Original Research Article

Study of trauma patients in the emergency department of a tertiary care hospital in north India during covid 19 pandemic

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Abstract

Aim : Trauma is an increasing cause of morbidity and mortality in India.This study was done to improve the understanding of the mode of trauma, severity of injuries, and outcome of trauma victims in our hospital during covid 19 pandemic with 6 months study, of which 3 months is of locked down period and 3 month is of unlocked period.**Materials and Methods:**This was a retrospective observational study of all trauma patients presenting to our emergency department(ED). Details of incident, injuries,and outcome were noted.**Results:**The ED attended to 5214 patients during the 6 month study period.The gender distribution was 64.6% males and35.36% females.The median duration from timeof incident to time of arrival to the ED was 3h (interquartile range[IQR]: 1.5–6.5) for priority one patients, 3h (IQR:1.5–7.7) for priority two patients, and 1.5h (IQR:1–7) for priority three patients. Road traffic accident (RTA) (63.4%) was the most common mode of injury, followed by fall on level ground (7.6%) of patients while13.3% had polytrauma with two wheeler accidents contributing to the majority. Most of the patients were of age group between 18-40 and most of patients 3080/5214(59%) were from orthopaedic department followed by neurosurgery department 1790/ 5214(34.3%). The ED team alone managed 55.85% of patients while the remaining 44.2% required evaluation and treatment by the trauma surgical teams.**Conclusion:** RTA (road traffic accidents) and falls are the predominant causes of trauma. Asimple physiological variable based scoring system such as the revised traum a score may beused to prioritize patients with polytrauma.

Keywords: TRAUMA, Road Traffic Accident, RTS

Introduction

Trauma is a major cause of morbidity and mortality in both developed and developing countries. The usual causes are road traffic accidents (RTAs), fall from height, occupational injuries, and assault. According to the World Health Organization report on road safety, RTAs would be the fifth leading cause of death worldwide by the year 2030.[1]Occupational injuries leading to disability are also of major concern in a country like India as many industries continue to be unregulated.The majority of trauma deaths occur in the prehospital periods as patients were referred from PHC and CHC due to lack of trained doctors in PHC and CHC. In India the first 60 min after trauma has been considered as the "golden hour" of trauma.[2]

It is therefore important to quickly asses the severity of injury accurately,This study was done to improve understanding of the mode of trauma, severity of injuries and outcome in our hospitalso that strategy to prevent morbidity and mortality of patients can be done and requirement of staff according to patients load can be assesed.GCS and RTS were used to predict prognosis of patient.

Materials and Methods

The study was a retrospective, cohort study of trauma patients presenting to the emergency department(ED)of BRD Medical College Gorakhpur,which is a174 bed department in north India with an average of 28 Patient admission daily.The department caters to all adult emergency cases as well pediatric trauma cases.The study recruited all trauma patients presenting to the ED between March 2020 and August 2020.

The inclusion criteria were all patients whohad sustained trauma through RTA,industrial incidents,electrical injuries, fall from height or level ground, or trauma related to assault, sports, and animals.

Exclusion criteria were patients who were brought dead on arrival and those patients who denied admission in the hospital.

Data of the patients were obtained from the hospital records. Details of history and physical examination findings of all patients were recorded.

The following were extracted: Demographics,mode of injury,time of injury and time of presentation,triage priority,severity of injury, type of injury, presence of vascular injury, and proportion of patients undergoing operative intervention. Triage priority level was defined as follows:

Triage Priority-1 Patient with airway,breathing or circulation compromise, or head injury with GCS < 8

Triage Priority-2 Patient with stable airway, breathing and circulation with long bone injuries, dislocations, stable abdominothoracic injuries, head injury with GCS>9

Triage Priority -3 Hemodynamically stable patients with minor trauma. All patients had routine blood investigations and relevant radiological tests based on the initial primary and secondary surveys. The severity of injury was assessed using the RTS[3] .

All penetrating injuries, fractures, dislocations, head injuries, and other internal organ injuries were classified as deep injuries. After

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initial stabilization by the ED team, the patients were handed over to the necessary surgical departments for further management if necessary. Patients with minor injuries were discharged by the ED team after a short observation period and those who required surgery or prolonged observation were admitted in the respective wards. In hospital outcome of all the admitted patients was noted.

Results

The ED attended to 5214 patients during the 6month study period with Pediatric (<18 years) trauma patients comprised 25.3(1316) while adult (>18 years) trauma patients comprise of 74.7 (3894) of all the cases. The average trauma cases were 869/month. The gender distribution was 64.3% males and 35.36% females. Mean age was 40+/-18.2 years. Almost about 60% of the injuries occurred between 8 am and 8 pm. However, 48% of the patients presented to the ED between 5 pm and 12 am. The median duration from the time of incident to time of arrival to the ED was 3 h (interquartile range [IQR]: 1.5–6.5) for priority one patients, 3 h (IQR: 1.5–7.7) for priority two patients,and1.5h (IQR:1–7)for priority three patients. However, 44% of the patients arrived to the ED within 3 h of the incident. The average number oftrauma incidents increasedduring unlock (3386 patient) period as compared to locked down(1828 patient) period of covid pandemic

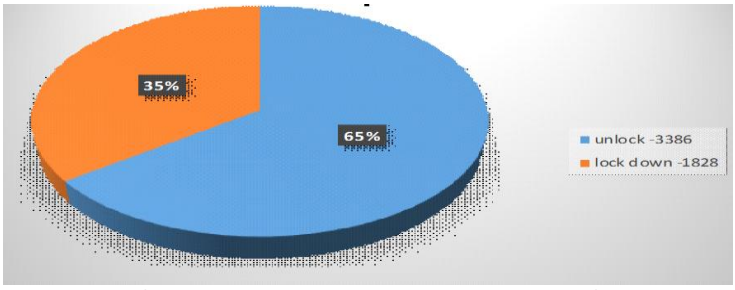

Fig 1: Distribution of patient during locked down and unlock period of covid 19 pandemic.

The triage priority distribution was as follows: Priority one (22%), priority two (46.2%), and priority three (27.8%). Most of the trauma incidents (64.3%) were the result of an RTA.

Table 1: The triage priority distribution

Mode of Injury	Priority-1	Priority-2	Priority-3	Total
Four Wheeler	200	504	402	1104
Slipped on Level Ground	10	190	100	404
Assault	4	70	30	104
Fall From Hight	70	240	98	408
Pedestrion	126	180	98	140
Sports Related Injuries	32	86	22	400
Two Wheeler	692	1002	510	2204
Other	48	210	190	448

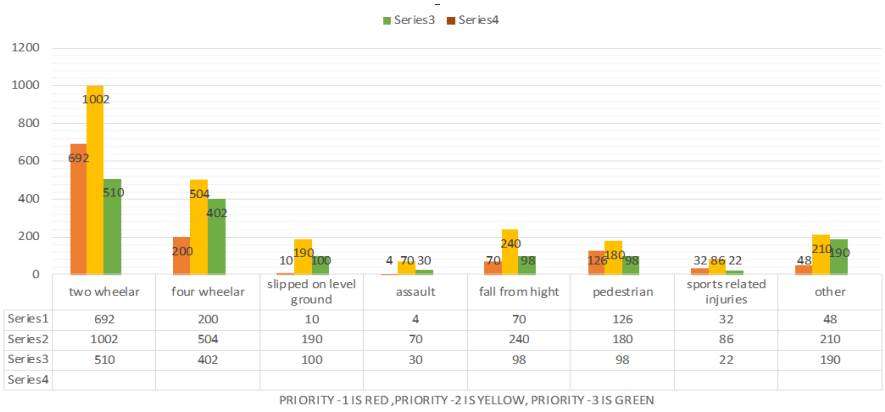

Fig 2: Mode of injury and triage priority level

Two wheeler accidents (42.2%) were the most common followed by four wheeler accidents (21.2%), and other vehicular accidents (2%) which included auto rickshaw, trains, tractors, and large trucks. Sixteen percent of these RTA victims were allegedly under the influence of alcohol. Other modes of injury included fall on level ground (7.8%), fall from height (7.7%), workplace injuries (6.3%), assault (2%),sports (2.6%), and animal-related injuries (0.8%).The triage priority-wise distribution of these accidents has shown 34.3% (1790/5214) of all trauma patients had TBI(Traumatic brain injury). The majority (69%) of those with head injury had mild head injury

(GCS: 13–15), 13% had moderate head injury (GCS: 9–12), and18% had severe head injury(GCS≤8).We assessed the risk of TBI with different modes of injuries such as fall from height, two wheeler accidents, pedestrian injuries, four wheeler accidents and assaults but didnot find any statistical significance(figure 2).The majority of these (42.2%) were due to two wheeler accidents. The median delay in arrival to the ED from the time of incident among these cases was 3 h(IQR:1–8.5).The ED team alone treated and discharged 2910/ 5214(55.8%) patients while the remaining 44.2% required evaluation and treatment by the trauma surgical teams. The trauma specialties that were commonly involved in the management were orthopedics (59.07%), neurosurgery (34.3%), plastic surgery (2.1%), general surgery(4.4%),and spine surgery(0.19%) (figure -3) most of patients 3423/5214(65.6%) are of age group of 18-60 years and region of body involve are 1790/5214(34.3%) patient have brain involvement and 2800/5214(53.07%) have upper and lower limb injuries and (5%) have abdominal injuries and about (1%) have spine injury.

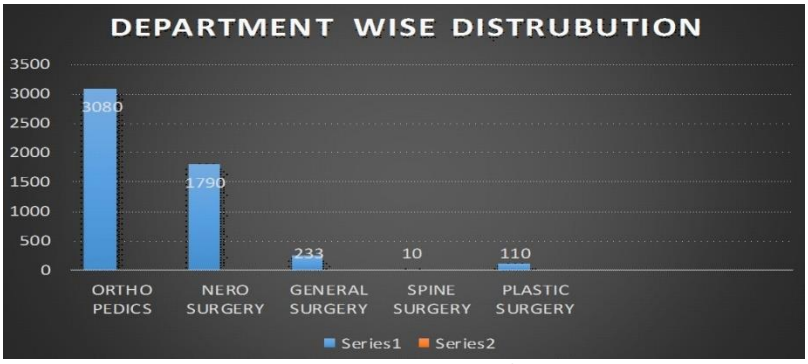

Fig 3: Departments involved in the management of patients in the emergency

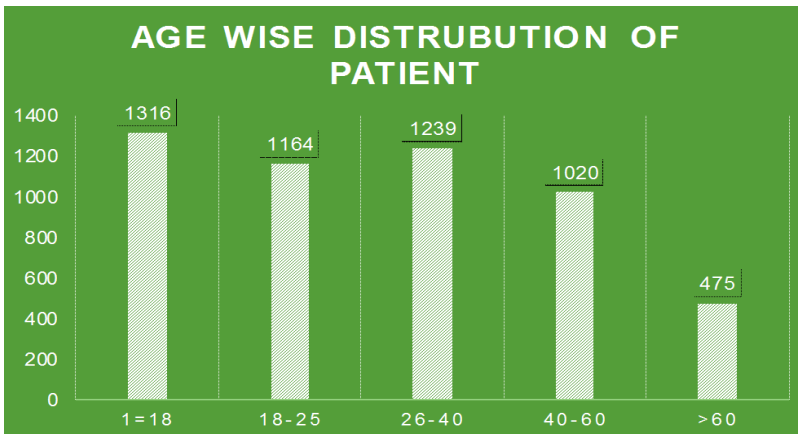

Fig 4 :Age wise distrubution of patient

Among the trauma patients admitted to the ED, 55.8% (2910/5214) were discharged in a stable condition.The remaining 44.2% of patients required admission for surgical intervention or conservative management

Discussion

Trauma is a major problem in India with severe and wide ranging consequences for individuals and society as a whole.In the united states traumatic injuries account for 30% of life year lost. [4]In developed countries there is increased case of trauma due to increase number of automobiles and industries. In develpoing countries like India there is increasing trauma due to high population density, increase in automobiles and rules are not followed regularly like use of helmet and seat belt and traffic rules. In this covid 19 pandemic there were less cases during locked down period as compared to unlocked period due to fact that less number of people were going outside due to locked down. Although a male predominance among trauma victims is seen in most international studies, the sex ratio in our study was very heavily skewed toward males[5,6]. This is explained by the fact that in our country, males are predominantly engaged in outdoor activities and operation of automobiles and hence are more vulnerable to injuries. Patients 18–45 years of age were more likely to sustain a traumatic injury. This is consistent with international findings. The mean age of 40 years in this study is also consistent with literature on trauma. The time delay in hospital arrival and the time pattern of hospital arrival of the trauma patients were similar to those described in other tertiary care trauma centers in India.[8].RTAs was the predominant cause of trauma, a result consistent with other studies from India and abroad[7,8].Four wheeler vehicles offer a fair amount of protection to those inside but pateints hit by this four wheeler suffer serious trauma of both TBI (traumatic brain injury) and orthopaedic component of both upper and lower limb .Two wheeler passengers are directly exposed to the elements of the road.This explains the overwhelming majority of the accidents involving two wheelers consistent with other Indian studies[7].

TBI (traumatic brain injury) and fractures are major public health problem in India as well as in other developing countries resulting in significant morbidity and mortality among the young productive people of our society. The economic losses to the individual and to the country are huge and unmeasurable. We tried to correlate the

mode of injury to the severity of TBI but did not find any statistically significant mode. However, more than two thirds of these injuries were due to two wheeler accidents and one fourth had severe head injuries. This is a serious concern and stresses the need to make use of helmets compulsory across the country. Compulsory use of helmets must be strictly enforced not only just by the government authorities such as the police but also voluntarily encouraged by the institutions people work for. Many roads in India are unsafe, and traffic regulations are rarely followed by drivers and seldom strictly enforced by the police. Alcohol is another evil that significantly impacts vigilance of the driver and is known to a factor in 20% of accidents causing TBI[9].In our study, a significant percentage of people were under the influence of alcohol, who contributed not only to their injuries but also caused significant harm to other vehicular passengers and pedestrians, which is consistent with other Indian studies. In India rarely breath alcohol levels monitored by traffic police. There is need to improve road safety and to change the casual attitude of people and law enforcing agencies toward traffic regulations. Falls comprised one fifth of all trauma cases in our study, which is similar to findings of other studies related to trauma [10]. Most of the occupational injuries that presented to us were related to heavy machinery at the workplace and were predominantly hand injuries. Many of these patients required tendon reconstruction surgery. These injuries account for major financial loss from time away from work and may lead to permanent deformities and dysfunction of the limb without prompt surgical intervention.

Polytrauma victims are those patients subjected to multiple traumatic injuries. RTA (Road Traffic Accident) and fall from height are the usual causes among regular civilians. Other causes in areas of conflict across the world include blast injuries, bullet, and other warfare injuries. Polytrauma patients represent the ultimate challenge to trauma care team in any ED. The prevalence of polytrauma cases in our study in the past have used different scoring system such as injury severity score (ISS), the new ISS,and the Acute Physiology and Chronic Health Evaluation II to predict early mortality. However, these are cumbersome and time consuming. A simple physiological variable based scoring system such as the RTS (revised trauma score) is more practical in resource limited settings. Our study showed the RTS to be an accurate predictor of prognosis of patient. Previous studies have shown GCS, age and hypotension at presentation to be independent predictors of mortality among polytrauma patients.[11]In our study, low GCS and high respiratory rate were found to be independent predictors of mortality.In an advanced tertiary care center like ours, the trauma teams operating in the ED are highly specialized,trauma cases after initial resuscitation by the ED team are managed by higher specialty departments such as plastic surgery, and spine surgery.and neurosurgery We have lack of cardiothoracic surgery and vascular surgery which explains the relatively more involvement of general surgery department in managing acute trauma cases.This pattern of referrals is similar to the pattern in another advanced tertiary care ED in South India[12].

Our study highlights the burden of trauma in the ED of India. Many primary and secondary health centers lack certain essential facilities such as computed tomography scan, blood bank and operating theatres and trained doctors for evaluating and treating severe cases of trauma. Unlike in our hospital, specialists in trauma care are not available in most rural hospitals, hence many patients need to be referred to higher centers and this lead to more number of deaths due to lack of early treatment. As shown in our study, a simple scoring system such as the RTS may be used by primary care physicians to assess the severity of trauma and to refer to higher centers after giving first aid and stabilizing the patient. Two third so four patients were referred after receiving first aid from local physicians and primary/secondary health centers. This fact emphasizes the importance of all primary care physicians being able to provide acute management of trauma care to the victims as their early intervention could potentially save manylives.

Conclusion

Our study shows that RTA and falls were the predominant causes oftrauma. There was more patient load during unlocked period of Covid 19 pandemic as compared to locked period. Increasing awareness and proper training of primary health centre staff and community health centre staff and early management of trauma are the urgent need of the time. A simple physiological variable based scoring system such as the RTS (revised trauma score)should be used in resource limited settings to prioritize patients with polytrauma.

Conflict of Interest: Nil
Source of support:Nil

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