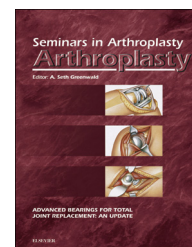


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Cuff tear arthropathy is best treated with a reverse total shoulder arthroplasty

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ABSTRACT

Cuff tear arthropathy is the arthritic eroded collapse of the glenohumeral joint with progressive superior humeral migration in the setting of long-standing rotator cuff insufficiency. The ideal management of cuff tear arthropathy remains elusive. Current arthroplasty options include hemiarthroplasty or reverse shoulder arthroplasty. Proper clinical and radiographic evaluation is essential in decision making in order to optimize outcomes. Acromio-humeral distance (AHD), as measured on plain radiographs, as well as fatty degeneration of the rotator cuff muscles on MRI are reliable tools for decision making. AHD < 7 mm correlates well with complete tear of the supraspinatus while AHD < 5 mm indicates infraspinatus involvement with significant muscular atrophy. Hemiarthroplasty remains an option for providing pain relief; however, continued development of superior migration and glenoid erosion remains a concern. The conversion to reverse total shoulder arthroplasty after hemiarthroplasty can be difficult due to glenoid bone loss. Recent literature supports the use of reverse total shoulder arthroplasty over hemiarthroplasty for cuff tear arthropathy with significant differences in functional outcome. Here, we discuss the radiographic evaluation of cuff tear arthropathy and review the treatment options and why we advocate the use of the reverse prosthesis.

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1. Case discussion

This discussion was centered on the optimal treatment for the patient using the radiographs in [Figure 1](#). The patient was a 69-year-old male, a previous tennis player, who has pain with activity and at rest. On physical examination, active range of motion is limited to 80° forward elevation and abduction, with evidence of grade IV fatty infiltration on MRI.

The ideal management of cuff tear arthropathy remains a challenge despite an abundance of recent literature addressing this issue. Cuff tear arthropathy, as described by Neer et al. [1], is characterized by the arthritic eroded collapse of

the glenohumeral joint with superior migration of the humeral head after a massive rotator cuff tear. Other characteristics include erosive changes to the superior glenoid and the acromion, humeral head collapse, and subcutaneous effusion. Natural progression of cuff tear arthropathy includes progressive superior migration of the humeral head with progressive erosion of the undersurface of the acromion, loss of the capsular stabilizers, and, ultimately, anterior superior escape of the humerus. Prior to the availability of the reverse prosthesis, surgical treatment of patients with advanced rotator cuff arthropathy with anterior superior escape was plagued with complications and poor outcomes. Current surgical management for chronic irreparable

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Figure 1 – An AP radiograph of a 69-year-old male with a centered humeral head with significant decrease in AHD.

rotator cuff tears with arthropathy has fallen into two categories: hemiarthroplasty or reverse total shoulder replacement.

Hemiarthroplasty for cuff tear arthropathy was advocated in response to early failures with standard and constrained total shoulder arthroplasty, particularly failure of the glenoid component [2,3]. This was believed to be due largely to increased shear forces across the glenoid with unopposed pull of the deltoid in cuff-deficient shoulders. Hemiarthroplasty has shown reliable results in terms of pain relief and function when compared against the early limited goals criteria. However, concern remains for subsequent development of anterior superior escape after hemiarthroplasty, especially in patients who have a history of previous subacromial decompression. Continued erosion of the acromion with hemiarthroplasty also makes further conversion to a reverse difficult or impossible.

Results with early designs of reverse total shoulder arthroplasty were met with catastrophic failure. It was not until Grammont and Baulot [4] introduced the Delta prosthesis that reverse shoulder arthroplasty become a viable option in the treatment of cuff tear arthropathy. Reverse prosthesis can reliably provide pain relief and return of function; however, concerns remain over reports of high complication rates and lack of good long-term outcome data.

2. Making the diagnosis

Clinical findings of pain, with and without activity, loss of active and passive range of motion, atrophy of infraspinatus and supraspinatus musculature, and demonstrable weakness

of elevation and external rotation are all findings that can be associated with massive rotator cuff deficiency. Hamada et al. [5] described the classic radiographic changes of rotator cuff arthropathy, including superior migration of the humeral head, joint space narrowing, wearing of the undersurface of the acromion, superior wear of the glenoid, and a decrease in acromio-humeral distance. Of note, the acromio-humeral distance has been shown to be an accurate predictor of rotator cuff abnormalities. Saupe et al. [6] described the relationship between reduced acromio-humeral distance

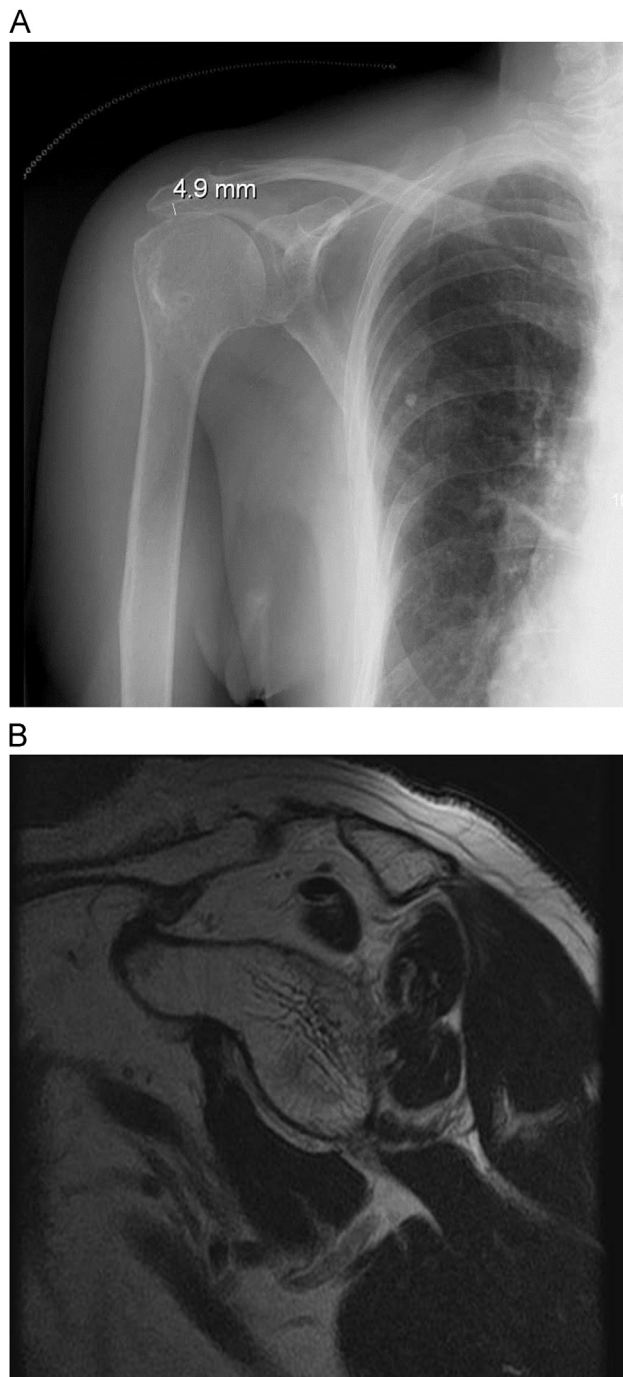


Figure 2 – An AP radiograph showing decreased AHD with corresponding fatty atrophy of the supraspinatus on MRI.

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