Section: Urology

Original Research Article

PROSPECTIVE STUDY OF MANAGEMENT OF HIGH GRADE BLUNT RENAL INJURY (GRADE 4, 5) IN A TERTIARY CARE HOSPITAL IN SOUTH INDIA.

Vikash Kumar[1], B.Thiruvasagamani M.Ch[2], Saravana Raja MCh[3]

[1]*M.Ch Postgraduate, Department of Urology, Government Tirunelveli Medical College Tirunelveli, India.*
[2]*Professor and HOD, Department of Urology, Government Tirunelveli Medical College Tirunelveli, India.*
[3]*Assistant Professor, Department of Urology, Government Tirunelveli Medical College Tirunelveli, India.*

Received *: 12/07/2024*
Received in revised form *: 06/09/2024*
Accepted *: 22/09/2024*

Corresponding Author:
Dr. Vikash Kumar,
M.Ch Postgraduate, Department of Urology, Government Tirunelveli Medical College Tirunelveli, India.
Email: vikashkumar1635@gmail.com

DOI: 10.70034/ijmedph.2024.3.160

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2024; 14 (3); 889-892

ABSTRACT

Background: The most common mechanism for kidney injury is blunt trauma, mainly from falls and automobile accidents. They happen in 5–10% of trauma cases. The majority of individuals with blunt renal injuries who are thermodynamically stable respond well to non-operative management. The gold standard for diagnosing renal trauma is contrast-enhanced computed tomography (CT), which needs to be done on all stable patients who have gross haematuria as well as any patient who presents with microscopic haematuria and hypotension. Additionally, if the results of the physical examination or the mechanism of damage indicate renal injury, a CT scan should be performed. The primary goals were to examine the patient's demographics, identify and ascertain the type of injury and common manner, and assess the effectiveness of different high-grade (grade 4-5) blunt renal injuries and its therapy strategies.

Materials and Methods: This was done as prospective observational study in the Tirunelveli Medical College emergency trauma and urology wards, where patients undergoing treatment for kidney injuries are monitored and documented closely. There were 50 subjects in this study. Each participant in this study completed an informed consent form. Through the completion of a specifically created proforma that comprises a thorough clinical history, laboratory and radiographic investigations, clinical assessment, and other information, patients submitted prospective data.

Results: Of the 50 participants, 42 were men and 8 were women. 42 were in road traffic accidents, 8 fell down a steep stairway. Twelve subjects had grade 2 injuries, twenty had grade 3 injuries, ten had grade 4 injuries, and six had grade 5 injuries based on AAST-based grading. Two individual sustained a grade 1 injury. 46 patients of the 50 cases had conservative care for their renal damage, whereas two person underwent an emergency nephrectomy.

Conclusion: For blunt renal trauma, conservative care was recommended above surgical care. Conservative management of blunt renal trauma without associated abdominal injury is feasible in patients who are hemodynamically stable at presentation. Advancements in imaging techniques and improved critical care have favored the conservative approach for even the severe grade of injuries.

Keywords: Blunt renal injury, high grade, conservative management.

INTRODUCTION

When a blunt or penetrating trauma occurs, one of the genitourinary organ systems most frequently impacted is the kidneys. Although penetrating injuries to the kidney are most commonly caused by gun and knife wounds, blunt trauma is also a result of motor vehicle accidents and falls. The disease must be correctly and quickly identified in order to preserve kidney function. Accurately classifying the

damage also requires computed tomography (CT) urography. The Organ Injury Scaling Committee of the American Association for the Surgery of Trauma (AAST) developed the most widely accepted and utilized classification scheme. It is determined by how serious the injury is. Grade I–III injuries are frequently thought of as mild to moderate injuries and can be treated conservatively, but grade IV and V injuries necessitate more intensive care.[1]

According to previous studies, severe trauma ranks as the sixth most common cause of death worldwide. Genitourinary tract traumas account for 10% of all trauma cases. Furthermore, with over half of all urinary tract injuries occurring in the kidney, it is the organ most frequently injured. Ninety percent of kidney injuries are caused by blunt trauma, and ten percent are caused by penetrating trauma. Nowadays, trauma claims the lives of more children than all other causes combined. After injuries to the nervous system, renal trauma is the second most common injury in children. Over time, the treatment of pediatric trauma has shifted away from exploratory surgery and toward conservative care. This is primarily due to the fact that radiography, laboratory, and clinical techniques enable accurate assessment of injuries. One of the best ways to quickly identify kidney damage is with ultrasound.[2]

Renal injury is discovered in about 10% of cases of abdominal injuries. However, the majority of renal injuries (80%–90%) are caused by blunt trauma, with penetrating renal injuries—usually from gunshot and stabbing wounds—making up the remainder. Renal damage is a common consequence of blunt trauma, which can occur from a direct hit to the flank or from a sudden stop. When the kidney is struck directly, it bruises, rupturing the renal parenchyma and resulting in an intrarenal, subcapsular, or perinephric hemorrhage. An avulsion of the uretero pelvic junction (UPJ), an intimal rupture in the vessel that may result in a thrombosis or laceration, or a laceration of the renal vein or artery can all result from an immediate tension on the renal pedicle caused by a deceleration injury.[3]

The morbidity and mortality rates from renal trauma are influenced by the extent of the renal injuries, any associated organ damage, and the treatment plan selected. The majority of kidney injuries caused by blunt trauma are low to moderate grade, and extensive research has demonstrated that conservative therapy is an effective treatment strategy in these cases. Treatment strategies for high-grade renal damage are still up for debate. Given that nephrectomy is nearly always the outcome of investigating high-grade renal damage, a number of writers advocate for non-operative therapy, which is becoming increasingly popular.[4]

The way that blunt kidney trauma is treated has evolved over the past 50 years. The use of non-operative care techniques has increased, initially with pediatric patients and then with adult patients as well. It is now widely accepted that the first non-operative treatment for low-grade renal trauma (grades IIII) ought to be selected. The only conditions that can now be treated surgically are hemodynamic instability, pedicle avulsion, growing retroperitoneal hematoma, renal artery thrombosis, and extravasation. It is still debatable how important non-operative care is for high-grade (grades IV and V) renal damage.[5]

MATERIAL AND METHODS

Retrospective and prospective methods were combined in this cross-sectional observational study. The emergency trauma and urology wards at Tirunelveli Medical College, where patients with renal injuries are tracked and monitored during their course of treatment, served as the study's sites of observation from January 2023 to July 2024. Patients provided prospective data by filling out a specially designed proforma that includes detailed clinical history, laboratory and radiological investigations, clinical examination, and detailed clinical history in addition to demographic data like age, sex, and the kind and timing of the injury-causing accident. For all patients diagnosed with blunt renal injury, the American Association for the Surgery of Trauma (AAST) organ injury severity scale was used.

The following data were collected: demographics, mechanism of injury, associated injuries, admission hemoglobin, blood transfusion, CT findings, renal injury grade, presence of other organ injuries on CT scan, type of management, indication for operative intervention, operative procedures, operative findings, any other interventions required, hospital stay, morbidity, and mortality an Informed Written Consent Will Be Obtained from All the Participants.

All patients, regardless of age or gender, who have been diagnosed with renal injury in blunt abdominal trauma using ultrasonography or CT scanning, were included in this study. While the study does not include patients with penetrating abdominal injuries, Correlated Traumatic Brain Injury, iatrogenic kidney damage and patients with serious injuries who passed away within 30 minutes of being admitted. SPSS version 24.0 was used for statistical analysis. The gathered information was analyzed through Multivariate Analysis. Percentiles was used to depict the descriptive data.

RESULTS

This study was carried out in 50 patients presenting with blunt renal injury due to trauma at emergency trauma and urology wards at Tirunelveli Medical College, In our study out of 50 subjects 42 were males and 8 were females. [Table 1]

Coming to mode of injury among our study population eight of the fifty respondents fell from a height, and rest had road traffic accident. [Table 2]

Table 3 shows blood transfusion of study subjects. 12 of the 42 male individuals received blood transfusions, whereas the remaining 30 male patients did not. 6 of the 8 female participants did not receive blood transfusions, while two of the female was undergone for blood transfusion. [Table 3]

Table 4 shows grades of renal injury based on AAST, two subject had a grade 1 injur Table 4 shows grades of renal injury based on AAST, two subject had a grade 1 injury out of 50, twelve had a grade 2, twenty had a grade 3, ten had a grade 4, and six had a grade 5.y out of 50, twelve had a grade 2, twenty had a grade 3, ten had a grade 4, and six had a grade 5. [Table 4]

Table 5 shows initial line of management of study subjects 46 of the 50 subjects had received conservative treatment for renal damage, and two underwent for an immediate nephrectomy. [Table 5]

Table 6 shows complications of study subjects. Of the 50 participants, 34 had no problems at all, four had fever, two had hematuria, four had ileus, two had urinoma, and four had UTI. [Table 6]

Table 1: Sex Distribution of Study Subjects

SEX	NO OF SUBJECTS
MALES	42
FEMALES	8
TOTAL	50

Table 2: Mode of Injury of Study Subjects

MODE OF INJURY	NO OF SUBJECTS
FALL FROM HEIGHT	08
RTA	42
TOTAL	50

Table 3: Blood Transfusion in Study Subjects

BLOOD TRANSFUSION	MALES	FEMALES
YES	12	02
NO	30	06
TOTAL	42	08

Table 4: GRADES AS PER American Association for the Surgery of Trauma (AAST)

AAST GRADES	NO OF SUBJECTS
GRADE 1	02
GRADE 2	12
GRADE 3	20
GRADE 4	10
GRADE 5	06
TOTAL	50

Table 5: Initial Line of Management of Study Subjects

MANAGEMENT	NO OF SUBJECTS
CONSERVATIVE FAILED	02
CONSERVATIVE FOR RENAL INJURY	46
IMMEDIATE NEPHRECTOMY	02
TOTAL	50

Table 6: Complications of Study Subjects

COMPLICATIONS	NO OF SUBJECTS
FEVER	04
HEMATURIA	02
ILEUS	04
URINOMA	02
UTI	04
NO COMPLICATIONS	34
TOTAL	25

DISCUSSION

The laterality of renal injury is poorly understood, but prior studies have not compared low- and high-grade injury groups. It was interesting to note that most of our serious injuries occurred on the left side. It's unclear exactly why, but the liver's defensive mechanism might be to blame. The right kidney is typically situated behind the liver, just below the diaphragm, and marginally closer to the midline than the left kidney. The right kidney is also marginally smaller than the left.[6]

Blunt renal injury can affect people of any age. In this study, the age group of 11–20 years old (mean age of 22.76 years) had the highest incidence of blunt renal trauma, with over 80 percent of patients falling between the ages of 10-39. This is probably because patients in this age group have more active

lifestyles and prefer outdoor activities. Other research projects have published comparable demographic data. Consistent with previous studies, men made up the majority of patients in our study. Abdominal injuries are more common in men than in women because, in our country, men are typically the breadwinners. However, renal damage was more common in females (95.6%).[7]

Blunt renal trauma is the most common mechanism, accounting for 80–85% of all renal injuries. Blunt renal trauma falls into two categories: minor and serious. Automotive blunt trauma is the most common cause of kidney damage. In our investigation, auto accidents accounted for 84% of the cases of blunt renal trauma. All of the patients in our study who had grade IV or V injuries had been involved in an automobile accident. It seems that a large impact force is necessary for significant harm. In this study, the most frequently injured intra-abdominal organs were the spleen and liver. Given that the most frequently associated injuries are to the liver and spleen.[8]

Non-operative therapy for BRIs (blunt renal injuries) has become the accepted course of treatment, even for high-grade injuries. Shariat et al. successfully treated 41 (80%) of the 51 patients with a grade IV BRI non-operatively. Investigational symptoms included anxiety and hypotension. In the event of hemodynamic stability, conservative management was suggested. The goals of non-operative care for traumatic renal injury include the identification, management, and limitation of related complications, including urine extravasation, urinoma, infection, bleeding, and, most critically, loss of renal function or unnecessary nephrectomy. These problems have been reported in 3% to 33% of patients after renal trauma. The primary guide for clinical management of these problems is objective clinical signs and symptoms, rather than imaging results (e.g., hemodynamic instability, increased discomfort, fever, and leukocytosis, decreasing hematocrit and blood transfusion requirement.[9]

Patients with renal trauma had an average age of 28 years. Young adults were most affected, with a unimodal age distribution. There was also a noticeable male preponderance. The most common mechanism was blunt injuries, particularly from falls and RTIs. This is in line with the worldwide literature, which demonstrates that patients with renal trauma are usually young (the mean age of their cases is between 30 and 40), male (70 to 90% of cases are male), and have injuries that are caused by blunt trauma, specifically road traffic accidents. Renal trauma was the most common RTI among pedestrians and cyclists. Both motorcycle riders and pedestrians may suffer from renal trauma. These injuries may be specific to low- and middle-income countries like India.[10]

CONCLUSION

Eighty-four percent of the patients in our study who had renal trauma also had other injuries. It is better to treat patients with high-grade blunt kidney injury conservatively rather than surgically. This is because trauma surgeons are now able to provide more effective resuscitation therapy and have introduced highly selective angioembolization. Close observation is advised in cases with high-grade renal impairment after conservative treatment because complications are more likely to occur in these cases. Advances in imaging and critical care have increased the popularity of the conservative approach, particularly for the most severe injuries.

REFERENCES

1. A Venkata Ranga Swamy, D Raja Reddy, Raja Sekhar Guddeti, Mutyasri Pedapathnapu.Clinical Characteristics and Management of Renal Trauma: A Single-centre Observational Study. International Journal of Anatomy, Radiology and Surgery. 2023 Jan, Vol-12(1): SO01-SO04
2. Alsaywid, Basim Saleh; Alkhashan, Muneera Yousef; Alrimawi, Mahmoud Hussein1; Abu-Alsaud, Nuha Mansour2; Al-Rimawi, Hussein Mahmoud1. Blunt renal trauma in pediatric population. Urology Annals. Jul–Sep 2019. 11(3): p 241-246.
3. Razali M R, Azian A A, Amran A R, Azlin S. Computed tomography of blunt renal trauma. Singapore Med J. 2010; 51(6): 468.
4. A.M. Maarouf, A-F. Ahmed, Shalabye, Y. Badranc, E. Salema, F. Zaiton. Factors predicting the outcome of non-operative management of high-grade blunt renal trauma. African Journal of Urology. March 2015; 21(1): 44-51
5. Jon D. Simmons, MD; A. Neal Haraway, MD; Robert E. Schmieg, Jr., MD and Juan D. Duchesne, MD. Blunt Renal Trauma and the Predictors of Failure of Non-operative Management. JOURNAL MSMA. May 2010.
6. Ishida, Yuichi; Tyroch, Alan H.; Emami, Nader; McLean, Susan F. Characteristics and Management of Blunt Renal Injury in Children. Journal of Emergencies, Trauma, and Shock. Jul–Sep 2017;.10(3): 140-145.
7. Parth Patel, Dipesh Duttaroy, Samir Kacheriwala. Management of renal injuries in blunt abdominal trauma. Journal of Research in Medical and Dental Science. April – June 2014; 2 (2).
8. Vijaya Kumar R,Dharwadkar S.Doshi C. Management of blunt renal trauma in a tertiary hospital of South India:A retrospective single centre study. International Journal of Surgery & Orthopedics. January March 2019; 5(1):65 -69.
9. Dr. Shabir Ahmad Mir, Waseem Dar, Sasjad Tak and Mumtazdin Wani. A tertiary care experience of conservative management of blunt renal trauma in northern India: A prospective study. International Journal of Surgery Science 2018; 2(3): 25-27.
10. Bhakti Sarang et al.Outcomes of Renal Trauma in Indian Urban Tertiary Healthcare Centres: A Multicentre Cohort Study. World J Surg. 2021; 45(12): 3567–3574.