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Fatal Cases of Trauma with Pelvic Fracture in Level-I Trauma Care Centre in India: An Autopsy Based Study

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Abstract

Trauma patients with pelvic fractures are known to be at risk of death. This, a retrospective study was conducted in Apex Trauma Center in New Delhi to find out the prevalence of pelvic injuries in fatal trauma cases subjected to autopsy. All patients (N = 280) admitted with pelvic fracture to the center during the year 2015-16, were included in the study. Male: Female ratio was 6.5:1. Out of 280 patients, the highest population was 25-60 year age group. Abdomen was most commonly injured region in association with pelvis (N=63, 22.5%) and Out of total 280 patients, 101 (36.1%) patients were either dead on the spot or they died during journey to the hospital. Mean ISS was 42.12. 136 (48.5%) patient had the ISS value between 50-75 ISS group which include critical and non survivable injuries.

Keywords: Pelvic Fracture; Injury Severity Score; Abbreviated Injury Scale; Critical Non Survivable; Hemorrhage.

Introduction

Pelvic fractures encompass a broad spectrum of injuries, from low-energy osteoporotic fractures to high-energy disruptions of the pelvic ring. In this study we will focus on the higher energy injuries as they pose a very different medical challenge to healthcare systems. Patients who have sustained these injuries fall into two main categories, survivors and non-survivors. In non-survivors, mortality is a bimodal distribution.

Early death is commonly because of hemorrhage or associated brain injury. Late death is usually because of overwhelming sepsis and multi-organ failure. Survivors frequently experience the long-term medical and socioeconomic implications of pelvic fractures. These include mental health problems, chronic pain, pelvic obliquity, leg length or rotational discrepancy, gait abnormalities, sexual and urological dysfunction and long-term unemployment [1].

Trauma patients with pelvic fractures are known to be at risk of death [7,10,11]. The most commonly cited cause of death is hemorrhage from posterior pelvic ring disruption [3,5,6,7,9]. One of the primary goal of the management of pelvic fracture is to minimize the risk of death. However there is vide variability in the literature on the rate, cause and the risk factors for death in patient with pelvic fractures [4,6,7,9]. Primary cause of death have included posterior pelvic venous hemorrhage, pelvic arterial hemorrhage, extra pelvic hemorrhage, multisystem organ failure [2,3,5,6,7,8,9].

The bony and ligamentous anatomy of the pelvis is relatively straightforward and It is the contents and roles of the pelvis that make this anatomical region unique. The intact pelvis provides protection for its visceral contents and traversing neurovascular

structures. It is the site of load transfer between the axial skeleton and the lower extremities; its many ligamentous and muscle attachments are finely balanced to allow load transfer to take place when standing, sitting and during locomotion. The bony pelvis is turned into a basin by the pelvic floor - a complex network of ligaments, tendons and muscles that is pierced by the urethra, anus and vagina. When the pelvic floor is torn, huge amounts of blood can escape into the thighs and retroperitoneal space. It is useful to think of the pelvis as the Pelvic fractures often resulting from high energy blunt trauma are associated with significant mortality. The outcome and survival rates in patient with pelvic fractures depend upon the associated injuries [1].

There is a paucity of epidemiological studies related to mortality in pelvic fractures in the Asian population as most of the studies on this subject are from western countries therefore This study was planned which aimed to find out the prevalence of pelvic injuries in fatal trauma cases subjected to autopsy.

Methodology

This, a retrospective study was conducted in Apex Trauma Center in New Delhi to find out the prevalence of pelvic injuries in fatal trauma cases subjected to autopsy. All patients (N = 280) admitted with pelvic fracture to the center during the year 2015-16, were included in the study. The pattern of associated injury was observed and the Injury severity score (ISS) was calculated using Abbreviated injury scale (AIS) and correlated with the survival period.

Results and Observations

Out of total 280 patients, 243 (86.8%) were males and 37 (13.2%) females (Table 1).

Age Group

The highest number of patient i.e. 170 (60.7%) were between 25-60 year age group, followed by 71 (25.4%) between 16-24 year age group. 32 patient (11.4%) were more than 60 year age group and 7 patient (2.5%) were less than 15 year of age (Table 2).

Associated Injuries

Abdomen was most commonly injured region in association with pelvis (N=63, 22.5%), followed by abdomen and chest combined region (N=37, 13.2%). Head injury was associated in 26 patients (9.3%) followed by head, chest and abdomen combined injury (N=23, 8.2%). 83 (30%) patient had no associated injury at all (Table 3).

Table 1: Gender wise distribution of patients

Gender	No. of Patients	% Age
Male	243	86.8
Female	37	13.2
Total	280	100

Table 2: Age wise distribution of patients

Age Group	No. of Patients	% Age
<15 years	007	02.5
16-24 years	071	25.4
25-60 years	170	60.7
>60 years	032	11.4
Total	280	100

Table 3: Associated injuries in other body regions

Body Part Injured	No. of Patient	% Age
Abdomen	63	22.5
Head	26	09.3
Chest	12	04.3
Abdomen & Chest	37	13.2
Abdomen & Head	20	07.1
Head & Chest	15	05.4
Head, Chest & Abdomen	23	08.2
None	83	30.0
Total	280	100

Table 4: Survival period

Category	No. of Patient	% Age
Spot/ Brought dead	101	36.1
<3 Hrs	40	14.3
3-24 Hrs	57	20.4
>24 Hrs	82	29.2
Total	280	100

Table 5: Injury Severity Score

ISS Group	No. of Patient	% Age
0-25	063	22.5
25-50	081	29.0
50-75	136	48.5
Total	280	100

*42 patients had ISS 75 (non survivable)

Survival

Out of total 280 patients, 101 (36.1%) patients were either dead on the spot or they died during journey to the hospital. 40 (14.3%) patients had survival period of less than 3 hours, 57 (20.4%) patients had 3-24 hours while 82 (29.2%) patients had more than 25 hours survival period (Table 4).

Injury Severity Score

136 (48.5%) patient had the ISS value between 50-75 ISS group which include critical and non survivable injuries. 63 (22.5%) patient were found in 0-25 ISS group and 81 (29%) patient in 25-50 ISS group (Table 5).

Discussion

The human pelvis is an extremely stable structure requiring a great amount of force to cause disruption. It is also associated with an extensive vascular network. These two factors contribute to the higher mortality associated with pelvic ring disruptions compared to other bony injuries [3,7,10]. Our experience with pelvic fractures and mortality is similar to other reports in the literature [10]. In our study the patients were mostly male (86.8%) and were aged between 25-60 years (60.7%). Male: Female ratio was 6.5:1. This demographic trend is similar to other literature [2,3,4,5]. Adult people of this age group are the most active of any community and also indulging in most risk taking behavior which makes them more susceptible for all types of injuries sustain at home, roads or workplace.

Road traffic accidents were the most common mechanism of injury accounting for 79.26% of the study population which are supported with the trends published in the other studies [4,5,6].

Various studies have concluded that injuries sustained concurrently with pelvic fractures contributed with significant to mortality. The results of our study also support this observation. Mean injury severity score in our study was 42.12 and most of the patients were in the 50-75 ISS group which is also supported by the other studies [4]. Factors such as greater fracture severity and increased patient age were associated with higher mortality rates.

Conclusion

- The data in this study does not support pelvic fracture as the primary cause or precipitating event of death in the majority of Polytrauma patient.
- Mortality in these patients appears to be dependent on associated injuries rather than on the pelvic fracture itself.
- This suggests that although early therapeutic measures to address the pelvis may assist in controlling hemodynamic instability, rarely is this measure alone sufficient. In critical patient with pelvic fractures, management of Head, Chest and Abdomen has the most important influence on the patient's ultimate mortality.
- Protection using helmet, seatbelt etc. could reduce the severity of injury.
- Data suggest that the early transport to definitive care and within the golden hour with quality pre-hospital care could be life saving.
- There is need to set up more specialized trauma centers across the country with good accessibility

to poorer sections of society for comprehensive management of Polytrauma patients.

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