

Outcome of Retrograde Interlocking Nail in Supracondylar Femur Fracture

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ABSTRACT

Objective: To determine the potential outcome of retrograde intramedullary nailing in supracondylar femur fractures in terms of fracture union and range of knee movement.

Methods: This descriptive case series study was conducted from June 2015 to November 2015. Study included 31 patients of either gender aged between 18-60 years presenting with supracondylar femoral fractures type 33A 1,2,3 which were fixed by retrograde interlocking nail technique using C-arm to make entry point and locking of nail. All patients were operated by one team in District Hospital Quarter Hospital Faisalabad. Outcome variable were frequency of union and functional outcome of knee range of motion

Results: The mean age of the patients was 38.77 ± 9.70 years with a male to female ratio of 5:1. Radiological and clinical union was established in 30 (96.8%) patients at 24th post-operative week while 1 (3.2%) patient was labeled to have non-union. The range of knee flexion increased gradually from 99.94 ± 9.98 degrees on 10th post-operative day to 122.13 ± 8.64 degrees on 24th post-operative week

Conclusion: Retrograde interlocking nail is an effective treatment option for supracondylar femur fractures with excellent union rate and functional range of motion at knee.

Key Words: Retrograde Interlocking Nail, Outcome, Supracondylar Femur Fracture

INTRODUCTION

Femoral fractures are typically the results of high-energy trauma and are usually associated with multiple injuries [1]. A good outcome of supracondylar femoral fractures is achievable by following fundamental principles of fracture reduction and stabilization. Selection of implant is dependent on fracture profile, quality of bone and the skills of surgeon. Although open reduction followed by internal fixation of the fracture may yield anatomical reduction, it is associated with the risks of wide soft tissue dissection resulting in infection and non-union. Biological osteosynthesis by saving the soft tissue envelop and the associated vascularity, diminishes the surgical insult at the fracture site and results in increased frequency of union with much lower complication rate [2].

Conventionally, stabilization of a supracondylar fracture of the femur has been achieved through open reduction. However, it is inevitable to damage soft

tissues and periosteum during open reduction, thus causing infection, bleeding, and non-union [3]. To avoid these problems, a minimally invasive method is needed, whether with a nail or a plate [4]. Stabilization of distal femoral fractures by retrograde nailing is a speedy procedure that doesn't require an extensive approach and can be performed through a small incision thus with minimal blood loss [5]. Using the modified technique, retrograde femoral nailing have been found to be a safe and successful treatment option in well selected patients [6,7]. Retrograde intramedullary nailing has been shown to give clinical results similar to dynamic condylar screw (DCS) and newer fixed-angled devices such as the less Invasive Stabilizing System (LISS) with less blood loss and shorter operating times [8,9,10]. The aim of the current study was to determine the potential outcome of retrograde intramedullary nailing in supracondylar femur fractures in terms of fracture union and range of knee movement.

METHODS

It was a descriptive case series conducted over 6 months period from Jun 2015 to November 2015. A total of 31 patients of either gender aged between 18 to 60 years presenting in accident and emergency

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department with supracondylar femur fracture and ipsilateral supracondylar femur and tibial shaft fracture and ipsilateral supracondylar femur along with fracture Neck Femur or Per Trochanteric fracture along with or without Tibia Fibula fracture were enrolled. Patients with open fracture (Gustilo type II, III), pathological fracture, non-united fracture and those having intercondylar involvement or unfit for anesthesia were excluded from this study. After initial resuscitation, these patients were kept on skeletal traction till the time of surgery. Written informed consent was taken from each patient. Preoperative 1g ceftriaxone was given intravenously at the time of induction and continued for 3 days post operatively in twice daily dosage. Tibial interlocking nail was used in interlocking mode as retrograde nail. Patients were encouraged to have regular knee exercises since 1st post operative day. Stitches were removed on 10th postoperative day and regular physiotherapy was started. Further follow-up was done at 6, 12, 18 and 24 weeks to evaluate knee stiffness and union. Weight-bearing was allowed when there was good radiological confirmation of callus formation. Non-union was declared when there was no radiological union at 24 weeks. All this data was recorded in a proforma.

RESULTS

The mean age of the patients was 38.77±9.70 years with a male to female ratio of 5:1 (Table 1). At 6 weeks follow up, 1 (3.2%) patient had radiological union. This frequency increased to 31 (48.4%) at 12 weeks follow-up. By 18th post-operative week radiological union was documented in 28 (90.3%) patients while it was clinically evident in 30 (96.8%) patients. Radiological and clinical union was established in 30 (96.8%) patients at 24th post-operative week while 1 (3.2%) patient was labeled to have non-union as per operational definition as shown in Table 2. The range of knee flexion increased gradually from 99.94±9.98 degrees on 10th post-operative day to 122.13±8.64 degrees on 24th post-operative week as shown in Table 3.

Table 1: Demographic features of Study Participants

Characteristics	Study Group (n=31)
Age (years)	38.77±9.70
Gender	
• Male	26 (83.9%)
• Female	5 (16.1%)

Table 2: Radiological and Clinical Union

Follow-up	Union
At 10 th Post-Operative Day	
• Radiological Union	0 (.0%)
• Clinical Union	0 (.0%)
At 6 th Post-Operative Week	
• Radiological Union	1 (3.2%)
• Clinical Union	0 (.0%)
At 12 th Post-Operative Weeks	
• Radiological Union	15 (48.4%)
• Clinical Union	15 (48.4%)
At 18 th Post-Operative Weeks	
• Radiological Union	28 (90.3%)
• Clinical Union	30 (96.8%)
At 24 th Post-Operative Weeks	
• Radiological Union	30 (96.8%)
• Clinical Union	30 (96.8%)

Table 3: Range of Motion at Knee Joint

Follow-up	Maximum Flexion at Ipsilateral Knee
At 10 th Post-Operative Day	99.94±9.98 (70-115)
At 6 th Post-Operative Weeks	107.90±7.39 (90-118)
At 12 ^h Post-Operative Weeks	113.71±7.30 (90-122)
At 18 th Post-Operative Weeks	118.48±7.49 (90-125)
At 24 th Post-Operative Weeks	122.13±8.64 (90-135)

DISCUSSION

Non-operative treatment of distal femoral fractures with immobilization has been forsaken due to frequent non-union, mal-union and complications of prolonged immobilization [11]. Over the time different types of implants have been used for the fixation of these fractures [12, 13]. Flexible intramedullary nailing [14], modified antegrade nailing [15], and external fixation [16] allow fracture reduction and stabilization with minimal exposure and soft tissue dissection at the fracture site. Perfect and stable fixation can be achieved by retrograde nailing in extra-articular as well as intercondylar fractures with minimal comminution. Due to preservation of soft tissue at fracture site and better purchase of the distal fracture fragment, it provides early joint movements and thus avoids

stiffness; a common and feared sequel in such patients. There is high rate of union with minimal long-term sequel. The ease of the procedure also enables fixation of fractures in polytrauma patients along with those with multiple fractures [17].

Reports on the long-term outcome of knee joint after trans-articular retrograde nailing are scarce. In the present study, we observed non-union in only 3.2% patients. Becher 2012 in a similar study reported non-union rate of 3% in open femoral shaft fractures treated by retrograde nail [18]. Anup 2002 reported a similar non-union rate of 2.85% with retrograde nail in Indian patients with union achieved between 12th to 18th weeks [19]. El-Kawy 2007 however reported 100% union rate with a medium follow-up of 14 weeks [20]. Neubauer 2008 reported that after a median follow-up of 16 weeks, 95.1% patients acquired radiological union with range of flexion from 90 to 120 degrees [21]. Giddie 2015 achieved union in 100% patients after retrograde nailing in distal femur fractures in elderly patients [22].

The results of the present study are in line with the exiting research and have shown that retrograde nailing in supracondylar femoral fractures is associated with minimal and acceptable non-union rates. Due to early movement and weight bearing, it is associated with decreased incidence of knee stiffness and a greater degree of flexion at the end of fracture union which make this surgical stabilization system a preferred treatment for such patients.

CONCLUSION

Retrograde interlocking nail is an effective treatment option for supracondylar femur fractures with excellent union rate and functional range of motion at knee.

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