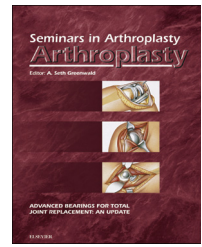


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Treatment options for rotator cuff tear arthropathy

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ABSTRACT

Rotator cuff tear arthropathy is characterized by massive and irreparable rotator cuff tears associated with shoulder arthritis. Symptoms include varying degrees of pain, loss of motion, and loss of function, or “pseudo-paralysis” alone. Nonoperative modalities are the treatment mainstay for mildly symptomatic patients, and there are viable medical and surgical treatment options for those whose symptoms are not severe enough to warrant shoulder arthroplasty. The trend toward using reverse total shoulder arthroplasty as the only treatment for this highly variable patient group does not allow a cautious approach to this disease nor recognize the high potential complication rate of the reverse prosthesis.

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1. Introduction

The term “cuff tear arthropathy” (CTA) was first described by Neer et al. [1] as a condition characterized by a rotator cuff tear insufficiency, proximal or superior migration of the humerus, and loss of humerus and glenoid cartilage. They suggested that both mechanical and nutritional factors contributed to the joint destruction associated with rotator cuff tears. The mechanical factors, which are the result of the loss of the rotator cuff ability to balance the humeral head, result in the upward migration of the humeral head toward the acromion. This migration causes an abnormal relationship between the articular surfaces of the humeral head and the glenoid and leads to wear of the glenoid, acromion, acromioclavicular joint, and greater tuberosity. Neer et al. [1] also suggested that the subsequent loss of motion created an alteration of the intra-articular pressure and diminished the quantity of the joint fluid. They postulated that these changes in the fluid and pressure in the joint would create disuse osteoporosis, cartilage atrophy, and subchondral collapse. However, they reported that only 4% of their patients with a complete rotator cuff tear went on to develop arthritis,

therefore, predicting which patient will progress to CTA is difficult [1].

Because the abnormalities in patients with rotator cuff tears are so varied, there is no one “typical” patient with a massive rotator cuff tear; some are asymptomatic, whereas others have marked disability and pain. Some patients will have no arthritis and some will have extensive bone erosions and superior subluxation of the humeral head. The axiom “treat the patient and not the lesion” especially applies to this group because the radiographs may appear markedly abnormal with substantial cartilage loss and yet the patient may have no pain or dysfunction. The goals of this article are to review the medical treatment options, the surgical options, and the arthroplasty options for patients who may not be candidates for reverse total shoulder arthroplasty (RTSA) and to address the rationale for avoiding RTSA in some patients.

2. Medical treatment

The mainstay of treatment for patients with irreparable rotator cuff tears is medical intervention. Medical treatment

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is especially indicated in those who are young (i.e., less than 70 years old [2]), have little to no arthritis, have little pain, or have little dysfunction. Patients with massive rotator cuff tears may have full range of motion (ROM), so they should be encouraged to consciously maintain that motion with a few minutes of stretching daily. Those with loss of active motion should maintain passive ROM to prevent stiffness and pain. It should be noted that in patients with more severe arthritis, the goal of stretching should be to maintain the motion and not necessarily increase it. Attempts to aggressively increase ROM in this population can lead to worsening of the pain and create more stiffness [3].

Within limits, activities that cause pain and may potentially decrease motion should be avoided. Patients may have pain and weakness when lifting above shoulder level or lifting objects away from their bodies. We encourage them to use both arms when lifting above shoulder level and to avoid repetitive overhead activities, such as painting, trimming trees above shoulder level, or washing windows. Similarly, they should bring heavy objects close to their bodies before trying to lift them; they will have more strength this way because of the shorter lever arm compared with the outstretched arm.

Patients with massive rotator cuff tears should be encouraged to stay fit and be active. Although they should avoid sports that aggravate their shoulders, we tell patients that they can do anything that does not hurt because there is no evidence indicating that exercise leads to the initiation or the progression to CTA. Lifting weights is often difficult for these patients, and because weight training has little aerobic value, patients with or without arthritis are instead encouraged to engage in sports that do not load the shoulders, such as walking, cycling, or the use of elliptical or stair-climber exercise devices. If the patient has associated arthritis, water exercises can not only be helpful for aerobic exercise but can also help maintain shoulder ROM without causing pain. Strengthening of the anterior deltoid has been suggested by Levy et al. [4] as a successful strategy for patients with massive rotator cuff tears. They found that, with this program, all 17 of their patients had substantial improvements in pain, function, and ROM [4].

For patients with rotator CTA and pain, there are a variety of nonoperative treatment interventions. For pain, these patients should be encouraged to use cryotherapy, especially after activity or before bedtime [5]. In our experience, some patients find heat more helpful for pain relief, especially for improving ROM. We encourage patients to use whatever modality is most effective for them to obtain pain relief and ROM.

Patients with CTA can be treated with medications such as acetaminophen, nonsteroidal anti-inflammatory drugs (as long as there are no contraindications to their use, such as a history of gastrointestinal bleed, warfarin, bleeding disorders, or liver or kidney disease), and mild pain relievers. Acetaminophen has been shown to be effective for arthritic pain if used regularly to maintain a consistent, appropriate level in the blood [6]. Glucosamine and chondroitin sulfate supplements have been shown to give up to 60% of patients pain relief [7], but these supplements can be expensive, must be taken daily, and do not regenerate cartilage as claimed by some studies early in their introduction [8,9].

Oral steroids in the form of dose packs can be very effective for some patients with massive rotator cuff tears with or without arthritis by not only eliminating pain but also increasing ROM. Injections of corticosteroids into the joint directly with or without ultrasound guidance can provide at least temporary relief for some patients. There is no known limit to how many dose packs or cortisone shots a patient can be given before there are deleterious side effects.

Injection of hyaluronic acid products into the shoulder joint has approval by the Food and Drug Administration in the United States, but it is not reimbursed by many insurance companies. A study has suggested that some patients may experience at least temporary relief with this injectable substance in the shoulder joint [10].

Narcotics or non-narcotic pain relievers can also be used for pain secondary to CTA and may be especially helpful for patients who are too sick for surgery or who have conditions that might prevent surgical intervention.

3. Operative intervention

When medical interventions no longer provide pain relief and the patient has substantial function impairment, operative intervention can provide varying degrees of pain relief and functional improvement. Operative options include debridement of the joint, latissimus dorsi transfer, partial shoulder replacement (hemiarthroplasty and surface arthroplasty), and RTSA.

Surgical debridement of the shoulder has been found to be inversely beneficial to the severity of the arthritis, i.e., patients with less severe arthritis obtain more pain relief than those with more severe arthritis [11]. Although there is little literature about debridement alone for CTA, the use of debridement alone for the arthritic shoulder has been shown to provide reasonable short-term relief of pain [11]. However, over time, the results of surgical debridement alone for osteoarthritis of the shoulder deteriorate, and it has been reported that by 5 years after debridement, 4% of patients have been converted to a total shoulder arthroplasty [11]. Biceps tenotomy or tenodesis can provide some pain relief for this population, but again, results depend on the degree of arthritis present [12].

Latissimus dorsi transfer has been promulgated for 2 different applications for the rotator cuff-deficient shoulder [13,14]. The first indication is for relief of shoulder pain associated with a massive rotator cuff tear. To accomplish this goal, the latissimus dorsi tendon is tunneled under the deltoid and attached across the greater tuberosity to prevent impingement of the proximal humerus against the acromion [15]. Although the initial reports for this technique were encouraging, subsequent studies have shown that in most instances the latissimus tendon tore from the greater tuberosity or did not provide lasting pain relief [16,17]. The second indication is to act as an active external rotator of the shoulder by placing the tendon on the proximal humerus, similar to the L'Episcopo procedure [18]. In this operation, the latissimus dorsi is meant to act as an active external rotator of the arm, thereby eliminating the "hornblower's sign" [19], which occurs because of poor strength in external rotation.

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