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More failures of uncemented acetabular screw-rings than of cemented polyethylene cups in total hip arthroplasties

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Abstract The results of 498 total hip arthroplasties were prospectively studied. In 329 patients a cemented acetabular polyethylene cup was inserted. In 169 patients a threaded socket without cement was introduced. Follow-up ranged from 6 to 8 years and follow-up rate was over 90%. Of the 169 threaded sockets 8 required revision (4.7%), and 3 acetabular components were seen to be loose on X-ray. Of the cemented cups, only 2 (0.6%) required revision and none were considered loose on X-ray.

Résumé Présentation d'une étude prospective de 498 arthroplasties totale de la hanche. Dans 329 cas, une cupule en polyéthylène cimentée a été utilisée. Dans 169 cas, un cotyle sans ciment vissé a été utilisé. 90% des patients ont été suivis 6 à 8 ans. Parmi les 169 cupules visées, 11 sont descellées et 8 ont dû être révisées (4,7%). Il n'y a que 2 descellements des cupules cimentées qui ont dû être révisés (0,6%).

Introduction

Various studies report a higher rate of loosening for acetabular components with threaded socket compared to cemented or cementless press-fit cups [3, 13–15, 18]; whereas other authors report encouraging results following cementless implantation [2, 4, 11].

It was the aim of this study to compare the rate of loosening of an acetabular screw ring (Model Muenchen, Aesculap) with that of a cemented polyethylene cup. The screw ring consists of a titanium alloy with a self-cutting thread, and has a polyethylene liner.

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Patients and methods

In this prospective study relevant information was collected using a data questionnaire and a databank. Between 1987 and 1990, 498 total hip arthroplasties were performed mainly in patients with coxarthrosis (Table 1). In 169 cases the screw ring (Model Muenchen, Aesculap) was used. In these cases autogeneous bone graft was inserted into the acetabular floor and impacted. In 329 cases a cemented polyethylene cup was used. An uncemented femoral component (BiCONTACT, Aesculap) was used in half of the cases and the same component was used with cement in the other half. Patients were followed clinically and radiologically after 3 months and annually until 1995. In the screw ring group 8 patients died and 16 could not be traced. In the group with cemented acetabular components ($n=329$) 56 died and 22 patients could not be traced; thus, the follow-up rate was over 90%.

Results

The mean follow-up time for the 169 screw rings was 7 (5–8) years and for the 329 cemented cups 7.5 (5–8) years.

Dislocation occurred twice: in one case there was a post-operative superficial infection and in the other a deep infection. In 8 patients in the screw ring group, the cup required revision after an average of 5 (3–8) years, due to radiological evidence of loosening. According to the criteria of Gruen, there was radiological evidence of loosening in another three patients. These patients were, however, all asymptomatic. In the cemented cup group, 2 were revised. There were no radiological signs of loosening in the remaining 327 patients.

At follow-up, assessment of pain and mobility did not show significant differences between the two groups. At the final follow-up, 95% of patients judged their hip to be satisfactory.

Discussion

Aseptic loosening is one of the main complications of hip arthroplasty [3, 7, 18, 19]. Review of the literature

Table 1 Patient data ($n=498$)

Acetabular cups	No.	Male/Female	Minimum age (years)	Maximum age (years)	Mean age male/female (years)
Cemented polyethylene cups	329	110/219	47	90	69.8/71.5
Screw ring	169	84/85	20	84	57.3/59.0

reveals that fixation of the acetabular components is the major problem. Lord and Bancel [10] reported promising results 7 years after implantation of a screw-in cup, whereas Bruijn et al. [3] reported radiological evidence of loosening in 25% of cases after implantation of a Mecring cup. Other studies also report increased rates of loosening after implantation of a screw ring [13, 18]. In our study there were 8 revisions and 3 cups were radiologically loose, although the patients were asymptomatic.

The screw ring is often selected for use in younger patients because of its perceived primary stability and good bony contact. A possible cause of loosening might be found in the construction of the „Muenchen“ screw ring that was used in this study. Bone graft is inserted through a central hole in the cup and there is thus direct contact between the polyethylene inlay and acetabular bone. This direct contact may cause bone resorption and loosening. The design was modified in 1991 to exclude the central hole.

An increased rate in cup migration, reported by some authors, was not found in this study; but an increased revision rate was found. Many authors have reported results of the Muenchen screw-ring that do not show a higher loosening rate [1, 8, 9, 12, 16, 17]; however, on the basis of our results we think this component should not be used in primary total hip arthroplasty.

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