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Epidemiology of Scapular Fractures and Concomitant Injuries: A Retrospective Cross-Sectional Observational Study.

*Lalatendu Swain [1], Prabhat Nalini Rautray [2], Mamata Singh[3]

[1] Associate Professor, Dept of Anatomy, GMC&H, Balasore

[2]Assistant Professor, Dept of Radiodiagnosis, GMC&H, Balasore

[3] Assistant Professor, Dept of Radiodiagnosis, SCB MC&H, Cuttack

ABSTRACT:

Introduction: Fracture of the scapula is an infrequent injury, with an incidence of 0.4% to 1% of all fractures. The low incidence is attributed to its anatomical position and muscle envelope. The most common area of the scapula to be fractured is the body. Motor vehicle accidents are the main cause of scapular fractures.

Objectives: To study the different types, etiological factors and associated injuries of scapular fracture.

Material and Methods: This study was a retrospective analysis of data of trauma patients admitted in the emergency room (ER) of S.C.B Medical College and Hospital, Cuttack and Govt. Medical College & Hospital, Balasore, Odisha, India, during the period from August 2017 to July 2018. Patients with scapular fractures were included in the study.

Results: In this retrospective cross sectional study we analysed 58 trauma patients presented with scapula fracture. Males sustained significantly more injuries as compared to females. Majority of fractures are seen in 5th and 6th decade of life. Road traffic accidents are most common cause of fracture scapula.

Conclusion: Scapular fracture is an uncommon injury and has received little attention in medical literatures. Scapular fractures are frequently associated with multiple other serious injuries. We propose that the presence of scapular fractures should be perceived as a marker of a critically injured patient who requires thorough evaluation for associated injuries.

Key Words: Scapular Fracture, road traffic accident, 3D scan

INTRODUCTION:

Fracture of the scapula is an infrequent injury, with an incidence of 0.4% to 1% of all fractures.[1] The low incidence is attributed to its anatomical position and muscle envelope.[2] The most common area of the scapula to be fractured is the body.[1] Motor vehicle accidents are the main cause of scapular fractures, accounting for more than 50% of the cases.[3] Because it is considered as the result of high energy trauma, association with other life-threatening conditions such as chest, cervical spine or blunt thoracic aortic injury is common.[4] But only a few studies have investigated these concomitant injuries. Associated injury has been reported in 35% to 98% of patients with scapular fractures.[1,3] On the other hand, there are a few case reports of SF related to indirect trauma with less violent causes.[5] Stephens et al.[6] reported that scapular fractures are not a significant marker for greater general or eurovascular morbidity among blunt-trauma patients. Veysi reported that patients with scapular fractures have more severe underlying

Corresponding author: Lalatendu Swain

chest injuries and worse overall injury severity score (ISS) but that this did not correlate with a higher rate of intensive therapy before admission, duration of hospitalization, or mortality.[3] The combination of a fracture of the scapular neck with an ipsilateral fracture of the clavicle is often referred to as a "floating shoulder". Since its first description [7], many clinical and biomechanical studies have focused on this complex shoulder injury and the definition of a floating shoulder has been updated over the last decades.

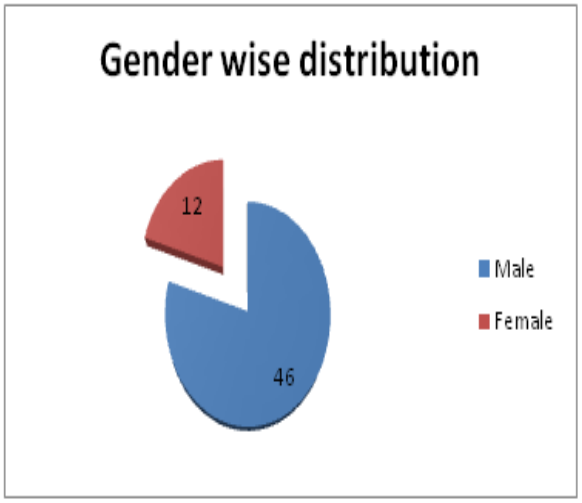
The objective of this study was to determine the types, etiological factors and associated injuries of scapular fracture.

Material and Methods

This study was a retrospective analysis of data of trauma patients admitted in the emergency room (ER) of S.C.B Medical College and Hospital, Cuttack and Govt. Medical College & Hospital, Balasore, Odisha, India, during the period from August 2017 to July 2018. Patients with scapular fractures were included in the study. The diagnosis of a fracture was based on the history, signs and symptoms, visual finding, manual examination, and OPG radiographs. Exact determination of site and pattern of bony injury was determined by correlating it radiographically using three dimentional CT scan. In our study, based on the documented radiographic findings, the fracture sites were assigned to one of five anatomical subsites including body, glenoid fossa, acromian processes, coracoid process, and neck regions. The etiological factors were classified as road traffic accidents (RTA), fall from height, blunt trauma, assult and bullet injury. Age, gender, etiology, pattern of scapular fractures and associated injuries were recorded in clinical proforma.

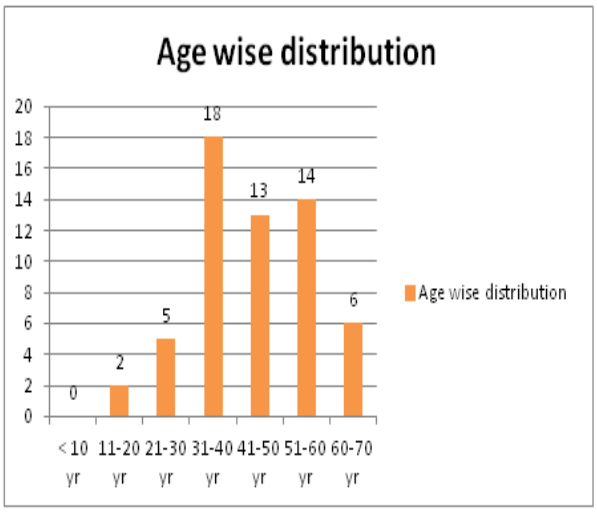
Results

We conducted this study on 58 of the 7126 trauma patients presented to the emergency department, who were radiologically diagnosed to have some type of scapular fracture. Out of 58 patients, 46 (79.3%) were males and 12 (20.7%) were females. Males sustained significantly more injuries as compared to females, with an overall ratio of 3.8:1. (Graph 1)



Graph 1 - Gender wise distribution of cases

Majority of fractures are seen in the age group of 31–40 years, 18 (31.1%) followed by 51-60 years, 14 (24.1%), 41-50 years, 13 (22.4%) of life, constituting a major proportion (77.6%) in 3rd,4th and 5th decade of life. In male patients it was more common in same 3rd,4th and 5th decade of life while in females it was more common in 5th and 6th decade of life. (Graph 2)



Graph 2 - Age wise distribution of cases

Among 58 total fractures, 56 (96.6%) fractures are unilateral and 2 (3.4%) fractures are bilateral. Among 56 unilateral fractures, 34 (58.7%) fractures are present on left side and 22 (37.9%) fractures are present on right side. Scapular fractures occurred most commonly in the body, about 31 cases (53.4%), followed by glenoid

fossa 17 (29.3%), acromian process 5 (8.6%), coracoids process 3 (5.8%), neck 2 (3.4%). (Table 1)

Table 1: Distribution of cases according to site of scapular fracture

Site	n=58	%
Body	31	53.4
Glenoid fossa	17	29.3
Acromian processes	5	8.6
Coracoid process	3	5.8
Neck	2	3.4

Fractures due to road traffic accidents are most common, seen in 42 (72.4%) cases, followed by fall from height in 9 (15.5%), blunt trauma 4 (6.9%), assult 2 (3.4%) and bullet injury in 1 (1.7%) cases. (Table 2)

Table 2: Distribution of cases according to their etiology

Etiology	n=58	%
Road traffic accident	42	72.4
Fall from height	9	15.5
Blunt trauma	4	6.9
Assult	2	3.4
Bullet injury	1	1.7

Scapular fractures are associated with other injuries in all cases. Most commonly associated injury was chest injury in 36 (62.1%) cases followed by rib fractures & head injury in 28 (48.3%), haemopneumothorax in 23 (39.6%), long bone fracture in 20 (34.5%) and lung contusion in 19 (32.7%) cases. Other associated injuries observed are hemothorax, pneumothorax, clavicle fracture, skull fracture, facial bone fracture, pelvic fracture, splenic and liver injury. (Table 3)

Table 3: Distribution of cases according to association with other injuries

Associated other injury	n=58	%
Chest injury	36	62.1
Rib fracture	28	48.3
Hemothorax	6	10.3
Pneumothorax	2	3.4
Haemopneumothorax	23	39.6
Clavicle fracture	7	12.1
Long bone fracture	20	34.5
Head injury	28	48.3
Skull fracture	5	8.6
Lung contusion	19	32.7
Facial bone fracture	4	6.9
Pelvic fracture	2	3.4
Splenic injury	6	10.3
Liver injury	3	5.2

Figure 1: Fracture of body and lateral border of scapula with rib fractures

Figure 2: Fracture of body, lateral and medial border of scapula

Figure 3: Fracture of body and inferior angle of scapula

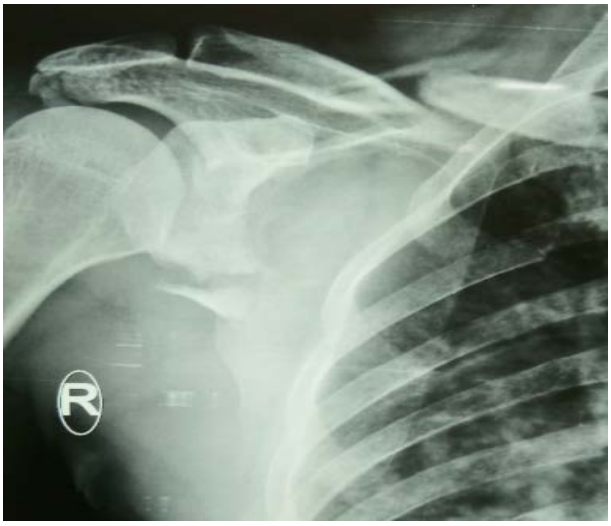


Figure 4: Fracture of glenoid cavity of scapula and clavicle

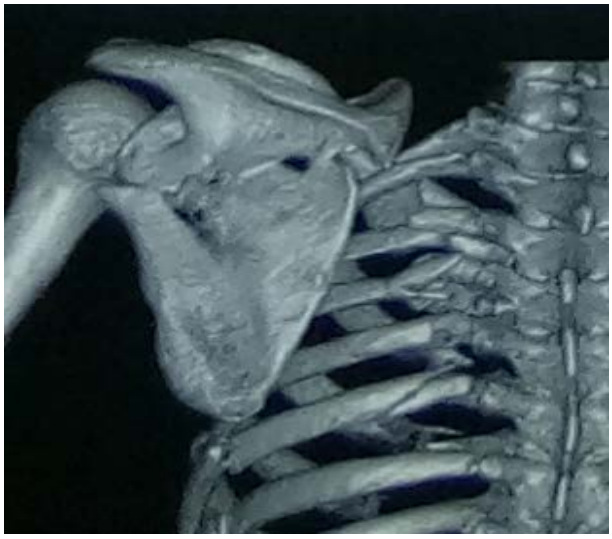


Figure 5: Fracture of glenoid cavity, neck and body of scapula with multiple rib fracture

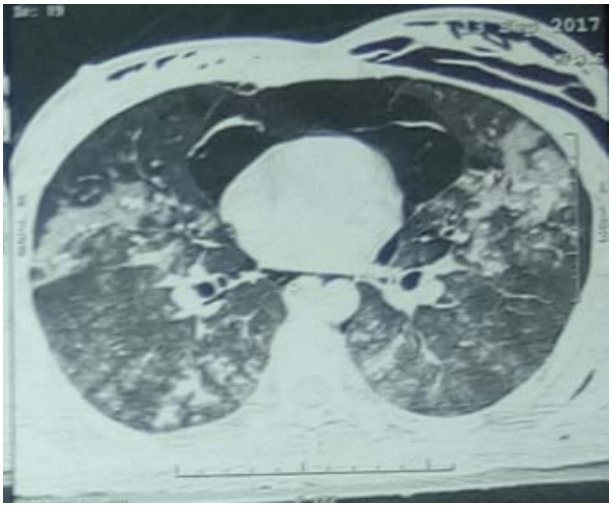


Figure 6: Bilateral lung contusion ,pneumothorax, pneumo mediastinum and sub cutaneous emphysema

Figure 7: Left perinephric hematoma

Figure 8: Splenic hematoma

Discussion

Scapular fractures are uncommon (accounting for only 0.4 - 1% of all bone fractures and 3 to 5% of all shoulder girdle injuries) due to the muscular coverage of the scapula and as a rule, they are the result of the marked force applied in the course of high-velocity chest trauma. [12] In this study we observed 0.8% of patients presented with trauma have scapular fracture. Similarly Osaree Akaraborworn et al [9] found scapular fracture in 1.1% of their trauma patients and Javad Salimi et al [8] in 0.48% of their trauma patients. in contrast to us Veysi et al [3] and Weening et al [14] studied scapular fractures in 6.8% and 3.7%, respectively.

We conducted this study on 58 diagnosed case of scapular fracture. We studied that incidence of scapular fracture was more in males 46 (79.3%) in compare to females 12 (20.7%). Males sustained significantly more injuries as compared to females, with an overall ratio of 3.8:1. Similarly Javad Salimi et al [8] have also observed scapular fracture more common in males (4.8 to 1). Saree Akaraborworn et al [9] also recorded higher fracture rate in males compare to females (77.4% vs 22.6%, 3.4:1). Michal Tuček et al [10] also observed more commonly in men than women (3.9:1). Tabet A. Al-Sadek et al [11]also observed scapular fractures are predominately male gender. Jan Friederichs et al [13] in their study observed 91% were male, and 9% were female (10.1:1).

We observed majority of fractures are seen in the age group of 31–40 years, 18 (31.1%) followed by 51-60 years, 14 (24.1%), 41-50 years, 13 (22.4%) of life, constituting a major proportion (77.6%) in 3rd,4th and 5th decade of life. In male patients it was more common in same 3rd,4th and 5th decade of life while in females it was more common in 5th and 6th decade of life. We found te average age of presentation was 42 yr. In accordance to us Michal Tuček et al [10] studied the majority of patients in the whole group (66%) were in 4th, 5th and 6th decades. The same applies to men, while most women were in 6th or 7th decades. They also obsereved the mean age was 45.3 years (range, 15-92); in men 43.5 years (range,16-83), in women 52.4 years (range, 15-92). Similar to us Tabet A. Al-Sadek et al [11] found the patient population's average age was 44 years and range of 32-72 years. Jan Friederichs et al [13] studied the median age of scapula fracture was 45 years (range 19–76 years).

\In this study we observed among the 58 cases, 56 (96.6%) fractures are unilateral and 2 (3.4%) are bilateral. Out of 56 unilateral fractures, 34 (58.7%) fractures are present on left side and 22 (37.9%) on right side. Tabet A. Al-Sadek et al [11] in their eleven fracture cases found six fractures on the right scapula and five fractures on the left scapula. In contrast to us Jan Friederichs et al [13] observed right side fracture in 55% of the injuries and left side in 45% of the patients.

In our study most common site of scapular fractures observed was in the body, about 31 cases (53.4%), followed by glenoid fossa 17 (29.3%), acromian process 5 (8.6%), coracoids process 3 (5.8%), neck 2 (3.4%). Similarly, Javad Salimi et al [8] observed the most frequent location of scapular fractures was the body (80%). In accordance to us Michal Tuček et al [10] studied the most common fracture site was scapular body (52%), followed by glenoid fossa (29%), the processes (11%) and the least frequent site was scapular neck (8%).

In this study we observed road traffic accidents as the most common cause of scapular fracture seen in 42 (72.4%) cases, followed by fall from height in 9 (15.5%), blunt trauma 4 (6.9%), assult 2 (3.4%) and bullet injury in 1 (1.7%) cases. Osaree Akaraborworn et al [9] also studied the most

common cause of injury being motorcycle crashes (60.7%), followed by motor vehicle crashes (16.7%) and falls (8.3%). Similarly Javad Salimi et al [8] observed road traffic accidents as the most common cause of scapular fracture (73.2%), followed by fall from height (17.1%), blunt trauma (7.3%) and cutting in (2.4%) cases.

In this study we observed that scapular fractures are associated with other injuries in 100% of cases. Most commonly associated injury was chest injury in 62.1% cases followed by rib fractures & head injury in 48.3%, haemopneumothorax in 39.6%, long bone fracture in 34.5% and lung contusion in 32.7% cases. Other associated injuries observed are hemothorax, pneumothorax, clavicle fracture, skull fracture, facial bone fracture, pelvic fracture, splenic and liver injury. In accordance to our study Osaree Akaraborworn et al [9] studied associated injuries in 88.1%of cases, mostly chest injury (59.5%) consisting of rib fracture (46.4%), pneumohemothorax (39.3%) and lung contusion (31.0%) cases. The second most frequent concomitant injuries observed by them were Head and extremity injuries (53.6%). They found associated abdominal injuries in 13.1% cases, consisting of splenic injury 8.3%, liver injuries 3.6% and others in 2.4% cases. They also pobserved pelvic fracture in 8.3% of cases. . Similarly the most common associated injury observed by Tabet A. Al-Sadek et al [11] was chest injury with multiple rib fractures, thoracic spine fracture, pulmonary contusion, haemopneumothorax, haemothorax and pneumothorax. In contrast to us Javad Salimi et al [8] studied association of long bone fracture in maximum number of cases (36.1%), followed by dislocation in 13.1%, clavicle fracture in 11.5%, skull fracture in 9.8%, facial bone fracture in 8.2%, rib fracture in 8.1% , brain injury in 6.6%, hemothorax and pelvic fracture in 3.3% of cases.

Conclusion

Scapular fracture is an uncommon injury and has received little attention in medical literatures. Although there is no associated blunt thoracic aortic injury identified, other significant associated injuries are still frequent. We propose that the presence of scapular fractures should be perceived as a marker of a critically injured patient who requires thorough evaluation for associated injuries. Patients should not be taken lightly and deserve

careful clinical evaluation. Scapular fractures occur primarily in men, predominantly in 4th – 6 th decades. After 60 years of age, there is an apparent increase in the share of women.

Acknowledgments: Nil

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