Original research article

Assessment of clinical profile and the optimal management approach of renal trauma patients

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Abstract

Background: The treatment of renal injury is conceivable with either operative approach or nonoperative methodology; in any case, it significantly relies upon the grade of the renal trauma. Various studies have reported that for the treatment of Grades I–III (low-grade) renal trauma, the nonoperative approach is favored over the operative approach. Previous studies have reported that the nonoperative approach had a lower rate of complications associated with the management of Grades I–III (low-grade) renal trauma. **Material & Methods**: The present prospective observational study was conducted at the Department of Urology at our tertiary care hospital. The study duration was from September 2015 to March 2019. A sample size of 50 was calculated at a 95 % confidence interval at a 10 % acceptable margin of error by epi info software version 7.2. Patients were enrolled from the emergency department and the ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before the start of the study. Written informed consent was taken from each study participant. **Results** Study included 50 patients with an average age of 38.7 years with 42 patients (84 %) male and 8 patients (16%) female patients with an average BMI of 25.8 kg/m2. On the basis of the side of involvement of renal trauma, right side renal trauma was present in 24 (48%) patients and left side renal trauma was present in 26 (52%) patients. The bilateral injury was not found in any of the study participants. 6 (12%) had Grade I renal trauma, 10 (20%) had Grade II renal trauma, 18 (36%) had Grade III renal trauma, 12 (24%) had Grade IV renal trauma and 4 (8%) had Grade V renal trauma. On the basis of mode of management, 39 (78%) patients had the conservative mode of management, and 11 (22%) patients had an operative mode of management. The mean duration of hospital stay of study participants was 12.2 days. 4 (8%) patients had Double J stenting, 3 (6%) patients had percutaneous drainage of perinephric collection, 1 (2%) patients had exploratory laparotomy with splenectomy and repair of jejunal perforation, 2 (4%) patients had Nephrectomy and 1 (2%) patient had Renorrhaphy. **Conclusion:** We concluded from the present study that the primary goal in the treatment of renal trauma was to preserve the kidney and conservative management is the standard mode of treatment for all grades of renal trauma. The nonoperative approach is favored over the operative approach because of lower morbidity and mortality rates and lower out-of-pocket expenditure compared to operative management. Patients who were hemodynamically unstable, not responding to conservative measures were managed by operative interventions.

Keywords: kidney injury, renal trauma, Conservative.

Introduction

The treatment of renal injury is conceivable with either operative approach or nonoperative methodology; in any case, it significantly relies upon the grade of the renal trauma. Various studies have reported that for the treatment of Grades I–III (low-grade) renal trauma, the nonoperative approach is favored over the operative approach (1). Previous studies have reported that the nonoperative approach had a lower rate of complications associated with the management of Grades I–III (low-grade) renal trauma (2).

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There are two kinds of renal injury. (I) Blunt renal trauma because of road traffic/ motor vehicle accidents, injuries due to falling from a height, and injuries due to physical sports/games. All these above-mentioned etiologies lead to abrupt deceleration or crush injuries to the renal parenchyma or the vascular pedicle (3). (ii) Penetrating renal trauma basically brought about by gunshots or injuries due to sharp objects. These injuries directly cause the infringement of the peritoneum, damages to the vascular structures, parenchyma, and excretory framework. There is consistently a high danger of bacterial development inside the hematoma or urine spillage that may require debridement or require nephrectomy (4).

Appropriate patient selection on the basis of their hemodynamic stability and accurate grading of renal injuries can prevent postoperative complications among patients with penetrating renal injuries. However, previous studies have reported that the nonoperative approach had a lower rate of complications associated with the management of Grades I–III (low-grade) renal blunt trauma as well as penetrating renal injuries and concluded as the standard approach of management (5). Various studies have reported that for the treatment of Grades I–III (low-grade) blunt renal trauma, the nonoperative approach is favored over the operative approach because of lower morbidity and mortality rates and lower out of pocket expenditure in compared to the operative management (6). Hence the present study was conducted to assess the clinical profile and the optimal management approach of renal trauma patients (Grades I–V) at our tertiary care center.

Materials & Methods

The present prospective observational study was conducted at the Department of Urology at our tertiary care hospital. The study duration was from September 2015 to March 2019. A sample size of 50 was calculated at a 95 % confidence interval at a 10 % acceptable margin of error by epi info software version 7.2. Patients were enrolled from the emergency department and ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before the start of the study. Written informed consent was taken from each study participant.

All the patients who were given consent irrespective of age and gender were included in the study design excluding the pregnant patients. The demographic details and clinical history, grade of renal injury, side of involvement, other associated injuries, treatment is given and length of hospital stay was recorded for each study participant. All study participants if hemodynamically stable were underwent Computed tomography (CT) for grading of renal injuries and other associated injuries. Renal injury grading was done based on the American Association for the surgery of trauma (AAST) organ injury scale (7).

Those study participants who were not responded to the conservative management were treated with operative procedures like double-J stenting, percutaneous nephrostomy, retrograde pyelogram, open drainage, percutaneous drainage of perinephric collection, renorrhaphy, and nephrectomy. Data analysis was carried out using SPSS v22. All tests were done at an alpha (level significance) of 5%; means a significant association present if the p-value was less than 0.05.

Results

In the present study, we enrolled 50 patients with renal injuries, consisted of mainly patients from different parts of Rajasthan and also some from the states like Gujarat and Madhya Pradesh. The study included 50 patients with an average age of 38.7 years with 42 patients (84 %) male and 8 patients (16%) female patients with an average BMI of 25.8 kg/m2. On the basis of the side of involvement of renal trauma, right side renal trauma was present in 24 (48%) patients and left side renal trauma was present in 26 (52%) patients. The bilateral injury was not found in any of the study participants. (Table 1)

Table 1: Distribution of study subjects according to the study parameters.

Age	Mean 38.7 Years
Sex	
Male	42 patients (84 %)
Female-	8 patients (16%)
Body Mass Index(kg/m2)	Mean -25.8 kg/m2
Side of involvement	
Right kidney	24 (48%)
Left kidney	26 (52%)

Renal injury grading was done based on the American Association for the surgery of trauma (AAST) organ injury scale. In the present study, 6 (12%) had Grade I renal trauma, 10 (20%) had Grade II renal trauma, 18 (36%) had Grade III renal trauma, 12 (24%) had Grade IV renal trauma and 4 (8%) had Grade V renal trauma. On the basis of mode of management, 39 (78%) patients had the conservative mode of management, and 11 (22%) patients had an operative mode of management. The mean duration of hospital stay of study participants was 12.2 days. (Table 2).

Table 2: Grading wise distribution of study subjects

Grading of renal injuries	Number patients
Grade I	6 (12%)
Grade II	10 (20%)
Grade III	18 (36%)
Grade IV	12 (24%)
Grade V	4 (8%)
Mode of management	
Conservative	39 (78%)
Operative	11 (22%)
Mean duration of hospital stay	12.2 days

In the present study, on the basis of associated injuries 4 (8%) patients had Rib fractures only, 3 (6%) patients had femur fractures, 3 (6%) patients had Rib fracture and urinoma, 2 (4%) patients had liver injury, 2 (4%) patients had Pelvic fracture and pelvic hematoma, 1 (2%) patient had Rib fractures, splenic laceration, and jejunal perforation. (Table 3).

Table 3: Distribution of study subjects according to the associated injuries.

Associated injuries	Number patients
Rib fractures only	4 (8%)
Femur fracture	3 (6%)
Rib fracture + urinoma	3 (6%)
Liver injury	2 (4%)
Pelvic fracture + pelvic hematoma	2 (4%)
Rib fractures + splenic laceration + jejunal perforation	1 (2%)

In the present study, on the basis of types of intervention 4 (8%) patients had Double J stenting, 3 (6%) patients had Percutaneous drainage of perinephric collection, 1 (2%) patients had Exploratory laparotomy with splenectomy and repair of jejunal perforation, 2 (4%) patients had Nephrectomy and 1 (2%) patient had Renorrhaphy. (Table 4).

Table 4: Distribution of study subjects according to the types of intervention.

Types of intervention	Number patients
Double J stenting	4 (8%)
Percutaneous drainage of the perinephric collection	3 (6%)
Exploratory laparotomy with splenectomy and repair of the jejunal perforation	1 (2%)
Nephrectomy	2 (4%)
Renorrhaphy	1 (2%)

Discussion

In the present study, we enrolled 50 patients with renal injuries, consisted of mainly patients from different parts of Rajasthan and also some from the states like Gujarat and Madhya Pradesh. The study included 50 patients with an average age of 38.7 years with 42 patients (84 %) male and 8 patients (16%) female patients with an average BMI of 25.8 kg/m2. On the basis of the side of involvement of renal trauma, right side renal trauma was present in 24 (48%) patients and left side renal trauma was present in 26 (52%) patients. The bilateral injury was not found in any of the study participants. Similar results were obtained in a study conducted by Sengupta S et al among 60 patients with renal injuries and found similar findings to the present study. They reported 51 males (85%) and 9 females (15%) in their study group. The mean age in years was 37.5 ± 15.5 (8). Similar results were obtained in a study conducted by Efraim Set al et al among patients of renal injuries and found similar findings to the present study (9).

Renal injury grading was done based on the American Association for the surgery of trauma (AAST) organ injury scale. In the present study, 6 (12%) had Grade I renal trauma, 10 (20%) had Grade II renal trauma, 18 (36%) had Grade III renal trauma, 12 (24%) had Grade IV renal trauma and 4 (8%) had Grade V renal trauma. On the basis of mode of management, 39 (78%) patients had the conservative mode of management, and 11 (22%) patients had the operative mode of management. The mean duration of hospital stay of study participants was 12.2 days. Similar results were obtained in a study conducted by JB Narendra et al among 121 patients with renal injuries and found similar findings to the present study. They reported the majority of the patients (83.47%) with renal injuries were treated conservatively, whereas only 20 patients (16%) were managed operatively. The mean duration of hospital stay was 11.38 days. 54 patients (44.63%) had trauma on the right side and 63 patients (52.07%) had trauma on the left side and 4 (3.30%) patients had bilateral renal trauma. On the basis of the AAST classification of renal injuries, 21 (17.35%) patients were in Grade I; 32 (26.45%) patients were Grade II; 25 (20.66%) patients were Grade III; 38 (31.40) patients were Grade IV and 5 (4.13%) patients were Grade V (10). Similar results were obtained in a study conducted by Richard A et al among patients with renal injuries and found similar findings to the present study (11).

In the present study, on the basis of associated injuries 4 (8%) patients had Rib fractures only, 3 (6%) patients had femur fractures, 3 (6%) patients had Rib fracture and urinoma, 2 (4%) patients had liver injury, 2 (4%)

patients had Pelvic fracture and pelvic hematoma, 1 (2%) patient had Rib fractures, splenic laceration, and jejunal perforation. Similar results were obtained in a study conducted by Steve P et al among patients with renal injuries and found similar findings to the present study (12). Similar results were obtained in a study conducted by Andrea M et al among patients with renal injuries and found similar findings to the present study (13). In the present study, on the basis of types of intervention 4 (8%) patients had Double J stenting, 3 (6%) patients had Percutaneous drainage of perinephric collection, 1 (2%) patients had Exploratory laparotomy with splenectomy and repair of jejunal perforation, 2 (4%) patients had Nephrectomy and 1 (2%) patient had Renorrhaphy. Similar results were obtained in a study conducted by Cecilia L et al among patients with renal injuries and found similar findings to the present study (14). Similar results were obtained in a study conducted by Christopher D et al among patients with renal injuries and found similar findings to the present study (15).

Conclusion

We concluded from the present study that the primary goal in the treatment of renal trauma was to preserve the kidney and conservative management is the standard mode of treatment for all grades of renal trauma. The nonoperative approach is favored over the operative approach because of lower morbidity and mortality rates and lower out of pocket expenditure compared to the operative management. Patients who were hemodynamically unstable, not responding to conservative measures were managed by operative interventions.

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