

Incidence of Os Acromiale in Patients With Shoulder Pain

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Abstract

A prospective case series was undertaken to determine the incidence of os acromiale in patients presenting to an orthopedic clinic with shoulder pain during a 6-month period.

Ninety-three shoulders in 88 consecutive patients were evaluated by history, physical examination, and radiographs. Radiographs included anteroposterior, scapular Y, and axillary views in all patients. Based on history and physical examination, no patient was given a primary diagnosis of os acromiale. However, when the plain films were specifically reviewed for this entity, it was present in 6 (6.82%) of the 88 patients. It was seen on the axillary view in each case. Five (83.3%) of the 6 patients had been given a diagnosis of either impingement or rotator cuff tear based on physical examination.

Os acromiale is an infrequent but not rare entity that must be kept in mind when evaluating patients with shoulder pain, as failure to recog-

nize an os acromiale may negatively influence treatment results. An axillary view should be obtained when evaluating patients with shoulder pain.

The acromion has 3 ossification centers: preacromion, mesoacromion, and meta-acromion. These typically appear by the age of 15 to 18 years and fuse to the rest of the scapula by the age of 22 to 25 years.¹ Failure of any of these apophyses to fuse with the spine of the scapula, or basi-acromion, results in an os acromiale.^{1,2}

The most common site for fusion failure is between the mesoacromion and the meta-acromion—the result being a mesoacromion.² This was first described in the late 19th century, when US and European anatomists¹ delineating the development of the normal acromion noticed incomplete fusion between some of these centers. Investigators conducting cadaver studies at the time reported an incidence of 3% (Gruber) to 15% (McAllister).³ By the early 20th century, several investigators using radiography in clinical studies reported an incidence of 0% (Kohler, Lilienfeld) to 2.5% (Becker).³ Liberson⁴ reported an incidence of 1.3% (24/1800) and later 1.9% (52/2800) in patients who presented to him with shoulder pain.³

The large discrepancy between anatomic and clinical studies was thought to be related to radiographic technique. An axillary view was not used in every case.

In more recent cadaver studies,⁵⁻⁷ incidence has consistently been 8.0% to 8.2%. However, since Liberson⁴ in 1937, no clinical studies of incidence have been reported in the

United States. The purpose of the present study was to define the incidence of os acromiale in patients presenting to an orthopedic clinic with shoulder pain, using an axillary view in each case.

METHODS

From September 30, 1997, to March 20, 1998, all new patients who presented to Dr. Mark J. Lemos with a primary complaint of shoulder pain were added to this study. The patients were evaluated by history, physical examination, and radiography. In each case, anteroposterior, scapular Y, and axillary plain films were obtained and then evaluated for general pathologic conditions that might support the patient's diagnosis and specifically for an os acromiale. Routine statistical analysis was performed.

RESULTS

Plain films showed that 6 (6.45%) of the 93 shoulders (or 6 [6.82%] of the 88 patients) had an os acromiale: 4 mesoacromions and 2 preacromions (0 meta-acromion, 0 bilateral). No patient had been diagnosed with an os acromiale based only on history and physical examination; in each case, the os acromiale was easily identified only on axillary plain films.

On the basis of only history and physical examination, 56% of all patients were diagnosed with impingement or a rotator cuff tear, 12% with acromioclavicular joint pathology, and 11% with instability. Of the 6 patients with os acromiale, 5 (83.3%) had a clinical diagnosis of impingement or rotator cuff tear, and the sixth (16.7%) had a diagnosis of adhesive capsulitis. The effect of the os acro-

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miale on the primary diagnosis was not determined.

All patients with os acromiale were treated only for their primary diagnosis, and all improved with conservative treatment (nonsteroidal anti-inflammatory drugs, physical therapy, subacromial steroid injection). None required surgery.

DISCUSSION

The results of our study show an os acromiale incidence more consistent with the 8.0% to 8.2% reported in recent anatomic studies⁵⁻⁷ than with the percentages reported in the earlier clinical studies by Liberson.^{3,4} The likely reason is that we used an axillary plain film for each of our patients, and the os acromiale was easily identified only with this view.

Attempts have been made to correlate os acromiale with rotator cuff pathology. Mudge and colleagues¹¹ found 9 os acromiales (6.2%) in 145 patients with rotator cuff tears confirmed by arthrogram, and Warner and colleagues⁹ found 8 os acromiales (2.4%) among 340 rotator cuff tears. Although these numbers are at or below the incidence of os acromiale in the general population, numerous articles still attribute rotator cuff tears to the os.¹¹⁻¹⁴ As pointed out by Boehm and colleagues,¹⁵ this issue needs further study.

Operative Management of Os Acromiale

Although none of the patients in our study required surgery, the optimal operative management of os acromiale

and ORIF with Kirschner wires (K-wires). However, treatment choices depended on the os itself. Excision was done only for small fragments; subacromial decompression for large, stable os; and ORIF for large, unstable os. Interestingly, there was no score difference between os acromiales that united and those that did not.

In contrast, Warner and colleagues⁹ found significantly better union rates using screws as opposed to K-wires. They also used a bone graft.

Armengol and colleagues¹⁷ argued for “modified” acromioplasty over excision or ORIF in their series of 42 patients. However, all 42 patients had rotator cuff tears, and no information was given regarding whether the os was symptomatic.

“...we used an axillary plain film for each of our patients, and the os acromiale was easily identified only with this view.”

Our results also suggest that os acromiale incidence does not differ between patients with shoulder pain and the general population. Defining the incidence in the general population, however, can be difficult and can be influenced by selection bias, as suggested by the work of Angel and colleagues,⁸ who found a 30% incidence of os acromiale in black laborers—raising the possibility of both genetic and environmental influences. Sammarco⁷ also demonstrated a higher incidence in males compared with females and blacks compared with whites.

Symptomatic Os Acromiale. The incidence of a symptomatic os acromiale is more difficult to determine. Warner and colleagues⁹ reported an incidence of 15 symptomatic os acromiales in 14 patients seen in a 4-year period. All 14 patients had pain to palpation over the os itself. Three patients had a positive bone scan at the os. Ryu and colleagues¹⁰ reported 3 patients with pain over the anterior acromion in a 6-year period. Despite these reports, the incidence of symptomatic os acromiale is not known.

Correlation of Os Acromiale With Rotator Cuff Pathology.

is still not known, and it probably depends on multiple factors, including fragment size, fragment stability, and management of the concomitant pathology, such as rotator cuff disease.

Numerous techniques⁹⁻¹⁸ have been reported for os acromiale treatment, including excision, subacromial decompression, and open reduction and internal fixation (ORIF) with screws or wire and with or without bone grafting. All these techniques have had conflicting results, likely reflecting the difficulty in determining whether the os was symptomatic.

Hutchinson and Veenstra¹⁶ performed arthroscopic subacromial decompression on 3 patients with an os acromiale. All 3 initially improved, but their pain recurred within 1 year.

In contrast, Wright and colleagues,¹³ using a “modified” subacromial decompression, reported satisfactory results in 11 of 13 shoulders, though none of their patients had tenderness over the os before surgery.

Boehm and colleagues¹⁵ reported similar constant scores for excision, subacromial decompression,

Adequate Preoperative Assessment. Because none of our patients was diagnosed with an os based only on history and physical examination, it is possible that, without proper plain films or attention to these plain films, the finding would have been missed. No patient in our study required surgery, but it is possible for a patient with an undiagnosed os acromiale to undergo surgical intervention for concomitant shoulder pathology. The os may then be ignored or inadequately addressed, possibly leading to pain continuation or recurrence, as reported by Hutchinson.¹⁶ Given the complexity and variety of treatment options, adequate preoperative assessment and selection of appropriate treatment seem more likely to lead to satisfactory postoperative results.

CONCLUSIONS

Os acromiale is not rare. It was present in 6.82% of patients presenting to our clinic with shoulder pain. It was diagnosed only with careful examination of an axillary plain films. For all

patients with shoulder pain, axillary plain films should be obtained and should be assessed for os acromiale to avoid possible treatment failure secondary to this entity. Further studies are needed to better define the incidence of clinically significant os acromiale and its relationship to rotator cuff disease.

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