Comparative Survival of Contemporary Cementless Acetabular Components Following Revision Total Hip Arthroplasty

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INTRODUCTION: Component design and technology has rapidly advanced over the last two decades. The advent of porous ingrowth surfaces and highly crosslinked polyethylene have been expected to dramatically improve implant survivorship, particularly in the revision setting. Therefore, we sought to evaluate the survival of contemporary cementless acetabular components following revision total hip arthroplasty (THA).

METHODS:

7334 revision THAs performed between 2000 and 2019 were identified from our institutional total joint registry. Of these, 7 cementless acetabular designs, implanted in 3969 hips, were included. These were paired with either highly crosslinked polyethylene (HXPE), dual-mobility, or constrained liners. The four most frequently used acetabular components were the Zimmer Trabecular Metal (TM) Porous Revision shell (n=2169, median follow-up 6 years), Stryker Tritanium Revision shell (n=566; median follow-up 5 years), Zimmer Trilogy metal-mesh (n=397, median follow-up 11 years), and Depuy Pinnacle Porocoat (n=329, median follow-up 9 years). Kaplan-Meier analysis was performed to assess the survivorship free of acetabular re-revision. A historical series of 260 Harris-Galante-1 (HG-1) acetabular components was used as reference.

RESULTS: There were 322 aseptic re-revisions (8%), of which 73 (1.8%) required acetabular revision. Components with adequate follow-up all had 10-year survivorship free of acetabular revision of >94%. Compared to historical control, Zimmer TM Revision (HR 0.38, 95%CI 0.26-0.56, p<0.001), Zimmer TM Modular Acetabulum (HR 0.33, 95%CI 0.13-0.87, p=0.03), Zimmer Trilogy Metal Mesh (HR 0.44, 95%CI 0.26-0.75, p=0.002), Depuy Pinnacle Porocoat (HR 0.26, 95%CI 0.12-0.54, p<0.001), and Stryker Tritanium Revision (HR 0.49, 95%CI 0.25-0.95, p=0.04) components had significantly less acetabular revision at 10-years. There were only 35 (0.9%) cases of acetabular aseptic loosening, ten of which occurred in metal-mesh components.

DISCUSSION AND CONCLUSION: Modern acetabular ingrowth and bearing surfaces have improved on historic results at the mid-term. Contemporary designs have improved revision free survivorship, and aseptic loosening, particularly with porous surfaces, is a less common failure modality.