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ORIGINAL ARTICLE

Os acromiale, a cause of shoulder pain, not to be overlooked

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KEYWORDS
Acromion;
Iliac graft;
Internal fixation

Summary
Introduction: Os acromiale is a failure of fusion of the acromial process. It is usually asymptomatic and discovered by chance. When it is painful a differential diagnosis must be made in relation to the subacromial impingement syndrome.
Hypothesis: Unstable os acromiale is the cause of atypical scapulalgias. Stabilization by tension band wiring and an embedded slot shaped graft achieves union and relieves pain.
Patients et methods: This series includes 10 patients mean age 43 years old presenting with shoulder pain resistant to a mean 15 months of conservative treatment. Pain followed trauma in three cases. Three patients had a history of acromioplasty, which had not relieved pain. All had pain during palpation of the superior aspect of the acromion. The diagnosis was confirmed in eight patients by positive results to local injection of the os acromiale. The mean preoperative Constant score was 53.4. The procedure included open reduction and fixation of the acromion by tension band wiring and pinning associated with an embedded iliac crest graft without acromioplasty.
Results: The mean follow-up was 48 months. Pain was relieved in seven cases and all patients had improved and were satisfied. Union of os acromiale was confirmed on CT scan in all patients. The mean Constant score was 82.2.
Discussion: The role of os acromiale in the origination of pain is confirmed by the efficacy of preoperative injection of the os acromiale and pain relief after achieving union. Moreover, our technique is reliable and always resulted in union of the os acromiale. Internal fixation by tension banding favors minimal upward migration of the os acromiale and union. In case of subacromial impingement syndrome an os acromiale should be looked for, as this condition could deteriorate with simple acromioplasty.
Level of evidence: Level IV retrospective observational study.

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Introduction

The term os acromiale is used to define failure of an acromial ossification center to fuse to the acromion. It was first described by Gruber [1] who distinguished three anatomical subtypes in relation to the size; os acromiale usually involves the mesacromion, just behind the acromioclavicular joint [2,3]. It is sometimes bilateral and is also found as frequently in the general population as in symptomatic shoulders (approximately 10% of cases) [2—5]. Several studies in the literature have evaluated the association between os acromiale and rotator cuff tears, and most have concluded that there is no relationship between the two [2,3]. It can also become painful on its own, and must then be recognized as a differential diagnosis of subacromial impingement syndrome.

Our hypothesis was that the mobility of an unstable os acromiale would be directly responsible for pain and that stabilization by tension band wiring and an embedded slot shaped graft would result in union and pain relief.

The aim of this retrospective study was to analyze the results of open reduction and internal fixation with a slot shaped iliac crest graft in the treatment of unstable symptomatic os acromiale.

Materials and methods

Between 1995 and 2010, 10 patients underwent surgery for scapulalgia associated with unstable os acromiale (Table 1) including seven men and three women, mean age 43.3 years old (16—65 years old). The right shoulder was involved in five cases and the left in five cases. On the day of surgery all patients had pain that was resistant to a mean 15.4 months of conservative treatment (8—22 months). Pain had developed suddenly in three cases following a fall on the shoulder stump, and was progressive in seven cases. In three patients, this pain was incorrectly diagnosed as a subacromial impingement syndrome and had been treated with acromioplasty in another center, which worsened symptoms in two cases and was ineffective in one case. A context of a work related disability or a work accident was found in three cases. All patients described pain in the shoulder during anterior elevation and abduction. The clinical examination always revealed pain during palpation of the upper surface of the acromion. Mean preoperative active range of motion was 144.5° during anterior elevation (85°—180°), 131° during abduction (90°—180°), and 61° during external rotation (20°—90°). All shoulders were limber during passive range of motion. Resistance during in rotation (Neer, Hawkins et Yocum) always caused pain. The acromioclavicular joint was never painful when touched and the cross arm test was painful in one case. Rotator cuff tests were always normal. Preoperative strength was reduced in all cases by a mean 53% compared to the contralateral side. The mean preoperative Constant score was 53.4 (39—64). Preoperative radiographic tests included standard X-rays and Arthro CT or MRI (Fig. 1A). X-rays identified os acromiale in six cases and CT scan or MRI always identified os acromiale. Mesoacromion was always the type. Moreover, no acromioclavicular or rotator cuff involvement was found and there were no signs suggesting subacromial bursitis. In eight patients, the role of os acromiale in the development of pain was confirmed by a CT (6 cases) or X-ray (2 cases) guided injection of the os acromiale, which was always positive (Fig. 1B). A subacromial injection was performed in five cases and only partially relieved the pain in one case.

All patients received initial conservative medical treatment. The surgical indication was based on the presence of pain and an unstable os acromiale, which did not respond to traditional analgesics. The aim of surgery was to stabilize the os acromiale by grafted bone union and reduce os acromiale by internal fixation with tension band wiring. The patients were operated under general anesthesia in the beach chair position. The approach was superolateral centered on the acromion (Fig. 2A). The acromio-acromion new joint was exposed by detaching the subperiostal trapezo-deltoid fascia to visualize tiny movements of the os acromiale (Fig. 2B). The surfaces of the acromio-acromion new joint were scraped and an anteroposterior slot shaped groove, which preserved the lower cortex and bridged the new joint was dug with an oscillating saw (Fig. 2C). Then a graft of 2.5×2.4 cm was harvested from the homolateral iliac crest with the cancellous graft obtained according to preoperative planning. The graft was shorter than the bone slot to allow compression. The acromial defect was reduced by raising the os acromiale using a spike retractor placed in front of the acromion. Internal fixation was obtained by pinning and superior tension band wiring to allow deflexion of the os acromiale, compression of the acromial defect and stabilization of the graft (Fig. 1C and 2D). The patient was immobilized for 4 weeks postoperatively in an abduction brace in neutral rotation.

During follow-up two patients presented with a complex regional pain syndrome of the elbow (case 5) and the shoulder (case 1). Internal fixation material was systematically removed a mean 6.8 months after surgery (3.5—13 months) after union had been confirmed by CT scan.

Analysis of the results included a clinical examination with determination of the Constant score [6] and functional analysis by the Quick Dash and SST self-reported questionnaires [7—9]. Union was confirmed by X-ray and CT scan (Fig. 1D) before the material was removed.

Differences were determined by the Fisher test. A P value of less than 0.05 was considered to be statistically significant.

Results

The mean follow-up at the final revision was 47.9 months (6—124 months) (Table 1).

All patients were satisfied. The mean functional score was 20.61 on the Quick Dash (0—61.4) and 8.9 on the SST (4—12) scores. Pain had improved in all cases. Only three patients still had residual pain during professional and/or sports activities. None of the patients had signs of subacromial impingement. Strength was reduced compared to the contralateral side in six cases by a mean 20%. Active range of motion had improved on all planes, with a mean anterior elevation of 161° (120°—180°), abduction of 163° (150°—180°) and external rotation of 64.5° (50°—85°). The mean Constant score at the final follow-up was 82.2 (40—100) and the