An Unusual Cause of Shoulder Pain: Undisplaced Salter-Harris Type I Fracture of the Coracoid Process

Tendai Mwaturura, MBChB, and Russell Bourne, MBBS, FRACS (Ortho)

In this case report, we describe an uncommon epiphyseal coracoid fracture, sustained while playing football, and how the patient was managed. The authors have obtained the patient's guardian's written informed consent for print and electronic publication of the case report.

Case Report

A 14-year-old boy was tackled while playing football. That day, he presented to the emergency department, complaining of left shoulder pain, and was evaluated. The contour of the shoulder was normal, there was tenderness over the acromioclavicular joint, and range of shoulder motion was decreased. A plain radiograph of the shoulder was obtained (Figure 1), and the patient was referred to fracture clinic with a presumptive diagnosis of a fractured acromion.

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On review in clinic, he was noted to have a swollen left shoulder and limited flexion and tenderness over the anterior third of the deltoid. There was no tenderness over the lateral edge of the acromion, and it was felt that the appearance of the acromion on the initial radiograph was consistent with an open growth plate. A plain radiograph of the right shoulder was obtained for comparison (Figure 2), and it confirmed open acromial growth plates.

The diagnosis, hematoma of the anterior deltoid, was not completely consistent with the findings, so magnetic resonance imaging (MRI) of the left shoulder was ordered. The scan was performed 9 days after injury (Figures 3–6), and an undisplaced Salter–Harris type I fracture of the coracoid process was diagnosed.

The patient was managed nonoperatively in a sling with assisted exercises for 3 weeks. Six weeks after injury, he had full range of motion, and a radiograph (Figure 7) showed a healing fracture of the left coracoid process. The patient returned to his sport, and a 6-month, final assessment was arranged.

Discussion

Fractures of the coracoid process are uncommon and account for only 2% to 5% of scapular fractures[1] and about 1% of all fractures.[2] They can easily be missed and should be kept in mind, particularly in patients with ongoing shoulder pain but no evidence of clavicular fracture. Radiographs (performed at 45° in a

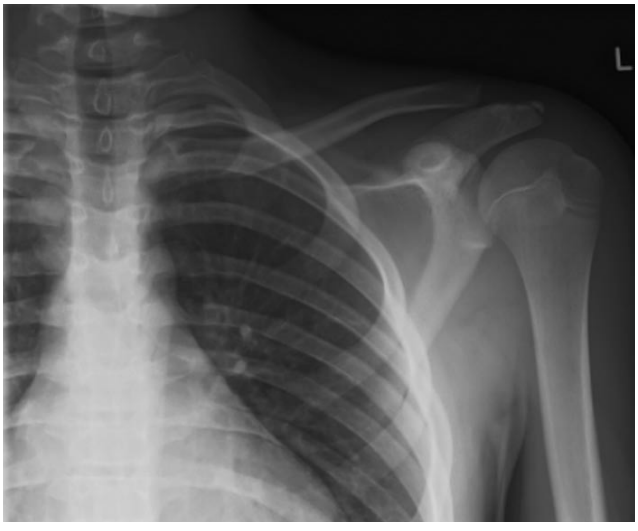

Figure 1. Radiograph of left shoulder shows open acromial epiphysis.

Dr. Mwaturura is Registrar, Department of Orthopaedics, Nambour General Hospital, Nambour, Queensland, Australia.
Dr. Bourne is Fellow in Orthopaedics, Royal Australasian College of Surgeons, and Consultant, Nambour General Hospital, Nambour, Queensland, Australia.

Address correspondence to: Tendai Mwaturura, MBChB, Department of Orthopaedic Surgery, Nambour General Hospital, PO Box 547, Nambour, Queensland 4560, Australia (tel, 61-400-130-528; fax, 61-754-761-468).

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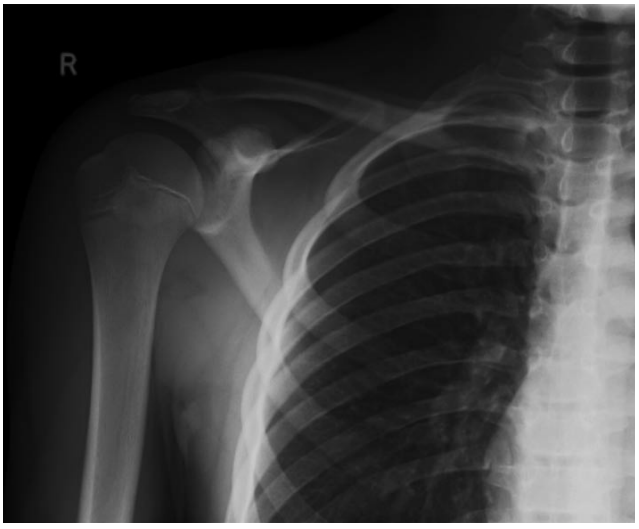

Figure 2. Radiograph of right shoulder shows open acromial epiphysis on uninjured shoulder.

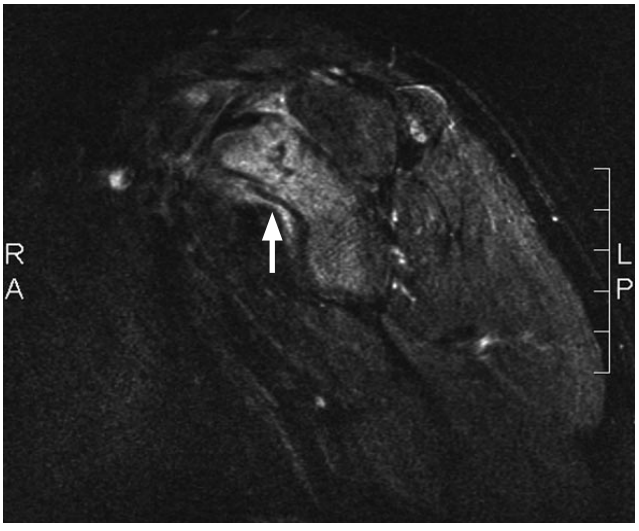

Figure 3. T_2-weighted magnetic resonance imaging shows fractured epiphysis of coracoid with surrounding edema (arrow).

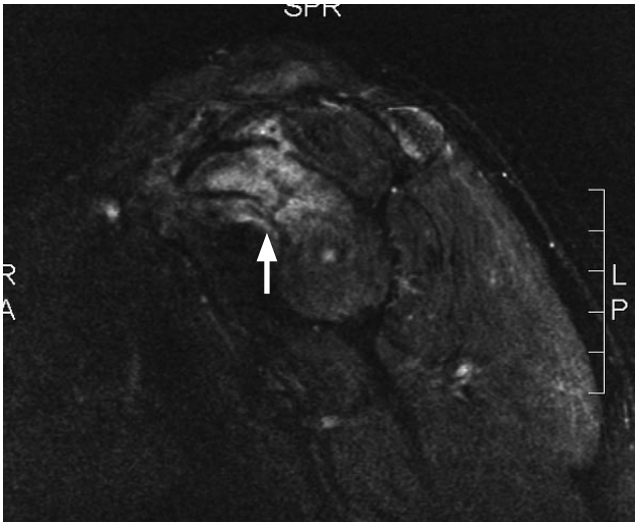

Figure 4. T_2-weighted magnetic resonance imaging of left coracoid process shows epiphysis with surrounding edema (arrow).

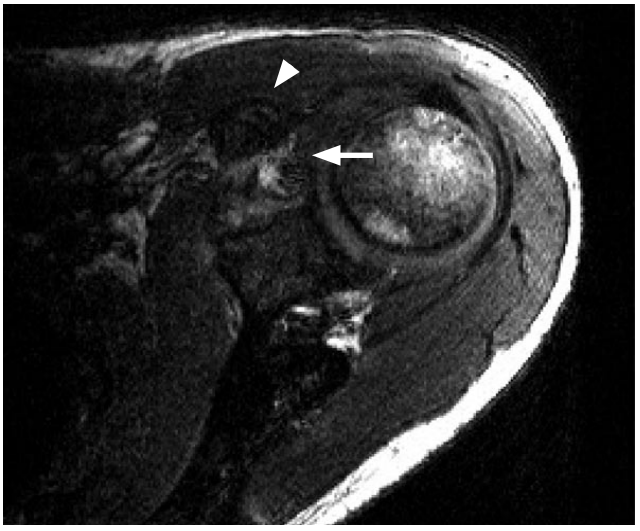

Figure 5. T_2-weighted axial magnetic resonance imaging of left coracoid process shows epiphysis with surrounding edema (block arrow) and tip of coracoid (arrowhead).

cephalic direction), computed tomography,[3] or MRI (as in our patient) may make identification of the fracture simpler. It should be noted that, on a plain radiograph, the appearance of a persistent ossification center can mimic that of a fracture and must be considered. Imaging of the contralateral shoulder may help to clarify the situation.

The mechanism of injury is either a direct blow (as in our patient) or contraction of the attached muscle (pectoralis minor, short head of biceps brachii, coracobrachialis). Such a fracture may also occur with a shoulder dislocation, which may impede reduction.[1]

Several classification systems for fractures of the coracoid process have been proposed. One system is based on the relationship of the fracture to the coracoclavicular ligament, which splints the fracture. Ogawa and colleagues[4] proposed that type I fractures be defined as those that occur posterior to the attachment of the coracoclavicular ligament. Such fractures are likely to be associated with other shoulder injuries and may require surgical intervention. Type II fractures were defined as those that occur anterior to the coracoclavicular ligament. These fractures can be managed nonoperatively.

Goss[5] proposed another system for approaching scapula fractures. His work led to one approach of assessing the main articulation between the thorax and upper limb—the superior shoulder suspensory complex. This complex consists of 2 medial bony struts (middle clavicle and lateral scapular spine and body) and a lateral circular complex involving the acromion, glenoid, coracoid process, coracoclavicular ligaments, distal clavicle, and acromioclavicular ligament. Fractures of at least 1 of the medial bony struts and 1 section of the circular complex,

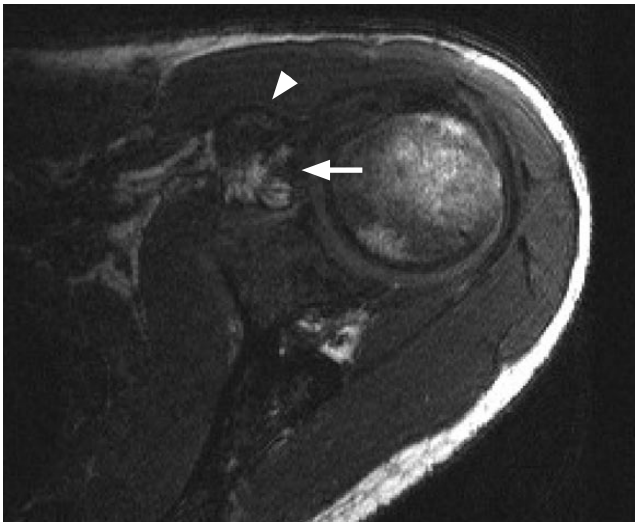

Figure 6. T_2-weighted axial magnetic resonance imaging of left coracoid process shows epiphysis with surrounding edema (block arrow) and tip of coracoid (arrowhead).

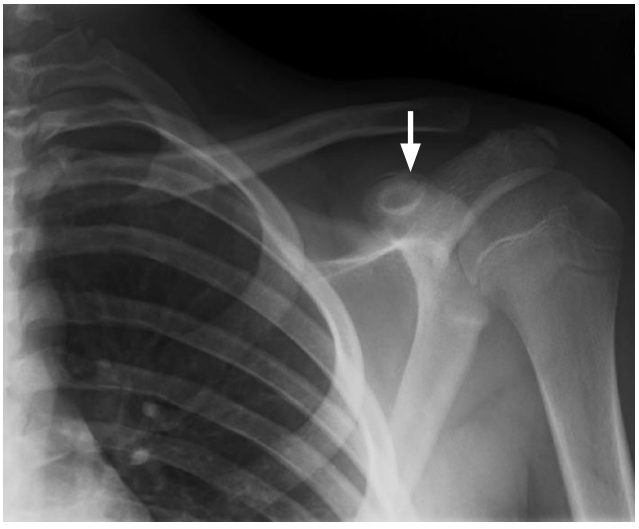

Figure 7. Radiograph of left shoulder shows callus formation (arrow).

and fractures of at least 2 sections of the circular complex, were identified as unstable and warranting in-depth consideration of operative management.

Our patient was managed nonoperatively with success. He satisfied the criteria for the type I class (Ogawa and colleagues[4]), which suggested that surgery should have been considered, and the stable class (Goss[5]), which favored nonoperative management. He was unique in that his fracture involved the epiphyseal plate (Salter–Harris type I). In our literature and database searches, we found only 1 other report[6] of a Salter–Harris type I injury to the coracoid in this age group. However, this injury probably occurs more often than reported.

The absence of clear guidelines and the presence of contradictory proposals on management of this injury highlights the need for ongoing reporting of cases and their management. Appropriate management protocols can be derived from such a database.

Authors' Disclosure Statement

The authors report no actual or potential conflict of interest in relation to this article.

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