

Short Nail or Long Nail? Should Radiation Exposure and Surgeon Safety Be Considered in Decision Making? A Single Centre Retrospective Analysis of Radiation Exposure During Intra Medullary Nailing of Proximal Femur Fractures

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Purpose: Hip fracture fixation surgery involves common procedures that are performed regularly in every hospital in the UK; these procedures require fluoroscopic assistance in the operating theater that exposes both the surgeon and the patient to the hazard of ionizing radiation. Surgeon risk is magnified if the operation was performed more than once in the same list. Short intramedullary and long intramedullary nails are both options of fixation for neck of femur fractures, with abundance of data comparing their mechanical and clinical outcomes; however, there is a scarcity of literature investigating the radiation exposure for both the surgeons and patients.

Methods: The aims of the study are to (1) provide a normalized dose of radiation for the long and short intramedullary nails for cases of fracture neck of femur and (2) compare the radiation dose in each procedure type. A retrospective analysis of prospectively collected data for patients who underwent the long intramedullary nail fixation for fracture neck of the femur and short intramedullary nail procedures for the same injury in a single major trauma center in London, UK. The data collected include demographic data, procedure type, and fluoroscopic radiation dosage data recorded. The radiation dosage parameters include the cumulative dose in mGy, cumulative dose area product (DAP) (Gy cm²), and the time of exposure (mm:ss).

Results: A total of 108 patients were included in the study, all of whom had an isolated proximal femur fracture and were treated with either short TFNA (trochanteric fixation nail–advanced; Synthes USA) (42%) or a long intramedullary nail (RAFN [retrograde/antegrade femoral nail], LFNA [lateral femoral nail–advanced], or long TFNA; Synthes USA) (58%). Age range was 22 to 100 years with a median age of 78 years. The cumulative dose mgY for the short nails ranged from 0.158 to 31.40 (mean 7.350, median 5.115) compared to 1.42 to 39.70 (mean 10.9154, median 7.660); $P = 0.01196$. The exposure time ranged from 0:21:00 to 9:13:00 (mean 1:32:00, median 1:13:00) for the short nail compared to 0:23:00 to 7:47:00 (mean 2:32:01, median 2:12:00); $P = 0.01494$. SPSS software was used for statistical analysis applying the Wilcoxon rank sum test with continuity correction after samples failed the Shapiro-Wilk normality test.

Conclusion: The results confirmed significant difference in the radiation dose and exposure time between the 2 procedures. As the radiation exposure in long nails is almost double, we recommend the use of the short nail when the fracture pattern and clinical scenario allow.