Femoral Components: Cemented Stems for Everybody?

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Summary

There is considerable evidence from our register studies, that cemented implants both in femur and acetabulum give satisfactory long-term (15 years) results. These findings apply both for young and old patients, and for all diagnostic groups. Cemented polished tapered stems have been reported with good results both in the Norwegian and Swedish hip implant registers. The Exeter and Charnley total hip implants (cup and stem) had similar results after 15 years follow up.

Introduction

During the 1980s, the use of uncemented femoral stems in total hip arthroplasty (THA) gained popularity, but still many surgeons regard the cemented metal stem with a small head articulating with a cemented all polyethylene acetabular socket as the gold standard for hip replacements. The Norwegian Arthroplasty Register started registration of hip implants in 1987 as a prospective ongoing study. The unique identification number given to each inhabitant of Norway enabled us to follow implants in many patients for extended periods of time. In several studies we have focused on the survival of different types of cemented and uncemented hip prostheses used in Norway [5]. In this paper we will present the latest update on femoral stem prostheses with up to 15 years of follow up.

Results of Cemented and Uncemented Stems

Our results indicated that both cemented and uncemented stems do well both in young and old patients (Figs. 8.1 and 8.2). Uncemented stems had marginally better results than the cemented stems in young patients (<60 years) [3], when the smooth proximal Biofit stem was excluded (Fig. 8.3). The uncemented stem with the best result in Norway was the HA coated Corail stem with a 15 year survival of 95.1%. In patients younger than 60 years, the Corail stem had a 12-year survival of 96.2%. For several uncemented stems concern has been raised due to increased incidence of thigh pain documented. In one randomised study the uncemented implant gave 17% thigh pain and the cemented implant 3% [8]. There is also concern as to what will happen when the hydroxylapatite disappears, will there subsequent be more aseptic loosening?

The cemented stems are well documented both regarding the survival of the implant and for pain relief [1]. The polished tapered Exeter stem had the best results of the cemented stems with a 15 year survival of 97.0%. In patients younger than 60 years, the Exeter stem had a 12-year survival of 95.2%. There were differences in results among the cemented stems. The polished tapered Exeter stem had better survival than the straight vaquasheined Charnley stem (Fig. 8.2, Table 8.1). These results compared well with the results of the Exeter implant in the Swedish Hip Register [9].

Results of THA System (Cup and Stem Combined)

However, it is arbitrary to look at only one of the components, as the results may change when we study the whole prosthetic system (cup and stem). Both in all patients and in patients younger than 60 years the result of the whole prosthesis was similar for Exeter and Charnley implants (Fig. 8.4). The reason was less revisions of the stems, b Uncemented stems, endpoint revision of stem. (The Norwegian Arthroplasty Register 1987–2004)
Cemented and uncemented cup/stem combinations, age < 60, 10 most common prostheses

- **Cemented** (Palacos or Simplex)
- **Uncemented (Ti-fit/Bio-fit excluded)**

**Table 8.1**: The 10 most commonly used cemented stems used in Norway. The revision percentages were calculated by Cox regression adjusting for age, gender and diagnosis and cement (Palacos, Simplex). The Norwegian Arthroplasty Register 1987-2004

<table>
<thead>
<tr>
<th>Stem Prostheses</th>
<th>N</th>
<th>B</th>
<th>Median Follow-up in Years</th>
<th>Revision % at 10 Years</th>
<th>Revision % at 15 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charnley</td>
<td>2622</td>
<td>973</td>
<td>5.8</td>
<td>5.5 (3.8-5.9)</td>
<td>7.9 (7.1-8.7)</td>
</tr>
<tr>
<td>Exeter</td>
<td>7587</td>
<td>138</td>
<td>5.7</td>
<td>2.2 (1.7-2.7)</td>
<td>3.0 (2.3-3.8)</td>
</tr>
<tr>
<td>Titan</td>
<td>7439</td>
<td>118</td>
<td>5.1</td>
<td>2.4 (1.9-3.0)</td>
<td>6.8 (4.6-8.9)</td>
</tr>
<tr>
<td>Spectron</td>
<td>3889</td>
<td>17</td>
<td>1.6</td>
<td>2.1 (1.5-2.7)</td>
<td>4.9 (2.6-7.2)</td>
</tr>
<tr>
<td>ITH</td>
<td>3533</td>
<td>64</td>
<td>7.2</td>
<td>4.5 (3.3-9.1)</td>
<td>8.3 (5.2-11.3)</td>
</tr>
<tr>
<td>Lubinus SP</td>
<td>1657</td>
<td>62</td>
<td>5.8</td>
<td>3.0 (2.3-3.8)</td>
<td>5.3 (2.3-3.8)</td>
</tr>
<tr>
<td>Bio-Fit</td>
<td>1556</td>
<td>10</td>
<td>6.8</td>
<td>7.9 (3.9-12)</td>
<td>10.2 (5.3-16)</td>
</tr>
<tr>
<td>CPT</td>
<td>875</td>
<td>6</td>
<td>2.8</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Etna</td>
<td>829</td>
<td>24</td>
<td>3.4</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>MS-30</td>
<td>816</td>
<td>7</td>
<td>2.4</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

*Insufficient follow-up*

**Charnley acetabular components. This was probably due to the smaller head (22.2 mm) in the Charnley implant compared to the Exeter implant (28 mm and 30 mm). The smaller heads give less wear and subsequently less aseptic loosening of the acetabular component [10].**

The uncemented implants had worse results than the cemented implants because of more aseptic loosening and polyethylene wear in press-fit HA coated cups, and polyethylene wear and osteolysis in press-fit hemispheric porous coated cups (Fig. 8.4 [3, 6, 7]).

The titanium stem prostheses (Titan and ITH) used in Norway had good 15 years results, with a 93.2% and 95.1% survival of the stem (Fig. 8.2). These prostheses were mainly used in patients over 60 years of age.

The cemented anatomic Lubinus SP stem had good results in the Swedish register [5], but in the Norwegian register the Lubinus SP stem had a survival of 91.7% after 15 years (Table 8.1)). The results from Norway with the Lubinus SP stem were mainly based on operations from two hospitals, and the inferior results were from one hospital. The results must therefore be interpreted with caution.

**Why Were Results Worse in Young Patients?**

In a study of the influence of the hip diagnosis we used cemented Charnley prostheses as a control group [4]. We found that the reason for poor prognosis in some hip diseases in young patients were due to the fact that these young patients had been given a poorly performing uncemented hip implant. These implants were introduced as more promising than the established cemented implants during the 1980s. During the last 15 years these implants have failed in large numbers. The reason for failures were aseptic loosening of uncemented smooth press-fit stems, threaded cups with smooth surface, or porous coated stems without circumferential coating. If the patient had been given a cemented Charnley prosthesis using a well-documented cement (Palacos or Simplex), the survival of the implant was good both in young and old patients in all hip-diagnosis groups [4].

There is considerable evidence from our register studies that cemented implants both in femur and acetabulum give good long-term results in all age groups. At our institution, we use cemented implants (both in femur and acetabulum) with a small head (22 mm) in young patients. In older patients (>80 years) where the polyethylene wear problem is negligible and the dislocation problem is greater, we use femoral heads of 32 mm [2].
References


