Open Versus Arthroscopic Acromioclavicular Joint Resection: A Retrospective Comparison Study

Bassem Elhassan, M.D., Mehmet Ozbaydar, M.D., David Diller, B.A., Daniel Massimini, B.S., Laurence D. Higgins, M.D., and Jon J. P. Warner, M.D.

Purpose: The purpose was to compare open and arthroscopic acromioclavicular joint (ACJ) resection. **Methods:** We retrospectively reviewed 103 patients (105 shoulders) who underwent ACJ resection between 2000 and 2005. There were 56 women and 47 men with a mean age of 48 years. The mean duration of follow-up was 51 months (range, 15 to 91 months). Arthroscopic ACJ resection by use of a direct approach was performed in 81 shoulders (group A), and open ACJ resection was performed in 24 shoulders (group B). Results were graded according to pain relief both subjectively and objectively with cross-body adduction testing and direct palpation of the ACJ, subjective shoulder value, Constant score, and improved function. **Results:** The Constant scores increased from 50 (range, 34 to 65) to 89 (range, 39 to 100) in group A ($P < .0001$) and from 46 (range, 22 to 63) to 87 (range, 43 to 100) in group B ($P < .0001$). There was no statistical difference in the postoperative normalized Constant score between group A and group B ($P = .47$). Pain with cross-body adduction testing and palpation of the ACJ improved in 76 shoulders (94%) in group A and 22 shoulders (92%) in group B. No patients had signs or symptoms of ACJ anteroposterior instability. Revision ACJ resection was performed in 5 patients (5 shoulders [6.2%]) in group A and 1 shoulder (4.2%) in group B ($P = .37$). The radiographs of the patients who underwent revision showed that 3 patients (3.7%) from group A had regrowth of the distal clavicle; in addition, 2 patients (2.5%) from group A and 1 patient (4.3%) from group B had incomplete distal clavicle excision. **Conclusions:** This study did not show a significant difference in the outcome between arthroscopic and open ACJ resection. Incomplete excision and regrowth of the distal clavicle are the most common causes of revision. Although only the arthroscopic group showed a small percentage of patients (3.7%) with regrowth of the distal clavicle, the number is too small to assume that this complication is the result of the arthroscopic technique only. **Level of Evidence:** Level IV, therapeutic case series.
Key Words: Acromioclavicular joint—Arthroscopic—Resection—Open—Comparison.

Osteoarthritis, osteolysis, and intra-articular derangement of the acromioclavicular joint (ACJ) are very common.[1-5] Management of symptomatic ACJ usually starts with nonoperative measures, which lead to resolution of symptoms in most instances.[6,7] However, in cases of refractory pain, operative intervention by resecting the ACJ may be indicated.[8,9] Traditionally, ACJ resection has been performed through an open approach with satisfactory outcomes.[10,11] However, failures have been reported with this approach and have been attributed to unsatisfactory cosmesis, weakness, and pain.[1] The persistent weakness of the affected shoulder and arm has been attributed to partial detachment of the deltoid muscle during open surgery. Furthermore, violation of the superior and posterior acromioclavicular (AC) ligaments without appropriate repair and reconstruction has been shown to generate pain due to iatrogenic anteroposterior instability of the ACJ.[1,12]

From the Department of Orthopedics, Mayo Clinic (B.E.), Rochester, Minnesota; Harvard Shoulder Service (M.O., D.D., D.M., L.D.H., J.J.P.W.); Sports Medicine and Shoulder Service (L.D.H.) and Department of Orthopaedic Surgery (J.J.P.W.), Harvard Medical School; Brigham and Women's Hospital (L.D.H.); and Massachusetts General Hospital (J.J.P.W.), Boston, Massachusetts, U.S.A.

The authors report no conflict of interest.

Received October 7, 2007; accepted June 10, 2009.

Address correspondence and reprint requests to Jon J. P. Warner, M.D., Chief, The Harvard Shoulder Service, Massachusetts General Hospital, Harvard Medical School, Yawkey Ctr. for Outpatient Care, Suite 3G, 55 Fruit Street, Boston, MA 02493, U.S.A. E-mail: jwarner@partners.org

0749-8063/09/2511-7513$36.00/0

doi:10.1016/j.arthro.2009.06.010

Outcome studies of open ACJ resection have reported high success rates in most clinical reviews.[1,3,5,10,11] With advances in arthroscopic shoulder surgery, many authors adopted an arthroscopic approach for ACJ resection.[13-21] Some surgeons believe that this approach results in better cosmesis, a faster return to work, and a level of sports activity similar to the level before the initial injury. This approach has also been associated with less postoperative ACJ instability and shoulder weakness while offering a success rate similar to that of the open procedure. This has led to the wide acceptance and use of the arthroscopic procedure in a comparatively short time.

Although several studies have reported on the outcome of open and arthroscopic ACJ resection, we are aware of only 1 study comparing the outcome of the 2 techniques in a small group of patients with symptomatic distal clavicle osteolysis.[16] The purpose of our study is to compare both techniques in all patients with painful ACJ disease in whom symptomatic measures of treatment failed. We hypothesize that the arthroscopic technique does adequately resect the ACJ and results in similar relief of symptoms and patient satisfaction to those achieved with the open procedure.

METHODS

A total of 149 patients (153 shoulders) who underwent an ACJ resection by the senior investigator between 2000 and 2005 were retrospectively reviewed. This study was approved by the Internal Review Board of Harvard Medical School (Boston, MA).

Inclusion criteria for this study were (1) localized pain and tenderness at the ACJ refractory to conservative management, (2) complete though temporary relief of pain with an injection of local anesthetic into the ACJ, (3) resection of the ACJ with an open or arthroscopic technique, (4) no previous major tendon transfer surgery or surgery to the ACJ, (5) surgery performed by the senior surgeon, and (6) at least 1 year of follow-up after surgery with appropriate radiographs. Twenty-four patients had previously undergone ACJ resection elsewhere and underwent revision by the senior author, and they were excluded from our study. In addition, 2 patients had previous latissimus dorsi transfer, 10 patients did not have follow-up radiographs, and 11 patients were lost to follow-up, and they were also excluded from the study. This left 103 patients (105 shoulders) in the final cohort for analysis. There were 56 women and 47 men in the study. The mean age of the patients at the time of surgery was 45 years (range, 23 to 73 years).

Table 1. *Previous Surgeries of Patients Who Had ACJ Resection*

	Group A	Group B	Total
Subacromial decompression			
Arthroscopic	4	3	7
Open	1	—	1
Rotator cuff repair			
Arthroscopic	4	3	7
Open	1	3	4
Arthroscopic superior labrum repair	4	3	7
Open capsular shift	2	—	2
Total	16	12	28

The dominant shoulder was involved in 66 patients. The mean duration of symptoms was 14.4 months (range, 3 to 50 months). The patients had 28 prior surgeries (Table 1). The mean duration of follow-up was 51 months (range, 15 to 91 months). The shoulders were divided into 2 groups. Group A included 80 patients (81 shoulders) who underwent ACJ resection with an arthroscopic bursal approach by use of a technique of direct resection.[20,21] This group consisted of 39 men and 41 women with a mean age of 45 years (range, 23 to 71 years). Group B included 23 patients (24 shoulders) who underwent ACJ resection by an open technique.[8] This group consisted of 15 women and 8 men with a mean age of 50 years (range, 30 to 73 years). Chart review provided patient information, including age at surgery, date of surgery, side of surgery, arm dominance, duration of symptoms, mean follow-up time, previous surgeries, and preoperative physical examination findings, which was recorded (Tables 1 and 2). Of the patients, 29 (27%) had work-related injuries; 22 (27.5%) were from group A, and 7 (30%) were from group B.

ACJ disorder was diagnosed by history, physical examination, and imaging. All patients presented with shoulder pain localized to the ACJ. Physical examination showed tenderness to palpation of the ACJ and pain with passive cross-body adduction of the arm. An injection of lidocaine and steroid (3 mL of 2% lidocaine and 1 mL of steroid [triamcinolone acetonide injectable suspension, United States Pharmacopeia]) was performed in all patients, which resulted in temporary relief in all patients.

The patients had standard radiographic evaluation including an anteroposterior view, an axillary view, and a Zanca view[22] of the ACJ. Preoperative and postoperative radiographs were available for all patients. Of the shoulders, 48 (46%) had ACJ osteoarthritis, 3 (3%) had distal clavicular osteolysis, and 51