



A 5-YEAR EXPERIENCE OF MANAGEMENT IN RENAL TRAUMA: A SINGLE CENTER STUDY IN INDONESIA

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Abstract: Our study was descriptive with retrospective approach extracting and analyzing the medical record data of renal trauma patient for the last four years. We reported a total of 84 renal trauma that were analyzed consisted with 5 to 20 years old (35.71%) male and 86.9% patients. Most of our patients were due to blunt trauma (95.2%) caused by motor vehicular accidents and penetrating trauma (4.8%). Grade I trauma accounted for most of the cases with 33.3% followed by grade IV with 23% and grade III with 19.2%. Several complications were observed including anemia (28.3%) and hematuria (82.1%). The most common procedure performed was nephrectomy (36.3%). Mortality rate was the highest in grade IV renal trauma (50%). Hemodynamically stable patients were found in 86.9% and did not require blood transfusion. Prognosis was affected by associated other injuries.

Keywords: Renal trauma, management of renal trauma, retrospective, single center

INTRODUCTION

Renal injuries accounted for one to five percent of all trauma cases [1]. Despite the fact that kidneys are shielded on the anterior side by lumbar muscles, vertebra, ribs, and visceral organs, they are the most commonly injured genitourinary organs in traumatic injuries [2]. Each year, approximately 200.000 cases are reported worldwide [3]. It can occur as an isolated injury; however, the majority of cases occur in conjunction with other injuries [4]. It is often separated into blunt and penetrating injuries based on the mechanism of injury. The leading cause of blunt renal trauma in adults is motor vehicle accidents (MVAs), followed by falls and sports injury. When compared to pediatric patients, the etiologies are different, with falling injuries and pedestrian accidents being the most common causes of trauma, followed by MVAs [5]. Penetrating injuries in renal are more severe and less predictable compared to the blunt injuries. They are mostly caused by firearms and stab wounds [6]. Gunshot injuries are less prevalent to occur in Indonesia, because firearms are not widespread among Indonesian civilians [7]. Renal trauma may have different features in different region as sociodemographic and geographic factors among many others may affect the common local etiologies of the trauma. Analyzing and identifying the characteristics of renal trauma are useful for establishing specific strategies or guidelines relevant to certain countries.

Currently, there are only two studies which reported the characteristics of renal trauma in Indonesia. The first study was conducted in a tertiary hospital in Bandung, West Java, while the second study took place in a tertiary hospital in Makassar, South Sulawesi [8, 9]. Dr. Soetomo General-Academic hospital is considered as the top referral hospital for the eastern Indonesian region, therefore evaluating the data for renal trauma in this center would provide important epidemiological data for renal trauma in Indonesia [10]. Consequently, we set out to evaluate the characteristics of renal trauma patients in Dr. Soetomo General-Academic hospital over the past five years.

METHODS

This is a descriptive study using a retrospective approach that examines the medical record data of all patients admitted to Dr. Soetomo General-Academic hospital with renal trauma due to various etiologies from January 2015 until December 2019. The variables described were patient age, sex, level of hematuria, mechanism of injury, renal trauma grade based on the American Association for The Surgery of Trauma (AAST) renal injury scale [11], characteristics of hematuria, hemodynamic status, associated injuries, type of management, requirement of transfusion, complications, and mortality rate. The collected data was organized and presented descriptively in the form of tables and narratives. Patients with inadequate data were eliminated from the study. The ethical committee of the research and development center of Dr. Soetomo General-Academic hospital authorized this study with the ethical number: 1136/KEPK/IV/2019.

RESULTS AND DISCUSSION

We collected 84 renal trauma data on our center. The detailed explanation of our result was presented in Table 1. Our data was extracted from medical record in the last 4 years. Our patients consisted of adolescent male with 86.9% with the age ranging from 5 to 20 years old (35.7%) with mean age of 31.41 years old. Blunt trauma (95/2%) and penetrating trauma (4.8%) were the most commonly types found in our data. For the severity of trauma, grade I trauma accounted for 33.3% followed by grade IV with 23% and III with 19.2%. Abdominal trauma was the most common injury with 43.62. Long term complications were also found in 28.3% of our patients. Transfusions were also not required in 72.6% of patients. The clinical profile and management of renal trauma cases in the hospital during the last 5 years were presented in Table 2. Almost all of the patients (82.1%) had hematuria, with the majority of them having micro hematuria (47.5 %). Two patients with grade IV renal damage and three with grade V renal trauma did not show any indications of hematuria. The hemodynamic state of the majority of the patients was stable (86.9 %). Two patients with grade V renal trauma owing to blunt trauma and three patients with grade III, IV, and V due to penetrating injuries had hemodynamic instability as a result of kidney-related injuries. The majority of the patients were given conservative treatment (88.4 %). Only 9 patients were surgically treated, resulting in a total of 11 operations, since some patients required two.

Despite their relatively safe retroperitoneal location, kidneys are the most susceptible of all genitourinary organs [11]. Despite the fact that research on the features of renal trauma have been published in the past, there are presently only two studies describing the characteristics of renal trauma in Indonesia as of the writing of this study. Incidence reports of trauma cases in certain locations are useful because they vary depending on where in the globe you are [12]. The findings from the first research were published from Bandung, West Java, while the findings from the second study were reported from Makassar, South Sulawesi [8, 9]. As a result, doing the research in Surabaya, East Java's capital, would represent the demographics of the Indonesian people. Furthermore, Dr. Soetomo Hospital is East Java's largest tertiary general hospital, and it is regarded as the region's top referral hospital [10]. We observed that the majority of the patients in this research were men (86.9%). These findings are consistent with prior research from other places across the world [3, 5, 13]. It's conceivable that the prevalence is higher among men due to our country's familial culture, in which the father is typically the family's leader. Men, on the other hand, are generally linked with a more prominent daily activity than women [14]. Our finding is linked to MVAs (78.5%) being the most common cause of blunt trauma in this research. Because of the fast deceleration and acceleration forces, MVAs may induce kidney damage. Acceleration forces may induce rupture or thrombosis of key kidney structures, whereas deceleration forces may cause parenchymal and vascular damage by colliding with adjacent tissues such as spinal vertebrae and ribs. In Indonesia, motorcycles are the principal means of transportation for the vast majority of males [15]. The majority of the patients in this research were males between the ages of 5 and 20, followed by those between the ages of 21 and 30. Young individuals are more vulnerable to MVAs than older people because they have less emotional control. As a result, some of them frequently violate driving safety precautions [16, 17]. Penetrating injuries, which were caused by stabbing injuries, were less prevalent among the patients (4.8 percent). Firearms are the leading cause of penetrating kidney damage in other parts of the world. Penetrating trauma as a result of gunshot wounds is more common in Brazil [6]. Gunshot wounds are less prevalent in Indonesia since most individuals are not authorized to carry weapons [7]. The majority of the patients in this research were treated conservatively with bedrest, fluids, and antibiotics (88.6%). Although the effect of antibiotics in renal trauma is unknown, broad range intravenous antibiotics have been shown to be beneficial when the collecting system is damaged and urine leakage occurs [18]. Long et colleagues found that 5% of patients with grade IV renal damage who were not given prophylactic antibiotics required nephrectomy as a result of urosepsis [19]. Antibiotics have the potential to lower the incidence of urinary tract infection and perinephric abscess by 5% [20]. Another research found that 17 percent of patients with renal damage who did not respond to antibiotics were more likely to develop urinoma, which then proceeded to sepsis [21]. Only a small percentage of patients (11.3 percent) with severe renal trauma grade IV and V or lower grades accompanied by unstable hemodynamic state and or indications of peritonitis had surgical treatments. Only 16.6% of the 19.572 renal trauma patients treated surgically, according to Bjurlin et al.

Table 1. Characteristics of patients in our center for the last 5 years

	Number of cases (n)	Percentage of Cases (%)
Age (years old)		
5-20	30	35.71
21 - 30	18	21.43
31 – 40	11	13.1
41 – 50	10	11.9
51 – 60	12	14.29
> 60	3	3.57
Sex		
Male	73	86.9
Female	11	13.1
Trauma Type		
Blunt Trauma	80	95.2
Penetrating Trauma	4	4.8
Etiology		
Motor		
Accident	66	78.5
Fall	4	4.8
Single accident	8	9.6
Violence (blowing)	2	2.3
Stabbing	4	4.8
AAST grade		
I	26	33.3
II	8	10.2
III	15	19.2
IV	18	23
V	11	14.3
Associated injuries		
Head and neck	7	7.45
Thoracal	16	17.02
Abdominal	41	43.62
Pelvic	11	11.7
Upper extremity	12	12.77
Lower extremity	7	7.45
Management		
Conservative	69	88.4
Surgery	9	11.6

CONCLUSION

Men mostly involved in renal trauma and MVA was the number one cause. Conservative treatment was indicated in patients with stable hemodynamic and blood transfusions were not needed in this type of patient. Prognosis was influenced by other associated injuries

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