Low Risk of Cup Fixation Failure at 10-Years Using Constrained Liners at the Same Time of Acetabular Component Revision

Faisal Majid Alfayyadh[1], Michael Neufeld[2], Lisa Howard[3], Bassam A Masri[2], Nelson Victor Greidanus, Donald S Garbuz[4]
[1]Orthopedic Surgery, University of British Columbia, [2]University of British Columbia, [3]VGH, [4]UNIVERSITY OF BRITISH COLUMBIA

INTRODUCTION:

There remains concern that the use of constrained liners (CL) implanted simultaneously at the time of acetabular cup revision in revision total hip replacement (rTHA) may not be safe due to loss of fixation at the bone implant interface and early cup loosening. Furthermore, there is a paucity of mid- to long-term data reporting on the outcomes associated of this practice. This study aimed to evaluate the survivorship free from aseptic cup loosening (fixation failure) and all-cause re-revision in rTHA when a CL was implanted at the same time as acetabular cup revision.

METHODS:

We retrospectively reviewed our institutional database to identify all consecutive rTHAs from 2001 to 2021 where a CL was implanted simultaneously with acetabular cup revision. Exclusions included revisions of a failed hemiarthroplasty, use of custom triflange implant, and less than 2-year follow-up. Eleven patients with less than a 2-year follow-up were excluded, none of whom required re-revision. A total of 174 revisions (173 patients) were included with an average follow-up of 8.7 years (range 2 – 21.7 years). Mean patient age was 70.7 years (range 25 – 91) and 60.9% were female. Ten percent had Paprosky Type 1 bone loss, 68.4% had Type 2A-C, and 21.3% had Type 3A-B. The main indications for index rTHA were instability (35%), second-stage periprosthetic joint infection (26.4%), and aseptic loosening (17.2%). Only 25% of revisions used modern highly porous revision shells. Two-thirds (116) of CLs were manufactured by one implant company and one-third (58) were by another. Twenty-three (13%) CLs were cemented into the revision cup. Screw fixation was evaluated. Kaplan-Meier analysis was used to assess survival with revision for cup aseptic loosening (fixation failure) and all-cause re-revision as endpoints.

RESULTS:

A total of 32 (18.3%) patients underwent re-revision at a mean time of 2.9 years (range 0.1 – 14.1). The most common reasons for re-revision were instability (14), periprosthetic joint infection (7), and loosening of the femoral component (4). Only 3 (1.7%) required re-revision due to aseptic loosening of the acetabular component (fixation failure) at a mean of 2 years (range 0.1 – 5.1 years). Acetabular component survival free from re-revision due to aseptic loosening was 98.9% (95% CI 97.3 – 100) at 5-years and 98.1% (95% CI 95.8 – 100) at 10-years (Figure 1). There were no acetabular component fixation failures in modern highly porous shells. The all-cause re-revision-free survival was 84.9% (95% CI 79.4 – 90.3) at 5-years and 79.9% (95% CI 73.0 – 86.7) at 10-years (Figure 2).

DISCUSSION AND CONCLUSION:

CLs implanted at the time acetabular cup revision in rTHA have a 98.1% 10-year survival free from acetabular cup fixation failure and aseptic loosening. There were no cup fixation failures in modern highly porous shells. Thus, when necessary, implanting a CL during revision of an acetabular component with stable screw fixation is safe with an extremely low risk of cup fixation failure.

Figure 1 Kaplan-Meier Survival Estimates for Re-Revision due to Cup Fixation Failure

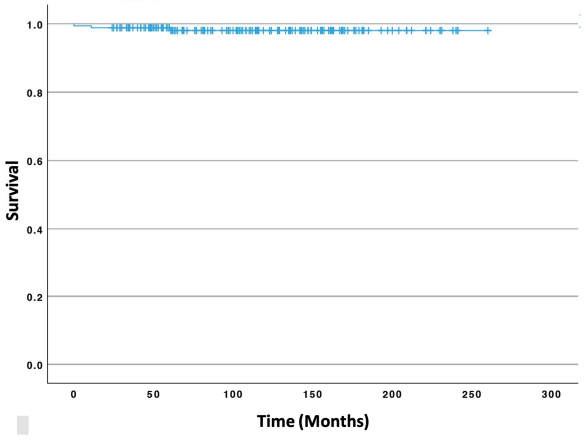

Figure 2 Kaplan-Meier Survival Estimates for All-Cause Re-Revision