EVALUATION OF TREATMENT OUTCOMES FOR NON-OPERATIVE MANAGEMENT OF BLUNT RENAL TRAUMA AT PEOPLE'S HOSPITAL 115

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ABSTRACT

Objective: To evaluate the non-operative management outcomes of blunt renal trauma and associated factors at People's Hospital 115.

Subjects and Methods: A combined retrospective and prospective cohort study. All cases of blunt renal trauma were treated at People's Hospital 115 from January 2021 to April 2025. The prospective phase was conducted from April 2024 to April 2025, while the retrospective phase spanned from January 2021 to March 2024.

Results: The mean age of patients was 41.4 ± 17.2 years, with the 20–39 age group being the most affected (40%). Conservative management was the primary treatment modality, applied in 74% of cases, and mainly indicated for low- to moderate-grade injuries. JJ stent placement and angioembolization were performed in 18% and 8% of patients, respectively. Good treatment outcomes were achieved in 84% of patients, with no conversions to open surgery or in-hospital deaths. Complications occurred in only 4% of cases. A statistically significant association was found between treatment outcomes and both injury grade (p = 0.032) and treatment method (p = 0.029). Among patients with good outcomes, 61.9% had a hospital stay of 7 days or longer, while all patients with fair outcomes were hospitalized for 7 days or longer. The difference in hospital stay length between the two groups was statistically significant (p = 0.043).

Conclusion: Non-operative management of blunt renal trauma, particularly in hemodynamically stable patients with low- to moderate-grade injuries, is effective and associated with favorable outcomes and low complication rates. The findings support a conservative-first approach, with selective use of JJ stents or angioembolization based on injury severity.

Keywords: Blunt renal trauma, Non-operative management, JJ stent, Angioembolization.

1. INTRODUCTION

Blunt renal trauma is a significant clinical concern, representing a considerable portion of renal injuries encountered in emergency and trauma settings. It is primarily caused by mechanisms such as motor vehicle accidents, falls, and sports injuries, and some studies suggest that these sources account for a significant majority of renal trauma cases. [1], [2]. The management of blunt renal trauma has undergone significant changes over the past decades. Non-operative management (NOM) is considered the standard of care in the majority of hemodynamically stable renal trauma cases and includes medical treatment, angioembolization, and minimally invasive urological procedures [3]. Among these, a notable advancement is the increasing emphasis on the role of renal angioembolization in managing renal trauma. This has led to a growing preference for conservative treatment and a significant reduction in the need for surgery and nephrectomy, owing to improvements in angioembolization techniques [3]. Although several studies have addressed this issue both

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internationally and in Vietnam, the available data remain limited. Therefore, we conducted this study entitled: *"Evaluation of Treatment Outcomes for Non-Operative Management of Blunt Renal Trauma at People's Hospital 115"* to evaluate the outcomes of non-operative management of blunt renal trauma and identify associated factors.

2. SUBJECT AND METHOD

2 .1. Subject

All cases of blunt renal trauma were treated at People's Hospital 115 from January 2021 to April 2025.

Inclusion Criteria

Patients diagnosed with blunt renal trauma who were managed non-operatively at People's Hospital 115 between January 2021 and April 2025.

Exclusion Criteria

Incomplete medical records lack sufficient research data.

Missing or lost medical records.

2.2. Methods

Study Design:

A combined retrospective and prospective cohort study. The prospective phase was conducted from April 2024 to April 2025, while the retrospective phase spanned from January 2021 to March 2024. All patients received the same standardized treatment protocol at People's Hospital 115.

Study Duration:

From January 2021 to April 2025, including a prospective phase (April 2024 to April 2025) and a retrospective phase (January 2021 to March 2024).

Study Setting:

Department of Urology and Kidney Transplantation, People's Hospital 115.

Sample Size:

All cases of renal trauma treated at People's Hospital 115 between January 2021 and April 2025 that met the inclusion criteria were included.

Data Processing and Statistical Analysis:

- Prospective phase:

All participants in the prospective phase were informed about the study's purpose, potential benefits, risks, and their rights. Informed consent was obtained before enrollment. Data were then collected using a standardized data collection form. For each included patient, the investigator collected clinical information from medical records and daily follow-up until hospital discharge.

- Retrospective phase:

For the retrospective phase, the investigator retrieved medical records using the International Classification of Diseases (ICD) code S37.0. Patient demographics, clinical data, and treatment outcomes were extracted from the medical records and entered into the data collection form.

Criteria for evaluating treatment outcomes:

- Good outcome: Conservative treatment of blunt renal trauma (BRT) was successful without complications. Clinically, patients exhibited complete resolution of symptoms, including gross hematuria, flank pain, and abdominal distension; hemodynamic status was stable. Renal function tests returned to normal, and the hematoma volume was reduced.

- Fair outcome: Conservative treatment of BRT was successful, but complications accompanied it. Clinically, patients showed resolution of symptoms, including gross hematuria, flank pain, and abdominal distension; hemodynamics remained stable. Renal function tests were within normal limits, and the hematoma volume was decreased.

- Average outcome: Conservative treatment of BRT was successful. However, patients still experienced persistent flank pain, and there was no reduction in the volume of perirenal fluid collection.

Data collection and analysis

All data were recorded in a standardized data collection form. Data were entered into a computer and analyzed using SPSS version 25. Correlations between study variables, if applicable, were assessed using the Chi-square test (χ^2) and Student's t-test. A p-value < 0.05 was considered statistically significant.

2.3. Ethical considerations

The study was approved by Decision No. 2147/QĐ-HVQY dated June 11, 2024, issued by the Vietnam Military Medical University. It was also approved by the Ethics Committee of People's Hospital 115 under approval number 3070/BVND115-NCKH dated October 2, 2024.

3. RESULTS

Table 1. Distribution of patients by age group and gender (n = 50)

Age group (years)	Male		Female		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
< 20	4	10.5	0	0.0	4	8.0
20 – 29	10	26.3	3	25.0	13	26.0
30 – 39	6	15.8	1	8.3	7	14.0
40 – 49	7	18.4	2	16.7	9	18.0
50 – 59	7	18.4	2	16.7	9	18.0
≥ 60	4	10.5	4	33.3	8	16.0

The mean age of the study population was 41.4 ± 17.2 years. The oldest patient was 85 years old, and the youngest was 17. The most commonly affected age group with renal trauma was between 20 and 39 years, accounting for 40.0% of all cases.

Table 2. Treatment methods (n = 50)

Treatment methods	Frequency (n)	Percentage (%)
Conservative management	37	74.0
JJ stent placement	9	18.0
Angioembolization	4	8.0

A total of 40 patients initially received conservative treatment, accounting for 80%. Among them, three patients later underwent JJ stent placement. Thus, out of the nine patients who received JJ stents, 33.3% initially underwent conservative management. One patient underwent angioembolization following failed conservative therapy.

Table 3. Treatment methods according to renal injury grade (n = 50)

Injury grade		
Conservative (n, %)	Angioembolization (n, %)	JJ Stenting (n, %)
Grade I		
5 (13.5)	0 (0)	0 (0)
Grade II		
10 (27.0)	0 (0)	1 (11.1)
Grade III		
16 (43.2)	3 (75.0)	1 (11.1)
Grade IV		
6 (16.2)	1 (25.0)	6 (66.7)
Grade V		
0 (0)	0 (0)	1 (11.1)

Conservative management was the most commonly used approach (accounting for 74% overall, with 37 out of 50 patients). Conservative treatment was primarily applied in patients with low- to moderate-grade injuries. There were no cases of grade V injury managed conservatively. Angioembolization was indicated in 4 cases, accounting for 8% of the total patient population. JJ stent placement was performed in 9 patients (18% of the total), including one case with grade V injury.

Table 4. Treatment outcomes for renal trauma (n = 50)

Treatment outcome	Frequency (n)	Percentage (%)
Good	42	84.0
Fair	8	16.0

A total of 42 patients (84%) achieved good treatment outcomes, while eight patients (16%) had fair outcomes. No patients required conversion to surgical treatment, and no deaths occurred during hospitalization.

Table 5. Incidence of complications (n = 50)

Complications	Frequency (n)	Percentage (%)
None	48	96.0
Present	2	4.0

Two patients (4%) experienced complications following treatment. One patient with grade V renal trauma underwent angioembolization and subsequently developed perinephric inflammation. Another patient with a grade IV injury, who was managed non-operatively and later received JJ stent placement, developed a urinary tract infection.

Table 6. Association between treatment outcomes and renal injury grade and treatment method (n=50)

Characteristic	Treatment results		p-value
	Good n(%)	Fair n(%)	
Injury grade			
I	5 (11.9)	0	0.032*
II	11 (26.2)	0	
III	16 (38.1)	2 (25.0)	
IV	10 (23.8)	5 (62.5)	
V	0	1(12.5)	

Characteristic	Treatment results		p-value
	Good n(%)	Fair n(%)	
Treatment methods			
Conservative management	34 (81.0)	3 (37.5)	0.029*
JJ stent placement	6 (14.3)	3 (37.5)	
Angioembolization	2 (4.8)	2 (25.0)	
Length of hospital stay			
<7 days	16 (38.1)	0 (0)	0.043*
≥7 days	26 (61.9)	8 (100)	

**Fisher's exact test*

The results indicated that the proportion of good treatment outcomes progressively decreased from CTT grade III (38.1%) to grade V (0%). In contrast, the proportion of fair outcomes increased from grade III (25.0%) to grade V (12.5%). This difference was statistically significant (p = 0.032).

Patients with favorable treatment outcomes for renal trauma were predominantly managed conservatively, accounting for 81%. Among patients with JJ stent placement, the rate of favorable outcomes was 3 out of 9 cases (30%), while in those undergoing embolization, favorable outcomes were observed in 2 out of 4 cases (50%). A statistically significant difference was found between the treatment methods and treatment outcomes (p < 0.05).

Among patients with good treatment outcomes for renal trauma, 61.9% had a hospital stay of 7 days or more. In contrast, all patients with fair treatment outcomes had hospital stays of 7 days or longer. The difference in the length of hospital stay between the two outcome groups was statistically significant (p < 0.05).

4. DISCUSSION

The mean age of patients in our study was 41.4 ± 17.2 years, with a range of 17 to 85 years. The most affected age group was 20–39 years, accounting for 40.0%. Males represented 76% of cases, with a male-to-female ratio of 3.2:1. There was no significant age distribution difference between sexes (p > 0.05). Our patients were slightly older than in recent studies but younger than in S. Nakao's study (43 years). Previous research has consistently shown a male predominance (70–91.4%), which aligns with our findings and reflects real-world clinical patterns. The high incidence among males aged 20–39 may relate to higher levels of physical activity, occupational exposure, traffic participation, and other outdoor activities—factors increasing the risk of blunt renal trauma (BRT), especially from traffic accidents [4].

In our study, 80% (40/50) of patients were initially managed non-operatively. Subsequently, three patients required JJ stenting, totaling nine patients (18%) who received JJ stents, while 4 (8%) underwent angioembolization. Overall, 84% of patients experienced good treatment outcomes, and 16% had fair outcomes. No patients required surgery or died during hospitalization. Angioembolization plays an increasingly critical role in managing high-grade renal injuries (AAST grades IV–V) with active bleeding in hemodynamically stable patients, often obviating surgical exploration. Reported success rates reach 94% in appropriately selected cases [5]. A 2025 study by Y. Li et al. involving 71 patients reported a 100% technical and 93.0% clinical success rate for embolization. Other studies show high success rates for non-operative management (NOM) [6]. For instance, Nguyen Nhat Huy (2024) reported a 93.9% renal preservation rate, comprising 81.9% of cases treated conservatively, 12% treated with angioembolization, and 6.1% requiring nephrectomy. Among grade IV injuries, 66% underwent embolization; all grade V cases required surgery [7].

In our study, complications occurred in 4% (2/50) of cases. One patient with a grade V injury developed perirenal inflammation following angioembolization, while another with a grade IV injury developed a urinary tract infection after JJ stent placement. Comparison with other studies shows that higher-grade injuries (IV–V) are associated with increased complications. However, our complication rate was the lowest, possibly because only conservatively managed patients were included, while other studies involved both surgical and non-surgical cases. Patients with good outcomes mostly had grade I–IV injuries; fair outcomes were observed in patients with grade III or higher injuries, with a statistically significant difference (p < 0.05). In the study by Tran Quoc Hoa (2023), 59.7% of patients with blunt renal trauma were managed conservatively, 29.6% underwent selective renal angioembolization, and 13.4% received kidney-preserving surgical interventions. During treatment, 61.2% of patients presented with hematuria (a 20.8% reduction compared to admission), 37.4% developed anemia, 44.8% had perirenal fluid collections, and 9% experienced fever. The majority of patients achieved favorable outcomes, with 62.7% classified as having good results and 34.3% as fair [8].

Among patients with good outcomes, 61.9% had

hospital stays of 7 days or longer. All patients with fair outcomes stayed for at least 7 days. The difference in hospital stay duration between the two outcome groups was statistically significant ($p < 0.05$). A 2018 study by Lindsay A. Hampson et al. found that prolonged hospitalization in BRT patients (grade III or higher) was predicted by injury severity (grade IV–V), associated injuries, and in-hospital complications. These patients often had complex trauma requiring prolonged care, not solely due to renal injury but also accompanying conditions [9].

5. CONCLUSION

Conservative management proved effective and safe for most patients with blunt renal trauma, particularly in low- to moderate-grade injuries. Adjunctive procedures were selectively applied with acceptable results. Treatment outcomes were significantly associated with injury grade, method, and hospital stay duration. These findings support the continued use and refinement of non-operative strategies to preserve renal function and minimize complications.

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