

## Study on Polytrauma in the Emergency Department: A Retrospective Analysis of its Character and Prognosis

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### Abstract

**Background:** In both industrialized and developing nations, polytrauma is a leading cause of morbidity and mortality. In a tertiary care hospital, this study aims to evaluate the prevalence and prognosis of polytrauma patients.

**Method:** In a sizable emergency department, this observational study was undertaken retrospectively (ED). The analysis included all patients >15 years old who presented to the ED with polytrauma.

**Results:** The majority (85%) of the 70 polytrauma patients were men. Age was 40.1 years on average (standard deviation: 10.05 years). Fewer than one-third of the patients visited the emergency room within three hours of their injuries. A fifth of the patients suffers severe traumatic brain injury. 75 percent of the patients needed orthopedic testing and treatment. The mortality rate in the ED was 12%. Fewer than one-third of the patients visited the emergency department (ED) within three hours of the accident, underscoring the urgency of enhancing prehospital treatment and transportation in our nation. In treating polytrauma sufferers, aggressive resuscitation with crystalloids and blood products is crucial.

**Keywords:** Emergencies, Emergency Department, Polytrauma, Trauma.

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### Introduction

A person who has had several traumatic injuries is said to have undergone polytrauma, also known as multiple trauma, in medicine [1]. In both affluent and developing nations, polytrauma is a significant cause of illness and mortality [2]. For children and young adults, trauma continues to be the greatest cause of death and disability. Road traffic accidents (RTA) have sharply increased in India in recent

years because of broad motor vehicle access and lax safety regulations. A trauma team composed of an emergency physician, orthopedic surgeon, general surgeon, neurosurgeon, and radiologist is typically responsible for managing polytrauma patients.

In a tertiary care hospital, this study aims to evaluate the prevalence and prognosis of polytrauma patients. We could better

understand and treat people with polytrauma thanks to the study's findings [3].

### Method

With an average of 200 to 300 admissions each day, this retrospective observational study was done in the Emergency Department (ED). All polytrauma patients who presented to the emergency department between April 2022 and August 2022 and were at least 15 years old were included in the study. Individuals who had only one system affected by their catastrophic injuries were not included. The charts were reviewed and the pertinent data of history, clinical findings, laboratory investigations, and focused assessment with sonography for trauma

(FAST) findings were reported in a semi-validated questionnaire. All ED results underwent evaluation.

### Statistical Procedures

(Microsoft Office Excel 2010). Mean values are shown for continuous variables. The percentages for categorical and nominal variables are shown.

### Results

Among 70 polytrauma patients, the Majority (85%) were male. The mean (standard deviation [SD]) age was 40.1 ( $\pm 10.05$ ) years. Less than one-third of the patients presented to the ED within 3 h of the time of injury. (table 1)

**Table 1: Baseline characteristics (n=70)**

Variable	n (%)
Males	70 (85)
Mean age (Year) $\pm$ SD	
<b>Time of Injury</b>	
12 AM – 8 AM	
8 AM – 4 PM	
4 PM- 12 AM	
<b>Time delay to ED presentation (h)</b>	
<3	22
3-10	44
>10	4

Plasma alcohol levels were sent in 22 patients and were found to be elevated in 14 (20%) patients (Table 2).

**Table 2: Clinical features and laboratory investigations**

Variable	n (%)
<b>Glasgow coma scale</b>	
Mild (>13)	45
Moderate (8-13)	5
Severe (<8)	20
<b>Plasma alcohol test</b>	
Not done	46 (65)
Normal	10 (15)
Increased 14 (20)	14 (20)
<b>PCV</b>	
<21	7 (10)
21-35	33 (50)
>35	30 (40)

The ED outcome is shown in table 3, The ED mortality rate was 12% and 26% admitted to ICU ward. The majority (75%) of the patients required orthopedic evaluation and intervention.

**Table 3: Emergency department outcome of patients with polytrauma**

Outcome	(%)
Stable and discharged	2
Death	12
Admitted to ward	20
Admitted to ICU	26
LAMA	10

## Discussion

In order to reduce patient morbidity and death, the initial care of a polytraumatized patient is crucial [4]. The primary premise of trauma treatment is an organized team approach, i.e. polytrauma sufferers are best managed by a team. The initial assessment of a person who has suffered many serious injuries is a difficult undertaking because every minute can be the difference between life and death. Each team member's delay could result in the patient's death. The receiving institution should ideally be equipped with the resources and knowledge necessary to effectively manage seriously damaged patients' injuries [5].

To avoid any delay and to have the best initial therapy for polytrauma, patient triage is critical. Living alone, having chronic illnesses, using drugs, being physically deficient, and having a high nutritional risk were the only risk factors for senior trauma left after Kamel *et al.* study [6]. The finding was similar to that of the study done by Nilanchal *et al.* which showed the majority of trauma fell into the 26-40 age group [7]. A time delay of 30 to 60 minutes was mentioned by Pathak *et al.* in their investigation. [8] Since we are a tertiary care facility, the majority of the patients who see us were either referred by or discharged from smaller facilities. The majority of our patients arrived between 3 and 10 hours after their injuries, which is upsetting and demonstrates the necessity for particular protocols to be

developed for peripheral hospitals to enable early transfer to higher facilities. The most traumatizing events in our study took place between the hours of 8 AM and 4 PM. The fact that there are busy roadways during these hours may help to explain this. The fact that construction sites have peak operating hours during which they are most likely to experience slips and falls is another element contributing to this. This result differs significantly from that of Choudry SM's retrospective analysis, which showed discrete peaks between 1600 and 2000 hours [9].

The trauma teams working in the emergency department in an advanced tertiary care facility like ours are extremely skilled. In contrast to many hospitals, trauma cases are handled by higher specialist departments such as plastic surgery, HLRS, vascular surgery, cardiothoracic surgery, and spine surgery following the first resuscitation by the ED team. According to our analysis, the general surgery team intervened in the majority of patients, followed by the orthopedics department. This pattern echoes that found in another advanced tertiary care ED in North India as well as Nilanchal *et al.* [1,7] The most frequent injury linked to RTA is a head injury, particularly in victims who were riding motorized two-wheelers. This is consistent with the research conducted by Patil *et al.* [10]

Priority for a patient with polytrauma and hemorrhagic shock is fluid resuscitation and achieving hemostasis. Equally crucial is the choice of resuscitation fluid. When blood loss exceeds 25% to 30%, packed red blood cells must often be given in addition to crystalloids [9]. A well-established blood bank in our hospital ensures a ready supply of type "O" negative blood that can be provided right away to the bedside, without the requirement for cross-matching, which is lifesaving in the rapidly exsanguinating patient. This is done because the golden hour is so important. Our study demonstrates that the majority of patients were given one unit of packed cell blood to reduce hemorrhage and hypotension. Another drawback is driven by the fact that this study was conducted in a big tertiary care hospital, and consequently, the patient group may be biased by patient selection and referral patterns.

### Conclusion

Road traffic accidents and falls were the two main etiological factors, and men were much more affected than women. The departments of orthopedics (75%) and neurosurgery (20%) were consulted extensively. In treating polytrauma sufferers, aggressive resuscitation with crystalloids and blood products is crucial.

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