Fracture of the superior border of the scapula

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Summary. *Twenty-four patients who sustained a fracture of the superior border of the scapula are reviewed. All were associated with a fracture of the coracoid process and other shoulder injuries. There were 19 long fracture lines and 5 short. The former and 3 of the latter were extensions of a coracoid fracture; in 2, there appeared to be an avulsion fracture by traction through the superior transverse scapular ligament resulting from the upward displacement of the coracoid.*

Résumé. *Vingt-quatre fractures consécutives du bord supérieur de l'omoplate ont été observées chez 24 patients. La totalité de ces fractures étaient associées à une fracture de l'apophyse coracoïde ainsi qu'à d'autres blessures concomitantes de l'épaule. On a pu constater 19 fractures longues et cinq fractures courtes. L'étiologie dans le premier cas et dans trois des seconds cas semble être l'extension de la fracture coracoïdienne. Dans deux des derniers cas, l'étiologie a été supposée être une fracture d'avulsion provoquée par la traction du ligament scapulaire transversal supérieur résultant du déplacement vers le haut de l'apophyse coracoïde fracturée.*

Introduction

Fracture of the superior border of the scapula is rare, except for those associated with comminuted

fractures of the body. A fracture of the superior border was first reported in 1940 and considered to be an injury to a persistent apophysis associated with a coracoid fracture [1]. There have been further reports of coracoid fractures associated with fractures of the superior border [3, 4, 5, 13], but not many have described fractures of the superior border itself [1, 6, 8, 9, 12].

We therefore studied these fractures in order to clarify their aetiology.

Patients and methods

Twenty-four fractures of the superior border of the scapula without accompanying comminuted fractures of the body were treated between 1974 and 1994. The average age of the 24 patients was 32 years (range 17 to 72 years). There were 20 men and 4 women. The right side was injured in 14 and the left in 10. The injury was recent in 22, but had occurred more than 6 months previously in 2.

The cause of injury, type of fracture, concurrent injuries and treatment were investigated. The outcome in 18 acute cases was studied by direct interview at a follow up of one year or more.

Results

The causes of injury were road traffic accidents in 15, a fall in 7 and miscellaneous causes in 2. There was a long fracture running almost the entire length of the superior border in 19 (Fig. 1). In 5 cases, the fracture line was shorter and near to the suprascapular notch (Fig. 2). All were associated with a wide variety of other shoulder injuries, coracoid fractures being the most common (Table 1). Nine of the coracoid fractures were intra-articular and could be classified as type III glenoid injuries [7]. The remaining 15 cases were

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Fig. 1. Radiographs of a man, 29 years of age, showing a long fracture of the superior border of the scapula associated with a fracture of the base of the coracoid and lateral part of the clavicle

Fig. 2. Radiograph of a woman, 37 years of age, showing a short fracture of the superior border of the scapula associated with a fracture of the intra-articular coracoid and acromion. The lower part of the suprascapular notch is not involved

extra-articular fractures of the base of the coracoid. Twenty-three injuries were sustained at the same time at sites other than the shoulder.

Eighteen of the 22 acute cases were treated, 4 being transferred to other hospitals. Ten fractures were managed conservatively and 8 by operations on coracoid fractures which were associated with acromioclavicular dislocation in 3, with fracture of coracoid and lateral part of the clavicle in 2, fracture of the lateral part of the clavicle in 2, and fracture of the lateral scapular spine in one. The superior border fracture was never the direct object of operation. One chronic case was treated for suprascapular nerve palsy by neurolysis, and the other for pseudarthrosis of the coracoid by osteosynthesis and for acromioclavicular arthrosis by lateral resection of the clavicle.

Fig. 3. Radiograph showing a secondary fracture of the central part of the fractured superior border which may be caused by traction of the omohyoid muscle

Table 1. Associated shoulder injuries

Coracoid fracture	24
Acromioclavicular dislocation/subluxation	19
Lateral clavicular fracture	5
Acromial fracture	4
Scapular spine fracture	4
Brachial plexus palsy	4
Segmental clavicular fracture	1
Glenoid rim fracture	1
Surgical neck fracture of the humerus	1
Suprascapular nerve palsy	1

The outcome of the 18 acute cases who were followed up for an average of 2 years (range 1 to 10 years) was excellent according to Neer's criteria [10].

Discussion

Most fractures of the superior border of the scapula are associated with a fracture of the base of the coracoid or a type III glenoid fracture [7]. Only one case of isolated fracture of the superior border has been reported [9]. The other associated fractures are a lateral clavicle fracture [8], a fracture of the shaft of the clavicle [1, 6, 8], a fracture of the acromion [1, 3] and acromioclavicular dislocation [4, 6, 8, 9]. We have observed these injuries, but have not seen an isolated fracture of the upper border, or a bilateral case [11], which must be extremely rare.

The mechanism of fracture has been considered to be produced by the force of contraction of the levator scapulae and omohyoid muscles [1, 6]. It has also been suggested that, besides these mechanisms, a vertical shearing force applied between

clavicle and scapula may fracture the superior border and cause a coracoid fracture [8, 9].

From a study of reported cases and associated injuries, and our own cases, we conclude that a horizontal shearing force occurring between scapula and clavicle may produce a fracture of the base of the coracoid, including a type III glenoid fracture extending into the superior border. Levator scapulae and the omohyoid muscles may not be directly involved, but traction by the omohyoid may produce a secondary fracture with displacement of the central part of the superior border (Fig. 3).

In 3 of the 5 cases with a short fracture limited to the lateral part of the superior border, the cause may have been an extension of the coracoid fracture. In the other 2 cases, the suprascapular notch was not involved and there was a fragment which was the shape of the insertion of the superior transverse scapular ligament; traction by this ligament due to upward displacement of the fractured coracoid may have avulsed the upper border.

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