

ORIGINAL RESEARCH**To evaluate the clinical profile and the best therapy strategy for renal trauma patients**¹Dr Jai Prakash, ²Dr Pranjal, ³Dr Rambeer Singh¹MCh Urology, Associate Professor, SP Medical College, Bikaner, Rajasthan, India^{2,3}MS, MCh Resident Third Year, SP Medical College, Bikaner, Rajasthan, India**Correspondence:**

Dr Jai Prakash

MCh Urology, Associate Professor, SP Medical College, Bikaner, Rajasthan, India

ABSTRACT**Aim:** To evaluate the clinical profile and the best therapy strategy for renal trauma patients.**Materials & Methods:** The current prospective observational research was carried out at Urology department. Each research participant's demographic information and clinical history, severity of renal damage, side of involvement, other concomitant injuries, therapy received, and duration of hospital stay were documented. All research participants who were hemodynamically stable received computed tomography (CT) to grade renal and other related damage. The American Association for the Surgery of Trauma (AAST) organ damage scale was used to grade renal injuries.**Results:** In the current research, 13 (13% of the participants) had Grade I renal trauma, 18 (18%) had Grade II renal trauma, 35 (35% of the participants) had Grade III renal trauma, 25 (25% of the participants) had Grade IV renal trauma, and 9(9%) had Grade V renal trauma. The conservative style of care was used by 80(80%) of the patients, whereas the surgical mode was used by 20(20%) of the patients. The average length of stay in the hospital for study participants was 13.15 days. In the current study, 9(9%) of patients had only rib fractures, 7 (7%) had femur fractures, 7 (7%) had Rib fracture and urinoma, 5 (5%) patients had liver injury, 5 (5%) patients had Pelvic fracture and pelvic hematoma, and 3 (3%) patients had Rib fractures, splenic laceration, and jejunal perforation.**Conclusion:** we concluded that kidney preservation should be the major focus of therapy for any degree of renal damage, making conservative care the gold standard. The decreased morbidity and death rates and lower out-of-pocket expenses associated with the nonoperative technique make it preferable to the surgical method of care. When non-conservative treatments failed to stabilise a patient's hemodynamics, surgery was used.**Keywords:** kidney injury, renal trauma, Conservative**INTRODUCTION**

When genitourinary organs are harmed, the kidney is the most frequent site of injury. Trauma to the abdomen, either blunt or penetrating, may cause this condition. The most common causes of blunt trauma include car crashes, falls, and attacks. The kidneys are susceptible to damage from rapid deceleration forces and direct transfer of energy upon collision. Gunshot and knife injuries are the most prevalent cause of penetrating injuries to the kidney. Usually children are more prone to renal trauma due to the insufficient protection of the rib cage and lack of enough perinephric fat which functions as a cushion. Both conservative and surgical managements were adopted. Recent research has questioned the long-held belief that high-grade kidney lesions are only treatable by surgical procedures. Patients with penetrating

trauma may be conservatively handled if they are properly categorised based on their hemodynamic stability and precise staging. It has been shown via a recent meta-analysis that conservative intervention is the gold standard for both mild and severe blunt and penetrating kidney injuries.¹ Surgical intervention is associated with an increased risk of complications in instances of blunt renal damage, according to several studies.²⁻⁵ When it comes to culture and customs, India has a lot to offer. Postoperative problems in patients with penetrating renal injuries may be avoided with careful patient selection based on their hemodynamic stability and an appropriate grading of renal injuries. However, prior studies have revealed that the nonoperative strategy had a reduced risk of complications associated with the therapy of Grades I–III (low-grade) renal blunt trauma as well as penetrating renal injuries and concluded as the standard technique of management.⁶ Studies have shown that the nonoperative care is preferred over the operative management of Grades I–III (low-grade) blunt renal trauma due to decreased morbidity and death rates and cheaper out-of-pocket expenses.⁷ Therefore, the current research was carried out to evaluate the clinical profile and best method of treating individuals with renal trauma (Grades I–V).

MATERIALS & METHODS

The current prospective observational research was carried out at Urology department. Simple random selection was used to enroll patients from the emergency department and ward. The research covered all patients who provided permission, regardless of age or gender. Each research participant's demographic information and clinical history, severity of renal damage, side of involvement, other concomitant injuries, therapy received, and duration of hospital stay were documented. All research participants who were hemodynamically stable received computed tomography (CT) to grade renal and other related damage. The American Association for the Surgery of Trauma (AAST) organ damage scale was used to grade renal injuries.⁸ Those who did not respond to conservative treatment were given operational treatments such as double-J stenting, percutaneous nephrostomy, retrograde pyelogram, open drainage, percutaneous drainage of perinephric collection, renorrhaphy, and nephrectomy.

SPSS 25.0 was used to analyse the data. All tests were performed using an alpha (level significance) of 5%; a significant relationship exists if the p-value is less than 0.05.

RESULTS

The research comprised 100 patients with an average age of 40.52 ± 6.65 years, 85 male patients (85%), and 15 female patients (15%), with an average BMI of 26.88 ± 5.36 kg/m². According to the side of involvement of renal trauma, 47(47%) patients had right side renal trauma and 53(53%) patients had left side renal trauma. (Table 1)

Table 1: Demographic profile of the patients

Parameter	Number	%
Gender		
Male	85	85
Female	15	15
Age in mean	40.52 ± 6.85	
Body Mass Index(kg/m²)	26.88 ± 5.36	
Side of involvement		
Right kidney	47	47
Left kidney	53	53

The American Association for the Surgery of Trauma (AAST) organ damage scale was used to grade renal injuries. In the current research, 13 (13% of the participants) had Grade I renal trauma, 18 (18%) had Grade II renal trauma, 35 (35% of the participants) had Grade III renal

trauma, 25 (25% of the participants) had Grade IV renal trauma, and 9(9%) had Grade V renal trauma. The conservative style of care was used by 80(80%) of the patients, whereas the surgical mode was used by 20(20%) of the patients. The average length of stay in the hospital for study participants was 13.15 days. (Table 2).

Table 2: Grading system of the patients

Grading of renal injuries	Number	%
I	13	13
II	18	18
III	35	35
IV	25	25
V	9	9
Mode of management		
Conservative	80	80
Operative	20	20
Mean duration of hospital stay	13.1±1.5	

In the current study, 9(9%) of patients had only rib fractures, 7 (7%) had femur fractures, 7 (7%) had Rib fracture and urinoma, 5 (5%) patients had liver injury, 5 (5%) patients had Pelvic fracture and pelvic hematoma, and 3 (3%) patients had Rib fractures, splenic laceration, and jejunal perforation. (Table 3).

Table 3: Associated injuries

Associated injuries	Number	%
Rib fractures only	9	9
Femur fracture	7	7
Rib fracture + urinoma	7	7
Liver injury	5	5
Pelvic fracture + pelvic hematoma	5	5
Rib fractures + splenic laceration + jejunal perforation	3	3

In the current research, 9(9%) of patients had Double J stenting, 7(7%) had Percutaneous drainage of perinephric collection, 3(3%) had Exploratory laparotomy with splenectomy and repair of jejunal perforation, 5 (5%) had Nephrectomy, and 3 (3%) patients underwent Renorrhaphy. (Table 4).

Table 4: Types of intervention

Types of intervention	Number	%
Double J stenting	9	9
Percutaneous drainage of the perinephric collection	7	7
Exploratory laparotomy with splenectomy and repair of the jejunal perforation	3	3
Nephrectomy	5	5
Renorrhaphy	3	3

DISCUSSION

One hundred patients were enrolled in the research, with a mean age of 40.52±6.85 years and a mean body mass index of 26.88±5.36 kg/m². Roughly half (47%) of patients had renal damage on the right side, whereas 53% of patients had renal trauma on the left side. Among 60 patients with renal damage, Sengupta S et al. observed outcomes consistent with the current research. There were supposedly 51 men (85%) and 9 females (15%) in the research

group. An average age of 37.51 ± 5.9 years was reported. Research by Efraim Set al et al among individuals with renal damage also revealed comparable outcomes.¹⁰

The American Association for the Surgery of Trauma (AAST) organ damage scale was used to determine the severity of the renal injury. There were 13 cases of Grade I renal trauma, 18 cases of Grade II renal trauma, 35 cases of Grade III renal trauma, 25 cases of Grade IV renal trauma, and 9 cases of Grade V renal trauma found in the current research. Eighty percent (80%) of patients were treated using non-operative methods, whereas twenty percent (20%) had surgical procedures. Patients in the research stayed in the hospital for a mean of 13.1 ± 1.5 days. JB Narendra et al., who studied renal damage in 121 individuals, reported similar outcomes. Only 20 patients (16%) were reported to have had surgical treatment for their renal lesions, while the rest (83.47%) were handled conservatively. In average, patients spent 11.38 days in the hospital. Twenty-four patients (44.63%), sixty-three patients (52.07%), and four patients (3.30%) suffered from bilateral renal trauma. According to the AAST scale, the percentage of patients with Grade I, II, III, IV, and V renal damage is as follows: 21 (17.35%), 32 (26.45%), 25 (20.66%), 38 (31.40), and 5 (4.13%).¹¹ The results of a research done on individuals with renal damage by Richard A. et al. were consistent with those of the current investigation.¹²

In this investigation, we used secondary injury data to Nine (9%), seven (7%) patients had just rib fractures, seven (7%) patients had both rib and femur fractures, five (5%) patients had both liver damage and pelvic fracture/hematoma, and three (3%) patients had all three. Steve P et al. observed comparable outcomes in a study of individuals with renal damage. Results from a study of individuals with renal damage by Andrea M et al.¹³ were consistent with those of the current investigation.¹⁴ Percutaneous drainage of perinephric collection was performed in 7% of patients, Double J stenting was performed in 9% of patients, exploratory laparotomy was performed in 3% of patients, splenectomy was performed in 3% of patients, nephrectomy was performed in 5% of patients, and renorrhaphy was performed in 3% of patients. Cecilia L et al research. among individuals with renal damage yielded comparable outcomes to the current study.¹⁵ Patients with renal damage have been studied before, and Christopher D et al. reported comparable outcomes.¹⁶

CONCLUSION

Based on the results of the current investigation, we determined that kidney preservation should be the major focus of therapy for any degree of renal damage, making conservative care the gold standard. The decreased morbidity and death rates and lower out-of-pocket expenses associated with the nonoperative technique make it preferable to the surgical method of care. When non-conservative treatments failed to stabilise a patient's hemodynamics, surgery was used.

REFERENCES

1. Mingoli A, La Torre M, Migliori E, Cirillo B, Zambon M, Sapienza P, et al. Operative and nonoperative management for renal trauma: Comparison of outcomes. A systematic review and metaanalysis. *Ther Clin Risk Manag.* 2017;13:112738.
2. McGuire J, Bultitude MF, Davis P, Koukounaras J, Royce PL, Corcoran NM. Predictors of outcome for blunt high grade renal injury treated with conservative intent. *J Urol.* 2011;185:187-91.
3. Sugihara T, Yasunaga H, Horiguchi H, Nishimatsu H, Fukuhara H, Enomoto Y et al. Management trends, angioembolization performance and multiorgan injury indicators of renal trauma from Japanese administrative claims database. *Int J Urol.* 2012;19:559-63.
4. Yang CS, Chen IC, Wang CY, Liu CC, Shih HC, Huang MS. Predictive indications of operation and mortality following renal trauma. *J Chin Med Assoc.* 2012;75:214.

5. Shoobridge JJ, Bultitude MF, Koukounaras J, Martin KE, Royce PL, Corcoran NM. A 9 years experience of renal injury at an Australian level 1 trauma centre. *BJU Int.* 2013;112(2):53-60.
6. Tsui A, Lazarus J, Van As AB. Non-operative management of renal trauma in very young children: Experiences from a dedicated South African paediatric trauma unit. *Injury.* 2012;43(9):1476–81.
7. Brillantino A, Iacobellis F, Robustelli U, Villamaina E, Maglione F, Colletti O, et al. Non operative management of blunt splenic trauma: a prospective evaluation of a standardized treatment protocol. *Eur J Trauma Emerg Surg.* 2016 Oct 1;42(5):593–8.
8. Tinkoff G, Esposito TJ, Reed J, Kilgo P, Fildes J, Pasquale M, et al. American Association for the Surgery of Trauma Organ Injury Scale I: Spleen, Liver, and Kidney, Validation Based on the National Trauma Data Bank. *J Am Coll Surg.* 2008 Nov;207(5):646–55.
9. Sengupta S, Basu S, Ghosh K, Sengupta S. A prospective observational study on the optimal management approach based on the clinical profile of renal trauma patients. 2020;7(11):1677– 81.
10. Serafetinides E, Kitrey ND, Djakovic N, Kuehhas FE, Lumen N, Sharma DM, et al. Review of the current management of upper urinary tract injuries by the EAU trauma guidelines panel. *Eur Urol.* 2015;
11. Narendra, Ratkal C, Keshavamurthy R, Karthikeyan V. Clinical profile of patients with renal trauma: A cross-sectional observational study. *Urol Sci [Internet].* 2020;31(3):131.
12. Santucci RA, Fisher MB. The literature increasingly supports expectant (conservative) management of renal trauma - A systematic review [Internet]. Vol. 59, *Journal of Trauma- Injury, Infection, and Critical Care.* J Trauma; 2005. p. 493–503.
13. McCombie SP, Thyer I, Corcoran NM, Rowling C, Dyer J, Le Roux A, et al. The conservative management of renal trauma: A literature review and practical clinical guideline from Australia and New Zealand [Internet]. Vol. 114, *BJU International.* Blackwell Publishing Ltd; 2014. p. 13–21
14. Mingoli A, Torre M La, Migliori E, Cirillo B, Zambon M, Sapienza P, et al. Operative and nonoperative management for renal trauma Comparison of outcomes. A systematic review and meta-analysis. *Therapeutics and Clinical Risk Management.* 2017.
15. Lanchon C, Fiard G, Arnoux V, Descotes JL, Rambeaud JJ, Terrier N, et al. High-Grade Blunt Renal Trauma: Predictors of Surgery and Long- Term Outcomes of Conservative Management. A Prospective Single Center Study. *J Urol[Internet].* 2016 Jan 1;195(1):106–11. Available from: <https://pubmed.ncbi.nlm.nih.gov/26254724/>
16. McClung CD, Hotaling JM, Wang J, Wessells H, Voelzke BB. Contemporary trends in the immediate surgical management of renal trauma using a national database. *J Trauma Acute Care Surg.* 2013;75(4):602–6.