Case Report

Results 25 years after hemiarthroplasty for chondrolysis of the shoulder. A report of two cases.

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Abstract

Two patients (age, 34 and 52 years) underwent an open repair of concealed rotator cuff tear with the aid of color arthrography using gentian violet. Postoperatively, they developed chondrolysis of the shoulder, which was treated with hemiarthroplasty. Twenty-five years after hemiarthroplasty, both patients showed good shoulder function without significant glenoid erosion on radiographs. Satisfactory long-term results are most probably due to maintenance of humeral head centering and glenohumeral conformity. These are the longest follow-up cases of arthroplasty for chondrolysis of the shoulder in the literature. We conclude that hemiarthroplasty can be a reasonable option for patients with this unfortunate disorder.

Keywords: shoulder; chondrolysis; hemiarthroplasty; long-term outcome

Introduction

Joint chondrolysis is an uncommon condition characterized by diffuse loss of cartilage after an insult to apposing articular surfaces. This process is rapid, commonly within 18 months, as compared to years in osteoarthritis [1]. Chondrolysis of the glenohumeral joint has been reported to occur following shoulder surgery with use of intra-
articular pain pump, suture anchors, radiofrequency, and intra-articular dye [2, 3]. Treatments include capsule release, meniscal allograft or other tissue interposition, and hemi- or total shoulder arthroplasty [3]. However, the long-term outcome of these procedures is not known, although it matters for the patients with chondrolysis who are generally young.

In 1997, Tamai et al. reported two cases of chondrolysis of the shoulder caused by use of intra-articular gentian violet during an open rotator cuff repair [4]. Both of the patients underwent hemiarthroplasty, and followed-up at regular intervals for 25 years postoperatively. In this report, we show the clinical and radiological results of these patients.

**Case Presentation**

**Case 1**
A 34-year-old female injured a rotator cuff tear in a fall during a volleyball game. She underwent an open cuff repair, in which aqueous solution of gentian violet was injected into the glenohumeral joint with the aim to identify the concealed tear of the tendon. Although the cuff was successfully repaired, she complained of slight discomfort and pain, which progressed after 3 years postoperatively. The radiographs showed a narrowed joint space (Figure 1A). At this time, a re-tear of the rotator cuff was ruled out and microbiological investigations were negative. At the age of 40, she underwent hemiarthroplasty using Physio-Shoulder System (Kyocera, Kyoto, Japan) (Figure 1B). Diffuse loss of articular cartilage of the humeral head and the glenoid fossa was noted.

The postoperative course was uneventful. The patient returned to her normal daily and sports activities including swimming. Twenty-five years post-hemiarthroplasty (at the age of 65), she reported slight fatigue sensation or pain after heavy use of the arm. The range-of-motions of the right shoulder were 160° in flexion, 60° in external rotation at the side, and L1 in internal rotation posteriorly. The UCLA shoulder score was 33 out of 35.

The radiographs showed no obvious loosening nor migration of the implant, although radiolucent lines were seen 15 years postoperatively. No glenoid erosion was noted throughout 25 years postoperatively (Figures 1C and 1D).

**Case 2**
A 52-year-old female injured a rotator cuff tear in a fall during skiing. She underwent an open cuff repair, in
which aqueous solution of gentian violet was injected into the glenohumeral joint with the aim to identify the extension of the concealed tear. Postoperatively she complained of postexertional pain in the operated shoulder, which progressed after 3 years postoperatively. The radiographs showed a narrowed joint space associated with periarticular osteopenia (Figure 2A). As rotator cuff re-tear and infection had been ruled out, she underwent hemiarthroplasty using Physio-Shoulder System at the age of 56 (Figure 2B). Similar to Case 1, diffuse loss of articular cartilage of the humeral head and the glenoid fossa was observed.

The postoperative course was uneventful. The patient returned to her normal daily and sports activities; she enjoyed skiing until the age of 80. Twenty-five years post-hemiarthroplasty (at the age of 81), she reported slight pain after shoulder movements, and slight muscle weakness to raise the arm was noted. The range-of-motions of the right shoulder were 140° in flexion, 10° in external rotation at the side, and L3 in internal rotation posteriorly. The UCLA shoulder score was 29 out of 35.

The radiographs showed no obvious loosening of the implant. Subchondral bone sclerosis of the glenoid fossa and moderate osteophytes at the glenoid margin were noted 15 years postoperatively (Figure 2C). The artificial humeral head was kept centered without a significant glenoid erosion, although slight central migration is seen associated with a cystic lesion in the glenoid fossa 25 years postoperatively (Figure 2D).

Discussion

The clinical and radiological results of the current cases indicate that shoulder hemiarthroplasty for chondrolysis is sufficiently durable for a much longer term than ever known (the longest follow-up in the literature is 8.6 years [5]). In addition, the implant survival for as long as 25 years has rarely been reported among patients with osteoarthritis or rheumatoid arthritis who underwent hemi- or total shoulder arthroplasty [6, 7, 8].

Looking at the results of arthroplasty in younger patients with glenohumeral osteoarthritis, the problem with hemiarthroplasty is glenoid erosion, which is the most common reason for revision [6, 9, 10]. Similarly, glenoid erosion is frequent after hemiarthroplasty in patients with rheumatoid arthritis, although the rate of revision is relatively low [8, 11]. In chondrolysis, patients often have relative osteopenia and lack the subchondral sclerosis seen with osteoarthritis, thus causing glenoid erosion after hemiarthroplasty [5].

In spite of these unfavorable reports, we performed hemiarthroplasty on our two patients in consideration of the potential risk of glenoid component loosening in anatomical total shoulder arthroplasty. Fortunately, both patients did not develop significant glenoid erosion and achieved satisfactory clinical outcome. Although the exact reason for this is not clear, there are two possible mechanisms. First, the artificial humeral
head has been kept centered by the repaired rotator cuff. Second, since we selected a same-size artificial humeral head in both cases, its curvature matched the osseous glenoid so that uneven distribution of the joint force has been avoided, although the radiological change 25 years after surgery in Case 2 (Figure 2D) could be a precursor to glenoid erosion. It goes without saying that prevention of chondrolysis is of utmost importance, but if it does occur and is treated with hemiarthroplasty, the keys for success would be to balance the soft tissues to ensure humeral head centering and to select a humeral head that can acquire glenohumeral conformity.

Based on our longest follow-up of arthroplasty for chondrolysis of the shoulder in the literature, we conclude that hemiarthroplasty can be a reasonable option for patients with this unfortunate disorder.

**Patient consent** The patients gave their informed written consent prior to their inclusion in this case report.

**Ethical approval** Not applicable.

**Conflicts of interest** None.

**References**


Figure Legends

Figure 1. Serial anteroposterior shoulder radiographs of Case 1

Four years after rotator cuff repair, a narrowed joint space was noted (A). This was treated with cementless hemiarthroplasty 5 years after the index surgery. The humeral stem was inserted in 30° retroversion, and a same-size, non-offset humeral head was selected (B). Although periprosthetic radiolucent lines were noted 15 years (C) and 25 years (D) postoperatively, the implant survived without obvious loosening, migration, or glenoid erosion throughout the follow-up period.
Figure 2. Serial anteroposterior shoulder radiographs of Case 2

Four years after rotator cuff repair, a narrowed joint space associated with periarticular osteopenia was noted (A). This was treated with cementless hemiarthroplasty. The humeral stem was inserted in 30° retroversion, and a same-size, non-offset humeral head was selected (B). Subchondral sclerosis of the glenoid fossa and moderate osteophytes at the glenoid margin were observed 15 years after hemiarthroplasty (C). A cystic lesion surrounded by osseous sclerosis was seen in the glenoid fossa 25 years postoperatively, associated with slight central migration of the implant (D). Periprosthetic radiolucent zone that appeared to be in Figure 2C is not visible in Figure 2D.