Robotic-arm assisted total knee arthroplasty is associated with improved early functional recovery compared with conventional total knee arthroplasty

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Aims : The objective of this study was to compare early postoperative functional outcomes between conventional jig-based total knee arthroplasty (TKA) and robotic-arm assisted TKA.

Patients and Methods : This retrospective cohort study included 112 consecutive patients undergoing conventional TKA (group 1) followed by 58 consecutive patients receiving robotic-arm assisted TKA minimum 1 year follow up (group 2). Inpatient functional outcomes, clinical and radiological outcomes during follow up were collected in all study patients. The clinical outcomes were collected using the KSS, WOMAC and Feller scores. Measured radiologic parameters of two groups were compared, which were measured by AI program. (Medial proximal tibial angle(MPTA), Joint line convergence angle (JLCA), mechanical lateral distal femoral angle (mLDFA), Hip-knee-ankle angle (HKA angle), weight bearing line (WBL,%) and joint line obliquity angle (JLOA))

Results There were no systematic differences in baseline characteristics between the conventional TKA and robotic-arm assisted TKA treatment groups with respect to age ($p = 0.35$), sex ($p = 0.513$), body mass index ($p = 0.676$), American Society of Anesthesiologists score ($p = 0.731$), preoperative haemoglobin level ($p = 0.851$) and preoperative radiologic parameters ($p>0.05$). Robotic-arm assisted TKA was associated with reduced postoperative pain ($p < 0.001$) at POD 1 and 2, decreased analgesia requirements ($p < 0.001$) at POD 1 and 2, and improved maximum knee flexion angle at discharge (POD 7) ($p < 0.001$) compared with conventional TKA. However, there were no significant differences in clinical outcomes at final follow up. There was significant difference in postoperative MPTA angle (group 1 vs group 2, 91.8±1.8 vs 90.5±2.1, $p=0.001$), but others were not significant. There was also no significant difference of outliers (>3°) between groups. (group 1 vs group 2, 8.6% (5/58) vs 13.4% (15/112), $p=0.361$)

Conclusion : Robotic-arm assisted TKA was associated with decreased early pain, improved early functional recovery compared with conventional TKA. However, other outcomes were not significantly different during follow up. Further follow-up studies are required to investigate the long-term outcomes