Ceramic Bearings and Revision Risk for Late Dislocation

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Disclosure

CORR
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Introduction

• Dislocation is a major complication after THA and constitutes a prominent reason for revision surgery
• Multiple studies have focused on risk factors for late dislocation, but bearing surface has not been extensively studied
• Currently there is conflicting evidence about bearing surfaces and dislocation rates
Introduction

The incidence of dislocation is highest in the first year after arthroplasty, and then continues at a constant rate over the life of the implant

• Early (<1yr) versus late dislocation (>1yr):
  – Early: patient and surgical factors
  – Late: biological factors
Objective

• To determine whether the bearing surface is a risk factor for late revision due to dislocation in primary THA
Methods

NZ Arthroplasty Registry:

– Since 1999
– 100,315 primary THJR (16-year Report)
– Dislocation most common cause for revision (26.5%)
Methods

Exclusion criteria:

– Resurfacing arthroplasty
– Revision arthroplasty

• Primary endpoint was revision for late dislocation (late defined as >1 year postOP)
Material and Methods

- 73,386 THRs fulfilling inclusion:
  - 73,386 hips >1 year postOP
  - 65,387 hips >2 years postOP
  - 42,086 hips >5 years postOP
  - 12,967 hips >10 years postOP

- Mean age 68.9 years
- Mean 10-year Follow-up
- 53.2% female
- 88% OA
Material and Methods

• Surgical Approach:
  - Posterior 65.3%
  - Lateral 28.3%
  - Anterior 4.2% (other 2.2%)

• Bearing surfaces:
  - MoP 53,331
  - CoP 14,093
  - CoC 8,177
  - MoM 5,910
  - CoM 461
Results

• 3130 (4.3%) hips revised for any cause
  – Rate of 0.7/100 component / years

• 836 (1.1%) revised for dislocation
  – Rate of 0.19/100 component / years

• 470 (0.65%) revised for dislocation >1 year
  – Rate of 0.11/100 component / years
Multivariate Analysis

CoC HR versus

- CoP
  (HR 2.10; 95% CI 1.12 – 3.94, p=0.021)

- MoP
  (HR 1.76; 95% CI 0.94 – 3.28, p=0.075)

Adjusted for age, gender, head size, surgical approach
Results

- There were statistically significant lower rates of revision for dislocation in all age groups with >28mm CoC bearings than:
  - MoM (HR = 0.36; 95% CI 0.20 – 0.67, p= 0.004)
  - CoP (HR = 0.51; 95% CI 0.30 – 0.89, p= 0.018)
  - MoP (HR = 0.55; 95% CI 0.33 – 0.93, p= 0.027)
Head size >28mm and age <65 years

Head size >28mm and age ≥ 65 years
Head size ≤28mm and age <65 years

Head size ≤28mm and age ≥65 years

There were more revisions in CoC than MoM THAs in younger patients and smaller head size (< 65 years, 28 mm) (HR 0.29; 95% CI 0.12–0.71; p = 0.014)
Discussion

- This 10-year Registry analysis shows low rates of revision for late dislocation with CoC THRs
- Confirms Australian Registry finding regarding the increased risk of revision for late dislocation in patients younger than 65 yrs with 28mm CoC
- Confirms findings of previous paper showing low rates of late dislocation with 32mm CoC

Sexton SA et al.: CoC and risk or revision due to dislocation after THA. JBJS 91B: 1448-53, 2009

Discussion

• Late dislocations may be influenced by biological factors:
  – analysis of tissue reaction to ceramics has shown small numbers of macrophages, few foreign body type giant cells and occasional lymphocytes
  – polyethylene implants promote extensive foreign body type inflammatory changes

Discussion

Late dislocations may be influenced by biological factors like *Pathology of the Pseudo-Capsule*:

- MoP pseudocapsules exhibit significantly higher levels of inflammatory markers than CoC
- inflammatory reaction to polyethylene and metal wear particles results in fluid expansion and capsule dissociation

Message to Take Home

Ceramic Bearings:

– Low rates of revision for late dislocation
– Best outcome with 32mm bearing surfaces