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The epidemiology and fracture patterns of acetabular fractures in a tertiary care centre of North India: A hospital based study

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Abstract

Background: A prospective study was conducted at Government Hospital for Bone and Joint Surgery, Barzulla, Jammu and Kashmir from 2015 to 2017. The study was a hospital based descriptive review of data of patients obtained from the tertiary care Orthopaedic hospital of Kashmir valley.

Material and Methods: We performed a hospital based prospective review of data of patients obtained from a tertiary care orthopedic hospital for Kashmir valley, namely Government hospital for Bone and Joint surgery hospital, Barzulla. Data from patients admitted for acetabular fractures from June 2015 to December 2017 was collected prospectively. Data on patients' ages, sex, side affected by the fracture, mechanism of injury, patterns of fracture, complications of the operation and associated fractures was collected.

Results: In this study sixty patients were evaluated from 2015 to 2017. 55% (33) of these patients presented a fracture in the left-side acetabulum, while 45% (27) presented a fracture in the right-side acetabulum. Car accidents accounted for 45% (27) of cases, followed by motorcycle accidents (30%; 18) and falls (10%; 6). The most common fracture pattern according to Letournel classification was anterior column with posterior hemi transverse (31.67%; 19) followed by posterior wall fractures (20%; 12) and transverse type (18.33%; 11). The most common associated injury was fracture of distal end of radius (8.33%; 5) followed by pelvic injuries (5%; 3).

Conclusion: It was observed in this population that

1. The left side was more affected.
2. The mechanism of injury that most often caused this type of fracture was automobile accidents.
3. Most common pattern of injury was anterior column with posterior hemi transverse.
4. Injuries to the sciatic nerve were the commonest surgical complications.
5. The most common associated injury was fracture of distal end of radius.

Keywords: epidemiology, fracture pattern, acetabular fracture, tertiary care centre, north India

Introduction

Fractures of the acetabulum were and continue to be a challenge for the orthopaedic surgeon. Successful treatment of an acetabular fracture is based on a thorough understanding of the complex three-dimensional anatomy of the innominate bone [1, 2]. Up to 1960s acetabular fractures were dark waters with conflicting recommendations regarding the optimal management and all these early investigators did agree that poor results would follow from a hip injury that resulted in either joint instability or a femoral head that was incongruent with the weight-bearing dome [3, 4]. Much of the confusion was due to the fact that there was no comprehensive or accepted acetabular fracture classification, fracture evaluation was further complicated by the fact that radiographic assessment was limited to a single anteroposterior pelvic view.

Judet, and Letournel in 1964, published their treatise based on 10 years of study of nonoperative methods which they found highly unsatisfactory. The further studies by Letournel and Judet and by Matta [5] have shown that to attain the best results, hip joint congruity and stability must be accompanied by an anatomic (defined as less than 2 mm of residual displacement) reduction by open reduction and rigid internal fixation of the displaced

articular surface. The achievement of these objectives should minimize pain, prevent posttraumatic osteoarthritis, and thereby improve long-term functional outcome. Although certain fracture patterns may not require surgery to have a satisfactory outcome, in general, those with hip instability, hip incongruity, or fracture displacement in the superior weight-bearing area of the acetabulum should be managed with open reduction and internal fixation.

The aim of this study was to study the epidemiology and injury patterns of acetabular fractures in a tertiary care center of north India.

Material and Methods

Kashmir valley has a population of 71,98,115 (census 2011) and has a urban trauma centers with available expertise to manage acetabular fractures. The regional trauma referral system is managed by a government-run medical system. The referrals in Kashmir involve stabilization of patients at their local hospitals followed by a transfer to a tertiary care center for management of complex injuries.

We performed a hospital based prospective review of data of patients obtained from a tertiary care orthopedic hospitals for Kashmir valley, namely Government hospital for Bone and Joint surgery, Barzulla. This hospital caters to the major chunk of complex orthopaedic trauma of the Kashmir valley. Data from patients admitted for acetabular injuries from June 2015 to December 2017, was collected prospectively. We included all adult patients with a diagnosis of acetabular fractures in our study. Patients received in the casualty were resuscitated appropriately and after primary survey for life threatening and other visceral injuries, secondary survey for accompanying skeletal injuries was performed. A proper history and general examination was done to rule out other medical conditions. X-rays of Pelvis, AP view and Judet's views were taken. A CT-scan with 3D reconstruction was done. Two blinded observers verified the Letournel classifications. This was based on AP pelvic radiographs, Judet views, and pelvic CT scans. Our preference for the Letournel classification was driven by its improved reliability, clinical utility, and simplicity when compared to the AO/OTA system. This classification system was used to identify patterns of injuries during the study period. We reviewed the medical charts of patients and documented their age, sex, side affected by the fracture, mechanism of injury, patterns of fracture, Letournel classifications, complications of the operation and associated injuries. The data were expressed as means and standard deviations, and were then correlated using percentages and graphical comparisons.

Results

In this study sixty patients were evaluated from 2015 to 2017. Among these, 85% were men and only 15% were women (Table 1).

The mean age among the population analyzed was 33 years, with a range from 16 to 66 years.

The side that was more commonly affected by a fracture was the left side, such that 55% (33) of the patients presented a fracture in the left-side acetabulum, while 45% (27) presented a fracture in the right-side acetabulum (Table 2).

Occurrences of hospitalization due to acetabular fractures increased over the years (Table 3). There was no difference in prevalence between the months of the year.

The injury mechanism that was most responsible for acetabular fractures was car accidents, which accounted for 45% (27), followed by motorcycle accidents (30%; 18) and

falls (10%; 6) (Table 4).

The mean duration of the hospital stay before the operation was 9.7 days, and the mean hospital stay after the operation was 11.42 days.

In this study, diagnoses of lesions of the sciatic nerve were made in three patients (5%), infections in two patients (3.33%) and pulmonary thromboembolism in one patient (1.67%).

The most common fracture pattern according to Letournel classification was anterior column with posterior hemi transverse (31.67%; 19) followed by posterior wall fractures (20%;12) and transverse type (18.33%;11) (Table 5).

The most common associated injury was fracture of distal end of radius (8.33%;5) followed by pelvic injuries (5%;3) (Table 6).

Discussion

Most of the patients who suffered a fracture of the acetabulum were male. This corroborates the previous studies [6, 7], which also found greater incidence among males.

The mean age among the patients (33 years) was close to what was found in the study by Kumar [7], in which the mean age observed was 39.5 years. It was not possible to establish a motive for the predominance of fractures on the left side, but we would suggest that this difference is not significant, given that it was possible for both sides to be affected.

Acetabular fractures are classified according to Judet and Letournel as either simple or in association. Simple fractures include: anterior wall, anterior column, posterior wall, posterior column and transverse fractures. Associations of fractures include: T-type, anterior column with posterior hemi-transverse fractures; transverse with posterior wall fractures; posterior column with posterior wall fractures; and both column fractures. Our study showed that anterior column with posterior hemi transverse pattern was most common followed by posterior wall fractures.

As observed, the increasing incidence over the years suggests that traffic accidents are increasingly caused by high-energy collisions.

Vehicle accidents were responsible for the higher rate of acetabular fractures, just as in the studies by Kumar [7] and VanOpdorp [8].

Acetabular reconstruction surgery is subject to complications, like nerve or vascular lesions, thromboembolism, infections; and late complications such as heterotopic ossification and osteo dystrophy [8, 9, 10]. In the present study, sciatic nerve lesions, infections and pulmonary thromboembolism were found.

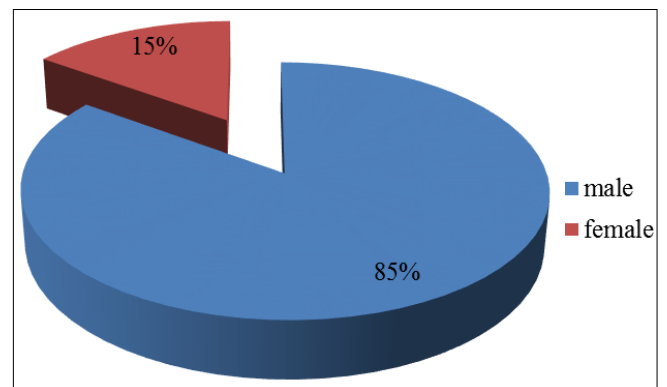


Table 1: Sex distribution of acetabular fractures.

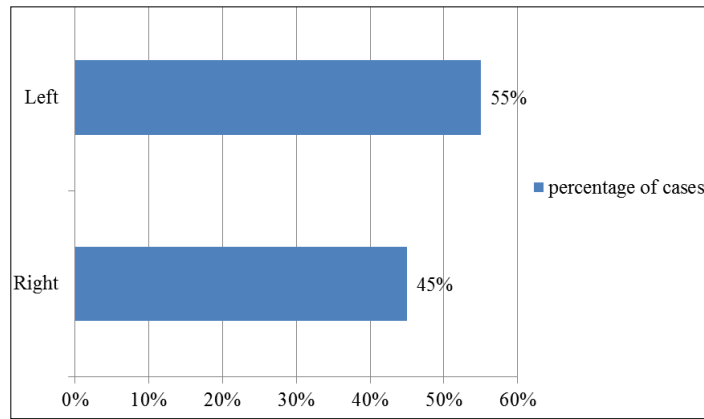


Table 2: Correlation between acetabular fractures and affected side.

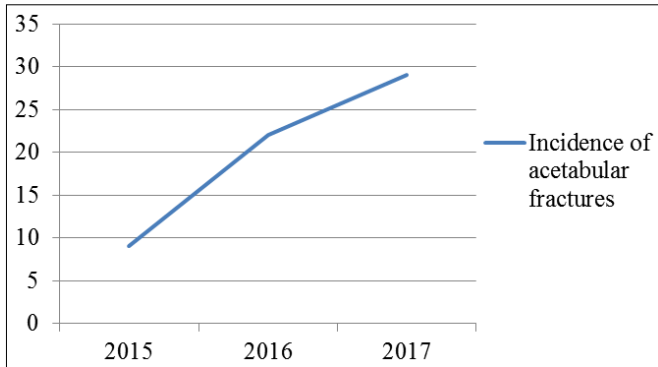


Table 3: Incidence of acetabular fractures per year.

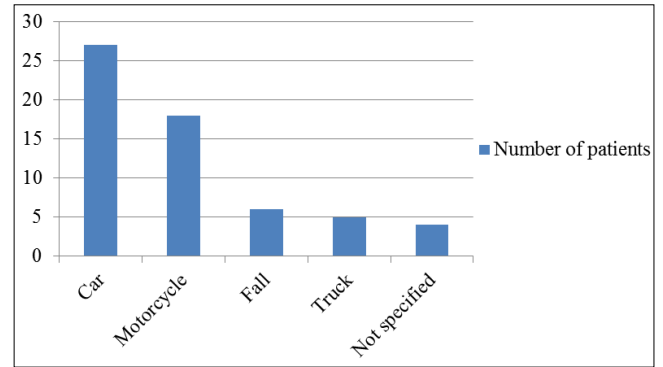


Table 4: Correlation between acetabular fractures and mechanism of injury.

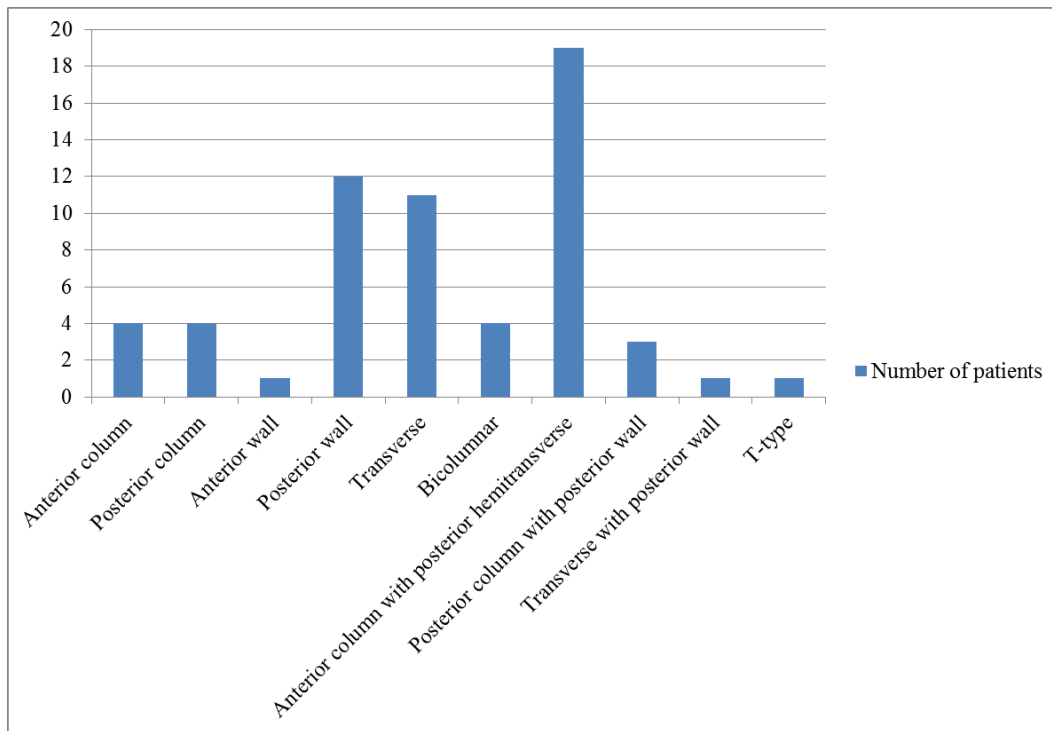


Table 5: Fracture pattern in acetabular fractures.

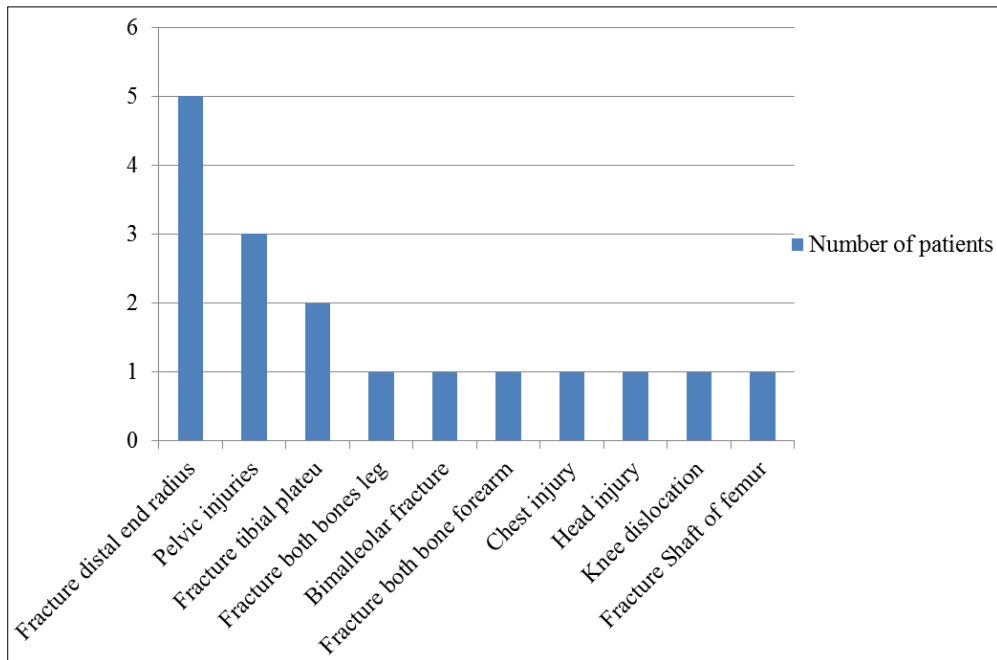


Table 6: Associated injuries in acetabular fractures.

Conclusion

From the data presented, it could be concluded that

- The sample only represented the Kashmir valley region and its surrounds, since this was not a multicenter study.
- A larger proportion of the acetabular fractures occurred among males, and the left side was more affected.
- The injury mechanism that caused most of these fractures was vehicle accidents, which shows that acetabular fractures are highly correlated with high-energy trauma.
- It was not possible to correlate any greater incidence of accidents with any specific months of the year.
- Most common pattern of injury was anterior column with posterior hemi transverse.
- Injuries to the sciatic nerve were the commonest surgical complications.
- The most common associated injury was fracture of distal end of radius.

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