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Original Research Article

Polytrauma with Blunt and Penetrating Chest Injury Management with Immunonutrition in Tertiary Care Hospital

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Abstract:

A persistent difficulty for trauma teams and general surgeons operating in poor nations is dealing with chest injuries. After head trauma and abdominal injuries, thoracic trauma is the third most prevalent cause of death for individuals with polytrauma. ln an attempt to improve care, prevent complications, and reduce the death rate of Polytraurna patients, this investigation examined the course of therapy, results, and epidemiological data of patients who had blunt chest trauma. A retrospective analysis of hospital records spanning four years (2017— 2020) was conducted for patients with chest trauma, including Polytrauma (n=180). A number of factors were investigated, such as the results, management, injury mechanism, and demographic profile. The male to female ratio was 2.3: I, and the patients' average life span was 36*15 years. Assaults and traffic accidents continue to be the most frequent causes of trauma. Immunonutrition was used to treat the majority of patients (56.1 I°/c). Of the patients, only 2.22°/c experienced mortality. Trauma mainly affects young male patients. Injuries from traffic are the most frequent cause. Nonetheless, the majority of patients respond well to conservative care, and the current study's death rate only applies to individuals who have many traumas.

Keywords: Polytrauma, Chest Injury, Management, Immunonutrition, Hospital, Epidemiology.

Introduction

Hemothorax, pneumothorax, or a combination of both is the most frequent potentially fatal side effects from traumatic and penetrating thoracic injuries. A chest tube can be used as a permanent treatment for about 85% of thesepatient1 [1]

Regardless of global attempts to reduce human accidents, the percentage of patients with Polytrauma who receive treatment to hospitals keeps rising [2]. Traumatic injuries are responsible for 5.7million deaths worldwide each Year [3]. Because these injuries vary widely in severity and complexity, advanced treatments are necessary to reduce morbidity and death rates, which presents a challenging issue for doctors everywhere.

Thoracic trauma is the third most prevalent reason for death for individuals with polytrauma, after head trauma and abdominal injuries [3]. However, further research is needed to enhance medical care, as several studies on patients with chest trauma have revealed significant differences in their mortality and morbidity [4].

High-speed vehicle travel has led to a rise in the prevalence of chest injuries. It causes extensive hemothorax, tension pneumothorax, and damage to bigger vessels, among other potentially fatal problem [5]. Many environmental and sociopolitical factors are responsible for the diversity in

The etiological pattern of chest trauma around the world, although in non-warzones of the world,

Road traffic accidents (RTAs) continue to be the most common cause of chest trauma [6].

Significant mortality has been linked to chest injuries. Data on chest trauma are few, despite the fact that hospitalizations for chest trauma are on the rise. A retrospective analysis of all patients with chest trauma admitted to our hospital between January 2017 and December 2020 will be conducted in order to ascertain the therapy's course and outcomes.

Objective of Study

The research sought to investigate the demographics, characteristics, duration, and management of Polytrauma patients with chest injury acknowledged to our tertiary care facilities level 1 trauma center in order to discover factors impacting

management, probable complications, and patient mortality.

Literature Review

Mechanism of Damage: As we have already covered, injuries to organs and structures that do not affect the tissue's integrity are referred to as blunt traumas. Blunt traumas can also be categorized based on how they operate. The three most frequent causes of blunt trauma are automobile accidents, industrial mishaps, and falls. Determining the process of blunt damage is essential for timely diagnosis and treatment therefore various methods can result in various kinds of injuries and since the nature of injury itself determines mortality [7].

The force and length of the blunt effect, the acceleration-deceleration injury, and the enlargement of damage brought on by trauma can all affect how serious the injury is. The following four Factors can result in blunt chest damage: The thorax might be directly impacted, compressed, injured during acceleration or deceleration, or burst [8]

The majority of blunt thoracic trauma cases are brought on by falls from heights and motor vehicle accidents, which also include pedestrian collisions [9,10]. Severe thoracic trauma is most frequently caused by auto accident [11,12]. Pedestrians, drivers, and motorcycle riders are the most often injured parties in auto accidents. The majority of blunt thoracic traumas that necessitated hospitalization were caused by car crashes and height falls.

In blunt chest trauma, the principles of thoracic compression and acceleration-deceleration injury are crucial. Thus it will be simpler to comprehend how these wounds harm the chest wall and lungs.

The Principle of Immunonutrition

The word "immunonutrition" refers to the potential of nutrients to affect immune system cell activity, while this phrase is most commonly used in reference to the use of certain nutrients or combinations of nutrients in patients who are surgery, traumatized, burned, or in critical condition [13]. Artificial nutrition is usually administered to these individuals either parenterally or enterally. The main idea behindimmunonutrition is that nutrients can enhance cell-mediated immune responses in a way that has clinical significance. However, when it comes to patients who need artificial nutrition, this idea is expanded to include oxidative stress reduction and improvement of the gut barrier, which stops bacteria from moving (Fig.I).

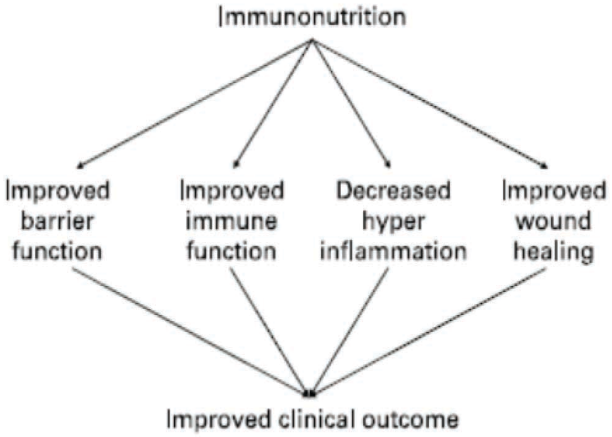

Figure 1: The idea of immunonutrition in relation to individuals undergoing surgery or who are very sick

Injuries relating to the chest wall

- **The thoracic cage**

When blunt thoracic trauma occurs, among the most frequent wounds are rib fractures from injuries to the chest wall. In addition to rib fractures, sternum and clavicle fractures should also be taken into consideration when discussing bone fractures.

A solitary fractured rib cannot be lethal. Nevertheless, other injuries such as pleural and lung tissue damage, hemothorax, pneumothorax, parenchymal laceration, pulmonary contusion, etc. frequently accompany rib fractures. The posterolateral bend. which is the most vulnerable area is where the affected rib typically fractures after a hard blow [14].

Adults are more likely to suffer rib fractures than children because children's ribs are more flexible. Children may therefore experience lung injuries without experiencing significant stress to the chest wall [15]. When a young kid has rib fractures, it should be considered a serious trauma with a high chance of death.

- **Flail chest**

A fracture of three or more contiguous ribs, prefer-

ably in two sections, is referred to as a flail chest. The separation of a portion of the chest wall from the wall that surrounds it is the primary cause of flail chest.

Flail chest is often caused by blunt trauma to the thorax, such as falls from a height, direct collisions, and car accidents. Usually, flail chest is accompanied by other injuries such as shock, blood loss, and injury to the extra thoracic organs. Patients with such extra injuries have a death rate that ranges from 10% to 20% [16]. Trauma sufficiently severe to result in a flail segment can also cause parenchymal contusion. Breathing becomes problematic when there is a parenchymal contusion, and bleeding into the lung tissue might result in necrosis and edema. Morbidity and pulmonary contusions are strongly correlated. Hemothorax and pneumothorax are two traumas that are closely linked to flail chest [17].

Methodology

In a tertiary care facility, the study was carried out. The study (n=180) included all patients with a diagnosis of chest trauma who were admitted to the surgical department (which involves multiple trauma or selective chest injuries). Retrospective observational examination of information collected from hospital records during January-2017and December, 2020 was part of the research's approach. [18]

The data that was analyzed comprised the following: management, results, types of chest injuries, made of injury, and demographic profile. [19]

Version20 of the SPSS software for Windows was utilized for statistical analysis. For univariate analysis, the ANOVA test was used, and for comparison, the chi square test was used. [20]

P-values were considered significant if they were less than 0.05. The mean and standard deviation were computed using a Microsoft Excel worksheet from 2017.The nominal data was displayed as a percentage.

Results and discussion

180 individuals with chest injuries who were admitted to the hospital over the course of the four years prior to the study's collection were included (January 2017 to December 2020).

Of the180 patients,45 belonged to the age group of 41—50 years, and 55 to the age group of 2I— 30 years. Men's mean age was 35*14 years, and women's mean age was 37 *17 years. The mean age is 36*15 years, as seen in Table 1. There were 2.3 males for every female.

Table 1: Profile of Demographics

Age	Male	Female	Sum
Lessthan10	3	1	4(2.22°/r)
II-20	9	2	20(11.1I°/r)
2I-30	44	3	55(30.55°/r)
31-40	20	3	23(12.77°/c)
41-50	3I	13	44(24.44°/c)
51-60	13	9	22(12.22°/)
>60	7	5	12(6.66°/)
Total	I2g	32	150
Mean+SD	33+I4	37+I7	36+l5

In this study, motor accidents accounted for the majority of injuries (n = 100, 55.55°/c). The second most frequent cause of injuries (n =65,37.77°/c) was assaults. Table 2listslesscommon modes.Just3% of patients suffered penetrating trauma, while most patients had blunt trauma to the chest.

Table 2: Cause of Injury

Cause of damage	Male	Female	Sum
Injury due to traffic On road	75	25	100(55.55°/c)
Falls	3	5	S(4.44°/c)
Assaults	47	21	65(37.77°/c)
Accident in railway	3	1	4(2.22°/)

The most frequent type of injury (n = 60) was abrasions, which was followed by rib fractures, hemothorax, and bruises (Table 3).

Table 3: Kinds of chest Injury

Kinds of Injury	No of patients
Abrasion	60
Bruise	21
Fractured ribs	25
Laceration	11
Flail chest	4
Fractured clavicle	15
Hemothorax	26
Pulmonary confusions	5
Pneumothorax	13

Nevertheless, in several in stances, there were several results. The number of patients with only chest injuries was lower (n=55). The majority of patients (n= 108) had concomitant head injuries. Fifteen patients had associated abdominal injuries, and two patient had head and abdomen injuries (Figure2).

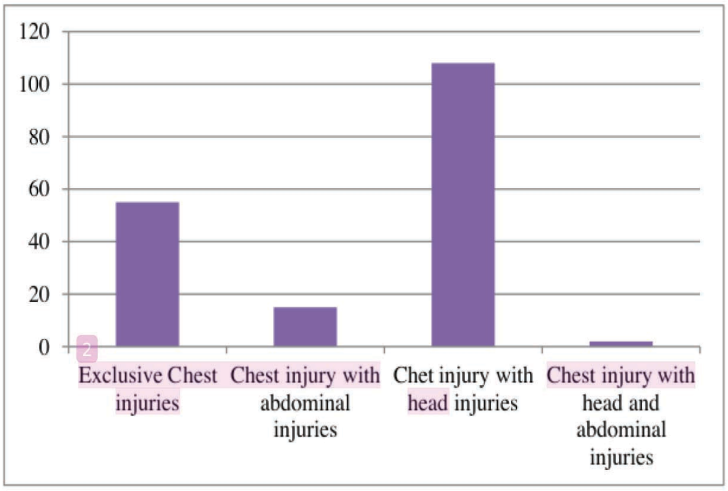

Figure 2: Injury Distribution

A conservative approach was taken in the majority of the cases (n=10I,56.1I°/c). Table4 shows that only 66patients (36.66°/c) needed intercostals chest tube drainage. P value is shall greater than. 05. Nevertheless, the results were not statistically significant.

Table 4: Patients management profile

Management	Cases
A dapting to LA	15(8.33°/r)
With immunonutrition	10I(56.1I°/r)
Draining of intercostalschesttubes	66(36.66°/r)
P-value	0.675465

A proportion of2.22°/c of patients experience mortality, whereas79.44°/c(n=143) were released in a satisfactory state (Table 5).

Table 5: Chest injury patient's results

Findings	Cases
Discharged	143(79.44°/r)
Referred	6(3.33°/r)
Left despite the advice of doctors	27(15°/c)
Expired	4(2.22°/r)

Notably, four of the patients who passed away also had additional injuries. Two patients suffered from flail chest, abdominal damage (liver laceration), and brain traumas as a result of railroad tracks. Two patients suffered injuries from car accidents, including multiple rib fractures. Since our institute lacked a neurosurgeon, six patients were referred because of related head injuries.

Conclusion

Chest injuries are most commonly caused by traffic accidents. However, assaults are also sharply on the rise and area significant cause of chest injuries. The population most impacted is young men. Chest trauma has a low death rate and is typically treated conservatively. Important actions must be taken to reduce traffic accidents and to provide counseling to younger adults who have been assaulted.

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