Case Reports

Posterior Rotator Cuff–sparing Total Shoulder Arthroplasty: Three Cases

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Abstract

The traditional total shoulder arthroplasty approach uses a subscapularis takedown through tenotomy, peel, or lesser tuberosity osteotomy. Recently, a subscapularis split, rotator interval, and sub-subscapularis approach have been developed to spare the rotator cuff and provide improved functional outcomes for patients. Rotator cuff–sparing total shoulder arthroplasty may improve postoperative pain, rehabilitation, and subscapularis function and strength. Here, the first three patients treated with a rotator cuff–sparing posterior approach that uses the interval between the teres minor and infraspinatus and an in situ osteotomy are described.

Total shoulder arthroplasty (TSA) has long been one of the more successful procedures orthopaedic surgeons perform. Complications including subscapularis rupture, dysfunction and attenuation, infection, superior rotator cuff failure, and glenoid loosening remain issues. Subscapularis dysfunction and failure are the leading complications of TSA, occurring in 11% to 66% of patients.1–4 Surgical intervention for subscapularis dysfunction is relatively rare but is frequently unsuccessful.5 The standard anterior approach to the shoulder requires division of the subscapularis tendon either through a tenotomy, peel, or lesser tuberosity osteotomy. It is accepted that the lesser tuberosity osteotomy and peel techniques are more resistant to subscapularis rupture, but chronic nerve denervation, weakness, and tendon dysfunction are still relatively common and long-lasting.6–8 Subscapularis insufficiency may result in long-term issues with glenoid loosening because of increased forces on the cement–prosthesis interface.9 Efforts to reduce subscapularis-related complications and improve glenoid exposure led some surgeons to question traditional surgical techniques. This report details the first three patients treated with posterior rotator cuff–sparing TSA.

Case 1

Patient 1 is a 68-year-old right hand–dominant man who presented in March 2016 with reports of right shoulder pain. He worked as a guard at a local correctional facility and reported of right arm pain in the region of the deltoid. It had been severe for 8 to 10 months, during which time he had been treated with an outside orthopaedic surgeon who...
had prescribed activity modification, nonsteroidal anti-inflammatories, and steroid injections, without success. After several months, he presented to our office and wished to consider the option of shoulder arthroplasty. On physical examination, the patient had significant motion deficits: forward flexion to 120°, external rotation to 30°, and internal rotation to the hip pocket. Radiographs demonstrated complete loss of joint space, small inferior humeral osteophytes, and 0° of glenoid retroversion.

The patient was offered a rotator cuff-sparing TSA from a posterior approach with a preoperative nerve block. On September 26, 2016, the patient underwent an uneventful posterior approach TSA. A stemless humeral head replacement was used (Wright Medical). An appropriately size-matched, keeled, cemented glenoid component was placed (Stryker Orthopaedics). The patient was allowed active motion on postoperative day 1. He was also cautioned about the possibility of posterior instability and given appropriate precautions, including avoidance of cross-body activities combined with forward flexion. The patient reported very little pain after the procedure and on postoperative day 8, he presented to the office for follow-up. He reported minor biceps pain but had good active motion to 90°. The wound was well healed, and he reported being able to sleep in his bed on postoperative day number 3. Radiographs were taken to assess implant position. Distance from the humeral head to the tuberosity was approximately 3 mm (mild valgus). The glenoid component appeared to be in good alignment. The wound was well healed, and the patient was able to discontinue using his sling.

At 6 weeks, the patient reported minimal pain, excellent stability, and good early passive range of motion with 150° of forward flexion, external rotation to 70°, and internal rotation to L3. Active motion demonstrated 115° of forward flexion, external rotation to 55°, and internal rotation to L5. He reported minimal pain and was pleased with his overall alignment. He had returned to his work as a guard at the local jail. All precautions were lifted. The patient remains very satisfied at this early time point and continues to work on range of motion. At the time of publication, the patient had 160° of forward flexion, external rotation to 70° and internal rotation to T12.

Case 2

A 63-year-old left hand–dominant man presented in March 2016 with reports of right shoulder pain secondary to primary osteoarthritis of the shoulder. He had 4 years earlier undergone a left anterior approach TSA with lesser tuberosity osteotomy performed by the author. After nonoperative treatment of the right shoulder was performed for several months, the patient continued to report severe pain and wished to consider surgery. His preoperative motion was 140° of forward flexion, 20° of external rotation, and internal rotation to L5. The patient was offered a posterior approach rotator cuff–sparing TSA. Radiographically, the patient demonstrated complete loss of joint space, minimal inferior humeral osteophytes, and an A1 glenoid.

On October 31, 2016, the patient underwent a posterior approach TSA with biceps tenotomy. A stemless humeral head replacement and keeled, cemented glenoid component were used (Wright Medical). On the first postoperative day, his visual analog scale pain score was a 2 after resolution of his block. Radiographs
demonstrated good restoration of humeral head height, and the glenoid component was in good alignment and version.

At his initial office visit (postoperative day 8), the patient reported minimal pain and had excellent passive motion to 160° of forward flexion, 75° of external rotation, and internal rotation to T12. His active motion was 145° on postoperative day number 8, and active abduction was 90° (Figure 1). At 2 weeks, he requested to return to his job as a food service inventory worker. The patient reported to have stopped taking narcotics on the fourth postoperative day. Our office records indicate that after his left TSA, his last prescription of narcotics was given 3 months after the surgery. At 10 weeks, the patient had good active motion to 170°, 80° of external rotation, and internal rotation to T10.

Case 3

A 68-year-old right hand–dominant man, presented to our institution with reports of left shoulder pain in April 2015. He was a prior weightlifting champion in the state of New York and noted severe discomfort with overhead motion, including symptoms of clicking, popping, and grinding in the shoulder. He had pursued non-steroidal anti-inflammatory drugs, activity modification, and steroid injections without much relief. Range of motion in his shoulder was extremely limited, and crepitation was noted on examination. Before surgery, his range of motion was 130° of forward flexion, 45° of external rotation, and internal rotation to T12. Radiographs and a preoperative magnetic resonance imaging demonstrated large inferior humeral osteophytes, adequate bone stock in the humeral head, and large humeral osteophytes with a B1 glenoid (Figure 2).

On November 7, 2016, the patient underwent an uneventful posterior approach TSA. On postoperative day 1, the patient was discharged from the hospital with minimal postoperative pain. He reported his pain level to be a zero, although he had received a preoperative interscalene block. He was followed up at 1 week for inspection of his wound. At that time, he reported himself as being off all narcotic pain medication and was doing well. He reported avoiding adduction and forward flexion in the immediate postoperative period and demonstrated reasonable early motion. His radiographs demonstrated good position of the glenoid and humeral components (Figure 3).

At the most recent follow-up, the patient had 150° of forward flexion, 65° of external rotation, and internal rotation to L5.

Discussion

The posterior approach uses a split of the middle and posterior heads of the deltoid and the inter nervous plane between the teres minor and infraspinatus (see video for surgical technique; http://links.lww.com/JG9/A0). Because it avoids subscapularis and posterior rotator cuff tendon release and repair, early active motion can be performed. The primary benefits of this approach include avoidance of subscapularis dysfunction or rupture, improved access to the retroverted glenoid, and the ability to perform posterior soft-tissue balancing. Newer implants, including stemless humeral components, have facilitated this approach for selected patients with reasonable proximal humeral bone. Additionally, this approach improves visualization of the humerus and glenoid over rotator interval and subscapularis-splitting approaches. It is unclear to what extent this approach will increase the incidence of posterior instability or posterior rotator cuff weakness. It does seem that the procedure can be done safely and with reasonable implant positioning through a posterior approach, although further studies are necessary to discover whether range of motion, pain control, return of function, and implant longevity can be fully achieved through this approach.

References

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