

Optimal Intramedullary Nailing for Trochanteric Fractures: The Importance of Distal Locking Screw and Reduction Position

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Purpose: The biomechanical advantages of nails have led to a rapid global increase in their use. When addressing the distal locking issue, some authors have stated that distal locking is not necessary for most trochanteric fractures (AO 31A1 + A2). On the other hand, others advocated distal locking screws. Therefore, the purpose of this study was to investigate the complications using a Gamma nail without distal locking screws. Further, the relationships were evaluated between these complication rates and their reduction positions after operation.

Methods: 365 operations were performed for trochanteric fracture (AO 31A1 + A2) at our clinic from 2012 to 2018. Of these, patients with follow-up periods >3 months were 218. The Gamma3 IM (intramedullary) Nailing System was used for all patients. 146 patients (Unlocked group) from 2012 to 2016 were operated without distal locking screws. 72 patients (Locked group) from 2016 to 2018 were operated with distal locking screws. We retrospectively analyzed those patients who suffered complications such as delayed healing and postoperative peri-implant fractures and cut-out of the lag screw. Further, in lateral view of their radiographs, we evaluated the position of the proximal fragment compared with distal fragment just after operation and at 1 week after operation to investigate what positions affected complications. The reduction positions were divided into 3 groups: anterior (subtype A), neutral (subtype N), and posterior (subtype P) according to the Ikuta classification.

Results: The mean age of the sample of 218 patients was 84.0 ± 5.2 years. The sample was comprised of more women than men (76.5% vs 23.5%). Tip-apex distance (TAD) was 15.45 ± 3.69 in Unlocked group and 16.22 ± 2.97 . Canal filling ratio was 0.804 ± 0.081 and 0.733 ± 0.091 . And, there was also no significant difference in fracture pattern between these groups. In Unlocked group, complications were shown in 94 patients (Complication group). Delayed healing was shown in 94/146 (64.4%) in Unlocked group and 12/72 (16.7%) in the Locked group. Peri-implant fracture was shown in 3/146 (2.1%) in Unlocked group and 0/72 (0%) in Locked group. Cut-out of the lag screw was shown in 4/146 (2.7%) in Unlocked group and 1/72 (1.3%) in Locked group. In the Complication group, subtype P was more than in the Non-complication group. And, most cases in the Complication group lost their reduction position from just after operation to 1 week after operation. There was a statistically significant difference between these group as for subtype P just after operation.

Conclusion: In the current study, a higher number of complications was seen in the distal unlocked group compared with the distal locked group. Our study showed the position of the proximal fragment might be associated with the complications such as delayed healing and postoperative peri-implant fractures and cut-out of the lag screw. Without distal locking, a tip of the nail can swing in a femur canal, which may lead to the instability associated with complications. We concluded that nailing without distal locking screws might be dangerous and subtype P should be avoided.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.