

# Humeral cup fixation in rheumatoid shoulders

## Roentgen stereophotogrammetry of 12 cases

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**Twelve shoulders in 10 patients with rheumatoid arthritis were treated with cemented cup hemiarthroplasty and examined by roentgen stereo photogrammetry during the first year after surgery. One cup migrated 0.5 mm while 11 remained well fixed. Our findings suggest that long-term prosthetic fixation may be achieved.**

The intermediate clinical and radiographic results of cup hemiarthroplasty of the rheumatoid shoulder have been satisfactory (Jónsson et al. 1986). By contrast, resurfacing arthroplasties of the femoral head are associated with a high rate of loosening. Roentgen stereophotogrammetric analysis (RSA) permits detection of prosthetic migration in the hip within 4 months after surgery (Mjöberg 1986). We studied the migration of 12 shoulder cup hemiarthroplasties during the first year after surgery.

### Patients and methods

Twelve shoulders in 10 rheumatoid patients were operated on with Scan shoulder cups (MITAB, Sjöbo, Sweden) and examined with RSA during the first postoperative year. The operation included reaming under irrigation with saline at room temperature, preservation of most subchondral bone, excitation of bone cysts for anchoring holes with preser-

vation of sclerotic cyst walls, cementation, and implantation of tantalum balls in the proximal humerus (Figure 1).

RSA (Selvik 1989) was performed 1 week, 4 months, and 1 year after the operation. All the exposures were made with the humerus in 45° of abduction in the frontal plane. Displacement of the shoulder prosthesis was not considered significant unless it exceeded 0.3 mm.



Figure 1. Radiograph of a cup hemiarthroplasty to show 0.8-mm-diameter tantalum balls positioned in the proximal humerus.

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## Results

Eleven cups did not migrate during the observation period. One of the 12 cups had migrated distally 0.4 mm after 4 months and 0.5 mm after 1 year. This cup was fixed with a cement layer, which was up to 7 mm thick due to severe attrition of the humeral head.

## Discussion

Loosening of cemented endoprostheses may be a consequence of insufficient mechanical support by weak cancellous bone or of heat injury of bone induced during reaming or during polymerization of bone cement (Mjöberg 1986). Although osteoporosis of the humeral head may be severe in advanced rheumatoid disease, the remaining cortical bone and the sclerotic cyst walls are apparently sufficiently strong for fixation of the cemented shoulder cup. The risk of heat injury of bone during reaming can be reduced by irrigation (Matthews and Hirsch 1972, Krause et al. 1982, Larsen and Ryd 1989), and the risk of heat injury during polymerization is small if the cement layer is thin and because the metal cup acts as a heat sink. This may explain the less frequent migration of the shoulder cup when compared with both acetabular (Mjöberg et al. 1986, 1987) and tibial (Ryd et al. 1986) prosthetic components. In shoulders with severe humeral-head bone attrition, which would need a thick cement layer, we now use a stemmed prosthesis.

Our findings suggest that long-term prosthetic fixation may be achieved with the cemented cup hemiarthroplasty of the rheumatoid shoulder.

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