Improving outcomes of lateral unicompartmental knee arthroplasty with robotic-assisted surgery

AUGART MA, PLATE JF, SEYLER TM, VON THAER S, ALLEN J, SUN D, POEHLING GG, JINNAH RH

Department of Orthopaedic Surgery, Wake Forest School of Medicine, Winston-Salem, NC, USA

jplate@wakehealth.edu

Introduction: Unicompartmental knee arthroplasty (UKA) has seen renewed interest in recent years due to improved surgical techniques and prosthetic design, and the desire for minimally invasive surgery. For patients with limited degenerative disease, UKA offers a viable alternative to total knee arthroplasty. Historically, the outcomes of lateral compartment UKA have been inferior to medial compartment UKA, with suboptimal patient satisfaction and increased revision rates. Robotic-assisted UKA has been shown to improve precision and accuracy of component placement, which may improve outcomes of lateral UKA. The purpose of this study was to compare the outcome of robotic-assisted UKA to conventional UKA for degenerative disease of the lateral compartment. The hypothesis of the study was that robotic-assisted lateral UKA results in superior outcomes compared to conventional UKA.

Methods: A search of the institution’s joint registry was conducted to identify patients who underwent UKA for limited degenerative disease of the lateral knee compartment. A total of 130 lateral UKAs were identified that were performed between 2004 and 2012. The mean age of the patients was 63.1 years (range, 20 to 88); patients had a mean BMI of 29.9 (range, 18 to 48). The medical records of all patients were reviewed and assessed for the type of surgical procedure used (robotic-assisted versus conventional), length of hospital stay, Oxford knee score, and occurrence of revision surgery.

Results: A total of 93 robotic-assisted and 37 conventional UKA were analyzed. At a mean follow-up 35 months (range, 1 to 107 months), the mean Oxford scores in the robotic-assisted and conventional group were similar (39.6 versus 35.9, p=0.135). The length of stay was significantly shorter after robotic-assisted UKA (1.7 days) compared to conventional UKA (2.3 days, p<0.001). There were significantly more revisions in the conventional UKA group [6 conversions to total knee arthroplasty (TKA), 2 tibial component exchanges] compared to robotic-assisted UKA (2 conversions to TKA, p<0.001).

Discussion and Conclusions: The findings of this study revealed a decreased revision rate in robotic-assisted lateral UKAs compared to conventional lateral UKA. Furthermore, patients who received robotic-assisted UKAs had a shorter postoperative hospital stay compared to patients who received conventional UKA. However, overall surgical outcomes were similar in both patient cohorts based on similar postoperative Oxford scores.

UKA is a technically challenging procedure with limited joint visualization and less tolerance for acceptable component position; a two-degree error may lead to UKA failure. Malaligned components may lead to impaired joint biomechanics causing pain and disease progression to other knee compartments. Robotic-assisted UKA systems offer increased accuracy of component placement with objective soft-tissue balancing. Improved component positioning with robotic-assisted UKA systems may improve the long-term survival of UKA in patients with limited lateral degenerative disease, which is performed less often than medial UKA.

References