Cementless total hip arthroplasty in rheumatoid arthritis: a systematic review of the literature

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CRD summary
The authors concluded that despite substantial rates of mechanical stem complications no evidence was found to establish that cementless components performed less well than cemented components. The reliability of the authors’ conclusion is uncertain given the poor quality of included studies and likely publication bias.

Authors’ objectives
To investigate the results of uncemented total hip arthroplasty (THA) on mechanical complications (such as intra-operative, peri-prosthetic fractures, implant migration, early loosening, failure rates) in patients with rheumatoid arthritis.

Searching
EMBASE, PubMed and The Cochrane Library were searched for articles published between 1966 and 2011. Search terms were reported. There were no restrictions on language or year of publication. Reference lists of identified articles were handsearched

Study selection
Clinical studies that compared cementless THA with cemented THA or cementless THA with other than a cemented control group or no control group in rheumatoid arthritis patients were eligible for inclusion. Studies that included revision cases and those on other implants other than conventional THA (such as resurfacing hip arthroplasty) were excluded. Outcome measures included rates of complications (such as intra-operative, peri-prosthetic fractures, implant migration and early loosening) and failures.

The included studies were conducted in USA, Finland, Canada, Spain, UK, Germany, Austria, Switzerland, Poland, Yugoslavia, Norway, The Netherlands, Sweden, China and Denmark. Mean follow-up ranged between one and 13.8 years. Studies assessed acetabular fractures and/or migration of the cup and proximal femoral fractures and/or subsidence of the stem.

The authors did not state how many reviewers assessed studies for inclusion.

Assessment of study quality
Two reviewers assessed study quality using a modified criteria for adequacy of 10 items (maximum 10 points): study design (prospective or retrospective study), homogeneity of type of implant, homogeneity of patient population, transparency of selection criteria for cementless THA, transparency of outcome measures and assessment, sample size, transparency of missing data and loss to follow-up, data management and statistics. Further details on these criteria were reported in the paper. Disagreements were resolved by consensus.

Data extraction
One reviewer extracted data on incidence of intra-operative fractures, postoperative migration of components not defined as loose, time from initial operation to revision and failure events (described as any revision for aseptic loosening of cup or stem, or radiographical loosening as defined by the authors).

Data were checked by another reviewer for accuracy. The authors did not state how any disagreements were resolved.

Methods of synthesis
Study results were compared using failure rate ratios with 95% confidence intervals (CIs). Failure was calculated as failure rate per 100 years of hips at risk. Random-effects meta-analysis was used where necessary (further details reported in the paper). National Institute of Clinical Excellence (NICE) criteria were used as a reference where there was no control group.
Results of the review

Twenty-three case series and five studies of implant registries were included. Eighteen studies had a quality score of 6 or less out of the maximum 10.

Acetabular fractures (four studies): Rates of acetabular fractures ranged from 2% to 5%.

Migration (six studies): Three studies reported rates of migrated cups of at least 10%.

Early loosening (five studies): One study reported three loose cups after an average period of 31 months. One study reported that two cups were loosened within two years after implantation. Three studies reported single cases of early loosening.

Aseptic loosening: Six studies reported failure rates higher than one (the NICE criteria). No significant difference was found in failure rates between cementless and cemented cups (rate ratio 0.6, 95% CI 0.14 to 2.60; six studies). The failure rate for the cup in case series without control group compared to the NICE criteria (failure rate/1) was 0.97 (95% CI 0.50 to 1.88; 16 studies).

National arthroplasty registries (four studies): In Finland results of press-fit porous coated cups after 10 years in rheumatoid arthritis were the same as those for cemented cups in patients aged below 55 years; uncemented cups performed better than cemented cups in patients aged at least 55 years. In Sweden cementless cups performed better than cemented cups in the general population. In Denmark the cumulative risk for revision for aseptic loosening after 14 years was slightly higher for rheumatoid arthritis than for osteoarthritis.

Femoral fractures (nine studies): No failure of implants was reported following conservative treatment or intra-operative direct fixation.

Subsidence (10 studies): In one study where subsidence rate was high (80%) only five out of 56 subsidised stems were found loose after a mean follow-up period of 14 years. Only one stem was found loose due to aseptic loosening in the remaining studies.

Early loosening: One episode was reported in one study.

Aseptic loosening (22 studies): Two studies reported increased failure rates. There was no significant difference in overall failure rates between cemented and uncemented stems (rate ratio 0.71, 95% CI 0.06 to 8.55; six studies).

The overall failure rate for the stem in case series without control (compared to the NICE criteria; failure rate/1) was 0.79 (95% CI 0.44 to 1.41).

National arthroplasty registries (five studies). In Finland cementless stems performed better than cemented stems across all age groups in patients with rheumatoid arthritis. In Norway and Sweden cementless stems performed better than cemented stems in the general population regardless of the diagnosis. In Denmark the cumulative risk for revision for aseptic loosening after 14 years was slightly higher for osteoarthritis than for rheumatoid arthritis.

Authors' conclusions

Despite substantial rates of mechanical stem complications, no evidence was found to establish that cementless components performed less well than cemented components. The results justified the use of cementless total hip arthroplasty in rheumatoid arthritis patients.

CRD commentary

The review question was broadly stated; eligible study designs and participants were not prespecified explicitly. Three major databases were searched for studies published in any language (which minimised language bias). There were no efforts to search grey literature sources so some relevant papers may have been missed. Data extraction and quality assessment were done in duplicate, which minimised error and bias; it was unclear whether similar procedures were followed in study selection. Most of the included studies were of poor quality. It was unclear whether heterogeneity was assessed and whether any results were used to inform the synthesis approach.
The reliability of the authors' conclusion is uncertain given the poor quality of included studies and likely publication bias.

**Implications of the review for practice and research**

**Practice:** The authors stated that current findings supported use of cementless total hip arthroplasty in rheumatoid arthritis patients.

**Research:** The authors did not state any implications for research.

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