

Introduction: Simultaneous bilateral total knee arthroplasty (TKA) is a viable option in selected patients. The aim of this study was to compare clinical and functional outcomes between robotic-assisted and conventional bilateral TKA performed in one stage.

Methods: A retrospective study was conducted including 63 patients who underwent simultaneous bilateral TKA with a minimum follow-up of one year. Patients were divided into two groups: procedures performed with an arm-based robotic-assisted system (n=42) and conventional surgery (n=21). Demographic data, perioperative outcomes, complications, and functional results assessed with the Forgotten Joint Score-12 (FJS-12) were analyzed.

Results: Mean age was 63.2 years in the robotic-assisted group and 65.4 in the conventional group (p=0.198). Transfusion was required in 76.1% of conventional cases compared with 14.2% in the robotic-assisted group (p<0.001). Mean postoperative hematocrit was 26.7 in the conventional group and 31.8 in the robotic-assisted group (p<0.001). Mean length of hospital stay was 6.38 days for conventional surgery and 3.76 days for robotic-assisted procedures (p<0.001). No significant differences were observed in tourniquet time between groups. One periprosthetic joint infection occurred in the conventional group and none in the robotic-assisted group (p=0.306), while no superficial infections were reported in either group. Functional outcomes were similar, with mean FJS-12 scores of 84.3 for the conventional group and 86.3 for the robotic-assisted group (p=0.757).

Conclusions: Robotic-assisted simultaneous bilateral TKA was associated with significantly lower transfusion requirements, higher postoperative hematocrit, and shorter hospital stays compared with conventional surgery. No differences were observed in tourniquet time, infection rates, or functional outcomes. These findings suggest that robotic assistance may improve perioperative safety in selected patients undergoing simultaneous bilateral procedures. The retrospective design, limited sample size, and minimum follow-up of one year represent limitations of this study.