



FEMORAL SHAFT FRACTURES MANAGED WITH CLOSED INTRAMEDULLARY NAILING AUGMENTED WITH USE OF BONE LEVERS THROUGH MINI OPEN STAB INCISIONS

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KEYWORDS :

INTRODUCTION

The treatment of choice for the femoral shaft fractures, presently, is closed intramedullary nailing.^{1,2} This mode of treatment has shown predictable fracture union with minimal complication rates.³ The favorable results are most likely due to preservation of surrounding soft tissue and fracture biology.^{4,5} A traction table is required for persistent traction for closed femoral nailing. Procedure is done under C-arm guidance and multiple radiation exposures are needed. We can use bone levers through small incisions to help smooth passage of guide wire into distal fragment. This may help us in reducing the surgical time and also reduce the cumulative radiation exposure.^{6,7} Open intramedullary nailing has the disadvantages of high infection rates and delayed union when compared to close nailing.^{8,9,10,11,12} We slightly modified the closed technique by performing mini percutaneous stab incisions away from the fracture site to aid reduction using bone levers. This method tends to decrease the operative time as well as the overall radiation exposure.

MATERIALS AND METHODS

We conducted our study on 86 cases of acute femoral shaft fractures who were managed with closed intramedullary nailing. The study was a prospective observational study conducted at Government Medical College hospital Jammu, from August 2017 to January 2020. We included acute diaphyseal and distal 1/3rd femoral fracture patients, of both sexes, aged more than 18 years. We excluded pathological fractures, neglected or non-acute injuries, open fractures and polytrauma patients. All the patients were operated within 1 week of injury. The surgery was performed under spinal anaesthesia in all cases. Functional outcomes were measured according to the classification proposed by Klemm and Borner.¹³ Preoperative radiographs were obtained in all cases to study the fracture location, pattern and comminution. Postoperative radiographs were taken to assess the quality of the reduction and subsequent fracture healing. Stable patients were discharged on 3rd post-operative day. Sutures were removed at 2 weeks post operatively. The patients were followed-up after every 3 months. We performed close intramedullary nailing using standard steps. We used small stab incisions away from the fracture site to help achieve reduction with the help of bone levers.

RESULTS

Among the 86 patients enrolled in our study, 8 were lost to follow up leaving 78 patients with isolated femur shaft fractures for final assessment. The study included 60 males and 18 females, with a predominant male to female ratio of 3.3:1. The mean age of the study participants was 34.8 years. The most common mode of injury was road traffic accident which was seen in 48 patients (61.53%), followed by fall from height and assault. The average operative time was 72 minutes. Reduction of fracture and passage of the guide wire, in no case, took more than 15 minutes. None of the patients required open reduction. In 58 patients (74.35%) fracture healed within 6 months. At 1 year, 70 patients (89.74%) showed union of fractures. 8 patients (10.25%) had delayed union and

were managed with exchange nailing with bone grafting. Eventually, all the fractures healed. 4 patients (5.12%) developed superficial infections which were managed with debridement and antibiotics. 2 patients (2.56%) had postoperative shortening of more than 2 cm. We achieved excellent to good results in 72 patients (92.3%) and in 6 patients (7.69%) had poor results.

DISCUSSION

Open reduction technique for the femoral shaft fractures has the big disadvantage of stripping the soft tissue and interfering with the blood supply of the bone. Hence, the chances of fracture non-union and infection are high. Closed nailing, on the contrary, is safe from these disadvantages and preserves the fracture biology. The procedure of close nailing helps deposit bone graft from the medullary canal during reaming of the bone.^{3,14,15}

Hence, the open technique is not used as a routine. However, some Orthopaedicians still advocate this method in view of reduced surgical time and radiation exposure.^{8,16} Closed technique is presently the preferred one as it helps preserve the soft tissue envelope which leads to predictable healing.¹⁷ The prolongation of operative time may put patients at added risk of surgery.^{18,19,20} We used small stab incisions away from the fracture site to help achieve reduction with the help of bone levers. We did not open the fracture site, hence fracture union was not compromised. Wolinsky *et al* reported a union rate of 98.9% with closed nailing.²¹ Our results were comparable to the quoted study. In our study, 4 patients (5.12%) developed superficial infections which were managed with debridement and antibiotics and 2 patients (2.56%) had postoperative shortening of more than 2 cm. The time consumed for reduction was reduced and the radiation exposure that is posed by multiple C-arm exposures was also reduced with the use of our mini-open stab technique. We achieved excellent to good results in 72 patients (92.3%) and in 6 patients (7.69%) had poor results.

CONCLUSION

Closed nailing continues to be the gold standard for the femoral shaft fractures. However, augmentation with mini open stabs away from the fracture site helps reduce the total surgical time and cumulative radiation exposure, while preserving the fracture biology.

REFERENCES

- Groves EW. Ununited fractures, with special reference to gunshot injuries and the use of bone grafting. *BJS*. 1918;6(22):203-47.
- Kuntscher G. The intramedullary nailing of fractures. *Clin Orthop*. 1968;60:5-12.
- Anastopoulos G, Asimakopoulos A, Exarchou E, Pantazopoulos TH. Closed interlocked nailing in comminuted and segmental femoral shaft fracture. *J Trauma*. 1993;35:772-5.
- Clawson DK, Smith RF, Hansen ST. Closed intramedullary nailing of the femur. *J Bone Joint Surg Am*. 1971;35:681-92.
- Hooper GJ, Lyon DW. Closed unlocked nailing for comminuted femoral fractures. *J Bone Joint Surg Br*. 1988;70:619-21.
- McFerran MA, Johnson KD. Intramedullary nailing of acute femoral shaft fractures without a fracture table: technique of using a femoral distractor. *J Orthop Trauma*. 1992;6:271-8.

7. Riska EB, Von Bonsdorff H, Hakkinen S, Jaroma H, Kiviluoto O, Paavilainen T. Primary operative fixation of long bone fractures in patients with multiple injuries. *J Trauma*. 1977;17:111-21.
8. Schatzker J. Open intramedullary nailing of the femur. *Orthop Clin North Am*. 1980;11:623-31.
9. Leighton RK, Waddell JP, Kellam JF, Orrell KG. Open versus closed intramedullary nailing of femoral shaft fractures. *J Trauma*. 1986;26:923-6.
10. Kempf I, Grosse A, Beck G. Closed locked intramedullary nailing. *J Bone Joint Surg Am*. 1985;67:709-19.
11. King KF, Rush J. Closed intramedullary nailing of femoral shaft fractures. *J Bone Joint Surg Am*. 1981;63:1319-23.
12. Rothwell AG, Fitzpatrick CB. Closed Kuntscher nailing of femoral shaft fractures: a series of 100 consecutive patients. *J Bone Joint Surg Br*. 1978;60:504-9.
13. Klemm KW, Borner M. Interlocking nailing of complex fractures of the femur and tibia. *Clin Orthop Relat Res*. 1986;(212):89-100.
14. Winquist RA, Hansen ST JR, Clawson K. Closed intramedullary nailing of femoral fractures. *J Bone Joint Surg Am*. 1984;66:529-9.
15. Winquist RA, Hansen ST JR. Segmental fractures of femur treated by closed intramedullary nailing. *J Bone Joint Surg Am*. 1978;60:934-9.
16. Harper MC. Fractures of femur treated by open and closed intramedullary nailing using the fluted rod. *J Bone Joint Surg Am*. 1985;65:699-708.
17. Whittaker RP, Heppenstall B, Menkowitz E, Montique F. Comparison of open vs. closed rodding of femurs utilizing a Sampson rod. *J Trauma*. 1982;22:461-8.
18. Baumgaertel F, Dahlen C, Stiletto R, Gotzen L. Technique of using the AO-femoral distractor for femoral intramedullary nailing. *J Orthop Trauma*. 1994;8:315-21.
19. Karpos PAG, McFerran MA, Johnson KD. Intramedullary nailing of acute femoral shaft fractures using manual traction without a fracture table. *J Orthop Trauma*. 1995;9:57-62.
20. Sirkin MS, Behrens F, McCracken K, Aurori K, Aurori B, Schenk R. Femoral nailing without a fracture table. *Clin Ortho*. 1996;332:119-25.
21. Wolinsky PR, McCarty E, Shyr Y, Johnson K. Reamed intramedullary nailing of the femur: 551 cases. *J Trauma*. 1999;46:392-9.