



TO EVALUATE THE PREDICTORS OF DELAYED NEPHRECTOMY IN HIGH GRADE BLUNT RENAL TRAUMA PATIENTS TREATED PRIMARILY WITH CONSERVATIVE LINE OF MANAGEMENT

Urology

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ABSTRACT

Introduction: There is no unanimity on the optimal management of high grade renal trauma. High renal losses likely to be seen in immediate surgical intervention, while secondary hemorrhage and persistent urinary extravasation is due to delayed surgical intervention. **Materials And Methods:** The records of 118 patients who were admitted to our institute with varying degrees of blunt renal trauma from January 2013 to June 2023 were retrospectively reviewed. Grade III-V renal injury was defined as high grade blunt renal trauma and was present in 48 patients. The factors analyzed to predict emergency intervention were demographic profile, grade of injury, degree of hemodynamic instability, requirement of blood transfusion and duration of intensive care unit stay. **Results:** The 70 patients with grade I and II renal injury did not require emergency intervention and underwent a trail of conservative management. 12 of the 48 patients with high grade renal injury (grade III to V) underwent nephrectomy (9 immediate and 3 delayed). Presence of grade V injury with hemodynamic instability and requirement of more than 10 packed cell units for resuscitation were predictors of nephrectomy. **Conclusion:** Majority of the high grade renal injuries can be successfully managed conservatively. Grade V injuries required immediate nephrectomy, the need for more than 10 packed cell transfusions during resuscitation predict the need for delayed nephrectomy.

KEYWORDS

INTRODUCTION

Blunt trauma is the most common cause of renal injury with road traffic accident as the mechanism of injury in the majority of cases. The management of renal trauma has become increasingly conservative with multiple series showing renal preservation after high grade injury.^{1,2} Indications for exploring high grade renal blunt injury remains controversial.³

The mainstay of renal trauma diagnosis is based on contrast-enhanced computed tomography (CT). Renal trauma management has evolved during the last decade, with a distinct evolution toward a nonoperative approach. The majority of renal trauma patients are managed non-operatively with careful monitoring, reimaging when there is any deterioration and the use of minimally invasive procedures. These procedures include angioembolization in cases of active bleeding and endourological stenting in cases of urine extravasation. In the present study, we evaluated the clinical features and outcome of patients who presented with high grade III-V renal trauma to our institute. The goals were to further refine the absolute indications for exploration and determine the outcomes of conservative management.

MATERIAL AND METHOD

The records of 118 patients who were admitted to our institute with varying degrees of blunt renal trauma from January 2013 to June 2023 were retrospectively reviewed.

Grade was assigned based on contrast enhanced computed tomography imaging after stabilizing the patient according to the American association for the surgery of trauma kidney injury scale. Grade III-V renal injury was defined as high grade blunt renal trauma and was present in 48 patients. Regardless of injury grade, all patients who were hemodynamically stable after resuscitation were considered candidates for conservative management. Conservative management consisted of bed rest, analgesia, hydration and broad spectrum antibiotics in the presence of urinoma. Patients who had ongoing hemodynamic instability despite blood transfusion and resuscitation, who had expanding hematoma and who had a pulsatile retroperitoneal

hematoma were considered for immediate exploratory laparotomy. Patients treated conservatively were followed-up with continuous hemodynamic monitoring, serial hematocrit determination and abdominal girth measurement. Routine reimaging after 48 h was not obtained in all patients. The indications for repeat imaging were urinary leak (grade IV injuries) and ongoing hemorrhage. Strict bed rest was advised until the gross hematuria resolved and patients were discharged after 3-4 days of ambulation and uneventful hospital stay.

Factors to analyze nephrectomy in high grade renal trauma patients treated primarily with conservative line of management were-

1. Grade of injury
2. Haemodynamic stability
3. Need for Packed Cell Transfusion

Statistical Analysis

All statistical analyses were performed by online statistical tool <http://www.graphpad.com/quickcalcs/> and a $P < 0.05$ was considered to be significant.

RESULTS

- Of the 118 patients, 95 (80.5%) were male, 23 (19.5%) were female.

At presentation, 76 (64.4%) patients had hypotension (i.e., systolic blood pressure ≤ 90 mm of Hg). 48 out of 76 patients had high grade renal injury.

Diagram showing gender-wise distribution

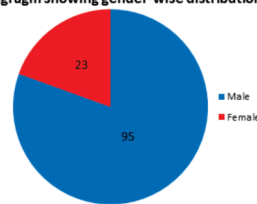


Diagram no.1

High velocity automobile and motor vehicle accidents were responsible for 96 of 118 injuries (81.4%) and the remaining 22 (18.6%) were due to fall from height and assault injuries.

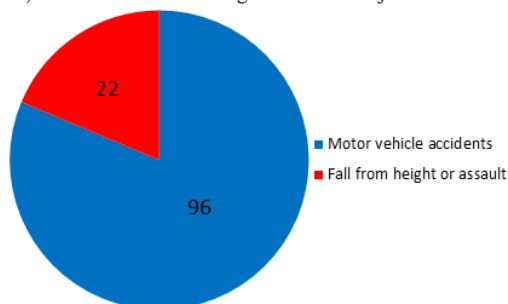


Diagram no.2

Of the 118 patients, grade I and II were 70 (59.3%), grade III injuries occurred in 22 (18.6%), grade IV in 17 (14.4%) and grade V in 9 patients (7.6%).

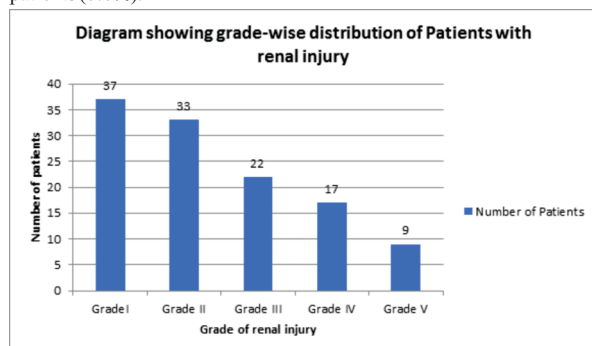


Diagram No.3

Out of 48 patients who had high grade renal injury, 9 underwent immediate nephrectomy with grade V injury while 3 patients with grade IV injury underwent delayed nephrectomy.

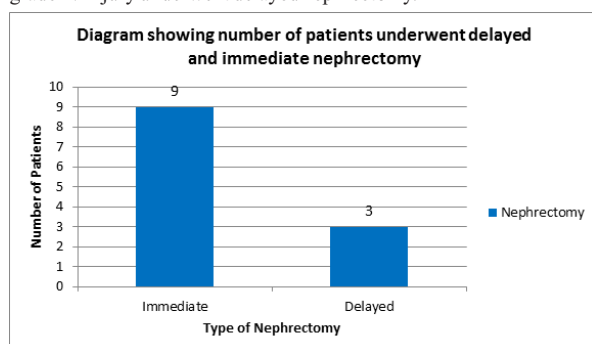


Diagram No.4

In 33 of 118 patients (28%), renal injury was the only intra-abdominal injury.

In 41 patients, another major abdominal organ was injured.

1. Liver laceration was seen in 22 (18.6%),
2. Splenic injury in 12 patients (10.2%),
3. Injury to the duodenum and pancreas in 5 patients (4.2%) and
4. Bowel injury in 2 patient (1.6%).

Rest of the patients had injuries such as rib fractures, pneumothorax, upper and lower limb fractures, head injury and pelvic fractures.

Emergency Intervention-

Of the 118 patients, 9 patients (7.6%) required emergency nephrectomy. All of them had grade V injury. Patients who needed intervention required more blood transfusion for resuscitation as measured by number of packed red blood cell units transfused. Out of 11 patients who required more than 10 units of packed cell volume, all 11 underwent nephrectomy (9 immediate, 2 delayed), whereas only 1 patient who required less than 10 units underwent delayed

nephrectomy ($p=0.0003$). Tachycardia, haemoglobin at admission and degree of haematuria were not significant predictors for emergency intervention. Among 9 patients requiring emergency nephrectomy, all of them had associated abdominal injuries. 4 had liver laceration, 4 splenic rupture and 1 bowel perforation.

Conservative Management Outcome:

Out of 118 renal trauma patients, 70(59.3%) patients with grade I and II were managed conservatively. Out of 48 patients with high grade renal trauma, 27(56.25%) patients managed conservatively. Patients with complications were significantly **older** and **hemodynamically unstable** at presentation **requiring more packed cell volumes** for resuscitation.

Table No. 1 Predictors Of Delayed Nephrectomy

Sr. No.	Factors	Delayed nephrectomy (3)	No nephrectomy (36)	P value
1.	Age, years(mean)	40.8	29.4	0.112
2.	Sex Male Female	2 1	27 9	0.942
3.	Grade III IV	0 3	22 14	0.741
4.	Grade V	Immediate nephrectomy required	NA	NA
5.	Requirement of transfusion of > 10 Packed cell units	2	0	0.0003
7.	Hemodynamic instability HR(beats/min) Systolic BP(mm Hg) Diastolic BP(mm Hg) Hemoglobin(g/dl)	122.3 86.8 68.6 8.16	116 89.3 72.5 10.7	0.101 0.216 0.79 0.001
8.	Associated other abdominal injuries	2	30	0.642
9.	Duration of ICU stay(days)	4.5	3	0.726

DISCUSSION

In our study, the proportion of patients with high grade injuries is 40.6%. As our institute is a tertiary referral centre; patients with high grade injury and hemodynamic instability are usually referred from other centres.

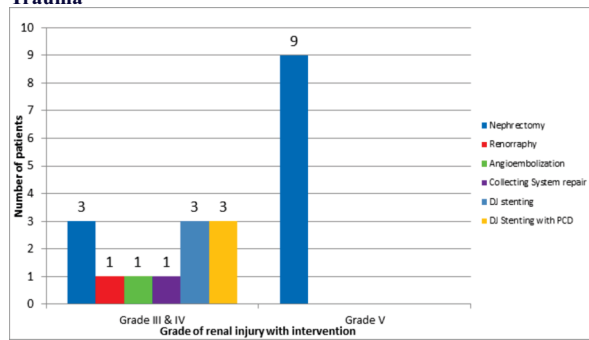
Although management of renal contusion and minor laceration is usually straightforward, there is no consensus on optimal management of high grade injury.³ In the absence of clear-cut indications like ongoing life threatening hemorrhage, expanding retroperitoneal hematoma and pulsatile retroperitoneal hematoma different management strategies emerge. Some groups advocate exploration based on injury grade alone, the presence of devitalized segments or presence of urinoma^{5,6,7,8,9,10}.

The reported operative rate for blunt renal trauma is 2-10%^{11,12}. Of the operative interventions, 70% resulted in nephrectomy. Similar to other studies¹³ an increased risk of nephrectomy was seen in our study with high AAST grades and this grading was the most powerful predictor of nephrectomy. When grade III, IV renal injuries are managed expectantly, delayed renal bleeding is found in 13-25%.¹⁴

In our study out of 48 patients with high grade renal injury (grade III to V), all 9 patients with grade V renal trauma were managed by immediate nephrectomy. In the remaining 39 patients grade III and grade IV injuries were noted. Out of 39 patients 27 patients managed expectantly, while 12 patients required intervention.

Out of these 12 patients, 3 underwent delayed nephrectomy, 1 underwent renorrhaphy, 1 angioembolization, 1 underwent collecting system repair and 3 patients required double J stenting alone while remaining 3 required DJ stenting plus percutaneous drainage for urinoma. Associated intra-abdominal injuries was seen in 34.7% of our patients compared to 43% seen in literature.¹⁵

Diagram Showing Intervention Done In High Grade Renal

Trauma**Diagram No.5****CONCLUSION**

Majority of the high grade renal injuries can be successfully managed conservatively. Grade V renal injuries required immediate nephrectomy. Grade III and IV injuries primarily managed conservatively. The need for more than 10 packed cell transfusions during resuscitation predicts the need for delayed nephrectomy.

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