Robotic-assisted versus conventional total knee arthroplasty: A Systematic Review and Meta-analysis

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Aim: To compare robotic-assisted total knee arthroplasty (TKA) and conventional TKA on both long-term and short-term follow-up.

Methods: For conducting this study, we searched four electronic databases. The outcomes were pooled as mean difference (MD) or risk ratio (RR), and 95% confidence interval. We used RevMan for performing the analysis.

Results: We included nine studies. The data showed a significant favoring of robotic-assisted TKA than the conventional one in mechanical alignment, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and femoral coronal outliers (MD = -1.10, 95% CI [-1.51, -0.69], p < 0.00001), (MD = -1.19, 95% CI [-2.35, -0.03], p = 0.04), and (RR = 0.49, 95% CI [0.30, 0.80], p = 0.004) respectively. On the other hand, the conventional TKA was better in range of motion-flexion (long-term) than the robotic-assisted one (MD = -3.02, 95% CI [-3.68, -2.37], p < 0.00001). However, there were no significant differences between them in knee society score-knee score, knee society score-function score, change in hospital for special surgery, and change in range of motion-extension (MD = -0.36, 95% CI [-2.43, 1.70], p = 0.73), (MD = -0.34, 95% CI [-2.36, 1.68], p = 0.74), (MD = 0.78, 95% CI [-0.84, 2.40], p = 0.34), and (MD = 0.16, 95% CI [-1.32, 1.64], p = 0.83) respectively.

Conclusion: Robotic-assisted TKA had better outcomes than conventional TKA regarding mechanical alignment and WOMAC. However, the conventional approach showed a better range of motion-flexion in the long term. More data is needed for the long-term outcomes.