

# Shoulder hemiarthroplasty in rheumatoid arthritis

## 19 cases reexamined after 1–17 years

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We reexamined 19 shoulder hemiarthroplasties in patients with rheumatoid arthritis after a mean of 8 (1–17) years. For the evaluation, we used the Constant and Murley score and routine radiographs. At the follow-up examination, 12 of the 19 shoulders showed little, if any, pain. In 7 shoulders the pain was moderate and no patient had severe pain. The range of motion was not improved. In 7/18 shoulders

proximal subluxation of the head of the humeral prosthesis and in 9/15 shoulders, progression of the glenoid erosion were seen. The increase in glenoid erosion and the postoperative pain were not correlated. Hemiarthroplasty of the shoulder effectively relieves the pain in rheumatoid patients and this seems long-lasting.

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The shoulder joint is frequently involved in rheumatoid arthritis and this results in pain and loss of function. In severe cases, the glenoid is eroded and the rotator cuff is ruptured. Shoulder hemiarthroplasty has been shown to relieve severe rheumatoid pain in studies with 2–4 years of follow-up (Marmor 1977, Vahvanen et al. 1989, Boyd et al. 1990, van Capelle and Visser 1994). We evaluated the long-term results of shoulder hemiarthroplasty in patients with rheumatoid arthritis.

### Patients and methods

Between 1977 and 1994 we performed 33 shoulder hemiarthroplasties in 25 patients with rheumatoid arthritis. All of them had severe pain and a severely damaged shoulder joint not responding to conservative therapy. 1 patient was excluded because no preoperative data were available at the time of our study, 4 patients had died and 4 were too ill to attend. The 16 other patients (19 arthroplasties) were reexamined a mean of 8 (1–17) years after the operation. The diagnosis was seropositive rheumatoid arthritis in 12 patients, seronegative rheumatoid arthritis in 3 patients and juvenile rheumatoid arthritis in 1 patient. No patient had been operated on the affected shoulder before. There were 14 women and 2 men; the mean

age was 66 (53–76) years. The mean duration of the rheumatoid disease was 27 (14–60) years. The left shoulder was operated on in 11 patients, the right in 8 patients; 3 patients had a bilateral hemiarthroplasty.

For the evaluation, we used the Constant and Murley score (Constant and Murley 1987). This is a shoulder assessment score with a maximum of 100 points which consists of various individual parameters: pain (15 points), activities of daily living (20 points), range of motion (40 points) and power (25 points). The follow-up examinations were performed by an independent physician. Radiographs (anteroposterior and axillary view of the operated shoulder) were assessed by an independent orthopedic surgeon with experience in shoulder arthroplasty. The radiographs were examined for progressive radiolucent lines around the stem of the humeral prosthesis, subsidence of the humeral prosthesis, proximal subluxation of the head of the humeral prosthesis and progressive glenoid erosion. Proximal subluxation was evaluated by measuring the displacement of the lower edge of the humeral prosthesis in relation to the lower edge of the glenoid. Preoperative radiographs were graded according to the classification by Larsen et al. (1977).

### Operative technique

In all patients, the Neer II hemiprostheses were inserted

Data for 19 shoulder hemiarthroplasties

No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	X	Y	Z
1	70	F	l	5,9	1	27	-	15	0	65	70	65	10	0	50	30	8	3	-	5	+	+	3	-	50
2	70	F	r	8,4	1	27	+	15	70	80	80	90	20	0	20	45	8	2	-	5	-	+	u	-	43
3	59	M	l	3,10	1	22	+	10	45	70	60	75	0	0	20	50	5	4	-	5	-	-	u	-	35
4	66	F	l	11	1	17	-	5	30	65	100	80	20	20	90	0	10	2	-	5	-	-	1	-	37
5	61	F	l	2,8	1	23	+	10	40	65	40	105	0	35	0	18	6	-	5	-	-	3	+	59	
6	53	F	r	5,9	2	26	+	15	100	180	100	180	30	50	40	30	16	5	-	5	+	-	0	u	76
7	72	F	l	1,2	1	25	+	10	30	70	30	90	20	90	90	45	15	1	-	5	-	-	u	-	36
8	59	F	l	7,5	1	14	+	5	70	80	70	85	30	25	20	15	12	1	-	5	-	+	2	-	36
9	59	F	r	7,2	1	14	-	5	70	40	70	45	40	30	80	20	10	0	-	5	-	+	3	+	29
10	63	F	l	7,1	1	30	+	5	90	40	120	45	30	30	50	0	3	0	-	4	-	-	0	-	18
11	73	F	l	6,7	2	26	+	5	60	35	60	35	0	0	90	30	6	1	-	5	-	+	0	-	18
12	74	M	r	17,8	2	32	-	15	60	115	90	75	20	0	40	20	15	2	-	5	+	u	u	u	54
13	76	F	l	10,5	1	32	+	5	40	10	65	15	10	0	30	0	4	0	-	5	-	-	1	-	9
14	76	F	r	9,3	1	32	+	15	0	10	0	20	5	0	5	0	4	0	-	5	-	-	1	-	19
15	64	F	l	10	1	19	+	10	90	70	90	35	50	45	30	60	7	6	-	5	+	-	0	-	35
16	63	F	r	7,8	1	31	-	15	90	75	160	60	60	30	70	45	6	0	+	4	-	+	2	-	41
17	62	F	l	14,8	3	60	-	15	35	40	60	65	10	45	60	20	5	6	+	5	-	-	0	u	32
18	54	F	r	5,9	1	25	+	15	0	20	0	120	45	75	0	45	14	1	-	5	-	+	0	-	46
19	76	F	r	1,4	1	20	+	5	90	35	150	50	20	60	10	30	6	7	+	4	-	-	3	-	24

A Age	H Pain post-op.	T Larsen classification
B Gender	I Abduction pre-op.	U Progressive radiolucent line
C Side	J Abduction post-op.	V Proximal subluxation
D Follow-up (years, months)	K Anteflexion pre-op.	X Progressive glenoid erosion
E Diagnosis: rheumatoid arthritis	L Anteflexion post-op.	1 mild
1 seropositive	M Exorotation pre-op.	2 moderate
2 seronegative	N Exorotation post-op.	3 severe
3 juvenile	O Endorotation pre-op.	Y Subsidence of humeral prosthesis
F Duration RA (years)	P Endorotation post-op.	Z Total Constant and Murley score
G Fixation	Q Activities of daily living	
+ cemented	R Power (pounds)	u unknown
- cementless	S Massive cuff rupture	op. operatively

ed. The patients were operated on in a reclining position. General anesthesia was used in all cases, in 5 patients combined with local blockade of the brachial plexus (Winnie blockade) to prevent postoperative pain. A deltopectoral incision was used and in 8 cases the deltoid muscle was partially detached from the acromion/clavicle to gain adequate access to the glenohumeral joint. The coracoacromial ligament was divided in 7 cases. 6 prostheses were inserted without cement and 13 with cement. Bone grafting was used in 2 shoulders to fill defects in the humeral shaft. In all patients, the rotator cuff was affected by the rheumatoid disease; 3 cases had a massive cuff rupture (> 5 cm) that could not be repaired. All patients received prophylactic systemic antibiotics for 48 hours. Postoperative treatment included a mobilization program according to Neer (1974).

## Results (Table)

At follow-up, the patients had little, if any, pain in 12 shoulders, moderate pain in 7 shoulders and no patient had severe pain. The mean pain score was 10 (5-15).

The active range of motion was scored according to Constant and Murley and also goniometrically. There was only a slight increase postoperatively in the mean abduction (8 degrees) and external rotation (6 degrees) and a minimal decrease in the mean anteflexion (6 degrees) and internal rotation (16 degrees). The mean score for range of motion postoperatively was 15 (0-40). The mean score for activities of daily living at the postoperative examination was 9 (3-18) points. The abduction strength varied from 0 to 7 points, with a mean of 2. Five patients had a score of 0 points: they could not pull even 1 pound. The mean total Constant and Murley score postoperatively was 37 (9-76) points. No patient was able to work full-time: 9 were totally disabled and 10 partially.

Preoperative radiographs showed a severely damaged shoulder in all patients: Larsen grade IV in 3 patients and grade V in the others. At follow-up, a progressive incomplete radiolucent line around the humeral prosthesis was seen in 4 shoulders. 2 of them were cementless and 2 cemented. Subsidence of the humeral prosthesis was present in 2/16 shoulders: 1 in a cemented and 1 in a cementless arthroplasty. In 3 arthroplasties no accurate measurement of the subsidence on the radiograph was possible. Proximal sub-

luxation was seen in 7/18 shoulders. Almost all of these patients had a proximal subluxation preoperatively. In 14/19 shoulders, the proximal subluxation did not increase after surgery. In 9/15 shoulders an increase in the glenoid erosion was seen. 3 shoulders showed mild, 2 moderate and 4 severe glenoid erosion. In 4 shoulders it was impossible to assess the glenoid erosion on the radiograph.

Complications included 1 fracture of the coracoid process (peroperatively), 2 hematomas (immediately after surgery) and 1 superficial infection. All these patients recovered completely. No neurological complications occurred.

## Discussion

A shoulder prosthesis has been reported to relieve pain in more than 90% of the patients with rheumatoid arthritis (Marmor 1977, Cofield 1984, Kelly et al. 1987, Barret et al. 1989, McCoy et al. 1989, Vahvanen et al. 1989, Boyd et al. 1990). These reports showed no difference in pain relief between a hemi- and a total shoulder arthroplasty. All our shoulder hemiarthroplasties obtained long-term pain relief, but one third still had moderate pain.

In most reports, the range of motion after shoulder arthroplasties has been improved, but less in patients with rheumatoid arthritis than in those with arthrosis (Cofield 1984, Barret et al. 1989, McCoy et al. 1989). Our patients had no improvement in motion—perhaps because of the severe rotator cuff destruction preoperatively (Cofield 1984, Kelly et al. 1987). Proximal subluxation of the humeral head is usually regarded as a sign of rotator cuff disease. We found a proximal subluxation in almost half of the operated shoulders, but we saw no relation between proximal subluxation and the range of motion postoperatively. A progressive, incomplete radiolucent line was observed around 4/19 of the humeral prostheses, but these patients had no clinical signs of loosening. Little is yet known about loosening and revisions of shoulder arthroplasties.

We chose to perform hemiarthroplasties in patients with rheumatoid arthritis and not to replace the glenoid. There remains doubt about the long-term ade-

quacy of fixation of the glenoid component, especially in patients with rheumatoid arthritis (Kelly et al. 1987, Barret et al. 1989, McCoy et al. 1989, Boyd et al. 1990). In hemiarthroplasty, destruction of the glenoid is likely to occur. The glenoid erosion may be produced by prolonged rubbing by metal on the cartilage articulation. However, most probably the progressive glenoid erosion is part of the normal course of rheumatoid disease. The contribution of progressive glenoid erosion to the occurrence of pain in this non-weight bearing joint is not clear. We found progressive glenoid erosion in most patients, but this did not correlate with the pain at follow-up. Our findings indicate that shoulder hemiarthroplasty appears to give long-term relief of pain in rheumatoid patients.

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