Risks for Nonunion in Periprosthetic Distal Femur Fractures

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Purpose: Our objective was to determine the risk factors for nonunion for periprosthetic distal femur fractures (PDFFs).

Methods: This was a retrospective chart review of a multicentered database of PDFFs (AO 33A-C[VB1, C1, D1], Su types 1-3) managed operatively with open reduction and internal fixation (ORIF) with either lateral locked plating, retrograde intramedullary nailing, nail-plate combination, or dual plating. Exclusion criteria were acute management with a distal femur replacement, less than 6 months of follow-up, and lack of injury or follow-up radiographs. The primary outcome measure was nonunion, defined as an operation requiring return to the operating room to achieve bony union. Comparisons were made between union and nonunion cases. Univariate analysis was used to identify factors to be analyzed in multivariate analysis to determine independent risk factors for nonunion.

Results: A total of 77 patients met inclusion criteria. Union rate was 69/77 (89.6%). There were no differences between the groups for age, sex, body mass index, comorbidities, Su classification, open injury, or mechanism of injury. Multivariate analysis identified risks for nonunion including postoperative malalignment (odds ratio [OR] 1.41; confidence interval [CI] 1.20-1.64; P<0.001), notching preoperatively (OR 1.22; CI 1.04-1.42; P = 0.012), presence of screws through fracture line (OR 1.28; CI 1.17-1.39; P<0.001), plate length <12 holes (OR 1.16; CI 1.02-1.33; P = 0.024), and screw density (OR 2.18; CI 1.25-3.78; P = 0.006)

Conclusion: The nonunion rate for PDFF was 10.4%. While limited by total case number, we identified postoperative malalignment, notching preoperatively, presence of screws through fracture line, plate length <12 holes, and screw density as independent risk factors for nonunion.