SURVIVAL OF TOTAL HIP ARTHROPLASTY (THA) IN YOUNGER PATIENTS. EFFECT OF HYDROXYAPATITE COATING AND CEMENT
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**Introduction:**

Plasma-sprayed hydroxyapatite (HA) coatings have been used since the mid 1980’s 1.

DHR was established in January 1995, and is a national wide clinical database of primary THA, revisions, and postoperative complications. Since 1995, 54,942 primary total hip arthroplasty and 9,317 revisions have been recorded 2.

**Objectives:**

The aim of the present study was twofold:

1. To evaluate the effect of HA coating on the risk of cup or stem revision.
2. To compare the results with those of cemented components in patients younger than 70 years of age.

**Material and methods:**

The study was based on the cohort of primary THA patients registered in the DHR during the period 1997-2004. We defined any kind of revision as endpoint.

We used Cox’ regression analysis to estimate the relative risk (RR) of revision and 95% confidence interval (CI) adjusted for age, gender, indication for primary surgery, and cement status for the other component in the hip. Separate analyses were done for revision due to aseptic loosening, and revision due to any cause.

We performed additional stratified analyses on cups, stems, age groups (<60, 60-69), gender, and producer/model of the components.

We used both the uncemented group without HA-, and the cemented group, as a reference. The SAS software Version 9.1.3. was used.

**Results: Cups**

Table 1: No reduction in adjusted relative risk of revision due to aseptic loosening and any reason for HA-coated cups compared to non-HA-coated cups (all diagnosis), from the Danish Hip Arthroplasty Registry, 1997-2004

<table>
<thead>
<tr>
<th>N total</th>
<th>Endpoint: Aseptic loosening</th>
<th>Endpoint: Any reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N revised</td>
<td>RR</td>
</tr>
<tr>
<td>Uncemented Cups - HA</td>
<td>12169</td>
<td>35</td>
</tr>
<tr>
<td>Uncemented Cups + HA</td>
<td>4014</td>
<td>9</td>
</tr>
</tbody>
</table>

Same findings for: crude relative risk, idiopathic arthritis, age and gender.

All diagnoses: all patients, i.e. irrespective of indication for primary surgery.
Any reason: defined as aseptic loosening, osteolysis /granuloma, deep infection, fracture of femur, dislocation, component failure, pain, and others, in accordance to the DHR registration form.

**Results: Stems**

Table 2: Reduction in adjusted relative risk of revision due to aseptic loosening but not due to any reason for uncemented cups compared to cemented cups (all diagnosis), from the Danish Hip Arthroplasty, 1997-2004

<table>
<thead>
<tr>
<th>N total</th>
<th>Endpoint: Aseptic loosening</th>
<th>Endpoint: Any reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N revised</td>
<td>RR</td>
</tr>
<tr>
<td>Cemented Cups</td>
<td>6614</td>
<td>75</td>
</tr>
<tr>
<td>Uncemented Cups</td>
<td>16183</td>
<td>44</td>
</tr>
</tbody>
</table>

Same findings for: crude relative risk, idiopathic arthritis and age.

All diagnoses: all patients, i.e. irrespective of indication for primary surgery.
Any reason: defined as aseptic loosening, osteolysis /granuloma, deep infection, fracture of femur, dislocation, component failure, pain, and others, in accordance to the DHR registration form.

**Discussion:**

The Registry was validated in 2003, and found to have a high overall degree of completeness of registration of THA procedures. None of the groups had less than 400 patients, to avoid small sub-groups. Some of the sub-groups estimates were based on few cases, due to the relative few revisions, resulting in statistical imprecision. Some other factors, which we did not adjust for, may have confound our risk estimates, i.e. component geometry, material, the surface roughness, the HA-coating (coating-area, coating thickness, porosity, density, crystallinity, purity, Ca/P-ratio), and the bearing material.

Our medium term results, suggest that there are no effect of HA-coating on implant survival. The results are specific for the used components. However, there might be an effect in the longer term due to a seal effect of the potential effective joint space thereby inhibiting migration of particles from the third body wear, as shown in experimental studies.

**Conclusion:**

In this medium term follow-up study of patients younger than 70 years old, we conclude:

1. Cemented implants as a group had higher revision rates due to aseptic loosening than cementless implants, but not due to "any reason".
2. That the use of HA-coated implants were not associated with any overall reduced risk of revision compared with HA-uncoated implants.

**References:**