

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

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INTRODUCTION: The last two decades have seen remarkable technological advances in total hip arthroplasty (THA) implant design. Porous ingrowth surfaces and highly crosslinked polyethylene (HXLPE) have been expected to dramatically improve implant survivorship. The purpose of the present study was to evaluate survival of contemporary cementless acetabular components following primary THA.

METHODS: 16,424 primary THAs performed for osteoarthritis between 2000 and 2019 were identified from our institutional total joint registry. Patients received one of 12 contemporary cementless acetabular designs with HXLPE liners. Components were grouped based on ingrowth surface into 4 categories: porous titanium (n=10,951, mean follow-up 5 years), porous tantalum (n=1227, mean follow-up 5 years), metal mesh (n=2680, mean follow-up 6.5 years), and hydroxyapatite (HA) coated (n=1566, mean follow-up 2.5 years). Kaplan-Meier analyses were performed to assess the survivorship free of acetabular revision. A historical series of 182 Harris-Galante-1 (HG-1) acetabular components was used as reference.

RESULTS: The 10-year survivorship free of acetabular revision was >98% for all 4 contemporary cohorts. Compared to historical control, porous titanium (HR 0.47, 95% CI 0.34-0.66, p<0.001), porous tantalum (HR 0.72, 95%CI 0.54-0.97, p=0.03), and metal mesh (HR 0.76, 95%CI 0.64-0.90, p<0.001) ingrowth surfaces had significantly lower risk of acetabular revision at 10 years. There was no difference between HA-coated and HG-1 acetabular survivorship (HR 0.59, 95%CI 0.24-1.46, p=0.254). There were 16 cases (0.1%) of acetabular aseptic loosening that occurred in 8 (0.07%) porous titanium, 5 (0.2%) metal mesh, and 3 (0.2%) HA-coated acetabular components. 7 of the 8 porous titanium aseptic loosening cases occurred in one known problematic design. There were no cases of aseptic loosening in the porous tantalum group.

DISCUSSION AND CONCLUSION: Modern acetabular ingrowth surfaces and HXLPE liners have improved on historical results at the mid-term. Contemporary designs have extraordinarily high revision-free survivorship, and aseptic loosening is now a rare complication.