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Modes of Failure in Total Hip Arthroplasty

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The rate of primary total hip arthroplasties (THAs) in the United States has increased over the past decade by approximately 50%, and it is estimated to rise by 174% in the next 20 years.^{1,2} It is estimated that by 2030 there will be nearly 100,000 revision hip procedures for any reason performed per year in the United States.² Causes of failure leading to the need for revision include hardware infection, joint instability, component loosening, and periprosthetic fracture. In a nationwide database review, Bozic et al evaluated the mechanisms of failure after THA in the United States performed within 15 consecutive months between 2005 and 2006.³ The most common causes for revision hip arthroplasties were instability and dislocation (accounting for 22.5%), followed by aseptic loosening (19.7%) and periprosthetic infection (18.4%).³ Similar numbers were reported in a retrospective study assessing the causes for implant failure in total hip replacement.⁴ According to this study, instability contributed to 35%, aseptic loosening to 30%, osteolysis and wear to 12%, infection to 12%, and periprosthetic fracture to 2% of revisions.⁴ The purpose of this chapter is to describe the failure mechanisms in these most prevalent causes of revision THA.

INFECTION

Introduction

Periprosthetic hip infection remains the most devastating complication after THA, due to its association with high morbidity and cost. With improvements in the operating room environment (ie, body exhaust systems, laminar air flow, minimal operating room traffic) and the use of antibiotic prophylaxis, the overall incidence of infection has decreased over the past 20 years.⁵⁻⁷ However, in the past decade Dale et al have documented a small but increasing infection rate (in this study, the relative risk of revision due to infection was 3.0 for patients who underwent THA between 2003 and 2007, when compared with those who were implanted between 1987 and 1992).⁸ Although the exact reasons for this are unknown, this might reflect an increased awareness or surveillance for periprosthetic infections in recent years.