



To evaluate the clinical profile of patients with trauma in a tertiary care hospital in North India

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Abstract

Background: Trauma remains a leading cause of morbidity and mortality worldwide, particularly in low- and middle-income countries like India. Road traffic accidents (RTAs), falls, and assaults constitute the major causes of traumatic injuries, often affecting the young and productive population.

Objective: To assess the clinical profile, injury patterns, severity scores, and outcomes of trauma patients presenting to a tertiary care hospital in North India.

Methods: A prospective observational study was conducted over one year at the Department of General Surgery, Dr. RPGMC, Kangra at Tanda. Fifty trauma patients aged ≥ 16 years, admitted for at least 24 hours with blunt or penetrating injuries, were included. Patients were evaluated clinically and scored using the Glasgow Coma Scale (GCS), Revised Trauma Score (RTS), and New Trauma Score (NTS). Laboratory and radiological investigations were performed as needed. Management was based on standard protocols, and outcomes were recorded.

Results: The mean age was 41.54 ± 18.14 years, with the majority in the 20–29 year age group. Males constituted 76% of cases. RTAs were the most common mode of injury (64%), followed by falls (20%). Blunt trauma (84%) predominated over penetrating injuries (16%). The head and neck were most frequently injured (40%), followed by limbs (30%). The mean GCS was 12.6 ± 2.9 , RTS 6.5 ± 0.8 , and NTS 8.2 ± 1.1 . The survival rate was 88%, while 12% of patients succumbed, mostly due to severe head injuries or multi-organ trauma.

Conclusion: Young adult males are the most affected group in trauma cases, primarily due to RTAs. Blunt trauma involving the head and limbs is predominant. Timely evaluation and appropriate intervention are critical for improving outcomes. Trauma scoring systems are effective tools for triage and management. The findings underscore the urgent need for road safety enforcement and enhanced trauma care infrastructure.

Keywords: Trauma, road traffic accidents, blunt injury, trauma severity scores, clinical profile, india

Introduction

Trauma is a leading cause of morbidity and mortality globally, and its burden is particularly pronounced in low- and middle-income countries like India. It significantly impacts the productive age group and contributes to long-term disability, healthcare burden, and socioeconomic loss. According to the World Health Organization, injuries account for over 5 million deaths annually, constituting approximately 9% of global mortality [1]. In India, trauma is a major public health issue, with road traffic accidents (RTAs), falls, assaults, and burns being the most prevalent causes [2].

The incidence of trauma has risen steadily due to rapid urbanization, increasing vehicular traffic, poor adherence to safety regulations, and inadequate infrastructure [3]. Road traffic injuries alone claim more than 1.5 lakh lives each year in India and leave many more with permanent disabilities [4]. Despite the establishment of trauma centers and improvements in emergency medical services, challenges such as delayed presentation, lack of pre-hospital care, and variability in injury patterns continue to hinder optimal management and outcome [4].

Evaluating the clinical profile of trauma patients is crucial for understanding epidemiological trends, identifying at-risk populations, and guiding preventive and therapeutic interventions. Such data are essential for formulating trauma care policies, improving hospital preparedness, and optimizing the allocation of resources [5].

This study aims to assess the clinical profile of trauma patients presenting to a tertiary care hospital in North India, with the objective of contributing to region-specific data that can inform evidence-based trauma care strategies.

Methods

This hospital-based prospective observational study was conducted in the Department of General Surgery at Dr. Rajendra Prasad Government Medical College (Dr. RPGMC), Kangra at Tanda, Himachal Pradesh, over a period of one year starting from July 2021. The study included trauma patients aged 16 years and above who presented with either blunt or penetrating physical trauma and required hospital admission for a minimum duration of 24 hours. Patients who were discharged or referred to other institutions directly from the emergency department, those with thermal injuries only, or those who declined to give informed consent were excluded from the study.

Upon presentation, a detailed history was obtained, including the mode and mechanism of injury. Clinical assessment included measurement of pulse rate, blood pressure, respiratory rate, peripheral oxygen saturation (SpO₂), and evaluation of the Glasgow Coma Scale (GCS). Patients were resuscitated as per Advanced Trauma Life Support (ATLS) guidelines. The severity of trauma was assessed using two standardized scoring systems: the Revised Trauma Score (RTS), which incorporates coded values of GCS, systolic blood pressure, and respiratory rate;

and the New Trauma Score (NTS), which is based on actual GCS, coded systolic blood pressure, and coded SpO₂ values. Once stabilized, patients underwent relevant laboratory investigations, including complete blood count, renal and liver function tests, serum electrolytes, serum lipase, arterial blood gas analysis, and coagulation profile (PT-INR). Radiological evaluations such as chest X-ray, cervical spine X-ray, ultrasonographic Focused Assessment with Sonography in Trauma (USG FAST), and non-contrast CT (NCCT) head were performed where indicated. Based on the nature and extent of injuries, patients were managed either conservatively or surgically, following standard hospital protocols.

All clinical and demographic data were recorded in a structured case record form and entered into Microsoft Excel for descriptive statistical analysis. The study was approved by the Institutional Ethics Committee (Reg. No. ECR/490/Inst/HP/2013), and written informed consent was obtained from all participants or their legal guardians. Confidentiality of patient information was maintained throughout the study.

Results

Baseline characteristics

In this study, among the 50 trauma patients included in the study, the mean age was 41.54 ± 18.14 years, with the majority belonging to the 20–29 year age group (34%), followed by 12 patients (24%) aged over 59 years. Other age groups included 18% in the 30–39 year range, 14% in the 40–49 range, and 10% in the 50–59 age group. A significant male predominance was observed, with 38 male patients (76%) compared to 12 females (24%), indicating that young to middle-aged males were more commonly affected by trauma in this cohort.

Mode and Type of Trauma

In this study of 50 trauma patients, the most common mode of injury was road traffic accidents (RTA), accounting for 64% of cases. This was followed by falls from height in 20%, physical assaults in 10%, and other causes such as workplace injuries in 6% of patients. Regarding the nature of injuries, the majority of patients (84%) sustained blunt trauma, while 16% presented with penetrating trauma. These findings indicate that RTAs and blunt force mechanisms are the leading contributors to trauma admissions in this setting.

Site of Injury

In this study, among the 50 trauma patients analyzed, the head and neck region was the most frequently affected site, involved in 40% of cases. Limb injuries were the second most common, seen in 30% of patients, followed by chest injuries in 16% and abdominal injuries in 14%. These findings highlight that trauma to the head and extremities accounted for the majority of injuries, underscoring the need for prompt neurological and orthopedic evaluation in trauma care.

Outcome

In this study, out of the 50 trauma patients included in the outcome analysis, 44 patients (88%) survived, while 6 patients (12%) succumbed to their injuries. The majority of survivors responded well to either conservative or surgical management, depending on the severity and nature of their

injuries. Mortality was primarily observed in patients with severe trauma, particularly those with significant head injuries or multi-organ involvement.

Trauma Severity Scores

The assessment of trauma severity in the study population revealed a mean Glasgow Coma Scale (GCS) score of 12.6 ± 2.9 , indicating that the majority of patients sustained mild to moderate head injuries. The mean Revised Trauma Score (RTS) was 6.5 ± 0.8 , while the mean New Trauma Score (NTS) was 8.2 ± 1.1 . These scores suggest that most patients had relatively stable physiological parameters upon presentation, though a subset demonstrated more severe derangements requiring intensive management.

Discussion

Trauma remains a significant public health burden, particularly in developing countries, where road infrastructure, safety regulations, and emergency care systems are still evolving. This study aimed to evaluate the clinical profile of trauma patients admitted to a tertiary care center in North India, focusing on demographics, mode and type of injury, injury sites, trauma severity scores, and outcomes.

In the present study, the mean age of trauma patients was 41.54 ± 18.14 years, with the majority in the 20–29 year age group (34%). This is consistent with findings from Jain *et al* [6], who reported that trauma predominantly affects young adults, especially those in the third decade of life. This age group is typically more active and more frequently involved in outdoor and vehicular activities, making them more vulnerable to trauma. Similarly, Sharma *et al* also observed a mean age of approximately 38 years in their trauma cohort [7].

A significant male predominance (76%) was observed in this study, which aligns with several previous studies, including Kumar *et al* [8], and Olff [9], where males accounted for over 70% of trauma admissions. This gender disparity may be attributed to greater male involvement in outdoor labor, travel, and higher-risk occupations.

Road traffic accidents (RTAs) were the leading cause of trauma (64%), followed by falls from height (20%) and physical assaults (10%). These findings are comparable to the study by Kanwar *et al*, where RTAs accounted for 60–70% of trauma cases. The burden of RTAs in India remains high due to increasing vehicular density, inadequate enforcement of traffic regulations, and lack of public awareness regarding road safety [10].

Regarding the type of trauma, blunt injuries (84%) were more common than penetrating trauma (16%), which mirrors the results of Saeednejad *et al*, who reported blunt trauma in over 80% of their patients. This reflects the nature of mechanisms such as vehicle collisions and falls, which predominantly cause non-penetrative injuries [11].

The head and neck were the most frequently injured sites (40%), followed by limbs (30%), chest (16%), and abdomen (14%). Head injuries are often associated with high-impact trauma, especially in RTAs. This observation is similar to the results reported by Mass *et al*, where head injuries were seen in 42% of patients, highlighting the need for immediate neurological evaluation and intervention in such cases [12].

In terms of trauma severity, the mean GCS score was 12.6 ± 2.9 , indicating that most patients had mild to moderate neurological impairment. The mean RTS and NTS were 6.5

± 0.8 and 8.2 ± 1.1, respectively. These values suggest that the majority of patients presented with moderate trauma severity. Khavandegar *et al* also reported similar trauma scores in their prospective study, reinforcing the utility of these scoring systems for initial assessment and triage [13]. The overall survival rate was 88%, with a mortality rate of 12%. Most survivors improved with timely conservative or surgical management. Mortality was primarily associated with severe head injuries or multi-organ involvement. This outcome is consistent with the study by Yadollahi *et al.* where mortality ranged between 10–15% among hospitalized trauma patients [14].

Table 1: Baseline characteristics

Baseline characteristics	Frequency (n=50)	Percentage (%)
Age group		
20-29 years	17	34%
30-39 years	9	18%
40-49 years	7	14%
50-59 years	5	10%
>59 years	12	24%
Mean age	41.54±18.14 years	
Gender		
Male	38	76%
Female	12	24%

Table 2: Mode and Type of Trauma

Mode and Type of Trauma	Frequency (n=50)	Percentage (%)
Mode of trauma		
Road Traffic Accident	32	64%
Fall from Height	10	20%
Physical Assault	5	10%
Others (e.g., work injury)	3	6%
Type of Trauma		
Blunt Trauma	42	84%
Penetrating Trauma	8	16%

Table 3: Site of Injury

Site of Injury	Frequency (n=50)	Percentage (%)
Head and neck	20	40%
Limbs	15	30%
Abdomen	7	14%
Chest	8	16%

Table 4: Trauma Severity Scores

Site of Injury	Mean ± SD
Glasgow Coma Scale	12.6±2.9.
Revised trauma score	6.5±0.8
New trauma score	8.2±1.1

Table 5: Outcome

Outcome	Frequency (n=50)	Percentage (%)
Survivor	44	88%
Non survivor	6	12%

Conclusion

This study highlights that trauma predominantly affects young to middle-aged males, with road traffic accidents (RTAs) being the most common mode of injury. Blunt trauma, especially involving the head and limbs, was the most frequent type and site of injury, underscoring the need for rapid neurological and orthopedic evaluation. Despite the severity of some cases, particularly those with head

injuries, the overall survival rate was high (88%), reflecting the effectiveness of timely medical and surgical interventions. Trauma severity scores such as GCS, RTS, and NTS were valuable in assessing patient status and guiding treatment. These findings emphasize the importance of preventive strategies, especially road safety measures, and the need for trauma care systems equipped to manage high-risk injuries.

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