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Research Article

Assessment of Clinical Characteristics of Patients with Penetrating Abdominal Trauma

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ABSTRACT

Background: One type of trauma is penetrating abdominal trauma (PAT). For this reason, given the importance of PAT and the management of these patients, this study aimed to determine the clinical characteristics of patients with PAT admitted to the ICU.

Methods: This retrospective study was conducted by reviewing and studying the medical records of patients. Researchers reviewed the records of patients who were hospitalized in the ICU with a diagnosis of PAT and extracted the relevant information. Inclusion criteria included being between the ages of 10 and 60, having a diagnosis of PAT, and being hospitalized in the ICU. Patients whose records were incomplete for any reason were excluded from the study. The research checklist included relevant information. In this study, ethical principles in research were observed in the study of the doctors' clinical records. Additionally, after extracting the data into SPSS version 16 software, data analysis was performed.

Results: Results showed 86.2% of the patients were male and 13.8% were female. Additionally, most of the patients were in the age range between 31-40 years, with 37.9%. The majority had a high school diploma (70.7%) and multiple traumas with 60.3%. The mean (SD) of mortality in the first 24 h was 1.82 (0.38), hospital mortality was 1.74 (0.44), and ICU length of stay (day) was 6.48 (4.2). Additionally, the results showed that most of the radiograph findings included air under the diaphragm at a rate of 6.9%, and the highest rate of complications observed in patients included surgical site infection at a rate of 24.13%.

Conclusion: The results of this study showed that infection is one of the important complications of hospitalization of patients with PAT in the ICU. Therefore, it is essential to carry out the necessary interventions in this area.

Introduction

Trauma is one of the causes of hospitalization, which can lead to the death of patients due to their short-term and long-term complications [1-2]. According to reports, in 2019, about 4.4 million deaths occurred due to injuries [3]. Trauma occurs due to various incidents, including traffic accidents, fights, falls from heights, and other traumatic events. In the event of trauma, various complications affect the patient and society. These complications include hospital costs, rehabilitation expenses, and disability [4-6].

Trauma is divided into two types: penetrating and non-penetrating, and the distribution of trauma by type depends on factors such as geographical area and causes of the accidents. A significant portion of penetrating trauma leads to death due to firearm accidents, and a

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significant portion of non-fatal penetrating trauma accidents are caused by cuts/piercings [7-9]. According to reported statistics, penetrating trauma is the cause of a crude fatality rate of 13 per 100,000, which is a significant statistic [10].

One specific type of trauma is penetrating abdominal trauma (PAT). In the United States, PAT was present in 38% of all types of penetrating trauma [11]. PAT is associated with significant complications and mortality in comparison to other types of trauma due to damage to vital organs and vascular structures. In fact, patients with PAT require emergency and immediate critical interventions due to blood loss, acidosis, and hypothermia [12-13].

Due to the sensitive conditions of trauma patients, they are admitted to the ICU. Admission of the patient to the ICU provides special medical and nursing care services that help improve patients' health [14-15]. Therefore, considering the importance of PAT and the management of their treatment of these patients, this study aims to determine the clinical characteristics of patients with PAT admitted to the ICU.

Methods

This retrospective study was conducted with the ethical code IR.MEDILAM.REC.1402.235 in 2022-2023 by reviewing and studying the medical records of patients. Researchers reviewed the records of patients who were hospitalized in the ICU with a diagnosis of PAT and extracted the desired information. Inclusion criteria included being between the ages of 20 and 60, having a diagnosis of PAT, and being hospitalized in the ICU. Patients whose records were incomplete for any reason were excluded from the study.

The research checklist includes information on gender (male/female), age (10-19/20-30/31-40/41-50/51-60), education (illiterate/diploma/university degree), Mechanism of injury (traffic accident/fall/gunshot/stabbing), Number of injuries (only abdomen injury/multiple trauma), concomitant injuries (chest/pelvic, spine/head, neck, and face/extremity), fate (death/improve), sequelae (permanent/transient/without), and mean (SD) of mortality in the first 24 h, hospital mortality, days of mechanical ventilation, hospital length of stay (day), ICU length of stay (day), and GCS.

In this study, ethical principles in research were observed during the review of clinical records. Additionally, after extracting the data into SPSS version 16 software, data analysis was performed.

Results

The results showed that 86.2% of the patients were male and 13.8% were female. Additionally, most of the patients were in the age range of 31-40 years, with 37.9%, The majority had a high school diploma (70.7%), and with multiple traumas with 60.3% (Table 1).

The result showed the mean (SD) of mortality in the first 24 h was 1.82 (0.38), hospital mortality was 1.74 (0.44), and ICU length of stay was 6.48 days was 6.48 (4.2) (Table 2). Additionally, the results showed that most of the radiographic findings included air under the diaphragm at a rate of 6.9%, and the highest rate of complications observed in patients included surgical site infection at a rate of 24.13% (Table 3).

Table 1- Baseline characteristics of PAT injury, N (%)

Variable		N (%)
Gender	Male	50(86.2)
	Female	8(13.8)
Age group	10-19	5(8.7)
	20-30	18(31)
	31-40	22(37.9)
	41-50	10(17.2)
	51-60	3(5.2)
Educational level	Illiterate	12(20.7)
	Diploma	41(70.7)
	University degree	5(8.6)
Mechanism of injury	Traffic accident	8(13.8)
	Stab/Cat	25(43.1)
	Firearm	14(24.1)
	Other	11(19)
Multiple trauma	Yes	35(60.3)
	No	23(39.7)
Concomitant injuries	Chest	4(6.9)
	Pelvic, Spine	8(13.8)
	Head, neck, and face	9(15.5)
	Extremity	6(10.3)
	No injuries	31(53.4)

Fate	Death	10(17.2)
	Improve	48(82.8)

Table 2- Baseline characteristics of PAT injury, M (%SD)

Variable	Mean	SD
Mortality in first 24 h	1.82	0.38
Hospital mortality	1.74	0.44
Days of mechanical ventilation	4.84	2.36
Hospital length of stay (day)	9.22	6.29
ICU length of stay (day)	6.48	4.2
GCS	6	1.41

Table 3- Radiograph findings and Complications observed

Variable		N (%)
Radiograph findings	Air under the diaphragm	4(6.9)
	Cardio-pulmonary angle blunting	2(3.4)
	Pneumothorax	1(1.7)
	Pneumothorax	1(1.7)
Complications observed	Stoma	1(1.7)
	Surgical site infection	14(24.13)
	Fistula (Pancreatic /Vesico-enteric)	2(3.4)
	Respiratory complications	1(1.7)
	Renal complications	1(1.7)
	Other	3(5.17)

Discussion

Due to the numerous complications of PAT, this study aimed to determine the clinical characteristics of patients with PAT admitted to the ICU.

In this study, 86.2% of patients were male, and most patients were in the age range of 31-40 years. In the study of Larsen et al. in 449 patients with abdominal trauma, 70% of patients were male, and the mean age of the patients was around 31 years [16]. In the study of Arafat et al., it was shown that 82.1% of patients studied in the Syrian war were male and in the age range of 19-35 years [17].

In this study, 17.2% of patients died, and 82.8% survived. In the meta-analysis study by Endeshaw et al., the mortality rate in 33 reviewed articles (Bunt and penetrating) in Africa was reported to be 9.67% (95% CI; 7.81, 11.52) [18], which is much lower than the results of this study. Conversely, in some studies, the mortality rate was higher than the results of this study. For instance, the mortality rate in the study by Krige et al. in South Africa, which included 75 patients with PAT, was reported to be 28% [19], which is higher than the results of this study. Furthermore, in the study by Gad MA et al. in Egypt, the mortality rate in 76 patients diagnosed with PAT was 57.9% [20], which is much higher than the results of this study.

According to the findings in this study, in terms of concomitant injuries, 6.9% of patients had chest injuries, 13.8% had pelvic and spine injuries, 15.5% had head, neck, and face injuries, 10.3% had extremity injuries, and 53.5% had no injuries. In the study by Abdulkadir et al., 6.5% of patients had no injuries to other body organs, 58% had injuries to one organ, and 27.5% had injuries to two organs. Additionally, the highest rate of injury was to the small bowel with 55.1%, large bowel with 25%, diaphragm with 13.9%, and liver with 11.4% [21]. Additionally, in the study by Mirzamohamadi et al., PAT patients had head, neck, and face injuries in 3.6% of patients, chest injuries in 23.2%, and extremity injuries in 8% of patients [22].

Conclusion

The results of this study showed that infection is one of the important complications of hospitalization of patients with PAT in the ICU. Therefore, it is essential to carry out the necessary interventions in this field.

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