Do We Really Need the Largest Possible Size of the Proximal Femoral Nail Antirotation (PFNA) in Intertrochanteric Fracture? A Study of Distal PFNA Intramedullary Canal Occupying Ratio (ICOR)

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Purpose: Our objective was to assess the impact of the intramedullary canal occupying ratio (ICOR) on bone union and the stability of fixation in intertrochanteric fracture treatment using the short proximal femoral nail antirotation (PFNA).

Methods: A retrospective analysis was conducted in elderly intertrochanteric fracture patients who subsequently underwent short PFNA surgery. The patients were divided into 3 groups based on their ICOR values, which ranged from 0.48 to 0.93. These groups were determined as follows: Group 1 had ICOR values from 0.48 to 0.72, Group 2 had values from 0.73 to 0.81, and Group 3 had values from 0.82 to 0.93. The bone union were assessed using the Radiographic Union Score for Hip (RUSH) at 2, 6, and 12 weeks post-surgery. To assess the stability of the fixation, we quantified difference in the neck-shaft angle, horizontal offset, and vertical offset by comparing radiographs taken immediately after the surgery with those obtained at the 3-month follow-
up. Furthermore, a multivariate regression analysis was employed to investigate the correlation between RUSH score and fixation stability, taking into consideration various factors including gender, age, body mass index, American Society of Anesthesiologists classification, AO fracture classification system, and ICOR.

Results: Data were collected from 151 patients. Among the 3 groups classified based on ICOR, no statistically significant differences were observed in the mean RUSH scores and fixation stability parameters at all time points. Our multivariate regression analysis further indicated the absence of correlation between RUSH score and ICOR. Additionally, the differences in the neck-shaft angle showed a statistically significant relationship with ICOR, albeit lacking clinical significance.

Conclusion: Our findings demonstrated that there is no significant association between ICOR and the timing of fracture union or the stability of fracture fixation. For clinical application, in situations where intraoperative estimation for nail size falls between available sizes, we recommend selecting the smaller-sized nail to minimize the risk of intramedullary reaming. This approach serves to mitigate potential complications such as increased blood loss and extended operative time.