Conventional versus robotic-arm assisted medial unicompartmental knee arthroplasty: A 20-year analysis of radiographic and clinical outcomes

John Wilson, Dominic Marino, Giovanni Ayala, Layanne Nayfeh, Brian Palumbo, Michael A Miranda

INTRODUCTION:

Unicompartmental knee arthroplasty (UKA) is a current surgical treatment option for knee osteoarthritis, representing 5-8% of all knee replacements in 2022 (1). However, there have been disadvantages reported following UKA, namely, reduced long-term survivorship of UKA compared to TKA (4). UKA can be performed robotically or with conventional instruments. This project aims to investigate functional outcomes and failure rates following robotic UKA versus conventional UKA at a minimum of two years of follow-up.

METHODS:

This retrospective analysis compared the revision rate between conventional versus robotic assisted medial UKA at a single institution performed by fellowship-trained arthroplasty surgeons. Secondary outcomes included radiographic parameters and outcome measurements of cUKA compared to rUKA. This included 687 patients over a 20-year time frame. *Revision* in this study was defined as surgical intervention to the UKA that required mechanical alteration in the component and excluded debridement, antibiotics, and implant retention (DAIR).

RESULTS:

719 patients were included in this study; 421 patients underwent a rUKA, and 298 were in the cUKA group. We found a clinically statistically significant revision rate difference between cUKA and rUKA. We observed 27 revisions (9.06%) in the cUKA group and 15 revisions (3.56%) in the rUKA group. The indication for revision includes subsidence, implant loosening, progression of arthritis in adjacent compartments, and polyethylene wear. The paper also demonstrated statistical differences in outcome scores and two radiographic parameters.

DISCUSSION AND CONCLUSION:

It is crucial to determine the most effective and beneficial way to perform UKA to maximize patient outcomes and improve survivorship. While UKA has significant benefits and pitfalls regardless of standard versus robotic technique (1-6), evidence supports a lower revision rate in the rUKA (12,13). This was a statistically significant value with an increased revision rate of 254% in the cUKA population compared to the rUKA population in this study.