

Subtrochanteric Fractures: Does Open Reduction Increase the Risk of Infection and Fracture Healing Complications?

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Purpose: The aim of our study was to investigate if open reduction of fractures involving the subtrochanteric region resulted in a higher incidence of infection and fracture healing complications.

Methods: Following IRB approval, all consecutive patients presenting with a fracture involving the subtrochanteric region were retrospectively identified (January 2009-December 2016). Exclusion criteria included patients undergoing their primary operations at other institutions and patients lost to follow-up.

Results: 560 patients fulfilled the eligibility criteria and were included in the study. 261 patients had an open reduction of their fracture. The mean age of this group was 70.48 years (SD [standard deviation] 21.00), 139 were female, mean ASA (American Society of Anesthesiologists) was 2.70 (SD 0.90), and 22 patients had an ISS >16. Time to operation was 1.93 days (SD 2.01), duration of operation was 126.67 min (SD 44.43), the grade of senior surgeon in theaters was a consultant in 131 cases and length of hospital stay (LOS) was 21.89 days (SD 18.76). 299 patients on the other hand were managed with a closed reduction, with a mean age of 75.31 years (SD 17.14), while 203 were female, mean ASA was 2.75 (SD 0.79) and 14 patients had an ISS >16. Time to operation was 2.25 days (SD 2.89), duration of operation was 97.38 min (SD 37.54), grade of senior surgeon in theaters was a consultant in 123 cases and LOS was 22.75 days (SD 19.34). 16 patients from the open reduction group and 19 patients from the closed reduction group died before discharge from hospital. When we compared the 2 groups, statistically significant differences were identified in age ($P = 0.003$), gender ($P = 0.001$), fracture classification as per AO ($P = 0.005$), duration of operation ($P < 0.001$), and grade of senior surgeon ($P = 0.035$), whereas these groups were otherwise comparable. Regarding the incidence of infection, in the open reduction group there were 17 patients diagnosed with deep and 28 patients with superficial infections, compared to 3 and 4 patients, respectively, in the closed reduction group ($P < 0.001$). Moreover, there were 29 patients in the open reduction group and 26 patients in the closed reduction group diagnosed with a nonunion ($P = 0.320$). Further linear regression analysis of the factors contributing to risk of infection identified only open reduction as being statistically significant, having an odds ratio (OR) of 4.60 (confidence interval [CI]: 1.87- 11.30). On the contrary, no factor was identified to be contributing to the risk of fracture healing complications (delayed or nonunion).

Conclusion: This study demonstrates that the single predictive factor of infection following intramedullary nailing of subtrochanteric fractures is need for open reduction (OR 4.60). Open reduction, however, is not associated with an increased risk of delayed/nonunion, but it is associated with increased operating times, which may reflect a more complex fracture pattern.