The Fate of Highly Porous Titanium Tibial Cones in Revision Total Knee Arthroplasty: A Multicenter 5-year Minimum Follow-up Study

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INTRODUCTION: Metaphyseal fixation is paramount for long term survivorship following revision total knee arthroplasty (rTKA). Highly porous titanium cones have been introduced to optimize metaphyseal fixation in cases of bone loss. Although it has been shown to have excellent short-term survivorship, mid-term follow-up results are lacking. The purpose of this multicenter study is to assess the mid-term survivorship of highly porous titanium tibial metaphyseal cones at a minimum follow-up of 5 years.

METHODS: We conducted a multi-center retrospective chart review of 231 patients who underwent rTKA using highly porous titanium tibial cones between June 2015 and May 2018. Out of this cohort, 80 (35%) patients were excluded due to: amputation (n=9); death (n=27); lost to follow-up (n=40); or only had femoral cones implanted (n=4) (Figure 1). A total of 151 rTKA patients were analyzed (40 septic and 111 aseptic). Demographics and baseline surgical characteristics were noted. Survivorships of rTKA and tibial cones were established. At latest follow-up, radiolucencies of surviving implants were evaluated according to the Knee Society grading system (either stable, warranting close observation, or loose). Mean follow-up of surviving cones was 6 years (2,179 days) (range, 1,770 to 3,089 days).

RESULTS: Overall, the mean age and body mass index (BMI) of patients at the time of cone implantation was 64.4 years (range, 32 to 84) and 34.6 kg/m2 (range, 19.6 to 61.4), respectively. Demographics are shown in Table 1. A tibial stem without offset was utilized alongside the tibial cone in 148 (98%) patients while 3 (2%) of patients did not have tibial stems implanted. Cemented tibial stems were utilized in 129 (87.2%) patients and short (\leq 75 mm) tibial stems were utilized in 144 (77%) patients. Baseline surgical characteristics are presented in Table 2. Out of the 151 patients included, 30 (19.9%) underwent a subsequent TKA revision: 19 (63.3%) for periprosthetic joint infection (PJI), 2 (6.7%) aseptic loosening, 1 (3.3%) periprosthetic fracture, 5 (16.7%) instability, and 3 (10%) for other reasons. At latest follow-up, according to Knee Society grading system, 115 (95.0%) of surviving rTKAs were deemed stable, 3 (2.5%) warranted close observation, and 3 (2.5%) were loose. Notwithstanding, only 14 (9.3%) tibial cones were ultimately extracted or revised: 11 (78.6%) for PJI, 1 (7.1%) for periprosthetic fracture, and 2 (14.3%) for instability. Overall, there were no significant differences on cone survivorship between septic (n=35, 87.5%) and aseptic (n=102, 91.9%) rTKAs (p=0.52). All results are displayed in Table 3.

DISCUSSION AND CONCLUSION: In the entire series, at a minimum follow-up of 5 years, cone survivorship for any reason was 90.7% with no significant differences between septic (87.5%) and aseptic (91.9%) rTKAs. Our data supports the use of highly porous titanium tibial cones to improve metaphyseal fixation when in presence of bone loss in the setting of revision total knee arthroplasty.

