

Comparative Functional Outcome and Complications Including Mechanical Failure Between Proximal Femoral Nail Antirotation (PFNA) With Cement Augmentation and Standard PFNA for Intertrochanteric Fracture in Elderly Patients: A Prospective Comparison Study

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Purpose: The incidence of hip fracture in elderly patients has been projected to increase worldwide and was associated with morbidity and mortality. There were comparable results between intramedullary device and extramedullary device for stable-type intertrochanteric fracture while intramedullary nail was appropriately applied for unstable intertrochanteric fracture. However, there was some mechanical failure from proximal femoral nail antirotation (PFNA) blade cut-out in clinical practice after osteoporotic hip fracture fixation. Some literature has identified potential of polymethylmethacrylate cement-augmented helical PFNA blades to improve implant stability only in human cadaveric study. One prospective study demonstrated PFNA with cement augmented blade in clinical practice, but they had no control group. The purpose of our study was to compare functional outcome and complication between PFNA with cement augmentation and standard PFNA for intertrochanteric fracture in elderly patients.

Methods: A prospective comparison study was done from low-energy trauma intertrochanteric fracture in elderly patients who underwent PFNA from 2016 until 2017. All patients had Singh index less than grade 4. Patients were classified into 2 groups: augmented PFNA group (n = 25) and standard PFNA group (n = 75). The former group defines that those patients underwent PFNA fixation with cement augmentation while the latter group is those patients who underwent standard PFNA fixation. The primary outcome was to compare the rate of mechanical failure (PFNA blade cut-out) in both groups. The secondary outcome was to compare time to radiographic union (weeks), functional outcome assessed by Harris Hip Score (HHS), and complications including mortality rate at 1 year. HHS was measured into 2 aspects in all patients: pre-fracture state by interview and postoperative state at 1-year follow-up. Surgical complications (mechanical failure including PFNA blade cut-out, blade cut through, and varus collapse) and mortality rate were compared between groups.

Results: There was no difference in demographic data and comorbidity including Charlson Comorbidity Index (CCI). Fracture pattern was assessed by modified AO/OTA 2018. There were no significant differences in fracture pattern (stable and unstable type) between groups. Even though rate of mechanical failure (PFNA blade cut-out) was not significantly different between groups (0% vs 4%, $P = 0.571$), the standard PFNA group had 4.0% (n = 3) mechanical failure (2 blade cut-out and 1 varus collapse). However, time to radiographic union, 1-year functional outcome, and mortality rate were comparable in both groups.

Conclusion: PFNA with cement augmented blade is safe and this may be useful as an alternative surgical fixation for elderly patients with osteoporotic hip fracture to prevent mechanical failure including PFNA blade cut-out.