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Choice of nail diameter for acute diaphyseal tibial fracture at a Major Trauma Centre: An audit of practice

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Background: Bone healing depends upon an ideal mechanical and biological environment. Intermedullary nailing for diaphyseal fractures aim to provide an environment which is mechanically and biologically appropriate for bone healing. Conflict exist among the orthopaedic community about the ideal nail thickness with some advocating using a tight fitting nail¹, while others suggest use of unreamed smaller diameter nails² because of the adverse effect of excessive reaming on blood supply^{4,5}, leading some authors to. Donegan et al. showed that nails with an intramedullary nail to canal diameter ratio of less than 0.8 or greater than 0.99 are 4.4 times more likely not to heal than patients with a ratio of between 0.8 and 0.99.⁶ The aim of this study is to determine the choice of nail diameter used for tibial shaft fractures at a Major Trauma Centre and also to evaluate various factors that could have contributed to the choice.

Methodology: A retrospective analysis of all tibial nails performed for acute diaphyseal fractures of tibia during one-year period from June 2018 to May 2019 was performed. Nail to canal diameter ratio was determined using post-operative X-rays. For comparative analysis nails were divided into two groups. Group A had nails with nail to canal diameter ratio of 0.8 or more and Group B had the nail to canal diameter ratio of less than 0.8. Group were compared for complexity of fracture (AO class), Open vs closed fracture, location of fracture, joint involvement, mechanism of injury (isolated vs. polytrauma), grade of surgeon performing surgery, presence of consultant during surgery, single vs. multiple surgeries at the same setting and timing of surgery.

Results: A total number of 47 tibial nails for acute diaphyseal fractures were performed during the study period. 8 nails were excluded due to non-availability of post-operative X-rays. Out of the 41 nails assessed, 30 (73%) had the nail diameter to canal ratio of 0.8 or more and 11 (27%) had the nail diameter to canal ratio of less than 0.8. The results of other variables evaluated are tabulated.

Conclusion: Over a quarter of tibial nails performed at a major trauma centre for acute diaphyseal tibial fractures had a nail to canal diameter ratio of less than 0.8 exposing them to significant risk of non-union. Apart from the fractures being open, none of the other variables was seen to negatively influence the surgeon's choice.

Biography

Mansoor Chaudhry is a Senior Trauma Fellow at James Cook University Hospital. He has worked through various orthopaedic roles in UK and abroad. His major interest lies in Trauma and has an extensive experience of orthopaedic trauma surgery that includes management of mass casualty situations.

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