

Medial wear of the polyethylene component associated with heterotopic ossification after reverse shoulder arthroplasty

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Medial wear on the polyethylene component after reverse shoulder arthroplasty (RSA) has been attributed to impingement of the humeral cup on the lateral border of the scapula. We present a case that illustrates that the presence of early heterotopic ossification may exacerbate medial wear of the polyethylene component in cases of RSA.

Case report

We performed an RSA (Anatomical Shoulder (TM) Inverse/Reverse; Zimmer) on a 73-year-old, right-handed man

who had radiographic evidence of an irreparable rotator cuff tear and early rotator cuff arthropathy. The patient was immobilized in a sling for 6 weeks postoperatively. The sling was removed 3 times daily for shoulder exercises. At 4 weeks postoperatively, the patient reported good pain relief and demonstrated 90 degrees of active forward elevation and abduction. Early postoperative radiographs showed no evidence of periarticular calcification (Fig. 1).

Eight weeks postoperatively, the patient presented to our clinic with pain after hearing a “crack” in his right shoulder.

Radiographs revealed disassociation of the glenoid head from the glenoid fixation and the development of significant periarticular heterotopic ossification inferior and medial to the glenoid (Fig. 2).

We performed revision surgery, which included removal of the humeral cup to reconnect the glenoid head. The humeral cup inlay contained significant wear of the polyethylene medially. Intraoperative trial reduction with a new inlay revealed that, although the implant was well clear of the glenoid neck and the lateral border of the scapula when the arm was abducted, the humeral cup was rubbing



FIG. 1. Early postoperative radiograph of the reverse shoulder prosthesis with the arm in adduction. No mechanical impingement or periarticular calcification is visible.

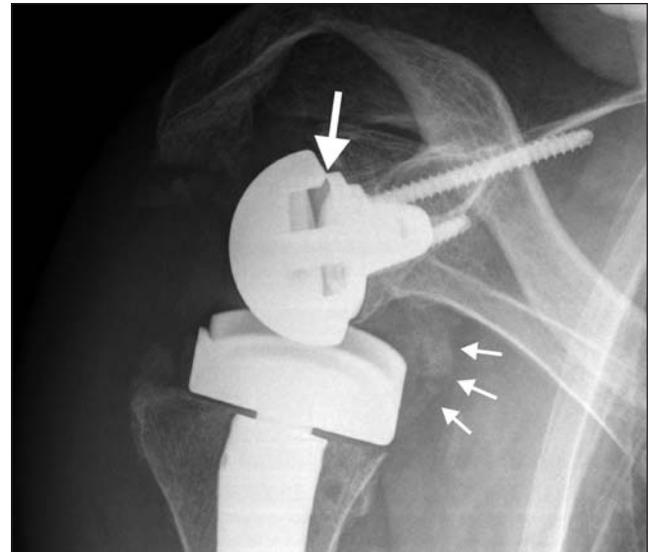


FIG. 2. Radiograph at 8 weeks postoperatively demonstrating disassociation of the glenoid head from the glenoid fixation (large arrow) and periarticular heterotopic ossification (small arrows).

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Note de cas

against the large, inferior mass of heterotopic ossification. We therefore carefully resected most of the ossification mass, then copiously irrigated the wound and closed it in standard fashion over a suction drain. Three months after the revision procedure, the patient showed no signs of further complication, and radiographs revealed no further evidence of heterotopic ossification.

Discussion

Polyethylene wear on retrieved implants has been observed in up to 50% of patients who undergo RSA.^{1,2} Fluoroscopic examination attributes this to impingement of the humeral cup on the scapular neck, which can also result in scapular notching.^{1,2} The notching phenomenon is of some concern because large or progressive lesions can negatively affect clinical outcomes and increase the risk of glenoid loosening.³ Some authors have suggested that impingement may simply be the initiating factor, with further osteolysis being triggered by polyethylene particles from cup wear.^{1,2} In our patient's case, revision surgery only 8 weeks after the initial RSA led us to believe that heterotopic ossification was the primary mechanical source of impingement leading to medial wear of the polyethylene component.

Conventional total shoulder arthroplasty has been known to result in postoperative heterotopic ossification. Sperling and colleagues⁴ found radiographic evidence of heterotopic ossification in 24.1% of 58 conventional total shoulder arthroplasties performed between 1989 and 1992. In most cases, the heterotopic ossi-

fication was present on early radiographs (1–2 mo postoperatively) and had developed inferior to the humeral head near the inferolateral aspect of the glenoid. Boehm and colleagues⁵ noted that patients with a primary diagnosis of cuff tear arthropathy who underwent total shoulder arthroplasty appeared to be at higher risk for the development of heterotopic ossification (36.4%) than patients with primary diagnoses such as osteoarthritis, avascular necrosis or fracture (< 14.5%).

We are not aware of any reports specifically documenting the incidence of heterotopic ossification after RSA. However, patients who have RSA may be at higher risk for the development of heterotopic ossification owing to a combination of factors: primary diagnosis of rotator cuff arthropathy; the amount of tissue damage from the surgical approach, which may include an extensive anterior and inferior capsular release; and the need to release the long head of the triceps from the inferior aspect of the glenoid to facilitate optimal inferior glenoid screw placement.⁵ The unique prosthetic design of RSA implants — an almost horizontal orientation of the RSA humeral cup combined with the absence of a prosthetic neck on the glenoid side — can predispose the polyethylene humeral cup inlay to excessive medial wear.¹ The presence of heterotopic ossification inferolateral to the glenoid could trigger or exacerbate this problem.

We recommend a meticulous surgical technique to minimize tissue damage during the surgical approach and copious irrigation intraoperatively to limit osteogenic cell contamination that may contribute to heterotopic ossification.

Although prophylactic nonsteroidal anti-inflammatory drug treatment does not appear to decrease the incidence of heterotopic ossification after total shoulder arthroplasty,⁵ no specific study of prophylaxis after RSA has been performed. Consideration should therefore be given to empiric nonsteroidal anti-inflammatory drug prophylaxis. We also suggest close monitoring of postoperative radiographs for the first 8 weeks to identify any increased incidence of heterotopic ossification.

Competing interests: None declared.

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