CASE REPORT

Eight-year follow-up of resurfacing hemiarthroplasty for advanced glenohumeral osteoarthritis following total acromionectomy

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SUMMARY

Total acromionectomy is now a largely historical procedure due to a number of biomechanical sequelae caused by defunctioning of the deltoid, although its overall effect on joint kinematics is uncertain. This presents a challenge when considering arthroplasty for subsequent glenohumeral arthritis. We report on successful management of such a case, treated with resurfacing hemiarthroplasty 57 years following acromionectomy. The patient continues to enjoy excellent functional outcome of the shoulder at 8 years after arthroplasty.

BACKGROUND

Total acromionectomy was first described in 1939 by Watson-Jones.[1] It was initially purported as surgical management of intractable supraspinatus impingement syndrome refractive to conservative management. However, it is now largely of historical interest, having been abandoned due to deleterious effects on deltoid function, and therefore shoulder glenohumeral kinematics.

Nevertheless, there remains a cohort of patients who have undergone the procedure who may present with either secondary arthrosis or with unrelated shoulder pathology. This cohort presents a challenge to the treating clinician. There is a paucity of literature regarding the biomechanical ramifications of acromionectomy, which is a vital consideration should arthroplasty be considered.

We present a unique case of a man presenting with glenohumeral osteoarthritis almost six decades following total acromionectomy. He was managed successfully with resurfacing arthroplasty of the humeral head.

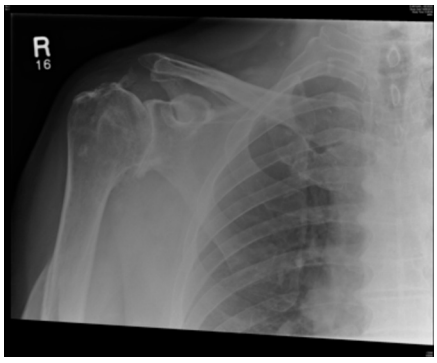

Figure 1 Preoperative anteroposterior radiograph (right shoulder).

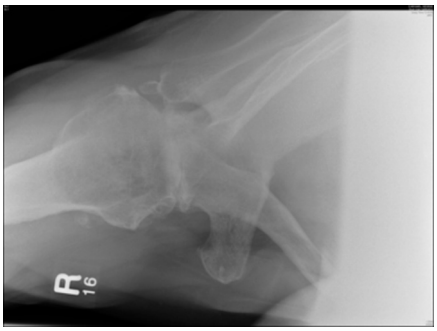

Figure 2 Preoperative axial radiograph (right shoulder).

CASE PRESENTATION

A 79-year-old otherwise fit man presented with severe pain and a global restriction of movement of his dominant right shoulder. He had undergone an open total acromionectomy 57 years previously while serving in the Royal Air Force but had a satisfactory functional outcome thereafter, able to continue as a pilot for many years while also continuing to play tennis into his sixth decade.

However, for 10 years prior to presentation he experienced progressive shoulder pain. At the initial hospital consultation he suffered from rest pain, night pain sufficient to wake him from sleep and inability to raise his dominant right arm to shoulder level or put his hand behind his back. On examination there was gross deltoid atrophy and posterior glenohumeral joint

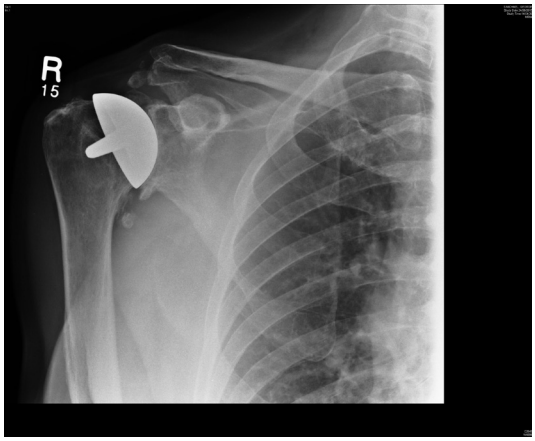

Figure 3 Postoperative radiograph (right shoulder).

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Figure 4 Postoperative axial radiograph (right shoulder).

line tenderness. The range of active and passive shoulder movement was severely restricted in all planes with palpable crepitus, although there was demonstrable activity in all of the rotator cuff muscles. The Oxford Shoulder Score was 10/48.

INVESTIGATIONS

Radiographs demonstrated concentric loss of joint space with subchondral sclerosis and periarticular osteophyte formation in the context of previous total acromionectomy (figures 1 and 2). MRI confirmed rotator cuff integrity with good muscle bulk.

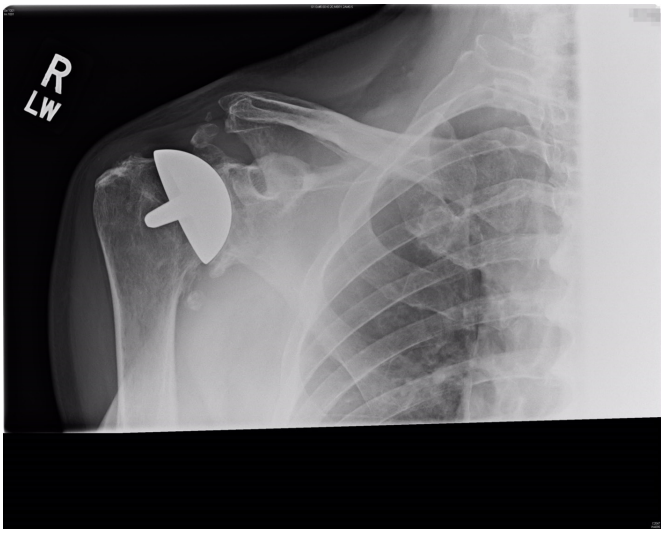

Figure 5 Radiographic appearance (anteroposterior) of the right shoulder at 8 years of follow-up.

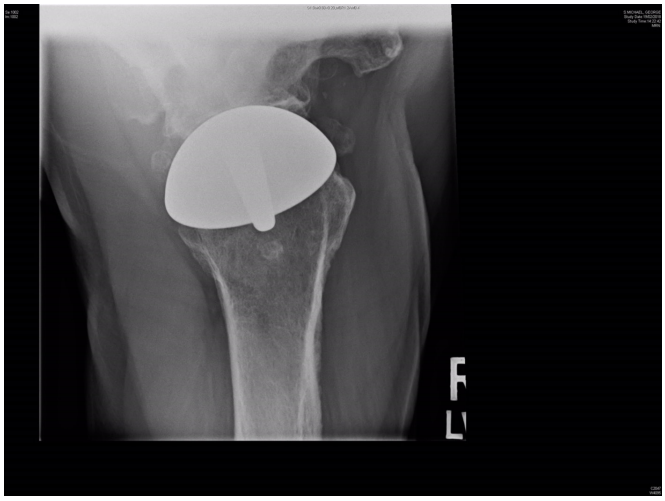

Figure 6 Radiographic appearance (axial) of the right shoulder at 8 years of follow-up.

TREATMENT

The patient underwent humeral head resurfacing hemiarthroplasty with a Copeland Mark III (BioMet) prosthesis, implanted through a standard deltopectoral approach. Further, the glenoid was microfractured and the intact long head of biceps tenodesed. Recovery was uneventful. Immediate postoperative radiographs are demonstrated in figures 3 and 4.

Figure 7 Demonstration of forward elevation range of movement at 8 years of follow-up.

Figure 8 Demonstration of abduction range of movement at 8 years of follow-up.

OUTCOME AND FOLLOW-UP

At 8 years of follow-up the patient remains pain free and continues to demonstrate excellent functional outcomes: radiographs are satisfactory (figures 5 and 6), range of motion is comparable to the contralateral shoulder (figures 7–10), Oxford Shoulder Score is 47/48 and the patient remains very satisfied with the outcome.

DISCUSSION

The acromion provides the most significant origin of the deltoid, in addition to acting as a lever arm to increase the mechanical advantage of the muscle. Further, it provides the lateral-most insertion of the trapezius and along with the coracoacromial ligament and coracoid forms the coracoacromial arch, beneath which runs the supraspinatus.

Figure 9 Demonstration of internal rotation range of movement at 8 years of follow-up.

Figure 10 Demonstration of external rotation range of movement at 8 years of follow-up.

Total acromionectomy as a means to decompress the supraspinatus was first described by Watson-Jones in 1939. Initial reports were promising: Armstrong, who had himself undergone the surgery by Watson-Jones, reported 84% satisfactory results in a series of 95.[1] Subsequently, Hammond published his series of 21 cases—later republished with 90—acromionectomies with only one poor outcome.[2 3]

However, Neer reported poor results in a number of cases following acromionectomy. He wrote that this was due to removal of the lever arm, negating the mechanical advantage offered by the acromion for the deltoid. The latter becomes adherent to the underlying humerus and/or rotator cuff, the muscle becomes fibrotic and permanently shortened, and the deltoid is thereby defunctioned. He therefore advocated acromioplasty with partial excision of the anterior third of the acromion and release of the coracoacromial ligament to treat impingement.[4] Proponents of acromionectomy argued these complications could be avoided by adequate repair (although with prolonged postoperative immobilisation).[5] This was more recently supported by a case report of acromionectomy used to treat an aneurismal bone cyst with near normal shoulder function at 10 years after surgery.[6] Acromionectomy, however, apart from these rare cases to treat local pathology, has become a historical operation.

Patients who have undergone such radical surgery many years previously may still present to the shoulder surgeon who must consider how best to manage further shoulder pathology in this rare group of individuals. In our described case, the indication for the acromionectomy is not clear; supraspinatus disease is unlikely given the patient was just 22 years old at the time of surgery with more likely diagnoses being glenohumeral instability with secondary subacromial bursitis. The original diagnosis however did not affect the treatment of the established glenohumeral osteoarthritis which had subsequently developed.

As this 79-year-old patient presented with severe shoulder pain and limited movement unresponsive to conservative treatment, arthroplasty was indicated. A reverse geometry replacement is primarily indicated for rotator cuff tear arthropathy and relies on deltoid function. This was therefore discounted, as the patient had the opposite—good cuff strength with a severely atrophied and weak deltoid. Conventional total shoulder replacement is associated

with slightly superior functional outcome compared with hemiarthroplasty,[7] but these data relate to patients with a normal acromion and deltoid function. Implanting a glenoid component into this patient's shoulder, with unpredictable biomechanics, could risk early failure. As a result, we elected to perform resurfacing hemiarthroplasty, minimising anatomical disruption while preserving humeral bone stock for any future revision procedure which may become necessary.

At 8 years of follow-up the patient remains pain free with an excellent functional outcome, demonstrating resurfacing hemiarthroplasty to be a viable treatment option for advanced osteoarthritis in patients who have undergone acromionectomy. The excellent active range of motion achieved despite severe deltoid weakness is attributed to excellent rotator cuff function, mirroring that seen in patients with complete axillary nerve injury.[8]

To our knowledge, this report represents the only case of shoulder arthroplasty following total acromionectomy in the literature.

Learning points

- Radical acromionectomy is now a largely historical procedure due to a number of sequelae causing potential defunctioning of the deltoid muscle.
- There is a paucity of literature about the effect of previous acromionectomy on joint kinematics and no previous articles to advise decision-making around arthroplasty in these patients.
- Resurfacing hemiarthroplasty of the humerus appears to be a successful means of treating glenohumeral arthritis after acromionectomy, providing there is good rotator cuff function in this rare situation.

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