Influence of Prosthetic Design on Squeaking after Ceramic-on-Ceramic Total Hip Arthroplasty

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DISCLOSURE: No author has received anything of value or owns stock in any company or institution related directly or indirectly to the subject of this study.

INTRODUCTION
Squeaking ceramic-on-ceramic total hip arthroplasties are a cause for concern. Although used in Europe for almost 40 years, ceramic-on-ceramic has been associated with some problems such as squeaking until FDA approved for US clinical use in 2003. Since then, many studies have attempted to elucidate the etiology of squeaking. Proposed causes include component malposition causing impingement or “edge loading,” ligamentous laxity leading to microseparation and stripe wear, inadequate lubrication, particle size and metal composition, and design defects.

The primary author began implanting ceramic-on-ceramic total hips in 1999. Over the course of 10 years, four distinct implant brands were utilized. However, an unusually high incidence of intense, audible squeaking became apparent shortly after implanting a cohort of Stryker Trident acetabular components and Accolade femoral stems. This study was undertaken to determine if squeaking is related to this particular implant combination and to elucidate any other factors which might be related to squeaking.

METHODS

From November 1999 through February 2007, the primary author implanted 306 ceramic-on-ceramic total hip arthroplasties in 307 patients. The acetabular component designs were used as follows: 1) PAA Orthopedics (PA, PAA Trident II+), 2) Stryker Trident, 3) Wright Medical Universal, and 4) DePuy Stryker. Femoral component designs used were the ProLite Orthopedics (P-LL, Stryker Accolade), and Wright Medical Profemur-Z.

In this study, 203 patients with 270 total hips were contacted telephonically to complete a survey regarding squeaking of their hip prosthesis. Only patients with a minimum of 4 years of followup were included in this study. Demographic and operative data were collected by questionnaire and review of the patients' medical records.

Additionally, all patients who reported squeaking were matched with controls based on nine matching criteria. Acetabular number of squeakers vs. controls in the nine matching criteria.

RESULTS

Table 1 presents the incidence of squeaking after ceramic-on-ceramic total hip arthroplasty implanted by one surgeon over an 8-year period. The incidence of squeaking in this cohort was 8.8%. The incidence of squeaking in the control group was 2.2%.

Table 2 presents the incidence of squeaking after ceramic-on-ceramic total hip arthroplasty implanted by one surgeon over an 8-year period. The incidence of squeaking in this cohort was 8.8%. The incidence of squeaking in the control group was 2.2%.

Table 3 presents the incidence of squeaking after ceramic-on-ceramic total hip arthroplasty implanted by one surgeon over an 8-year period. The incidence of squeaking in this cohort was 8.8%. The incidence of squeaking in the control group was 2.2%.

CONCLUSIONS

Based on the findings of this study, the authors recommended against the use of the Stryker Trident cup with the Acollade stem and the use of short necks in ceramic-on-ceramic total hip arthroplasty. Ceramic-on-ceramic arthroplasties should be used with caution in rheumatoids. Further research would likely elucidate the mechanisms causing squeaking in these subgroups of patients.