Trends in Trauma: A Rural Experience

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Abstract In last 20 years a progressive increase in the cases of road traffic accidents is seen in the institution. In this study efforts have been made to study epidemiology of trauma & how to help the trauma victims in a better way. To study the changing trends in incidence & presentation of trauma victims. To recommend preventive measures based on the analysis. The present study was carried out in MGIMS, Sewagram, Wardha from 2001 to 2003. For this study which is retrospective and prospective, a total of 986 cases of surgical trauma were studied. Present study showed that in this rural area accidents account for maximum trauma admissions & major trauma only in 20 %. Out of 986 patients, 78.8 % required repair of wounds, 3.8 % required exploratory laparotomy and 16.3 % had orthopedic interventions. Overall mortality rate was 2.9 %. It was found that general care in wards was good in terms of trauma results of rural areas. These results may vary when compared with specialized trauma centers in cities; however after a period of few years cost effectiveness of trauma centers in terms of benefits needs an assessment*.

Keywords Trauma · Trauma centre · Road traffic accidents · Pre hospital trauma care

Introduction

No age or sex is free from trauma, and every individual must have suffered some or the other form of trauma in

his or her life. Only serious cases of major trauma admitted to hospitals are reported [1]. Despite this no systematic study is available in literature about the trauma. Trauma is a disease of modern society which is assuming epidemic proportions day after day, but still is a neglected disease [2]. In India there is no proper or organized system to deal with trauma victims; trauma is responsible for 7 % of all deaths. About 1,40,000 people die due to accidental deaths per year in India and leave almost double the number disabled. Nearly 60 % of the victims are between 15 and 55 years of age. Hence, for control of trauma, it is essential to develop a system which involves preventive measures to reduce incidence and severity of trauma [3], rapid early care, and well-equipped trauma centers.

Trauma care systems in India are at a nascent stage of development. There is a gross disparity between trauma services available in various parts of the country. Rural India has inefficient services for trauma care, due to the varied topography, financial constraints, and lack of appropriate health infrastructure [4]. Kasturba Hospital of M.G.I.M.S is located in a remote village of Sewagram in Wardha district of Maharashtra. It is in a remote part but is now being connected by the interstate highway. In past 20 years, a progressive increase in the cases of road traffic accidents is seen in the institution which is due to increase in the number of automobile vehicles. A few years back, it was decided to establish a “trauma care centre” which became operational since November 2002. When it was conceptualized, there were no studies available from the institution; hence, this study was contemplated to help delineating types of trauma cases and their management. In this study, efforts have been made to study epidemiology of trauma and how to help the trauma victims in a better way.

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Aims and Objectives

1. To study changing trends in the incidence and presentation of trauma victims during past 10 years
2. To recommend preventive measures based on the analysis
3. To review the available literature in the field of trauma

Material and Methods

This study was carried out in the department of surgery, Mahatma Gandhi Institute of Medical Sciences, from June 2001 to June 2003. For this study, which is retrospective and prospective, a total of 986 cases of trauma were studied from January 1993 to June 2003. These cases were divided into two groups:

- Group A: From January 1993 to December 2000 (retrospective 534 patients)
- Group B: From January 2001 to June 2003 (Prospective 452 patients)

For this study a detailed performa was prepared. For retrospective cases (group A), case papers of trauma victims admitted to the department of surgery from January 1993 to December 2000 were taken out from the Medical Records Department (MRD) and the available information was recorded in the performa. For prospective cases (group B), each admitted patient was interrogated, examined personally, and the findings were recorded in the performa. All the cases were followed till discharge/death and a note was made about the clinical condition, investigations, treatment, operative procedures, and complications in the performa. A note was made about the intraoperative findings if the patient was operated. Cases of serious head injury were transferred to other higher centers as hospital does not have a neurosurgical unit. The rest all cases were managed in the institute itself.

The data collected were fed into the computer for analysis using FoxPro, EPI 5, Excel softwares.

Observations

It was observed that during the period of this study (i.e., from January 1993 to June 2003) total hospital admissions were 2,33,099 of which 40,345 (17.3 %) were in surgery and 11,880 (5.1 %) were in orthopedics. Total number of trauma patients was 5,098 (9.76 %). We analyzed 986 (19.34 %) cases of polytrauma. There was a lot of intermingling of case papers due to change in the international coding system and deposition of case papers in the court of law as many were medicolegal cases. This study shows

that maximum number of trauma cases was in the age group of young adults (16–30 years), 345 males (35.0 %) and 65 females (6.6 %); followed by the age group of adults (31–45 years), 262 males (26.6 %) and 54 females (5.5 %); the third group of older ones (>50 years), 102 males (10.3 %) and 29 females (2.9 %); and the minimum cases were observed in the group of children (1–15 years), 99 males (10.0 %) and 30 females (3.0 %). The study also shows an increasing trend of trauma cases from 1993 to 2003 (Fig. 1).

It is observed that maximum patients are admitted within 6 h of sustaining injury (Fig. 2). A total of 732 (74.2 %) patients were admitted in the first 6 h followed by 152 (15.4 %) in 6–12 h, 55 (5.5 %) after 24 h, and minimum 47 patients (4.7 %) in 13–24 h. Patients either came within 12 h or after 24 h. It was observed in this study that (615) 62.4 % patients received no treatment after sustaining trauma and came directly to the hospital. A total of 239 (24.2 %) patients received treatment either at the primary health centre or by a private practitioner and then came to the hospital. Only 132 (13.4 %) patients were referred to the hospital from other institutes or hospitals for tertiary care. Moreover, 223 (22.6 %) cases were found to be addicted to alcohol at the time of sustaining injury.

Maximum patients (69.5 %) sustained road traffic accidents (Fig. 3). Also, maximum patients sustained injuries by two-wheelers (57.60 %), followed by four-wheelers (9.22 %), and three-wheelers (3.65 %). These road traffic accidents also include cases of bullock cart injuries and fall from train. About (18.66 %) patients sustained injuries due to fall from height at home or at workplace. In the group of assault, there were only 3 (0.3 %) cases of gun shot injuries admitted to hospital in past 11 years. Blunt trauma is responsible for maximum number of assaults (13.99 %); however, 6.99 % sustained stab injuries. It was also observed that 833 (78.7 %) patients sustained head injuries, 166 (15.7 %) chest injuries, and 60 (5.7 %) abdominal injuries. The study also revealed that surgical intervention was done in 684 (69.4 %) patients. Out of these simple repair was done in 539 (78.8 %), orthopedic intervention in 112 (16.3 %), exploratory laparotomy in 26 (3.8 %), and intercostal drainage in 7 (1 %). It was observed that 97 (9.8 %) patients were referred to super specialty hospitals especially

Fig. 1 Distribution of cases according to age

Fig. 2 Distribution of cases showing interval between injury and admission.

for neurosurgical intervention after CT scan or when patients wanted to have a second opinion. A total of 524 (53 %) cases were cured and 336 (34 %) relieved (discharged after repair of wounds on first or second day), while 29 (2.9 %) patients died (Fig. 4).

Discussion

Till a few years back, the management of trauma patients was in the domain of general surgeons, but after 1980s there has been sudden realization by the world community about the necessity of improving the management of trauma victims. Germany and the USA put the lead role in this concept and from here started the new discipline of surgery, “trauma care management system,” and “trauma care specialists” who started taking over management of trauma patients from general surgeons [5]. In the past few years, the concept of “trauma centers” has come, where the team is trained to look after only trauma victims and to manage trauma to any part of the body. Following this system it is expected that there will be a reduction in the “preventable deaths” and improved outcome in the severely injured patients. Improved quality of care ultimately leads to reduced social and economic burden of injury to the community as a whole.

A few years back in our hospital it was envisaged to start a trauma centre based on the western model. This study was started after the conceptualization of this centre. In our area road traffic accidents (69.5 %) accounted for maximum cases of trauma. In this area the most of road traffic accidents involved two-wheelers (57.60 %); this is because two-wheelers constitute the common mode of transportation. As two-wheelers need balancing in bad roads, the balance may be lost due to adventurism by the younger ones on the bikes [6]. Four-wheeler accidents (9.22 %) were also less because in this rural area the number of four-wheelers is less as compared to urban areas. In this area violence is not common as in other states mainly northern or north east regions. This may be the reason that only (0.3 %) cases of perforating injuries (gunshot) are seen in this area. Moreover, there are no terrorist activities in this area. In our country it needs license to possess firearm, whereas sharp weapons such as

knife, gupti, and swords can be kept without a license, and hence the number of penetrating or stab injuries is more common than firearm injuries in comparison to western world where firearms are freely available and possessed by people. Demetroides et al. found that homicides were the leading cause of traumatic deaths followed by road traffic accidents and suicide by firearms in the USA [7]. In a similar Indian study, most trauma patients were found to be in the age group of 20–40 years. Maximum cases were of fall, followed by road traffic accidents and minimum of assault [8].

Alcohol addiction was found in 223 (22.6 %) of trauma victims. Wardha district and specially Mahatma Gandhi’s Sewagram are a dry area, yet 22.6 % of trauma victims were found to be under the influence of alcohol which needs a special mention. Gentilello et al. found alcohol abuse to be 50 % among the trauma patient admitted in most states of the USA [9]. The mean blood alcohol concentration of such patients was 187 mg/dl, nearly twice the permissible legal level for driving in most states of the USA. When questionnaires such as the Short Michigan Alcohol Screening Test (SMAST) were administered to trauma patients, as many as 44 % tested positive for chronic alcohol abuse. Alcoholism plays such a significant role in trauma that efforts to reduce the risk of injuries or their recurrence are unlikely to be successful, if it remains untreated.

Liberman et al. carried out a multicentre Canadian study of prehospital trauma care comparing three types of prehospital trauma care systems [10]: Montreal where physicians provide advance life support (ALS), Toronto where paramedics provide ALS, and Quebec City where emergency medical technicians (EMT-BLS) provide basic life support. They found best results were of EMT-BLS because they did not waste valuable time, and the best way was to scoop and skip especially if the hospital could be reached within 30 min from the site of injury and better care could be provided in ideal situation by trained staff. It was observed that mortality rate was high when primary care was provided by the trauma team at the site of accidents in comparison with the care provided by paramedics. Mortality rates were 35 % in case of physicians, 24 % in paramedics, and 18 % in emergency medical technicians (EMTs). Our results can be compared with the western results.

In our study out of 986 patients, 29 (2.9 %) died and 97 (9.8 %) were referred to higher centers. Maximum patients (84.5 %) sustained head injuries. According to Miller et al., head injuries accounted for 300 hospital admissions per 1,00,000 population per year, and up to 20 % of acute surgical admissions [11]. Duus et al. reviewed the records of 713 female and 1,163 male patients with the mean age of 27.5 years admitted after a minor head injury and found that the incidence of minor head injury was 5,000 per 1,00,000 population per year in Sweden [12].

Fig. 3 Distribution of cases showing mode of injury.

Peitzman et al. evaluated the relationship between volume and outcome in seriously injured trauma patients in the Chicago Trauma System and found that low-volume trauma centers (<140 patients per 2 years) had higher mortality rates than high-volume trauma centers (>200 patients per 2 years) [13]. A seriously injured patient's chance of dying was 30 % greater at a low-volume trauma center [13]. It was suggested that a trauma surgeon should treat ≥ 35 seriously injured patients per year (28 adult patients with blunt injury) to achieve normative survival for blunt injuries in adult.

It was observed that established trauma centers and trauma systems were found to be costly and difficult to support because of the extent to which trauma care is uncompensated. It has been reported that care provided at a trauma center is more costly than the care at other centers [14]. Such information may not be interpreted in favor of organized trauma systems in bigger cities. Trauma centers and systems must determine whether the costs associated with establishment and maintenance of accredited trauma centre can be justified. It will be important to determine whether the highest level of trauma care has provided an increased survival benefit and whether the trauma centre warrants continued support to maintain a high volume and level of expertise [15].

Fig. 4 Showing results of trauma cases.

The trauma centre which has been commissioned in our hospital in November 2002 is being managed basically by general surgeons and orthopedicians who were managing trauma cases previously in wards also. So it is not right to say that the trauma centre has helped to increase the skill. The result of our study puts a big question mark when it comes to cost-effectiveness; however, after a few years cost-effectiveness of trauma centers in terms of benefits needs an assessment. Is it worth to put such a huge amount of physical and financial resources when only a minimum number of patients required major surgical interventions needs to be answered.

Conclusions

Everybody is aware that maximum deaths and disabilities are due to accidents and assaults in civilian life. Everybody among us is taught about safety road rules, but how many follows remains a question. So to say legislation will prevent accidents is not at all correct, and the same stands true about awareness programs. Alcohol and use of cellular phones during driving also leads to an increasing number of accidents and none of the laws could stop this phenomenon.

1. The study shows that in this rural area accidents account for maximum trauma admissions and major trauma only in 20 %. Present trauma center figures in terms of admission and mortality are very impressive, but needs thinking as it is managed by the same old team of workers who were managing in general wards.
2. It was found that general care in wards was good in terms of trauma results of rural areas. These results may vary compared with specialized trauma centers in cities; however, after a few years cost-effectiveness of trauma centers in terms of benefits needs an assessment.

3. To prevent accidents, law needs to be modified and strengthened. Laws should be enforced to prevent use of alcohol and cell phones while driving. The practice of allowing driving without a license and by any age should not be permitted.
4. Road conditions are bad and therefore many accidents occur; it needs renovation and proper maintenance. Seat belts and helmets should be made compulsory and traffic rules should be followed.

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