Robotic vs Navigational vs Conventional Primary Total Knee Arthroplasty. Clinical and Radiological Long-Term Results with a Minimum Follow-up of 10 years − Survivalship Analysis −

Seung-Min Na, Gun-Woo Kim, Nam-Hun Lee, Young-Woo Chung Jong-Keun Seon and Eun-Kyoo Song
Center for Joint Disease, Chonnam National University Hwasun Hospital seonbell@chonnam.ac.kr

Abstract

1. Introduction

The aim of this study was (1) to compare the clinical and radiological outcomes of robotic, navigational and conventional total knee arthroplasty (TKA) with a minimum follow-up of 10 years, (2) to evaluate the survival rate, (3) and to estimate the accuracy of the three techniques.

2. Methods

We evaluated 515 knees who underwent robotic, navigational or conventional TKA with minimum follow-up of 10 years. Finally, this study including 92 patients (103 knees) who underwent robotic TKA using ROBODOC®, 197 patients (225 knees) who underwent navigational TKA using Orthopilot, and 175 patients (187 knees) who underwent conventional TKA. Hospital for special surgery (HSS) score, Knee Society Score (KSS), Western Ontario and McMaster Universities (WOMAC), and Range of Motion (ROM) were used for clinical evaluation. Mechanical alignment, implant radiological measurements and outliers were analyzed for radiological results. Complication related with surgery was also evaluated.
Figure 1: Flowchart of the cohort

2004 - 2007 Cohort
508 patients
(578 knees)

Robotic Group
203 patients
(208 knees)

182 patients
(187 knees)
Lost in follow-up
21 patients
Died
27 patients

155 patients
(160 knees)
Outpatient Clinic
110 patients
(115 knees)
Phone Interview
45 patients
(45 knees)

196 patients
(230 knees)
Conventional Group
305 patients
(333 knees)

273 patients
(323 knees)
Lost in follow-up
32 patients
Died
37 patients

Phone Interview
76 patients
(84 knees)

Figure 2: ROBODOC®-assisted total knee arthroplasty
3. Results

All clinical assessments including HSS, KSS, WOMAC, and ROM at final follow-up showed improvements in three groups (all, p<0.05), without any significant difference between the groups (p>0.05). In radiologic data, sagittal inclination of femoral implant in robotic group showed better result than another groups (p<0.05). The cumulative survival rate was 94.8% in the robotic group, 96.2% in the navigation group, and 92.4% in the conventional group with excellent survival (p=0.563). Complication rate was 5.2% in the robotic group, 5.3% in the navigation group, and 8% in the conventional group.

4. Conclusion

Our study showed excellent survival with robotic, navigation and conventional TKA and similar clinical outcomes at long-term follow up. However, in terms of radiological outcome robotic TKA showed accurate position of femoral component. With longer follow-up and larger cohort, the accuracy and effectiveness of robotic TKA can be elucidated in the future.
References


Sharkey PF, Lichstein PM, Shen C, Tokarski AT, Parvizi J (2014) Why are total knee arthroplasties failing today—has anything changed after 10 years? J Arthroplast 29:1774–1778


Song EK, Seon JK, Yim JH, Netravali NA, Bargar WL (2013) Robotic-assisted TKA reduces
postoperative alignment outliers and improves gap balance compared to conventional TKA. Clin Orthop Relat Res 471:118–126


Herry Y, Batailler C, Lording T, Servien E, Neyret P, Lustig S (2017) Improved joint-line restitution in


