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Revision of the uncemented hip prosthesis

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In a series of 213 consecutive total hip replacements a.m. Lubinus, the clinical course after 72 revisions and 141 primary procedures was compared after 5 years. The revised THRs were uncemented Ring prostheses. Dislocation and peroperative fracture were more common in the revision group. Two failures because of aseptic loosening occurred in the revision group and 3 in the control group. No excisional arthroplasty was required, and no infections occurred. Radiographic evaluation of prosthetic positioning, component loosening, calcar resorption, and paraarticular ossification disclosed only slightly inferior results in the revision group. Clinically, the revised cases were not inferior to the primary ones. Revision of the uncemented hip seems less difficult than of the cemented hip.

Loosening of total hip components has become a major problem (Callaghan et al. 1985, Gruen et al. 1979), and an increasing number of patients require revisional arthroplasty. To date, there are no reported comparative studies on the outcome of a consecutive series of uncemented revised and primary arthroplasties with the same type of prosthesis.

We report 5 years postoperatively the results obtained with the Lubinus prosthesis after revision of uncemented and primary THRs.

Material and methods

Primary THR. During the period 1979–1980, 141 consecutive primary THRs were performed in 131 patients; 67 were women and 64 men with a mean age at operation of 65 (23–94) years. The mean follow-up time was 5 (5–7) years. At follow-up, 6 patients had died and 3 could not be traced. Nevertheless, these 9 patients were included in the assessment of immediate postoperative complications. Another 3 patients were excluded from clinical evaluation because they had undergone revisional arthroplasty. Thus, 129 hips were available for evaluation. The diagnosis was arthrosis in 120 hips and rheumatoid arthritis in nine hips.

Revision THR. Totally, 72 consecutive uncemented Ring prostheses were exchanged in 66 patients; 36 were women and 30 men. Six patients underwent bilateral revision. The mean age at revision was 70 (33–80) years, and the mean follow-up time was 5 (3–7) years. The indication for revision was pain and suspected loosening of the prosthesis. At operation, loosening of the femoral implant only was found in 11 cases, the acetabular implant in 5 cases, and both components in 56 cases. Both components of the original implant were replaced by a cemented Lubinus prosthesis. The average time to failure after primary THR was 4 (0.5–9) years. In 59 of the arthroplasties, loosening was aseptic. In 13 cases a positive bacterial culture was obtained, but in none significant growth. At the time of follow-up, 4 patients (1 case was a failure) had died and 3 could not be traced. Nevertheless, these 7 patients representing 8 revisions were included in the assessment of immediate postoperative complications. Another 4 revision cases were excluded from clinical evaluation because in the meantime they had undergone another revision arthroplasty. Thus, 60 revisions were available for clinical evaluation. The diagnosis was primary arthrosis in 58 hips and rheumatoid arthritis in two hips.

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The cemented prosthesis. All the operations in both groups were performed by the same surgeon. The Lubinus prosthesis with a curved stem was inserted by a posterolateral approach without trochanteric osteotomy and fixed with gentamicin-impregnated radiopaque PMMA (Palacos®). The length of the femoral stem was 150–250 mm in the revised group and 130–150 mm in the primary group. The patients were given systemic penicillin until removal of the sutures and the anticoagulant phenprocoumon (Marcoumar®) until discharge. The patients, as a rule, were mobilized on the third postoperative day.

Evaluation of results. The clinical status was classified according to the hip score of Merle d'Aubigné and Postel (1954) as modified by Charnley (1972). Cases with impaired walking due to factors other than the hip were excluded in the walking score. The radiographs were analyzed in chronologic order, special attention being focused on progression in width of radiolucent zones and migration of the components. Radiographic loosening of the femoral component was defined by migration or a radiolucent zone at the proximal lateral part of the stem (Lindberg and Carlsson 1983). The acetabular area was divided into three zones according to DeLee and Charnley (1976). Loosening was defined by migration of the cup or progressive radiolucency in one zone or more. The femoral stem orientation was assessed as neutral, valgus, or varus. Paraarticular ossification was graded as proposed by DeLee et al. (1976). The significance of differences was evaluated by the Yates corrected chi-square test.

Results

Complications (Table 1). Peroperative fractures occurred in 11 revisions: eight of the greater trochanter or calcar, two of the lateral femoral cortex (perforation), and one of the femoral shaft. Four of these fractures required fixation with cerclage wires. In the primary group, three minor fractures occurred during insertion of the femoral component. In both groups, all the fractures healed without further complications. One patient in the primary group had transient sciatic palsy, but none in the revision group were afflicted. Five revised hips and one primary hip dislocated. Closed reduction of the primary hip was successful, whereas three of the revised hips had to be reoperated on with reimplantation of the components because of recurrent dislocation 2, 3, and 36 months postoperatively – one probably because the acetabular component was positioned too vertical and two because the neck of the femoral component was too short.

Failures. Among the 72 revisions, 5 cases had another revision within the observational period, 2 because of aseptic loosening 3 and 5 years postoperatively, and 3 because of recurrent dis-

Table 1. Complications

	Revision Group n 72	(per cent)	Primary Group n 141	(per cent)
Fracture	11	(15)	3	(2)
Disclocation	5	(7)	1	(1)
Infection	0	(–)	0	(–)
Revisional arthroplasty				
Because of loosening	2	(3)	3	(2)
Because of dislocation	3	(4)	0	(–)

Table 2. Mean (SD) clinical assessment (Charnley 1972)

	Revision Group n 60	Primary Group n 129
Pain		
Preoperative	2.3 (0.89)	1.6 (0.75)
Postoperative	5.5 (1.17)	5.7 (0.65)
Mobility	n 60	n 129
Preoperative	4.1 (1.05)	3.2 (1.10)
Postoperative	4.9 (0.85)	5.2 (0.75)
Walking ability[a]	n 44	n 92
Preoperative	2.0 (0.78)	2.1 (0.82)
Postoperative	5.0 (1.30)	5.4 (1.10)

[a] 16 patients in the revision group and 37 in the primary group with rheumatoid arthritis, cardiovascular and/or respiratory disability contributing to impaired walking ability were excluded from this assessment.

Table 3. Radiographic assessment

	Revision Group n 60	(per cent)	Primary Group n 129	(per cent)
Stem orientation				
Neutral	35	(58)	81	(62)
Valgus	12	(20)	11	(9)
Varus	13	(22)	37	(29)
Radiographic loosening				
Femoral component	17	(28)	28	(22)
Acetabular component	31	(52)	59	(45)
Calcar Resorption	12	(20)	27	(21)
Para-articular ossification Grade III	7	(11)	12	(10)

location. Among the 141 THRs in the primary group, aseptic loosening necessitating revisional arthroplasty occurred in three hips. No infection was encountered and not a single patient had to have excisional arthroplasty.

Clinical examination. Preoperatively, both pain and mobility scores were higher in the revision group (Table 2). Postoperatively, in both groups, four fifths were completely free from pain, and there was no difference in mobility between the groups, which did not differ in walking ability either.

Radiographic analysis (Table 3). Calcar resorption, paraarticular ossification, and radiographic signs of loosening were slightly increased in the revision group.

Discussion

Our results after primary arthroplasty were satisfactory and comparable to those of earlier reports (Charnley 1972, Visuri et al. 1977, Beckenbaugh and Ilstrup 1978). Surprisingly, the results after revision arthroplasty were only slightly inferior compared with primary arthroplasty, with satisfactory pain relief in 52 of the 60 patients. Wallensten and Olsson (1982) reported 64 per cent satisfactory results after revision arthroplasty, Broughton and Rushton (1982) 58 per cent, whereas Hunter et al. (1979) reported only 24 per cent. In these series the exchanged prostheses were cemented, which may explain (Jones 1979) the inferior outcome compared with the exchanged uncemented prostheses in our series. Furthermore, we performed revision early after prosthetic loosening was diagnosed, which probably reduces the loss of proximal bone stock. The results of radiographic analysis were also only slightly inferior in the revision group. Because radiographic features have been shown to be of relevance for predicting failure of THR, there are no reasons to assume that the frequency of late failures will be higher in the revised group than in the control group. The dislocation rate in the revised group was higher than in the primary group. This might be explained by previous surgery causing bone loss, scarring, and atrophy of the abductor muscles, which might contribute to increased hip instability. Moreover, 3 of the 5 dislocated hips were probably also caused by inadequate component positioning.

The high fracture rate occurring at revisional arthroplasty can probably be attributed to the ingrowth of bone through the fenestrations in the Ring prostheses, making them relatively difficult to remove. However, most of the fractures were only minor lesions of the calcar or greater trochanter, which healed without further complications.

Revisional arthroplasty has been reported to be associated with an increased incidence of complications, and some authors recommend excisional Girdlestone arthroplasty for failed THR (Hunter et al. 1979). Whereas others have reported this outcome in one fifth of their cases (Broughton and Rushton 1982, Dandy and Theodorou 1975), we had no Girdlestone arthroplasty in our series.

Infection rates from 3.3 to 32 per cent after revision THR have been reported (Wallensten and Olsson 1982, Hunter et al. 1979). As opposed to these reports, there was no infection in our series. One reason may be the use of gentamicin-loaded bone cement, another the absence of trochanteric osteotomy, which reduces the operation time and the risk of hematoma (Parker et al. 1976). The low rate of aseptic loosening in the revision group, might be explained by the absence of cement, leaving a better bone stock for anchorage of the new prosthesis.

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