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Original article

Fate of the unrevised cemented stem following cup only revision: 227 hips at an average of 6 years follow-up



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ABSTRACT

Background: After primary total hip replacement, aseptic loosening of the acetabular cup is more common than loosening of the femoral stem. Removal of a well-fixed stem adds to operative time, blood loss, risk of bone loss and fracture. There is limited evidence that isolated cup revision can be a safe option in revision hip arthroplasty. We question the following regarding the unrevised cemented stem after isolated cup revision: 1) Does the unrevised stem require revision after isolated cup revision? 2) When is the stem subsequently revised? 3) Why is the stem subsequently revised? 4) Do unrevised stems exhibit radiographic loosening?

Hypothesis: We hypothesise that after isolated cup revision most unrevised stems do not need subsequent revision, and that most do not exhibit evidence of radiographic loosening.

Patients and methods: A retrospective analysis of all patients who underwent revision of the acetabular component only during revision hip arthroplasty between March 1970 and July 2013 was carried out. We assessed survival of the unrevised stem, reasons for subsequent revision, plus radiographic analysis for stem loosening.

Results: Two hundred and twenty-seven hips were included [215 patients with an average age at the time of primary surgery was 47 (13–70) years]. The Charnley stem was used in 161 cases; C-stem 65, Howse 1. Average time between primary surgery and cup revision was 15.9 (1.6–33.4) years. Average follow-up for all stems post-isolated cup revision was 6.1 (0.1–30.7) years. Twenty-eight stems (12.3%) were subsequently revised 5.1 (0.1–12.6) years after the isolated cup revision. Reasons for subsequent revision were: aseptic loosening (10); infection (8); dislocation (6); unreconstructable joint post-loose cup removal (2); fracture (2). Radiographic review was possible on 140 cases. Five femoral stems were revised and 2 others showed evidence of possible radiological loosening but were not revised.

Conclusion: To our knowledge this is the largest series showing that isolated cup revision in the place of a well-fixed cemented stem is safe and is associated with ongoing good long-term survival of the stem.

Level of evidence: Level IV, retrospective case series.

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1. Introduction

Acetabular cup revision for aseptic loosening is much more common than stem loosening in revision hip arthroplasty [1]. In 2013, the United Kingdom National Joint Registry noted that 30% of single stage hip revisions involved cup revision only, whilst only 14% of revisions involved isolated stem revision [2]. This differential in longevity is likely to be explained by the different modes of failure of the 2 different components [3]. The presence of a well-fixed femoral stem, providing adequate leg length, offset, anteversion

and stability provides a good argument for stem retention during cup revision. Reasons for isolated acetabular cup revision in revision total hip replacement include aseptic loosening, wear, instability, fracture, and cup malpositioning. Access to the acetabulum for revision surgery can be hindered by the presence of an in situ femoral prosthesis. Removal of a well-fixed stem adds to operative time, blood loss, risk of bone loss and fracture, whilst bearing in mind that revision stems have poorer outcome/longevity than primary stems [4,5]. Removal and reinsertion of the cemented femoral component has been described to aid access to the acetabulum for revision with reasonable results [6].

Although previous similar studies have reported good outcomes after isolated cup revision, these studies have been based on a heterogeneous cohort of cemented and uncemented stems [7–11]. Data focusing on a narrow range of retained cemented femoral

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stems is limited. Therefore, we performed a single institute study focused on a large cohort of patients who underwent isolated cup revision in the presence of a well-fixed cemented stem.

We reviewed our database to answer the following questions regarding the unrevised stem after isolated cup revision:

- does the unrevised stem require revision after isolated cup revision?
- when is the stem subsequently revised?
- why is the stem subsequently revised?
- do unrevised stems exhibit radiographic loosening?

We hypothesize that after isolated cup revision the vast majority of unrevised cemented stems do not need subsequent revision, and that most do not exhibit evidence of radiographic loosening.

2. Patients and methods

2.1. Patients

The local arthroplasty database was searched retrospectively for all patients who underwent revision of the acetabular component only during revision hip arthroplasty between March 1970 and July 2013. Patients were included in the study if they met the following criteria:

- isolated revision of acetabular component revision during revision hip replacement;
- final clinic appointment \geq 1 year after cup revision.

Patients meeting any of the following criteria were excluded:

- previous femoral stem revision prior to isolated acetabulum revision;
- failed to attend follow-up clinic;
- stem temporarily removed to facilitate acetabulum exposure, and subsequently reinserted.

2.2. Methods of assessment

A retrospective analysis was carried out utilising paper and electronic case files, plus plain films and electronic radiographs from the local picture archiving system (PACS). Age, gender, operation side, stem types, previous surgery, primary and revision surgical approaches, postop complication after primary and revision surgery, reason for cup revision, duration between primary and revision surgery, duration between revision surgery and latest follow-up were reviewed. Evidence of possible radiographic stem loosening of the unrevised stems was described using the grading system of Harris et al. [7]. End points were final follow-up (minimum 1 year) and stem revision (including those revised within 1 year of cup revision).

2.3. Statistical analysis

Kaplan-Meier survival analysis was performed on the unrevised stems. Stem revision was considered the end point. Ninety-five percent confidence intervals were calculated. Considering the limited number in some categories, we were not able to perform a Logrank test to compare survivorship.

3. Results

A review of the local database identified 227 cases of isolated cup revision, in 215 patients. At the time of data collection, there were 32,524 primary and 6155 revision hip replacements in the database. Twelve patients had bilateral surgery, (72 men, 143 women) 115 left, 112 right, average age at the time of primary surgery was 47 years (13–70). The cemented stems used were Charnley 161; C-stem 65; Howse 1 (De Puy International, Leeds, UK). The surgical approach was posterior in 3, transtrochanteric in 164 cases, and unknown in 60 cases.

Average time between primary surgery and cup revision was 15.9 years (1.6–33.4). Reasons for cup revision are outlined in Table 1. In all cases, the cemented stem was found to be well-fixed at the time of cup revision. Average age at the time of revision/final follow-up was 68.6 (24–93) years.

Radiographs of acetabular cup aseptic loosening and subsequent isolated cup revision 13 years after the primary operation are shown on Fig. 1a and b.

Twenty-eight stems were subsequently revised after isolated cup revision. Kaplan-Meier stem survival is presented on Fig. 2. Stem survival after 30 years was 68.5% (95% CI 64.7–72.2%). Stem revision was performed 5.1 (0.1–12.6) years after isolated cup revision. Four stems were revised within a year of cup revision. Reasons for subsequent stem revision are outlined in Table 2. Comparative survival analysis for the different causes of revision is illustrated on Fig. 3.

Radiographic follow-up was performed on 140 cases, due to limited availability of plain film radiographs taken at the beginning of the database. Of these patients, 5 underwent stem revision (included in the 28 stem revisions). Two other cases showed evidence of possible radiological loosening (zones 1, 2 & 5; and zones 2 & 3, respectively) but were not revised, due to a lack of clinical

Table 1
Reasons for cup revision.

Reason for revision	Frequency
Aseptic loosening	208
Dislocation/instability	11
Poly wear	7
Fractured socket	1

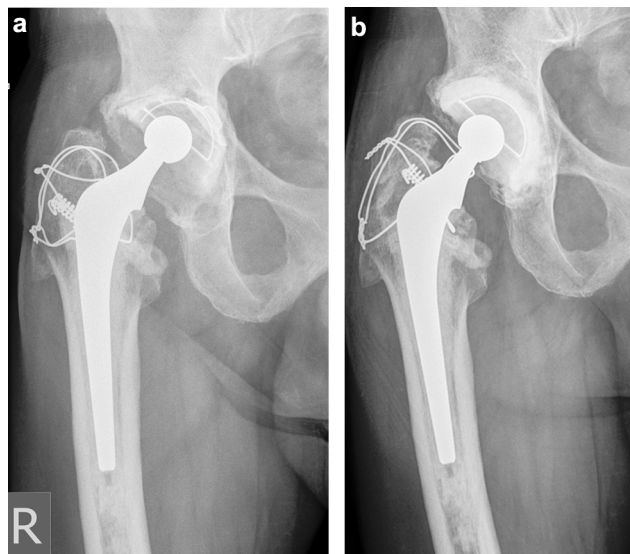


Fig. 1. a: aseptic loosening of acetabular component pre-isolated cup revision; b: post-isolated cup revision.

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