Clinical Article

Acromioclavicular joint: Direct arthroscopy, the Mumford procedure

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Abstract:

Background:

Isolated degeneration of the acromioclavicular joint (ACJ) is a common cause of ACJ pain in active young to middle-aged athletes and workers performing overhead activities. Once conservative treatment has failed, various surgical options are available. These are an open ACJ excision or an arthroscopic resection, either via a subacromial approach or via direct superior approach.

Methods:

The diagnosis of isolated ACJ pathology was confirmed on history, examination, and special investigation including X-rays and ACJ injection. Patients then underwent an arthroscopic ACJ resection via a superior approach as described by Flatow, a brief description of which is presented in this article.

Results:

A total of 168 patients who had undergone a superior ACJ resection were interviewed telephonically to assess their current level of function and satisfaction. In total 81% reported excellent results, with 7% good results and 12% poor results.

Conclusion:

Although various surgical techniques are available, when considering surgical treatment options for isolated ACJ pathology, resection of the ACJ via a direct superior approach is a safe and effective method.

Introduction

Isolated degeneration of the acromioclavicular joint (ACJ) is encountered with relative frequency in active young to middle-aged individuals. Osteolysis of the distal clavicle (ODC) is a variant of that condition and is traditionally associated in the literature with middle-aged male athletes and workers performing overhead activities, most commonly weightlifting.[1,2] Depending on the activity or the sport involved, ODC can be divided into post-traumatic, as first described by Dupas, Badilon and Dayde in 1936,[3] or atraumatic, as reported in 1959 by Ehricht.[4]

Despite the fact that this condition has been described in the literature for over 70 years, the exact pathophysiology leading to ODC is still debated. Theories that have been suggested include causes such as repetitive microtrauma,[2]

terminal neurovascular compromise,[5] synovial invasion of the subchondral bone[6] and autonomic nervous dysfunction with altered blood supply.[7] Of these, arguments for repetitive microtrauma appear to be the most widely accepted theory.

Most cases of isolated degeneration of the AC joint are not specifically ODC but a form of degeneration affecting both the acromial and clavicular facets of the joint.

Guidelines for the diagnosis are based on history, examination (including special tests) and X-ray findings.[2,8] ACJ injection of a local anaesthetic (*Figure 1*) is also very helpful in confirming the diagnosis and can be used to exclude additional pathology. The initial treatment includes conservative measures such as modification of activities, ice and non-steroidal anti-inflammatory drugs (NSAIDS). Patients who do not respond to conservative measures or who are unable to modify their activities will require surgical intervention.

In 1941, Mumford[9] and Gurd[10] first described the open acromioclavicular joint excision. Although initially described for traumatic disruption of the ACJ, this surgical technique was commonly used to treat patients with ODC. More recently, arthroscopic resection techniques have been described by Ellman and Esch,[11] the subacromial approach, and by Johnson[12] but adapted by Flatow, Cordasco and Bigliani[13] to a direct superior approach. The technique and results of the arthroscopic direct superior approach will be discussed in this article.

Surgical technique

Patients diagnosed with isolated ACJ pathology underwent an arthroscopic ACJ resection via a superior approach as described by Flatow *et al*,[13] a brief description of which is presented in this article.

All patients receive a general anaesthetic and are positioned in the beach chair position. After an initial glenohumeral and subacromial arthroscopy to exclude intra-articular pathology, an arthroscopic direct superior ACJ resection is performed.

The two-needle inflow-outflow technique is used to determine joint position and inclination. This is done with two 22-gauge needles placed anterior and posterior followed by injecting normal saline. The passage of fluid through the other needle confirms intra-articular ACJ placement.

The two portals used are an antero-superior portal, in line with the ACJ and just anterior, and a postero-superior portal, in line with the ACJ and just posterior.

Portals are injected with local anaesthetic and epinephrine to decrease bleeding.

ACJ injection of a local anaesthetic is very helpful in confirming the diagnosis and can be used to exclude additional pathology

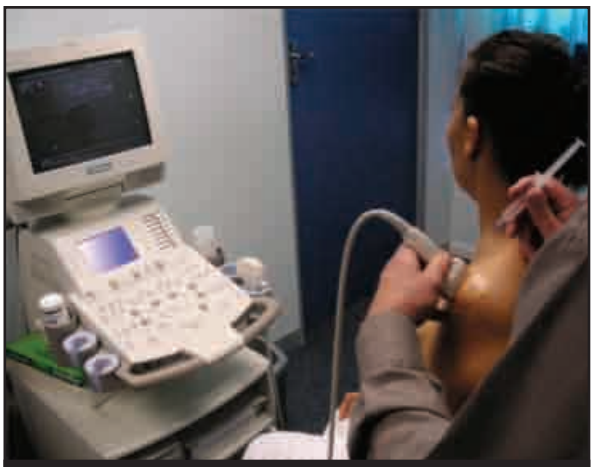

Figure 1: Ultrasound-guided acromioclavicular joint injection

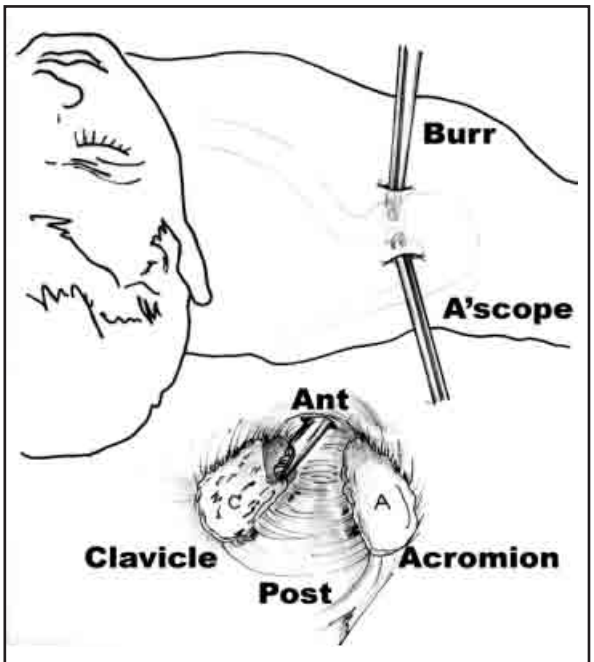

Figure 2: Diagrammatic representation of portals

The posterior portal is the 'viewing' portal while the anterior portal is the 'operating' portal (*Figure 2*). During the initial assessment it is important to assess for a degenerated meniscus, clavicle pathology, cartilage degeneration and cysts.

An initial soft-tissue debridement is performed with a shaver and thermal probe (2.5 mm) through an anterior portal. Once the soft tissue has been adequately debrided, bone resection is performed using an arthroscopic burr (5.5 mm acromioniser) through the anterior portal cannula (5.5 mm) (*Figure 3*).

Figure 3: Arthroscopic view of the acromioclavicular joint showing the bone resection

Table I: Outcome of the questionnaire

	Total	Percentage
Excellent	136	81
Good	12	7
Poor	20	12

The amount of bone resection is usually about 7 mm from the clavicular side and 2 to 3 mm from the acromial facet. The adequacy of the resection should be judged intra-operatively with the cross-body adduction test.

The surgery is performed as a day case procedure. Postoperatively patients are allowed full active and passive motion as pain allows and no sling is required.

Results

All the patients who underwent a superior direct arthroscopic ACJ resection between 1998 and 2008 were included in this study. A total of 168 patients were interviewed telephonically and scored according to the Simple Shoulder Test (SST) and a specifically designed questionnaire to assess their current level of function and satisfaction. In keeping with the literature, the average age was 31 and the majority (86%) were males.

Based on the scores of the questionnaire, the outcome of surgery and patient satisfaction were classified as excellent, good and poor as shown in *Table I*.

Discussion

Acromioclavicular degeneration is a condition seen in middle-aged male athletes and workers who commonly perform overhead activities.[1,2] Once the diagnosis has been confirmed, conservative treatment should be prescribed. Should conservative methods fail, there are various surgical techniques available for ACJ excision. These include an open approach, an arthroscopic subacromial approach and an arthroscopic direct superior approach. We believe that the arthroscopic direct superior approach is the preferred technique in patients with demonstrated isolated ACJ pathology.

The diagnosis warrants further discussion. Cahill defined specific criteria which can be used to confirm the diagnosis of ODC.[2] The usual history is that of insidious onset of pain over the ACJ, especially with overhead activities, although a history of trauma should be excluded. The presence of pain is confirmed on examination, with pain demonstrated at the ACJ with palpation of the ACJ. A review of our patients' records shows that this was a very sensitive sign of isolated ACJ pathology. Other clinical manoeuvres include O'Brian's test, the adduction across body test and the 'push up' test.

The X-ray changes noted in ODC are well documented; in younger patients these are joint-space narrowing and subchondral cysts. In older patients osteophytes and sclerosis are also present.[8] It is, however, essential to highlight that these X-ray changes should always be an adjunct to a clinical examination. Historically, an increased uptake on a bone scan was commonly used to assist in the diagnosis[2] but this is no longer advocated.

Injection of the ACJ with local anaesthetic is an important test to confirm the diagnosis of isolated ACJ pathology (*Figure 1*). Ultrasound can be used to improve accuracy of the injection and may demonstrate an increased effusion compared to the contralateral side. Once the joint is palpated clinically and identified with ultrasound, a 21G needle can be used to inject 1 or 2 ml of local anaesthetic. The ability to inject this volume is in itself suggestive of ACJ pathology. After the injection, the special tests should be repeated. The absence of pain confirms the diagnosis of isolated ACJ pathology.

An advantage of the direct superior approach is that an acromioplasty is not required to gain access to the ACJ. In addition, the ACJ remains relatively stable after resection as the inferior, anterior and posterior parts of the AC ligaments remain intact. It should be emphasised, though, that this technique should not be used in patients with associated subacromial pathology such as impingement or rotator-cuff tears. In our series, less favourable results were more common in the older patients and in those without a clear pre-operative injection test. This may be due to associated pathology.

In conclusion, our results confirm that resection of the ACJ via a direct superior approach is a safe and effective method of treatment for isolated ACJ pathology.

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No benefits of any form are to be received from a commercial party related directly or indirectly to the subject of this article.

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