A Randomized Controlled Trial of Locked Plating Versus Retrograde Nailing for Periprosthetic Distal Femur Fractures

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Purpose: Periprosthetic fractures of the distal femur (PPDFs) above a total knee arthroplasty (TKA) are challenging to manage and substantial controversy exists regarding the ideal fixation strategy. One such area of controversy is locked plating (LP) versus retrograde intramedullary nailing (RIMN). We conducted a multicenter, randomized controlled trial of LP versus RIMN for the treatment of PPDFs.

Methods: 94 patients with a PPDF amenable to both treatment groups were randomized to either LP or RIMN. Patients were followed for 2 years. Our primary outcome was the timed up and go (TUG) test at 3 months. Secondary outcomes included the Knee Society Score (KSS), rates of nonunion, malunion, reoperation, and mortality.

Results: 53 patients were randomized to LP and 41 patients to RIMN. Follow-up data for our primary outcome were available for 82% of patients. No significant differences were observed between groups in the TUG test at 3 months (56.5 ± 57.0 seconds in the LP group vs 50.0 ± 51.5 seconds in the RIMN group, P = 0.62), or any time point thereafter. Similarly, no significant differences were observed in KSS scores at any time point. Nonunion occurred in 3/40 (7.5%) of patients in the LP group at 1 year versus 0/30 (0%) patients in the RIMN group (P = 0.25). Malunion was less common in the LP group 4/43 (9.3%) vs the RIMN group 13/36 (36.1%) (P = 0.003). Reoperation occurred in 5/40 patients (12.5%) in the LP group at 1 year versus 1/30 patients (3.3%) in the RIMN group (P = 0.23). Mortality rates were similar in both groups at 1 year (13% LP group vs 14.3% RIMN group, P = 1.0).

Conclusion: This randomized controlled trial of LP versus RIMN for the treatment of PPDFs did not demonstrate any significant differences between the 2 fixation strategies with respect to functional outcomes. Malunion was significantly more common in the RIMN group. Nonunion and reoperation occurred more frequently in the LP group, although the differences were not significant and both events were infrequent. Both LP and RIMN are acceptable treatment options for the management of PPDFs above a TKA.

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