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Causes of delayed diagnosis of scapular fractures

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Summary

Objectives: To study the causes of delayed diagnosis of scapular fractures in blunt trauma cases, and to advise on early fracture detection.
Patients and methods: Between February 2003 and September 2004, 64 consecutive patients (3 females) with a median (range) age of 35 (8—60) years, treated at Al-Ain Hospital for scapular fractures, were prospectively collected. Fractures diagnosed after more than 24 h from admission were considered missed; 8 people with missed scapular fractures were compared with a control group of 56 who had timely diagnosis, regarding the mechanism and distribution of injury, injury severity score, and type and quality of radiological methods used.
Results: The median (range) abbreviated injury scale scores for the missed scapular fracture group and the control group were 4 (0—5) and 2 (0—2), respectively. The missed scapular fracture group stayed significantly longer in the intensive care unit compared with the control group, with a median (range) stay of 15 (5—37) days compared with 9 (1—26) days. Associated injuries overshadowed the scapula on chest trauma radiographs. If computed tomography did not cover the whole scapula, some fractures might not be shown. Convulsive seizures were the only significantly different mechanism of injury between the missed fracture and the control groups.
Conclusion: Delayed diagnosis of scapular fractures can be due to extensive chest injuries overshadowing the scapula on the chest trauma radiographs, inappropriately performed computer tomography or an unusual mechanism of injury.
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Introduction

Scapular fractures are usually caused by major blunt trauma.[2,8,11] More than 90% of scapular fractures are undisplaced or only moderately displaced, and

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are therefore treated conservatively. As a result, these injuries have received little attention in the literature.[6] Severity of associated injuries often leads to delay in the diagnosis of a scapular fracture.[1,13] Recent concepts regarding surgical management of scapular fractures emphasise the benefit of early diagnosis.[3,5–7] In addition, delayed fracture identification may have medico-legal implications.[4] We aimed to study the causes of delayed diagnosis of scapular fractures in a consecutive series of blunt trauma cases, and to make recommendations to enable early fracture detection. The local ethics committee of Al-Ain Health District approved the study.

Patients and methods

Between February 2003 and September 2004, 64 consecutive victims of blunt trauma (3 females) with a median (range) age of 35 (8–60) years, treated at Al-Ain Hospital for scapular fractures, were prospectively studied. These patients were a subset of a larger study population of 107 patients whose cases were analysed to define the relationship between scapular fracture type and injury severity.[12] We recorded mechanism of injury, associated injuries, injury severity score (ISS), fracture type and anatomical location, and time to diagnosis after emergency department admission. Fractures detected after 24 h from admission were considered missed. A group of 8 people had missed scapular fractures (MSF), and 56 who had a timely diagnosis of scapular fracture formed a control group. Plain radiographs (chest or scapular views) and computed tomography (CT) were available in 58 cases. Plain radiographs only were available in the remaining 6 cases. Analyses of the clinical data, radiographs and CT were carried out to identify the circumstances leading to delay in diagnosis. The Mann–Whitney test or Fisher's exact test were used to compare the two groups, as appropriate. A p-value of 0.05 or less was considered statistically significant.

Results

The median (range) age of the 8 participants in the MSF group was 30 (18–15) years and of the 56 participants in the control group was 35 (8–60) years ($p = 0.96$). The median (range) duration of diagnostic delay in the MSF group was 5 (2–195) days. The mechanisms of injury in both groups are shown in Table 1. Convulsive seizures comprised the only mechanism of injury that demonstrated a significant difference between the two groups ($p = 0.04$). Table 2 shows the anatomical locations of the fractures in both groups; there were no significant differences. Table 3 shows the associated injuries and pulmonary complications in both groups. The MSF group showed a trend to higher pulmonary complications and more frequent need for ventilation. The abbreviated injury scale (AIS) for the chest scored significantly higher among the MSF group than among the control group ($p = 0.048$), as shown in Table 4. However, there was no statistically significant difference in ISS between the two groups. In the MSF group, 5 of

Table 1 Mechanism of injury in missed scapular fracture and control groups

Mechanism of injury	MSF group ($n = 8$)	Control group ($n = 56$)	p-Value[a]
Road traffic accident	4	42	0.20
Fall from height	2	10	0.60
Convulsive seizures	2	1	0.04
Fall on same level	0	1	1.00
Heavy object trauma	0	2	1.00

[a] Fisher's exact test.

Table 2 Anatomical locations of scapular fractures in the missed scapular fracture and control groups

Location	MSF group ($n = 8$)	Controls ($n = 56$)	p-Value[a]
Acromion	1	6	1.00
Body of scapula	7	47	1.00
Coracoid process	0	6	1.00
Glenoid process	2	7	0.31
Neck of scapula	2	16	1.00
Spine of scapula	2	17	1.00

[a] Fisher's exact test.

Table 3 Associated injuries in the missed scapular fracture and control groups

Associated injuries	MSF group ($n = 8$)	Control group ($n = 56$)	p-Value[a]
Chest injuries	7	36	0.25
Need for ventilation	3	6	0.08
Atelectasis	3	7	0.10
Adult respiratory distress syndrome	1	3	0.40
Upper limb injuries	3	13	0.40
Head and facial injuries	4	13	0.20
Lower limb injuries	5	11	0.02
Pelvic fractures	3	13	0.40

[a] Fisher's exact test.

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