Risk Calculators for Failure of Knee and Hip Replacement In a Large Health Maintenance Organization

Christopher F. Ake, PhD
Elizabeth W. Paxton, MA
Maria C. Inacio, MS
Monti Khadot, MD
E. Eric Yue, MD
Robert S. Namba, MD
Ted T. Farahbahi, MD

Introduction

- Each year in the United States over 750,000 total joint replacement (TJR) surgeries are performed.
- While TJR implants can last 10-20 years, replacements more often fail and require revision surgery.
- The increased risk and cost associated with revision procedures emphasize the need for prevention. Identification of risk factors associated with TJR failures and revisions is one method for potentially reducing TJR revision rates.

Discussion

- The total joint revision rates in this study were similar to those published previously. Similar to other studies that have examined revision risk factors, our study identified gender, age, BMI, diagnosis, and diabetes as risk factors of revision.
- These risk factors were included in a prognostic risk calculator to enhance patient and surgeon clinical decision making.

Strengths:
- Large number of TJR cases used, with revision cases adjudicated by chart review of all cases.
- Development of pragmatic prognostic risk calculators that can be applied in a clinical decision making setting.

Limitations:
- Potential bias due to the proportion of cases with missing values which were not used in model development.
- These risk predictors have yet to be validated in other populations and outside our healthcare setting and may not predict as well in these situations.

Future versions of these risk calculators can benefit from surgeon feedback concerning additional candidate predictors to examine, such as prior knee surgery, steroid use, and Hemoglobin A1c levels, as well as ways to improve calculator website interface design, and greatly reduced levels of BMI missingness.

Conclusion:

Total joint revision risks calculators may assist surgeons and patients in clinical decision making at the point of care. Identification of risk factors to influence treatment decisions may reduce revision total joint replacement and enhance quality of care.

References