Arthroscopically Assisted Conversion of Total Shoulder Arthroplasty to Hemiarthroplasty With Glenoid Bone Grafting

Surena Namdari, MD, MSc; David Glaser, MD

Abstract: Aseptic loosening of the glenoid component after total shoulder arthroplasty presents a considerable treatment challenge in the setting of substantial glenoid bone loss. Glenoid component explantation and bone grafting of defects have become common methods of recreating bone stock in hopes of preventing later fractures, maintaining joint kinematics, and allowing for later glenoid reimplantation if necessary. Although this has been traditionally accomplished via open techniques, this article describes an arthroscopic-assisted method of glenoid explantation and bone grafting for cases of aseptic glenoid loosening with contained bone defects.

Surgical Technique

We perform this procedure in the beach-chair position. Standard posterior and anterior portals are established. As previously described by Hersch and Dines and O’Driscoll et al, blunt trocars and gentle lateral traction on the humerus can be used to minimize potential damage to the humeral component in cases of capsular scarring. A 30° arthroscope is used and turned away from the humeral head to prevent a “mirror effect” that can distort anatomy (Figure 1).3

Grafting is thought to be important in cases of bone deficiency for several reasons, including to prevent later insufficiency fractures, restore the joint line for improved joint kinematics, and offer the potential for later glenoid component placement.5 This has traditionally been accomplished via open techniques.

Arthroscopy provides a minimally invasive means of glenoid component removal and assessment of glenoid bone stock. This article presents a technique for arthroscopically assisted conversion of a total shoulder arthroplasty to a hemiarthroplasty with bone grafting of contained glenoid defects.
Loosening of the glenoid component is often an important indication for revision shoulder arthroplasty. Despite advances in glenoid component and cement technology, the etiology of loosening remains unclear. To help protect the bone component in the setting of loosening and treatment of loosening, once loosening is identified, either preoperatively or via arthroscopy, options have historically included revision of the component or conversion to a hemiarthroplasty via removal of the loose glenoid component or without glenoid bone grafting.6,7,10,11 Arthroscopy is a minimally invasive means of evaluating the glenoid under direct visualization to confirm or rule out loosening.

This article reports an additional application of arthroscopy in glenoid retrieval and bone grafting of contained defects after removal of the glenoid component. This approach reduces the risk of infection and other complications associated with open revision surgery for the failed total shoulder arthroplasty. In addition, by avoiding the extensive open surgical exposure required to visualize the glenoid component, we expect decreased pain, lower morbidity, and quicker recov-
When the inability to revise the glenoid component is due to loss of glenoid bone stock, the additional application of arthroscopic glenoid bone grafting is indicated. We begin cases that are concerning for possible inability to reimplant a glenoid component with diagnostic arthroscopy, glenoid removal, and assessment of the remaining glenoid bone stock. This method eliminates the need for a large surgical dissection when a new glenoid component may not be reimplanted.

We have limited our indications for arthroscopic glenoid bone grafting to contained defects. We have not attempted to bone graft uncontained defects, and it is unclear whether there is a role for arthroscopy in these situations.

Despite the obvious advantages of being able to remove a loose glenoid and to bone graft a deficient glenoid vault arthroscopically, this technique has its concerns. As noted by multiple authors, access and space within the glenohumeral joint is often difficult to obtain, especially in cases with capsular fibrosis.3,4 Similarly, authors have reported the “mirror effect,” which results from the reflection of the metal humeral head and leads to difficulty in obtaining proper orientation and visualization within the glenohumeral joint.2,4,5 Although these difficulties in accessing and visualizing the joint can be improved by using blunt trocars, plastic cannulas, gentle lateral traction on the humerus, and a 30° arthroscope directed away from the humeral head, they cannot be eliminated.

Although we believe that preservation of glenoid bone stock during glenoid component removal can be equivalent in arthroscopic and open techniques, making cuts in the glenoid component using an arthroscopic bur or osteotome and removing all retained cement can be more technically challenging via arthroscopy.

In addition, we have experienced mild damage to the humeral head during arthroscopy; however, the long-term clinical effect of a scuffed or roughened humeral component remains unknown. In terms of bone grafting, although it appears that a graft can be introduced and packed into place with the same reliability as that achieved via open techniques, this has also not been specifically evaluated.

Our indications for arthroscopically assisted glenoid removal and bone grafting are limited to aseptic loosening of the glenoid component with resultant contained glenoid defects in patients unsuitable for revision of the glenoid component. This technique allows for a theoretically less morbid approach to conversion of a painful total shoulder arthroplasty to a hemiarthroplasty with restoration of glenoid bone stock.

However, this technique is not appropriate in cases with severe capsular contraction, a need for significant bony and soft tissue reconstruction and balancing, or metal-backed glenoid components, or in any cases in which the surgeon expects significant technical difficulty in accessing and visualizing the glenohumeral joint via an arthroscope.

**REFERENCES**