Distal Femur Replacement for Oncologic vs. Non-Oncologic Indications: A Comparative Analysis of Outcomes

ABSTRACT

Introduction: Distal femur replacement (DFR) is utilized for both oncologic and non-oncologic indications. Despite sharing implant design, these populations differ substantially in age, comorbidity burden, and preoperative functional status. The present study compares perioperative characteristics, postoperative complications, functional outcomes, and implant survivorship between oncologic and non-oncologic DFR.

Methods: A 10-year retrospective review was conducted of 119 patients undergoing DFR at our institution (69 oncologic; 50 non-oncologic). Outcomes included postoperative complications, readmission, reoperation, amputation, revision to arthrodesis, 6-month ambulatory status, and implant survivorship. Statistical analyses included Mann-Whitney U and chi-square/Fisher's exact tests. A 1:1 propensity score-matched sensitivity analysis (24 pairs) was performed based on age, BMI, Charlson Comorbidity Index, and primary versus revision status.

Results: Oncologic patients underwent DFR for primary bone tumors (85.5%) or metastatic disease (14.5%), while non-oncologic indications included periprosthetic fracture (50%), revision TKA (24%), and PJI (14%). Oncologic patients were younger (40 vs. 70 years, $p<0.001$), with lower BMI (26 vs. 34, $p<0.001$), lower ASA class (2 vs. 3, $p=0.002$), and fewer prior revisions ($p<0.001$). Non-oncologic patients had higher EBL (400 vs. 250 mL, $p<0.001$), more transfusions (16.0% vs. 2.9%, $p=0.017$), and longer hospital stays (6 vs. 4 days, $p=0.031$). Overall complications were higher in the non-oncologic group (62.0% vs. 40.6%, $p=0.034$), including conversion to arthrodesis (17.0% vs. 1.4%, $p=0.003$), while readmission, reoperation, PJI, and amputation rates were similar. Independent ambulation at 6 months was achieved in 66.2% of oncologic versus 14.6% of non-oncologic patients ($p<0.001$). Implant survivorship favored the oncologic cohort (log-rank $p=0.009$). Findings were maintained in the propensity score–matched cohort.

Conclusion: DFRs demonstrate similar readmission, reoperation, PJI, and amputation rates regardless of indication. Non-oncologic DFR was associated with greater EBL, higher complication rates, and worse 6-month ambulatory status. These findings persisted after propensity score matching, underscoring the need for individualized patient optimization.