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EPIDEMIOLOGY OF ACETABULAR FRACTURES AT A TERTIARY CARE CENTRE IN CENTRAL INDIA

Orthopaedics

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ABSTRACT

Aim: To describe the epidemiological profile of acetabular fractures at a tertiary care centre in Central India. Methods: In this retrospective study, records of cases of acetabular fractures occurring over last one year period were retrieved. Demographic profile, mode of injury, type of injury, associated injuries, management, in-hospital complications and duration of post-operative stay were noted. Data was collected on an excel worksheet and presented as frequency and proportions or mean±SD. Results: Records of a total of 52 cases were retrieved during the period. Age of patients ranged from 15 to 77 years. Maximum patients were aged <30 years (48.1%). Mean age of patients as 37.21±18 years. Majority of patients were males (84.6%) and had road traffic accident (76.9%) as the cause of injury. Anterior column with posterior hemitransverse (40.4%), posterior wall (15.4%) and transverse (9.6%) were the most common fracture types. Right side was more commonly involved (57.7%). A total of 19 (36.5%) had dislocation too. Associated injuries were seen in 46 (88.5%) cases. ORIF was the preferred management (82.7%). Post-operative complications occurred in 10 (19.2%) cases. There was 1 (1.9%) in-hospital mortality. Mean time gap between injury and intervention was 8.75±4.89 days. Mean post-operative stay was 9.87±3.48 days. Conclusion: Acetabular fractures primarily affected the young males in their productive years of life with road traffic accident being the most common cause. Management of these fractures is compounded by huge burden of associated injuries and required a prolonged hospital stay.

KEYWORDS

Acetabular fractures, road traffic accident, Open reduction and internal fixation (ORIF), conservative management, associated injuries.

INTRODUCTION

Acetabular fractures are relatively less common and are caused due to high energy trauma, especially road traffic accidents. Its annual incidence has been reported to range from 2 to 4 per 100,000 persons[1,2]. Though epidemiological data related to acetabular fractures is not systematically available in India, however, given the fact that India has perhaps the worst road traffic accident records affecting nearly half million persons each year[3,4], could have a much higher incidence of acetabular fractures as compared to global data. Acetabular fractures are often secondary to pelvic/hip fractures[2,5] and are accompanied by other bony and non-bony injuries. Acetabular fractures are cause of significant loss of work. Management of acetabular fractures is challenging, take long time and is accompanied with poor functional outcomes[6,7].

Despite these conditions indicating a high incidence of acetabular fractures in India, there are limited studies describing its epidemiology properly. To fill this gap, we present an epidemiological profile of acetabular fractures as observed at a tertiary care facility in Central India.

MATERIAL AND METHOD

The present study was carried out at a tertiary care centre in Central India after seeking approval from appropriate Institutional authority. In this study, retrospective records of cases of acetabular fractures occurring over one year period (January, 2019 to December 2019) were retrieved. The inclusion criteria of the study was patients aged 15 years or above presenting with acetabular fractures. Cases with malignant conditions, incomplete records and unclear diagnosis were excluded from assessment.

Demographic profile and mode of injury was noted. Type of injury was classified according to Judet and Letournel Classification[8]. Details of associated injuries, management, in-hospital complications and duration of post-operative stay were noted.

Data was collected on an excel worksheet. Data was analysed using Statistical Package for Social Sciences, version 21.0 and presented as frequency and proportions or mean±SD.

RESULTS

A total of 52 records were retrieved. Age of patients ranged from 15 to 77 years. Maximum patients were aged <30 years (48.1%). Mean age of patients as 37.21±18 years. Majority of patients were males (84.6%) and had road traffic accident (76.9%) as the cause of injury. There were 12 (23.1%) cases having other modes of injury (10 fall and 2 assault) (Table 1).

All the cases had unilateral involvement. Right side (57.7%) was more commonly involved than the left side (42.3%). Anterior column with posterior hemitransverse (40.4%), posterior wall (15.4%) and transverse (9.6%) were the most common fracture types. A total of 19 (36.5%) had dislocation too. Associated injuries were seen in 46 (88.5%) cases. Most of these cases (38/46; 82.6%) had skeletal injuries. Fracture upper limb (23.1%), fracture lower extremity other side and non-skeletal injury (15.4% each) and head injury (13.5%) were the most common associated injuries (Table 2).

ORIF was the preferred management (82.7%). A total of 9 (17.3%) patients were managed conservatively. Post-operative complications occurred in 10 (19.2%) cases – these included infections (n=6), avascular necrosis (n=2), embolism and nerve injury (n=1 each). There was 1 (1.9%) in-hospital mortality. Mean time gap between injury and intervention was 8.75±4.89 days. Mean post-operative stay was 9.87±3.48 days (Table 3).

Table 1: Demographic Profile and Mode of Injury

SN	Characteristic	Statistic
1.	Age	
	<30 years	25 (48.1%)
	30-50 years	15 (28.8%)
	>50 years	12 (23.1%)
	Mean age±SD (Range) years	37.21±18.00 (15-77)
2.	Sex	
	Male	44 (84.6%)
	Female	8 (15.4%)
3.	Mode of injury	
	Road traffic accident	40 (76.9%)
	Others	12 (23.1%)
	(10 – Fall; 2-Assault)	

Table 2: Side Involved, Type of Fracture and Associated Injuries

SN	Characteristic	Statistic
1.	Side involved	
	Left	22 (42.3%)
	Right	30 (57.7%)
2.	Type of fracture (Judet and Letournel Classification)	
	Anterior column	3 (5.8%)
	Posterior column	4 (7.7%)
	Anterior wall	4 (7.7%)
	Posterior wall	8 (15.4%)
	Transverse	5 (9.6%)
	Bicolumnar	3 (5.8%)
	Anterior column with posterior hemitransverse	21 (40.4%)
	Posterior column with posterior wall	2 (3.8%)
	T-type	2 (3.8%)

3.	Dislocation	19 (36.5%)
4.	Associated injuries	
	No associated injury	6 (11.5%)
	Fracture at lower extremity same side	2 (3.8%)
	Fracture at lower extremity other side	8 (15.4%)
	Fracture upper limb	12 (23.1%)
	Fracture both upper and lower limbs	4 (7.7%)
	Head injury	7 (13.5%)
	Chest injury	2 (3.8%)
	Other skeletal injuries	3 (5.8%)
	Non-skeletal injuries	8 (15.4%)

Table 3: Management, Post-operative Complications and Hospital Stay

SN	Characteristic	Statistic
1.	Management	
	ORIF	43 (82.7%)
	Conservative	9 (17.3%)
2.	Post-operative complications	
	No complications	42 (80.8%)
	Complications (Infections 6, Embolism-1, AVN-2, Nerve injury-1)	10 (19.2%)
3.	In-hospital mortality	1 (1.9%)
4.	Mean time gap between injury and intervention±SD (Range) in days	8.75±4.89 (1-21)
5.	Mean duration of post-operative stay±SD (Range) in days	9.87±3.48 (4-18)

DISCUSSION

The demographic profile and mode of injury of acetabular fractures in the present study showed a dominance of young individuals, males and road traffic accidents. Road traffic accidents generally involve young working population and show a male dominance[9,10]. Most of the other studies from India as well as from abroad show a dominance of young male victims of road traffic accidents as the affected patients. Ahmed et al.[1] in a study from Qatar reported 93.2% patients as males and 49.5% with road traffic collisions as the cause of injury. In another study from Brazil, Cavalcante et al.[11] reported the mean age of patients as 39.8 years with 86.2% patients being male. This is close to the mean age of patients in our study (37.21 years) and proportion of males (84.6%). Trikha et al.[12] in a study from north India also reported mean age of patients as 37.1 years and proportion of males as 87.8%. Compared to present study, Boudissa et al.[13] in a study from France reported the mean age of patients to be slightly higher (49.4 years) and proportion of males as 74%. Another study from western world (UK) showed mean age of patients with displaced and undisplaced acetabular fractures to be 46.8 and 55.6 years respectively and proportion of males from 59% to 75%[14]. Slight differences in demographic profile might be dependent on differences in life expectancy and status of women in respective society. In a previous study comparing epidemiology of acetabular fractures between Chinese and American population too the mean age of American population was found to be significantly higher as compared to that of Chinese population[15].

In the present study, all the cases had unilateral fracture. Bilaterality is a rare finding in different studies describing the epidemiology of acetabular fractures. Similar to present study a number of workers found all the cases in their series as unilateral[16-18]. Those reporting bilateral involvement have reported it to be very rare. Laird and Keating[14] in their study that included 351 cases of acetabular fractures found bilaterality in only one case. Trikha et al.[12] reported bilaterality in only 2.6% of cases in their series.

In the present study anterior column with posterior hemitransverse fracture was the most common type of fracture (40.4%) followed by anterior wall (15.4%). Overall a total of 9 types of acetabular fractures were seen. Halwai et al.[16] in their study encountered 10 fracture types and reported anterior column with posterior hemitransverse fracture as the most common type, however, contrary to the present study where anterior column fracture was found to be the next most common type they found posterior column fracture to be the next most common type. In their study Trikha et al.[12] observed that Posterior Wall fractures and Transverse with posterior wall fractures were more common in younger age groups. Kucheria and Kavalakkatt[17] in their study observed posterior wall fracture to be the most common type followed by posterior column and both anterior and posterior columns respectively. In fact fracture pattern in acetabular fractures is highly variable and depends on the site and intensity of impact inflicting the injury.

In the present study more than one third (36.5%) fractures were accompanied with dislocation. Compared to present study, Laird and Keating[14] observed dislocation in relatively much higher proportion of cases (62.4%). Kuncheria and Kavalakkatt[17] found dislocation in 43.9% of their cases. Ahmed et al.[1] in their study observed dislocation in 21.3% of cases only while Trikha et al.[12] reported it in 16.1% cases only. The reason for these differences among studies could be difference in nature and type of injury and its impact.

The present study seemed to have high impact injuries as most of the cases had associated injuries (88.5%). Among associated injuries too, there was a dominance of skeletal injuries. Only 8 (15.4%) patients had non-skeletal injuries. Fracture upper limb (23.1%) and fracture lower extremity same/other side (19.2%) were the most common associated skeletal injuries. Head injury and chest injury comprised 13.5% and 3.8% of associated injuries. Compared to present study, Halwai et al.[16] in their study reported distal end of radius (8.33%;5) followed by pelvic injuries (5%;3) as the most common associated skeletal injuries. Ahmed et al.[1] reported associated injuries in 62.5% of their cases and described the common associated injuries as long bone fractures, chest, head, and abdominal injuries. Trikha et al.[12] reported other limb injury (38.7%) to be the most common associated injury which is in agreement with the present study.

In present study, conservative management was done in 9 (17.3%) cases only. Remaining patients were managed using open reduction and internal fixation. Conservative management has a limited usefulness in acetabular fractures as fractures are often associated with associated injuries and require stabilization[7,8]. Conservative management can be recommended in undiplaced fractures only. In their series Laird and Keating[14] performed conservative management in only 60.3% of undisplaced fractures, thus showing that even all undisplaced fractures cannot be managed conservatively. Ahmed et al.[1] too reserved conservative management for elderly patients with minimal displacement. In the study by Kuncheria and Kavalakkatt[17], 31/41 (75.6%) patients underwent ORIF while remaining 10 (24.4%) were managed conservatively.

Post-operative complications were noted in 10 (19.2%) cases. Infection was the most common post-operative complication. More serious complications like avascular necrosis, embolism and nerve injury were seen in 2, 1 and 1 cases respectively. Laird and Keating[14] in their study reported avascular necrosis in 4% of the displaced fractures and infections in 6.5% of operatively treated patients. Halwai et al.[16] reported nerve injury, infections and thromboembolism in 5%, 3.33% and 1.67% patients respectively. In general, the findings of present study are in agreement with the previous studies reporting fewer post-operative complications. However, Kuncheria and Kavalakkatt[17] reported a high rate of postoperative complications (22.59%).

In present study, one patient (1.9%) died. This was the patient having associated head injury and also developed embolism during the hospital stay. In the study by Laird and Keating[14] too there were 4.8% mortalities in acetabular fracture patients which were attributable primarily to associated injuries. However, Ahmed et al.[1] in their series did not report any mortality. Some other series also did not report any mortality[12,16,17]. As acetabular fractures occur owing to high energy trauma it is the associated injury that is responsible for death.

In present study, time gap between injury and intervention ranged from 1 to 21 days. Mean time gap was 8.75±4.89 days. Mean duration of post-operative stay was 9.87±3.48 days. As already highlighted acetabular fracture patients often present as victims of road traffic accident and other traumatic injuries in which primary management of non-skeletal injuries is done at priority. Halwai et al.[16] in their study reported the preoperative gap as 9.7 days and post-operative stay as 11.42 days. Dias et al.[18] on the other hand reported the time gap between injury and intervention to be much higher at 16.4 days. However, Kuncheria and Kavalakkatt[17] reported this gap to be only 5.64 days. As such given the diversity in nature of associated injuries, there could be high variability in these parameters.

The findings of present study provided the epidemilological profile of acetabular fractures at a tertiary care centre in central India. The findings in the present study are in agreement with most of the evidence elsewhere. Further studies on a larger sample size are recommended.

CONCLUSION

Despite rarity, acetabular fractures need hold a high significance owing to the fact that they affect young males in most productive phase of their life. Associated injuries pose a challenge in delaying their management and prolonging their hospital stay.

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