Primary Total Knee Arthroplasty Using a Cementless Highly Porous Titanium Tibial Baseplate: a Minimum 10-year Follow-up

Michael Joseph Stoltz, Maunil Mullick, Erik W Van Eperen, Langan S Smith[1], Madhusudhan Reddy Yakkanti[2], Arthur L Malkani[3]
[1]UofL Health, [2]Louisville Orthopaedic Clinic, [3]University of Louisville

INTRODUCTION:
Historically, cemented total knee arthroplasty (TKA) has been the gold standard. Due to higher failure rates of cemented implants in obese, younger, and active males along with increasing life span, cementless TKA has had a resurgence due to the potential of long-term biologic fixation. With the introduction of highly porous implants, cementless TKA has garnered greater interest along with increased usage demonstrated in the AJRR database. The purpose of this study was to evaluate the clinical and radiographic results of primary TKA using a cementless highly porous tibial baseplate with a minimum 10-year follow-up.
METHODS:
This was a retrospective study with 200 consecutive, primary cementless TKAs using the same highly porous tibial baseplate. 23 patients were deceased, 22 lost to follow-up, and 5 unable to participate leaving 150 cases available for review with a minimum 10-year follow-up. The mean BMI was 34.7 (range: 19.7-63.9), with 73 males and 127 females, with a mean age at surgery of 62.7 years (range: 40-85). Outcome measures included knee range-of-motion (ROM), Knee Society score (KSS), KOOS JR score, Forgotten Joint Score (FJS-12), PROMIS-10 score, patient satisfaction, revision incidence, and radiographic findings. Statistical analysis involved paired t-tests to compare preoperative and postoperative scores.
RESULTS:
Mean KSS Function and Knee scores improved from 46.0 and 40.4 preoperatively to 77.4 and 90.2, postoperatively ($p=<0.0001$). The mean postoperative KOOS JR score was 85.7, FJS-12 mean of 82.5, and PROMIS-10 Mental Health mean of 54.1 and Physical Health of 47.1. Range of motion improved from a preoperative mean flexion of 105 degrees and 2.4 degrees of extension to 118.8 degrees of flexion and 0 degrees of extension at 10 years ($p=<0.0001$). 98.6% (141/143) of the patients in the cohort were very satisfied or satisfied. There were 7 revisions: 1 aseptic tibial loosening, 2 instability, 1 extensor mechanism rupture, 1 patella subluxation, 1 infection, and 1 for unexplained pain revised at an outside facility. Survivorship with all-cause failure as the endpoint at 10 years was 95.3% and 99.5% with aseptic loosening as the endpoint. Radiographic evaluation demonstrated no evidence of osteolysis or progressive radiolucent lines.
DISCUSSION AND CONCLUSION:
Cementless TKA using a highly porous, tibial baseplate at 10-year follow-up provided effective pain relief, high patient satisfaction, with 95.3% survivorship. Given the significant increase in the use of cementless TKA, the results of this study appear promising. Current design cementless TKA appears to be a sound alternative to cemented TKA especially in younger, obese, and more active patients undergoing primary TKA providing durable results at 10 years follow-up.