



REAMED VERSUS UNREAMED NAILING FOR FEMORAL SHAFT FRACTURES.

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ABSTRACT

BACKGROUND: Stabilization of fractures with an intramedullary nail is a widespread technique in the treatment of femoral shaft fractures in adults, however to ream or not to ream is still being debated. Intramedullary nailing is the mainstay of treatment femoral shaft fractures.

AIMS AND OBJECTIVE: The primary objective of this study was to determine clinical results following Unreamed versus ream intramedullary nailing of femoral fractures.

METHODS AND MATERIALS: Between November 2016 to December 2018, 100 patients with femoral shaft fractures were treated with Unreamed or reamed femoral nails in G.S Medical College and Hospital, Hapur. From this prospective single centre study, 18 patients were excluded due to insufficient follow-up data. According to the AO Classification, fractures in this study were either type A or B. Dynamic proximal locking was performed in all cases. The remaining 82 patients were divided in to two groups of 41 with ream or Unream nailing.

RESULT: There were no differences in radiologic union time. ($p=1$) or full weight bearing time ($p=0.74$) between ream and Unream nailing. In the ream group surgical time was about thirty minutes longer and differences were significant ($p=0.000$). We found no statistical difference between union time with or without reaming. On the other hand, there was significant increased operation length, blood loss and systemic changes in BP or So_2 in the ream group versus the Unream group. We also had pulmonary complication and radiation exposure in reamed group.

CONCLUSION: Unream nailing in traumatic femoral shaft fractures is a simple, safe and effective procedure with significant advantages, especially in multitrauma patients.

KEYWORDS : Intramedullary nailing, fracture fixation, femoral fracture and femur.

INTRODUCTION

The femur is the strongest, largest and heaviest long bone in the body. Femoral shaft fractures are the most common injuries which the orthopaedic surgeons come across, which are the result of severe trauma in young age. Patients who have low mineral density got their shaft fractured even by low impact trauma [1-6]. The treatment of femoral shaft fractures still remains a problem and a subject of controversy among orthopaedic surgeons. Knowing the advantages and disadvantages of different methods or technique, we can reduce morbidity, disability and period of stay in the hospital [2, 3]. Intramedullary nailing has become the standard treatment for diaphyseal femoral fractures. Proximal and distal locking of the intramedullary nail provides longitudinal and rotational stability [7, 8]. In addition, now a day's ante-grade reamed femoral nailing is popular since it has a high union and low infection and malunion rate. However, several concerns have been raised regarding local and systemic effects of reaming. Reaming disrupts the cortical blood flow and may cause variable degrees of thermal necrosis. With reaming procedures, the elevated intramedullary pressure can result in intravasation of fat and bone marrow contents. Reamed femoral nailing is associated with greater impairment of immune reactivity and with an increased consumption of coagulation factors. Intramedullary nailing also results in the stimulation of the inflammatory system. These systemic changes may contribute to pulmonary morbidity in patients with trauma [9-11]. In recent published review, it was concluded that reamed technique has better treatment results.

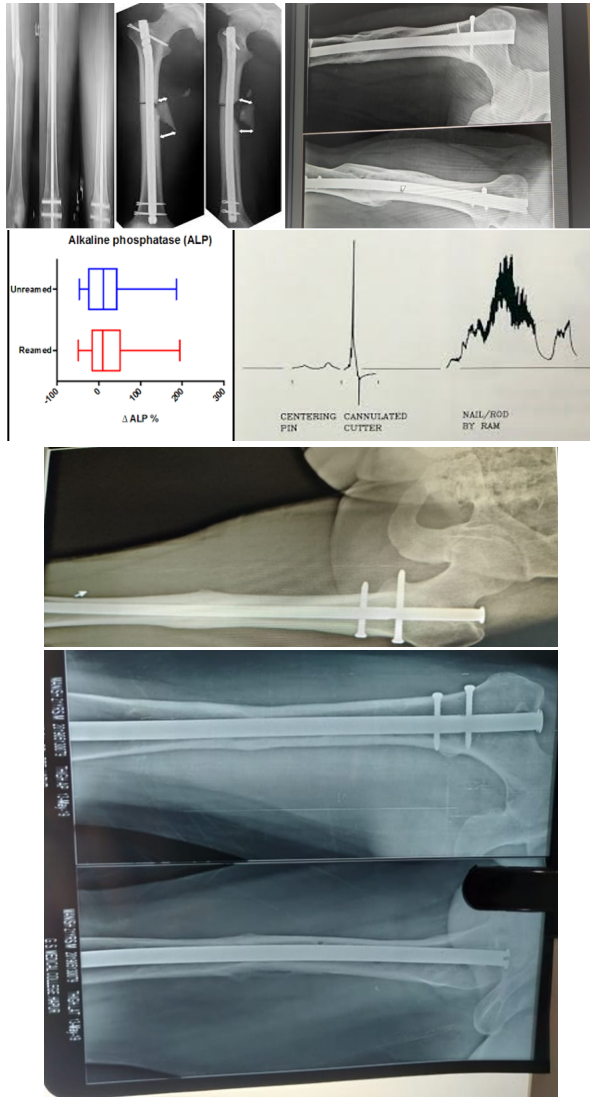
AIMS AND OBJECTIVE: To compare clinical results of Ream

versus unream intramedullary nailing for closed femoral fractures.

MATERIAL AND METHODS:

This study has been conducted from November 2016 to December 2018. 100 patients with acute, traumatic femoral shaft fractures were treated by ante-grade femoral nailing at G.S Medical College and Hospital, Hapur, U.P. All patients were skeletally mature. Clinical records and radiographs were reviewed by authors. From this prospective single centre study, 18 patients were excluded due to insufficient follow-up data. According to the AO Classification, fractures in this study were either type A or B. Dynamic proximal locking was performed in all cases. The remaining 82 patients were divided in to two groups of 41 with ream or Unream nailing. During and after surgery, we evaluated some variables and compared them between two groups. These factors included duration of surgery, bleeding during surgery, blood pressure change, O_2 Saturation change, cost of implant, radiologic union and the interval between surgery and full weight bearing. Blood loss during and after surgery was calculated by number of sponges, drainage collected in the suction system and hemovacs. According to AO classification, we selected patients with type A or type B fractures. All fractures were localized in the middle third of the femur. For Unream cases we used a 9mm solid nail (Synthes Pattern) and for ream case an 11-13 nail (Synthes Pattern). All patients in the study had isolated closed femoral fractures and we did closed intramedullary nailing (ream/Unream) with c-arm control. The section nails were statically or dynamically locked depending on fracture pattern. These patients were allowed progressive weight bearing in the first 6 weeks. There is no universally

accepted definition of non-union, thus we defined non-union as failure of clinical and radiological union after 9 months.



Selection criteria:

Inclusion Criteria:

1) All Male Patients with a mean age of 27 years (range 20-50 years). 2) All of the fractures were caused by traffic accidents.

Exclusion Criteria: 1) Patients with a pathological fracture of the femur and 2) Patients who underwent secondary operations were excluded.

RESULT:

Surgical time was about half an hour longer in the ream group, 119.4 minutes versus 80.4 minutes in the ream and unream group respectively ($p=0.000$). Bleeding during operation was averaged at 360.6 ml and 150.9 ml in the ream versus unream group respectively ($p=0.000$). Change in blood pressure during reaming or insertion of the nail occurred in 13 patients in the ream group and in 8 patients in the unream group. This variable was also significant according to the x^2 test ($p=0.015$).

We also documented oxygen saturation changes during reaming or insertion of nails in both groups. According to this data, 5 patients of the ream group and only 2 patients of the unream group experienced So_2 changes (x^2 test, $p=0.033$). We did not find any significant difference between the two groups (ream/unream) in the case of full weight bearing interval ($p=0.6$) and radiologic union ($p=0.1$). In our country the cost of

nails are higher for patients in the ream group than the unream group ($p=0.016$). We had 1 patient with pulmonary complication in reamed group like fat emboli and 1 patient with radiation hazards in reamed group. We did not have any implant failure and intra operative fracture. In one patient from the unream group (a type B fracture), loss of reduction occurred but he did not need revision surgery. Also in 1 patient from the ream group, a superficial infection occurred and was treated with antibiotics and drainage successfully.

DISCUSSION:

Long bone fractures specially in femoral, are very common in orthopaedic daily practice [12]. According to a recent Swedish registry report, it's estimated that annual incidence of femoral shaft fracture is about 0.1% [13]. The first locked intramedullary nail was introduced by Klemm and shellam in 1972 and then developed by Kempf and Gross [14, 15].

Comparative study of reamed and unreamed intramedullary nailing has given conflicting results and most of them have included relatively small sample size of patients [16-18]. Giannoudis et al found no difference in the rate of non-unions in their studies. These authors recommended the use of an unreamed technique, as it is quicker to insert and performs as well as to the reamed technique [19]. Several prospective, randomized clinical trials have been published comparing reamed and unreamed ante-grade femoral nailing. The rate of non-union ranged from 1% to 2% in the reamed group and from 0% to 8% in the unreamed group [17, 18]. Duan xin et al. report in their systematic review, significantly lower delay-union and non-union with the use of reamed nailing compared to unreamed nailing. ($p=0.002$ and $p=0.02$ respectively)[20]. Tornetta and Tiburzi analyzed 83 fractures that had reamed nailing and 89 fractures that had nailing without reaming. They found a significantly shorter time for union in the reamed group compared to the unreamed group. This was most evident in distal femoral fractures [21].

In the current study blood loss was higher in the ream group than the unream group ($p=0.000$). Tornetta P and Tiburzi D found similar results with more blood loss in ream group [21]. Surgical time was half an hour longer in the ream group and in comparison to the unream group, this difference was statistically valuable ($p=0.00$). In our study we had no nail breakage, one secondary loss of reduction occurred in the unream group but angulations were acceptable and did not need revision. There was no statistically different in implant failure rates in recently published review too [20].

Blood pressure and oxygen saturation during the operation were compared between ream and unream groups which showed statistically differences ($p=0.015$ for BP changes and $p=0.033$ for oxygen saturation difference). We advocate that unream nailing in traumatic femoral shaft fractures is a safe and effective procedure, especially in multi-trauma patients.

CONCLUSION:

Open or closed femoral intramedullary nailing should be based on type of fracture and its pattern of injury, equipments and instruments available and most certainly the experience of surgeon. Closed intramedullary nailing is for treatment of diaphyseal femur fractures in patients with poly traumatic injuries. Open nailing should be tried in case where an adequate reduction cannot be achieved by closed methods. Results of unreamed nailing are comparable to the reamed nailing with fewer complications.

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