



RENAL INJURY GRADE IV DUE TO MOTOR VEHICLE ACCIDENT: A CASE REPORT

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ABSTRACT

Most renal trauma occurs as a result of blunt trauma. In 90% of cases, there will be renal injury due to blunt trauma. Renal injuries may be generally divided into 3 groups: renal laceration, renal contusion, and renal vascular injury. All subsets of renal trauma require a high index of clinical awareness, prompt evaluation and management. Renal injuries also may be classified into grade one to five. Current case report based on 17 years old Malay male brought by his friend to the emergency department due to motor vehicle accident. Patient was admitted to the ward for gross hematuria. Patient was underwent CT scan to rule out any abdominal injury. Patient was diagnosed having right renal injury grade IV. The management of blunt renal trauma has been evolving. Renal blunt injury managed conservatively with bed rest and frequent serum hemoglobin monitoring. Advances in imaging and staging of trauma, as well as in treatment strategies during the last 20 years, have decreased the need for surgical intervention and increased renal preservation.

Key words: Renal Injury; Grade IV level injury; Motor Vehicle Accident

INTRODUCTION

Trauma is defined as the morbid condition of body produced by external hostility such as motor vehicle accident.¹ Renal trauma occurs in approximately 1-5% of all traumas.^{2,3} Renal trauma can be acutely life-threatening but majority of renal injuries are mild and can be managed conservatively. Renal trauma is present in approximately 10% of all abdominal injuries.⁴ The mechanism of renal injuries is classified as blunt and penetrating. Blunt trauma is usually secondary to motor vehicle accidents, falls, contact sports and assault. Traffic accidents are the major cause for almost half of blunt renal diseases.⁴⁻⁶ Gunshot and stab wounds represent the most common causes of penetrating injuries. In most cases, they result from interpersonal violence. Renal injuries from penetrating trauma tend to be more severe and less predictable than those from blunt trauma.⁶

The organ injury scaling (OIS) Committees classification of renal trauma as Grade 1-hematuria with normal imaging studies, contusions and nonexpanding subcapsular hematomas, Grade 2-nonexpanding perinephric hematomas confined to the retroperitoneum, Grade 3-renal lacerations greater than 1 cm in depth that do not involve the collecting system, Grade 4-renal lacerations extending through the kidney into the collecting system, injuries involving the main renal artery or vein with contained hemorrhage, and lastly Grade 5-shattered or devascularized kidney, ureteropelvic avulsions and complete lacerations or thrombus of the main renal artery or vein.⁷

Decisions about radiographic imaging in cases of suspected renal trauma are based on the clinical findings and the mechanism of injury. Since the majority of renal injuries are not significant and can be resolve without any intervention, many attempts have been made to identify patients who could be spared the discomfort, radiation exposure, possible allergic reaction, and expense of a radiographic evaluation.⁸

CASE PRESENTATION

Seventeen-year-old, Malay, guy was transferred from emergency department to surgery ward for gross hematuria. Patient was brought by his friend to the emergency

department due to an alleged motor vehicle accident. Patient was found with fully conscious, no ENT bleeding, and no neck pain. However, patient was unable to walk post motor vehicle accident due to dizziness. Patient had also pain at right forearm and right lumbar.

Patient past medical history was wholly unremarkable. Patient reported taking no medication. Patient is a student, non-smoker and non-alcoholic. Patient denied any general or medication allergies. Laboratory data is presented in table 1.

Patient physical examination showed the presence of laceration at the right below eye lid margin. There is negative chest and pelvic spring. Patient examined soft, bruises and distended abdomen. On the same day of admission, radiological investigation was done which is Urgent Non-contrast CT scan (NCCT) and Contrast Enhanced Computed Tomography (CECT). The finding of the investigation is gross parenchymal disruption of right kidney with multiple deep lacerations resulting in shattered kidney. The right renal artery and veins are also intact. The doctor diagnosed patient as renal injury grade IV. Besides, patient also diagnosed as fractured right radial ulna. The fracture was managed with back slab above the elbow and bactigras dressing. Patient also was kept nothing by mouth (NBM) for one and half day.

Patient treatment in ward

- i) I/V Tramal 50mg TDS
- ii) I/V Ranitidine 50mg TDS
- iii) I/V Ciprobay 400mg BD
- iv) I/V Flagyl 500mg TDS
- v) I/V Meropenem 1g stat and then TDS

I/V Meropenem was prescribed after I/V Ciprobay and I/V Flagyl stopped due to urosepsis, the patient having on the second day in the ward. Meropenem is a broad spectrum and bactericidal activity results from the inhibition of bacterial cell wall synthesis.

Table 1: Laboratory data at admission day

Tests	Value
Hemoglobin	13.4 g/dL
Urea	4.9 mmol/L
Potassium	3.2 mmol/L
Platelet	219
Hematocrite	38.5
pO ₂	191mmHg
Sodium	145 mmol/L
Creatinine	111 μmol/L
O ₂ sat	100.5%

DISCUSSION

The Committee on Organ Injury Scaling of the American Association for the Surgery of Trauma (AAST) has developed a renal-injury scaling system that is now widely used.⁷ Abdominal computed tomography (CT) or direct renal exploration is used to accomplish injury classification. CT is considered the gold standard method for the radiographic assessment of stable patient with renal trauma. CT more accurately defines the location of injuries, easily detects contusions and devitalized segments, visualizes the entire retroperitoneum and any associated hematurias, and simultaneously provides a view of the abdomen and pelvis. It demonstrates superior anatomical detail, including the depth and location of renal laceration and presence of associated abdominal injuries, and establishes the presence and location of the contralateral kidney.⁹

Initial assessment of the trauma patient should include securing of the airway, controlling any external bleeding and resuscitation of shock as required. Physical examination is the basis for the initial assessment of each trauma patient. Vital signs should be recorded throughout diagnostic evaluation. The following findings on physical examination may indicate possible renal involvement such as haematuria, flank pain, fractured ribs, abdominal distension/mass and abdominal tenderness. Haematuria is a hallmark sign of renal injury, but is neither sensitive nor specific enough for differentiating minor and major injuries. Serial haematocrit determination is a method of continuous evaluation of the trauma patient. Initial haematocrit in association with vital signs implies the need for emergency resuscitation. The decrease in haematocrit and the requirements for blood transfusions is an indirect sign of the rate of blood loss and along with the patient's response to resuscitation is valuable in the decision-making process. As most trauma patients are evaluated within 1 hour after injury, creatinine measurement

reflects renal function prior to the injury. An increased creatinine usually reflects pre-existing renal pathology.


The goal of management of patients with renal injuries is to minimize morbidity and to preserve renal function. The condition of the patient remains the absolute determinant in the decision for initial observation versus surgical intervention. For several decades, the management of major renal injuries with urinary extravasation and devitalized fragments has been controversial. Since these injuries are very uncommon, all published series report on small numbers of patients. In recent years, it seems as though it has been recognized that most major injuries heal with non-operative treatment.¹⁰

CONCLUSION

Most renal injuries are of the minor type and include contusion, subcapsular and perinephric hematoma, and superficial laceration. A more significant injury, such as a deep laceration, infraction, or active haemorrhage, early surgery is the preferred choice.

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