First Revision Total Hip Arthroplasty for Instability: 10-Year Outcomes and Risk Factors Associated for Re-Revision

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INTRODUCTION: Recurrent instability remains a leading cause of failure after revision total hip arthroplasty (THA). There is conflicting data regarding the optimum treatment strategy and the current literature is limited by relatively short follow-up times and heterogenous cohorts. The aim of this study was to assess the 10-year survivorship of the first revision THA when undertaken for instability and identify patient and surgical factors associated with failure.

METHODS: A retrospective review of the prospectively maintained database from our tertiary referral centre was performed to identify 678 patients that underwent revision THA for instability during the study period (2000 to 2022). Of these cases, 290 (42.8%) were the first revision procedure and met inclusion criteria for the current study. We excluded re-revisions and/or oncology reconstructions. The patient median age at revision was 65 years (inter-quartile range (IQR) 56-76), 182 (63.2%) were female; and the median body mass index (BMI) was 28.1 (IQR 24.3-32.2). The mean study follow-up was 11.4 years (range of 2 to 22) and there were 82 (28.3%) deaths during the study period. The main patterns of hip instability were classified as malposition of the acetabular component (27.7%), impingement (36.7%) or late polyethylene wear (19.4%). Most revisions involved either modular exchange (liner + femoral head) (44.5%) or acetabular component revision with modular exchange (39.4%). The primary outcome was re-revision for instability. Re-revision was defined as addition or exchange of implants. Implant survivorship at 10 years was calculated using Kaplan-Meier estimates with 95% confidence intervals (CI). Multivariable Cox proportional hazard regression modelling was used to assess variables associated with 10-year survival and are reported as hazard ratios (HR) with 95% CI.

RESULTS:

A total of 84 (29%) hips underwent at least one re-revision. Most failures (77.8%) occurred within 5 years of the initial revision surgery and the indications for re-revision were recurrent instability (66.7%), periprosthetic joint infection (13.3%), pseudotumour formation (8.9%), loosening and wear (6.7%), and periprosthetic fracture (4.4%). Ten-year survivorship estimates were 80.9% (95%CI 76.0-86.1) for instability as the primary end-point (Figure 1) and 72.4% (95%CI 66.8-79.2) when considering all-cause re-revision THA. Modular component exchange alone was associated with re-revision for instability compared to procedures which included revision of the femoral stem, acetabular component, or both (HR 1.89 95% CI 1.1-4.1, p = 0.02). Dual mobility (DM) components had significantly higher 10-year instability-free survival than both standard bearings and constrained liners (Figure 2) (log rank p = 0.04). However, when considering ‘large’ (>36mm) femoral heads, there was no difference in the risk of re-revision when compared to DM components (p=0.59). Constrained liners were associated with a higher risk of revision for instability (HR 2.7 95%CI 1.05-6.8, p=0.01). The factors associated with increased all-cause re-revision risk within 10 years were younger age at surgery (HR 0.65 95%CI 0.42-0.97, p = 0.002), elevated BMI (HR 1.3 95%CI 1.01-1.65, p=0.01), abductor deficiency (HR 2.1 95%CI 1.1-4.1, p=0.03) and using a constrained liner (HR 2.3 95%CI 1.3-4.9, p = 0.04).

DISCUSSION AND CONCLUSION:

There is a high 10-year rate of failure when the first revision THA is undertaken for hip instability. Approximately 20% will experience recurrent instability and nearly 30% will undergo a further revision procedure. Modular exchange alone increased the risk of recurrent instability. DM reduced this risk, but not more than large femoral heads. Constrained liners were associated with re-revision for instability, but a selection bias was likely present. Younger age, elevated BMI, and abductor deficiency were independently associated with increased risk of both instability-specific and all-cause re-revision. These findings may help guide implant selection and inform patient counselling in the setting of revision THA for instability.