ORIGINAL RESEARCH PAPER

General Surgery

EPIDEMIOLOGY OF TRAUMA AND CHANGING TRENDS IN THE MANAGEMENT OF BLUNT ABDOMINAL TRAUMA IN A TERTIARY CARE HOSPITAL

KEY WORDS: Trauma, epidemiology, abdominal trauma, nonoperative treatment

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ABSTRACT

Aim : The aim of this study is to examine the epidemiology of trauma and to analyze the efficacy of conservative management in blunt abdominal trauma in a tertiary care hospital.

Material and Methods: All patient who came to emergency department due to trauma were studied between 1st January 2015 and 1st January 2017.The demographic characteristics, type of injury, injured organ, type of treatment for blunt abdominal trauma and mortality data were evaluated.

Results: The study includes 2644 patients who came to emergency ward with trauma. Most common cause of trauma is road traffic accident in 67.2% of cases. Males are more common than females with mean age of 34.5. Aside from 30 early trauma deaths, a total of 1187 patients were admitted for further treatment. The most common major trauma sites of admitted patients were on the extremities (36.7%), followed by craniocerebral, abdominopelvis, and thorax..Of all trauma patients 329 patients had abdominal trauma . The mechanism of trauma was penetrating in 17.3%, blunt abdominal trauma in 83.6% . Of blunt abdominal trauma patients 87patients (31.9%) were operated for hemodynamic instability and/or peritonitis on admission. The remaining 68.1% of patients (n=185) were treated nonoperatively, 22(11.9%) of whom required laparotomy during follow-up and 1(0.5%) patient died during study . The remaining 162 patients were treated with non-operative management. The success rate for non-operative treatment was 86.4% and there was no difference in terms of the types of injuries

Conclusion: The epidemiology of the trauma patients studied was found to be mainly blunt trauma due to road traffic accidents in middle aged men. In blunt abdominal trauma nonoperative treatment with close monitoring is safe and effective and treatment modality of choice in hemodynamically stable patients ..

INTRODUCTION

Trauma is a commonly encountered scenario in the Emergency ward, the commonest cause being road traffic accidents. There is an increasing incidence of mortality and morbidity among trauma patients; therefore, it is important to analyze the trauma epidemiology in order to prevent trauma death.

Abdominal trauma is the third common trauma following the head and extremities [1,2]. Injuries may be in the form of blunt abdominal trauma, stab wounds or gunshot wounds. There have been major changes in the approach to abdominal trauma in the last 20 years. Non-operative management of abdominal injuries, especially of blunt abdominal trauma has recently become more common and gaining wide acceptance.

AIM:

The purpose of this study is to examine the epidemiology of trauma through data gained from emergency ward and to analyze the efficacy of conservative management in blunt abdominal trauma patients in a tertiary care hospital.

MATERIALS AND METHODS:

All patients who came to emergency department with trauma were studied between 1st January 2015 and 1st January 2017. When patients came to the emergency ward, patient information such as age, gender, address, and method of admission is gathered; additionally, clinical information such as mechanisms of injury, the time of injury, major injury site, and death on arrival is composed in detail.

Abdominal injuries were analyzed based on type of injury, and blunt abdominal injury patients were subjected to thorough evaluation . Hemodynamically unstable patients on admission underwent laprotomy. Hemodynamically stable patients were subjected to computed tomography with I/V contrast enhancement immediately after ultrasonography . Patients were categorized into different grades of injury according to Moore's grades. Baseline investigations like hemogram, kidney function test, liver function test, X-ray chest, cervical spine and pelvis were done.

Patient for non-operative management was selected when there is :

1. Hemodynamic stability:

a)systolic blood pressure of more than 90 mm Hg
b)Rate less than 100 beats per minute

2. No demonstrable peritoneal signs on abdominal examination:
a) Abdomen moving comfortably with respiration
b) Palpation would reveal a soft abdomen with no tenderness or rebound tenderness in any quadrant.

3. The absence of any intraperitoneal or retroperitoneal injuries on computerised tomography scan requiring operative intervention.

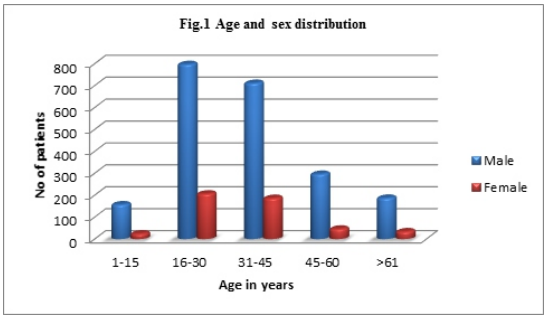
Patients were subjected to intensive hemodynamic monitoring for first 48 h in surgical intensive care. Serial hemoglobin and hematocrit levels were measured . Repeated abdominal assessment was done by clinical and ultrasonic means. Patients were operated if deterioration of hemodynamic stability and/or lesion (hematoma, etc) progression on imaging was detected.

RESULTS:

Total 2644 patients came to emergency ward due to trauma.

Distribution of trauma patients according to age and sex

Of 2644 patients, males were 2148(81.2%), females were496 (18.8%). The average age was 34.5.The age and sex distribution is shown in Fig.1.



Mechanism of injuries in trauma patients

Among 2644 patients, road traffic accidents were the most prominent cause of trauma (67.2%; n=1776) as can be observed in Table 1. 21.3% (n=563) of patients were injured by blunt force trauma, such as contusion by objects, beatings by others, and sports-related or machine-related injuries. Other 8.1% (n=216) were injuried due to slip and fall. The remaining 3.4% (n=89) had penetrating injuries with stab or gunshot wounds.

Table 1. Injury Mechanism of Trauma Patients (n=2644)	
n (%)	
Road traffic accidents (n=1776,67.2%)	
Two wheeler	634 (23.9)
Three wheeler	597 (22.5)
Four wheeler	328 (12.4)
Pedestrians	217 (8.2)
Other blunt injury (n=563, 21.3%)	
Injury by sports	197 (7.5)
Injury by others	168 (6.4)
Injury by machine	124 (4.7)
Injury by object	74(2.7)
Slip-and-fall injuries (n=216, 8.1%)	
Fall from height	194 (7.3)
slip	22 (0.9)
Penetrating injury (n=89 , 3.4%)	
Stab injury	88(1.4)
Gunshot injury	1 (0.0)

Disposition of trauma patients at emergency center

As shown in Table 2, 36.3% (n=961) of a total of 2644 patients were discharged from the emergency ward after early recovery. In total, 53% (n=1401) were admitted for further treatment. Of this,44.9% (n=1187) of patients were admitted to the general ward for in-hospital treatment, and 8.1% (n=214) were admitted to the intensive care unit . 0.5% (n=13) of all patients were dead on araival and 0.7% (n=17) died after receiving cardiopulmonary resuscitation (CPR) at the emergency center.

Table 2. Treatment Results of Trauma Patients (n=2644)	
n (%)	
Discharged after symptom improved	961 (36.3)
Admission to general ward	1187 (44.9)
Admission to ICU	214 (8.1)
Dead on arrival	13 (0.5)
Dead after CPR	17(0.7)
Discharged against advice	252 (9.5)

Major injury site in hospital admission

Table 3 shows the distribution of admitted patients according to major trauma site that led to admission. The most common major injury sites were the extremities (36.7%; n=514). Major craniocerebral damage (27.2%; n=382) was second, followed by abdominopelvic injury (23.8%; n=329) and major thoracic injury (12.6%; n=176).

Table 3. Distribution of Admitted Patients According to Major Injury Site (n=1401)	
n (%)	
Craniocerebral	382(27.2)
Thoracic	176(12.6)
Abdominopelvic	329 (23.8)
Extremity	514 (36.7)

The mechanism of trauma and associated abdominal injuries

Of total 329 abdominopelvic injuries17.3%(n=57)were penetrating injuries and 82.6%(n=272)were blunt adominal injuries. Spleen is the most common organ injured alone in 23.5%(n=64),followed by liver alone in 20.5%(n=56). Both liver and spleen injured in 17.6%(n=48)cases.

Table 3: The mechanism of trauma and associated abdominal injuries (n=329)	
n(%)	
Penetrating injury	57(17.3)
Blunt injury	**272(82.6)**
Spleen	64(23.5)
Liver	56(20.5)
Spleen+liver	48(17.6)
Kidneys	19(6.9)
Pancreas	9(3.3)
Stomach	8(2.9)
Small intestine + duodenum	17(6.25)
Large intestine + rectum	9(3.3)
Diaphragm	5(1.8)
Urinary bladder	8(2.9)
Multiple organs	29(10.7)

Method of treatment, treatment success and mortality rate of blunt abdominal trauma:

Of total 272 blunt abdominal trauma cases 31.9% (n=87)unde went immediate surgery.68.1%(n=185)were selected for conservative management. Of them 11.9%(n=22)underwent surgery at a later date and 0.5% (n=1) mortality. 86.4% (n=162)were managed successfully by conservatively.

Table 5:Method of treatment, treatment success and mortality rate of blunt abdominal trauma (n=272)	
n(%)	
Immediate surgery	87(31.9)
Selected for Conservative management n=185(68.1)	
Delayed surgery	22(11.9)
Mortality	1(0.5)
Successful	160(86.4)

DISCUSSION:

Globally, trauma is one of the major cause of mortality and morbidity and is especially prominent at a young age.[3,4] For all age groups, the frequency of trauma in males was higher than in females, and the changes in trauma frequency between age groups were similar for males and females, as stated by WHO.5 Such can be inferred by the more prominent social activities of men in comparison to those of women, and as a result, men are more prone to vehicle and work related accidents. The distribution of trauma according to age shown in this study is similar with that of other studies.[6,7] It can be presumed that trauma under the age of 10 is mostly due to carelessness of children, whereas trauma between the ages of 21 to 50 is dominated by an increasing number of motor vehicle accidents or work related accidents.[8]

Most common trauma mechanisms in our data was vehicle related accidents(67.2%). Motor vehicle accidents are among the highest leading causes of death and disability and are a major cause of trauma patients in public health. Drunk driving, drowsy driving, and careless driving are several examples of the causes of motor vehicle accidents, and all of them are prominent in young men and women in general.[9,10] These health problems can be prevented by safety education by promoting a safe environment and continuing health education.

Of the total number of patients who visited the emergency center, 36.3% of patients were discharged by the emergency physician after primary treatment and 53% were admitted for further treatment. When looking at WHO data from 2007, deaths caused by trauma constitute 9% of total annual deaths.11 Excluding in-hospital deaths in our data, early trauma mortality 1.2%.

Abdominal trauma is the third common trauma following the head and extremities [1,2]. The management of abdominal injuries has changed significantly when compared with the management prior to 1990. Many studies have confirmed that 80–90% of all blunt injuries may be managed without laparotomy by nonoperative management there by reducing the rate of unnecessary laparotomy.[12] This significant shift towards non-operative management was because of high precision of diagnostic algorithm given by ultrasonography, computed tomography, angiography[13,14]. Hemodynamically stable patients can be followed nonoperatively . They were subjected to intensive hemodynamic monitoring for first 48 h in surgical intensive care with close clinical

observation and imaging methods (CT, ultrasound).

Patients were operated when there is deterioration of hemodynamic stability and/or progression of lesion .The failure of conservative treatment is generally due secondary haemorrhage, missed injuries, hollow organ injuries, abdominal compartment syndrome ,bile leak, sepsis and associated intra-abdominal injuries .[15] Strenuous activity is generally restricted in blunt trauma for 5–6 months, in order to safeguard them against re-injury, which have a higher failure rate with non operative management even though the recommendation is not supported by any sound clinical data. Also there is little data available which could nicely explain the time taken by the injured liver to undergo the reparative process.[16]

In general mortality in abdominal injuries, is 10% .Missing abdominal trauma, shock, acidosis, transfusion requirement, presence of multiple organ injury, delay in treatment, presence of co-morbid diseases and high trauma scores are factors increasing mortality[17,18]. The mortality rate in our study (0.5%) was found to be lower than the literature.

CONCLUSION:

The epidemiology of the trauma patients studied was found to be mainly blunt trauma due to road traffic accidents in middle aged men. Rapid transport, rapid sequence management, effective trauma team approaches, constant education may decrease trauma-related deaths. Abdominal trauma is the third common trauma following extremities and head injuries. In blunt abdominal trauma nonoperative treatment with close monitoring is safe and effective and treatment modality of choice in hemodynamically stable patients .

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