Risk Factors for Manipulation After Total Knee Arthroplasty: A Pooled Electronic Health Record Database Study

Kiel J. Pfefferle, MD¹, Scott T. Shemory, MD¹, Matthew F. Dilisio, MD², Stephen D. Fening, PhD¹, Ian Gradisar, MD³.
¹Summa Health Systems, Akron, OH, USA, ²Summa Health System, Akron, OH, USA, ³Crystal Clinic Orthopedic Center, Akron, OH, USA.

Disclosures:

Introduction: Total knee arthroplasty (TKA) is a reliable surgical procedure for relieving pain, restoring mobility, and improving quality of life in patients with degenerative knee pathology. Stiffness following TKA is a relatively common complication (termed arthrofibrosis), and generally is initially treated with a manipulation under anesthesia when severe. However, the risk factors for postoperative arthrofibrosis are not well understood. The purpose of this study is to identify risk factors for postoperative stiffness requiring a manipulation under anesthesia after TKA between groups stratified by race, sex, nicotine dependence or depressive disorders.

Methods: A commercially available software platform, Explorys, (Explorys, Inc., Cleveland, OH), was used to query a multicenter electronic healthcare database consisting of the medical records of over 24 million patients. The incidence of manipulation under anesthesia within 90 days of total knee arthroplasty was determined, and the relative risks with 95% confidence intervals (CI) were then calculated for defined risk factors including race, sex, nicotine dependence and depressive disorders. A subgroup analysis of African American females was also performed. The Pearson’s Chi Squared statistical instrument was used to determine significance (p<0.05).

Results: Of the 184,580 patients that had undergone a total knee arthroplasty, 2,810 (1.5%) had undergone manipulation under anesthesia within 90 days of total knee arthroplasty. Female sex, African American race and nicotine dependence demonstrated a relative risk of 1.27 (CI: 1.17-1.362), 2.51 (CI: 2.32-2.73) and 1.34 (CI: 1.26-1.52) respectively, when compared the group without the defined risk factor. A statistically significant difference was found between all three groups (p<0.001). African American females had the highest relative risk of manipulation under anesthesia (2.77, CI: 2.52-3.01) compared to non-African American females (p<.001). Depressive disorders were not found to be a significant risk factor (p=0.26).

Discussion: Total knee arthroplasty is a successful and cost effective procedure. As the demand for total knee arthroplasty continues to rise, it is paramount to identify risk factors associated with adverse outcomes. Stiffness following TKA can lead to continued pain, decreased function and patient dissatisfaction. To our knowledge this is the largest cohort of patients analyzed for risk factors of MUA following TKA. A total of 146,650 patients with TKA were analyzed and a MUA rate of 1.7% was found. The Explorys platform has been used in previous studies to analyze large cohorts of patients. A pooled EMR database allows for large cohort analysis otherwise not possible. Until a joint registry is fully implemented in the United States, pooled EMR databases such Explorys may serve as a surrogate to conduct studies requiring a large number of patients.

Significance: African American race, female sex and nicotine dependence are statistically significant risk factors for manipulation under anesthesia after TKA. African American females had the highest risk. Defining patient risk factors for postoperative arthrofibrosis will allow physicians to counsel patients on their individual risks factors preoperatively and closely monitor patients postoperatively.

Acknowledgments:

References:

ORS 2014 Annual Meeting
Poster No: 0847