Treatment of Infraisthmal Femoral Fracture with Intramedullary Nail: Is Retrograde Nailing a Better Option Than Antegrade Nailing?

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Purpose: Although intramedullary (IM) nailing is an ideal option for the treatment of femoral shaft fractures, it may be difficult to fix the fracture distal to isthmic level effectively due to widening of the medullary canal. Moreover, short working length of the IM nail can have a negatived effect on the union. We tried to compare the results of infraisthmal femoral shaft fractures treated with antegrade and retrograde nails.

Methods: 60 patients with infraisthmal femoral shaft fracture treated by IM nailing and followed for over 1 year were enrolled, including 38 cases of antegrade nailing (A group) and 22 retrograde nailing (R group). According to AO/OTA classification, there were 35 cases of type A fractures (A1: 1, A2: 11, A3: 23), 16 cases of type B fractures (B1: 2, B2: 7, B3: 7), and 9 cases of type C fractures (C2: 4, C3: 5). There was no obvious difference in age, gender, or level of fracture between the two groups. Radiologic evaluation including bony union, union time, and alignment were performed, and functional result was assessed by using the Knee Society scoring system. Complications including nonunion and malalignment were analyzed in accordance with the level of fracture, type of fracture, and operative method.

Results: Mean follow-up duration was 29.5 months (range, 12-133). In group A, primary bony union rate was 73.7% (mean 20.7 weeks; range, 12-41), and that of group R was 86.4% (mean 17.4 weeks; range, 12-30). We could not discover a significant difference in the union rate ($P = 0.251$, X^2 test) and union time ($P = 0.897$, Mann-Whitney test) between the 2 groups. There were no cases of malalignment greater than 10° in any plane in both groups. Mean Knee Society score in group A was 92 (range, 62-100) and that of group R was 91 (range, 83-95), showing no significant difference ($P = 0.297$, X^2 test). Although the level of fracture was not significantly related to the union rate ($P = 0.584$, Mann-Whitney test), patients who had ratio of the shortest distance from distal femoral joint line to the fracture to the shortest distance from distal tip of IM nail to the fracture less than 0.75 were found to be particularly prone to nonunion ($P = 0.003$, X^2 test).

Conclusion: Although no difference was found in terms of type of IM nail used for the treatment of infraisthmal femoral shaft fracture, IM nails with shorter working length distal to the fracture had a strong relationship to nonunion.