

Introduction

Studies on the success of primary total hip arthroplasty are well documented in the literature and survival rates are generally reported to be over 90% at long-term follow-up.^{1,2} Unfortunately, some are not successful and require eventual revision. The burden of primary and revision hip arthroplasty could reach epidemic proportions in this country over the next 20-30 years. With a projected increase of 137% in revision total hip arthroplasties over the next two to three decades, it is crucial for us to evaluate the success and identify modes of failure for this procedure.³ The purpose of our study was to critically analyze a large group of revision total hip arthroplasties to determine the major reasons for failure, survivorship, and whether the major modes of failure had changed during the time period of the study.

Methods

Between 1986 and August 2005, 1100 revision total hip arthroplasties (1036 patients) were performed. As a tertiary referral center, the majority of cases were referred for revision surgery. Our institution's total joint registry identified repeat revisions and performed a retrospective review of medical records. Revision surgery was defined as any surgery that involved an open procedure to address a failure mode of the primary hip arthroplasty. Revision diagnoses of the index revision and repeat revision were documented as well as respective dates of surgery.

Time to failure and failure rate were calculated for the entire cohort as well as by each diagnosis. The dates of index revision were stratified into three equivalent time periods: time period 1 index procedures performed from January 1986 through July 15 1992; time period 2 from July 1 1992 through February 28 1999; and time period 3 from February 29 1999 through August 2005. There were 594 females and 442 males. The average age was 63.7 years (22-96). Standard descriptive statistics were calculated. Survivorship analysis was conducted using the Kaplan-Meier method. If patients had not been evaluated within 6 months, phone surveys were conducted.

Figure 1: Survivorship by Diagnosis

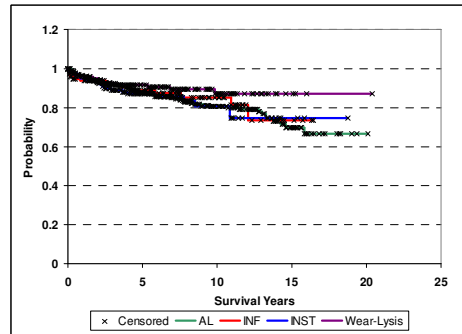
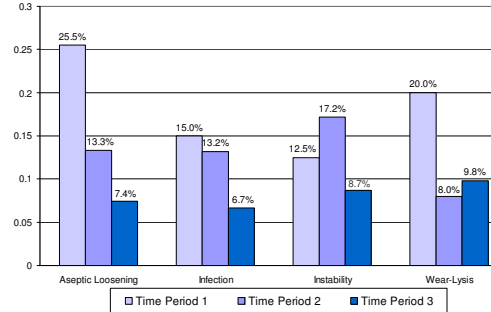


Figure 2: Failure Rate by Diagnosis and Time Period



Results

The main indications for revision surgery were aseptic loosening in 498 hips (45.2%), instability in 172 hips (15.6%), osteolysis and/or wear in 172 hips (15.6%), infection in 118 hips (10.7%), and periprosthetic fracture in 63 hips (5.7%). There were 77 miscellaneous indications (7%) for revision surgery including implant fracture (33), failed/painful bipolar (30), heterotopic ossification (7), nonunion (6) and unexplained pain (1). The index revisions consisted of 522 full component revisions (48%), 275 acetabular revisions (25%), 170 femoral revisions (15%), and 133 acetabular polyethylene liner +/- head exchange (12%).

One hundred and forty-one (13%) revision total hip arthroplasties in 139 patients required second revision. The average time to failure from the index revision was 44.0 months (range 0.3 to 190.3 months). Survivorship for revision total hip arthroplasty using second revision as endpoint was 82% at 10 years. See Figure 1 for survivorship by diagnosis. The reasons for failure requiring a second revision were instability in 49 hips (35%), aseptic loosening in 42 hips (30%), infection in 17 hips (12%), osteolysis and/or wear in 17 hips (12%), and periprosthetic fracture in 3 hips (2%). There were 13 miscellaneous reasons (9%) for failure including implant and/or liner fracture (9), nonunion (1), painful bipolar, and heterotopic ossification (1). When stratified by time period, failures for aseptic loosening decreased, while failures for wear and osteolysis increased. See Figure 2. Forty-three hips (30%) required a second revision for the same diagnosis as their index revision while 98 hips (70%) required a second revision for a different diagnosis.

Conclusion

Revision total hip arthroplasty was successful in 87% while 13% of procedures required repeat revision. While we were able to solve the original problem necessitating revision on a consistent basis (70%), a certain percentage of procedures eventually failed for other reasons. Aseptic loosening and instability accounted for 65% of these failures. The routine use of large head technology, enhanced fixation methods and improved bearing surfaces may improve these results and diminish the need for repeat revision.

References

- Callaghan JJ, Tooma GS, Olejniczak JP, Goetz DD, Johnston RC: Primary hybrid total hip arthroplasty: an interim followup. Clin Orthop 1996;333:118.
- Engh CA, Culpepper WJ, Engh CA: Long-term results of use of the anatomic medullary locking prosthesis in total hip arthroplasty. J Bone Joint Surg 1997;79:177.
- Barrack RL, Sawhney J, Hsu J, Cofield RH: Cost analysis of revision total hip arthroplasty. A 5-year followup study. Clin Orthop 1999;369:175