patient basis and is now doing well.

Fig 5: Specimen resected showing the cystic mass cut open to show remnant renal tissue with the hematoma

Discussion:

The renal trauma is now graded according to the Organ Injury Severity(OIS) Score by the American Association for the Surgery of Trauma (AAST)[Table 1] [4].Urinary extravasation with collecting system injury after renal trauma is classified as a grade IV injury.

Table 1: OIS Grading of renal injury by AAST (N.B. one grade to be upgraded in case of bilateral injuries)

Grades of injury	Type of injury	Description
I	Contusion Hematoma	Microscopic or gross hematuria Subcapsular, Non expanding without laceration
II	Hematoma Laceration	Non expanding perirenal hematoma confined to renal retroperitoneum Parenchymal depth of renal cortex <1cm without urinary extravasation
III	Laceration	Parenchymal depth of renal cortex >1cm without injury to the collecting cystem/ urinary extravasation
IV	Laceration vascular	Parenchymal laceration extending through renal cortex, medulla and collecting system(positive urinary extravasation) Main renal artery or vein injury with contained hemorrhage
V	Laceration Vascular	Completely shattered kidney Avulsion of renal hilum

The presence of gross hematuria is the most valuable sign for injuries to the genitourinary organs and should prompt further evaluation.

CECT abdomen is the investigation of choice for blunt abdominal trauma. It can accurately identify the site of injury, its severity and also demonstrate extravasation of contrast material from the collecting system with a delayed excretory phase suggestive of urine extravasation. [5].

In grade I-III injuries patient can usually be managed conservatively under close observation. But high grade injuries usually require some form of intervention. In the absence of hemodynamic instability, even grade IV injuries are managed conservatively [6].

But sometimes, the urinary leak may lead to complications such as urinoma formation as it was in our case. [7]. Urinoma formation requires continued renal function, rupture of the collecting system and an element of distal obstruction [8]. Therefore ureteral stenting sometimes become helpful in the management of urinomas by relieving distal obstruction. In our case neither CECT nor CT urogram showed any distal obstruction.

The majority of urinomas reported in the literature have a delayed diagnosis because of the gradual and nonspecific symptoms like malaise, vague loin or abdominal pain, weight loss, palpable mass. Sometimes if they become infected may present with fever.

Complications of urinomas include abscess formation and

rupture leading to urinary peritonitis. The management of urinary extravasation is a very controversial topic and due to absence of specific guidelines in place, the decision to intervene is based entirely on the judgment of concerned surgeon. Trauma surgeons usually prefer early stenting while urologists prefer a conservative approach in most cases [9].

Although most urinomas resolve spontaneously, large and medially located urinomas require some intervention to prevent complications such as page kidney, persistent hypertension, abscess and adhesion formation [10].

So in general, non operative management is the recommended treatment for lower grade injuries in hemodynamically stable patients. Surgical exploration is reserved for specific indications.

The absolute indications for exploration are expanding hematoma, pulsatile hematoma, and persistent renal bleeding as these findings are suggestive of renal pedicle injury [12]. The relative indications include persistent urinary extravasation, nonviable renal parenchyma, arterial injury, and incomplete renal staging.

Conclusion:

Though isolated traumatic injuries to genitourinary system is rare, urinary extravasation and urinoma formation after high grade renal trauma may occur. Usually, high grade renal injuries are managed by some form of intervention. Early intervention in the form of stenting could have prevented the formation of urinoma in our patient. It is also necessary to confirm the presence of contralateral kidney before going for nephrectomy in high grade injuries. Certain nonoperative managements like renal arteriography and selective angioembolization have been used with increasing frequency in management of renal trauma. Renal trauma persists as a cause of morbidity, however rates of renal loss may be curtailed by using minimally invasive management techniques.

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