



DISTAL FEMORAL SHAFT FRACTURES; FUNCTIONAL OUTCOME AFTER FIXATION WITH TIBIAL NAILS

Tawfeeq Safi Sarraj¹, Jehan Zaib Shah²

1. Consultant of Orthopedic Surgery
Nordrhein German Orthopedic
Board
(Orthoped-Unfallchirurgie Facharzt)
German Sport Medicine Board.
2. MBBS, FCPS
Resident Orthopedic

Correspondence Address:

Dr. Jehan Zaib Shah
Resident Orthopedic
jzshah75@gmail.com

Article received on:

18/05/2017

Accepted for publication:

15/10/2017

Received after proof reading:

28/02/2018

ABSTRACT... Objectives: To assess the functional outcome in supracondylar femur fractures fixed with intramedullary tibial nail. **Study Design:** Prospective case series. **Setting:** Al Noor specialist hospital, Makkah, Saudi Arabia. **Period:** Four years (2009-2013). **Methods:** 25 patients with closed supracondylar femoral fractures operated with tibial intramedullary nail. The functional outcome was measured by Tegner Lysholm criteria during and after 4 years. **Results:** Out of 25 patients 20 were male and 5 were female. The mean time of healing was 15.80(2.646) weeks. 6(24%) patients showed excellent results, 12(48%) patients showed good results and 7(28%) patients showed fair results. There were no poor results in our study. **Conclusions:** Retrograde tibial nails are cheaper, convenient and lead to good functional outcome in patients with supracondylar femur fractures.

Key words: Supracondylar Femur Fractures, Tibial Interlocking Nail, Retrograde Femoral, Nail.

Article Citation: Sarraj TS, Shah JZ. Distal femoral shaft fractures; functional outcome after fixation with tibial nails. Professional Med J 2018; 25(3):359-363.
DOI:10.29309/TPMJ/18.4056

INTRODUCTION

Distal femoral fractures are very common in patients suffering from a high energy trauma.¹ Distal femoral fractures comprises 4% of all the femoral fractures.² The treatment of the distal femoral fractures whether transverse, oblique, spiral or comminuted still confuses the surgeon regarding the correct surgical option for the specific fracture pattern.³

In the time of John Charnley initially supracondylar fractures were being treated conservatively after manipulation with plaster of Paris cast, skeletal traction, external splints and braces⁴. These measures led to drastic outcomes as non unions, malunions and most of the time lifelong disability.⁴

The modern philosophy of fixing almost all the femoral fractures has shown significantly better results.⁵ Previously, different surgical options for distal femoral fractures were condylar blade plates, dynamic condylar screws, LISS plates, distal femoral locking plates.⁶ The most obvious disadvantage of these options are deep tissue dissections, postoperative collection

of hematoma, infection and a large surgical incision on the lateral aspect of the thigh, with the exception of LISS technique.⁷ The application of blade plates requires expertise and not many surgeons are much acquainted to it.⁸ Furthermore, blade plates and dynamic condylar screws pulls the distal fragment of the femur laterally which causes the rotation of the fragment pulling the blades and the screws out causing the implant failure.⁹

On the other hand, recently retrograde intramedullary nails for the supracondylar fracture femur is getting a lot of acceptance because of decreased blood loss, small surgical incisions, decreased infection, early weight bearing and decreased operative time, which are otherwise, the complications in conventional plate application.¹⁰ However, the original retrograde femoral nails designed especially for the fixation of supracondylar femoral fractures is quite expensive and brings about affordability issues in patients of the developing countries.¹¹ To fix the supracondylar fracture femur some surgeons¹² have used the tibial nails which are comparatively

much cheaper with same success as especially designed distal femoral nails.

The purpose of our study was to evaluate the functional outcome of tibial locked nails in supracondylar femoral fractures.

Data Collection procedure

Study was started after approval from the ethical committee of hospital. A total number of 25 adult patients with fracture supracondylar femur seen in the A&E of Al Noor Specialty Hospital Makkah were included in the study. The study was conducted over a period of four years starting from January 2009 to January 2013. The inclusion criteria were: distal one third fractures of femur, Simple Type A extra-articular supracondylar femur fractures and closed fractures. The excluding criteria was: all open fractures, B2, B3, C2, C3 fractures, preoperative flexion/extension deformity. After taking the consent all of the patients were operated by an experienced Orthopaedic surgeon.

Surgery was done after scrubbing and draping the patient. A midline incision of 4cm was taken from inferior pole of patella up to tibial tuberosity. The paratenon over patellar tendon was sharply incised and patellar tendon was split in the midline along the direction of its fibers. A straight bone awl was inserted into the joint through the split tendon and positioned against the inter-condylar notch. The position was confirmed in the image intensifier in anteroposterior and lateral position. An entry point was made. The bone awl was then removed and guide wire passed through entry point. The fracture was reduced under image intensifier control and guide wire passed in proximal fragment. The distal fragment was then reamed with flexible shafts. The predetermined nail of adequate diameter and length was then loaded over the jig. The nail was then inserted over the guide wire through the entry point made

previously through distal fragment and then proximal fragment.

Its position was confirmed on image intensifier and then depending on the length of the nail, the proximal holes were locked with the help of corresponding markings on the jig. After inserting the proximal and distal locking screws the jig was then disengaged, the joint was washed thoroughly to remove the debris, homeostasis achieved and incision closed in layers. Particular attention was paid to repair paratenon of patellar tendon.

Postoperative x-rays were immediately done and patients were discharged on 3rd postoperative day after physiotherapy. The follow-up was done after 2 weeks, 6 weeks, 3 months and then every monthly till union and after that every year till 4 years. The functional outcome was measured by Tegner Lysholm¹³ criteria which measures the functional outcome in terms of limping, pain, locking, stair climbing, support, instability, swelling and squatting.

The follow up was ensured by taking the phone numbers of the patients.

SPSS 16 was used for statistical analysis. Frequencies and percentages were calculated for categorical variables and mean and standard deviations were calculated for numerical variables. Descriptive statistics were used for all continuous variables.

RESULTS

Out of 25 patients 20(80%) were male and 5(20%) were female. The mean age in our study was 37. The results related to time of healing and Tegner Lysholm functional scoring of the knee are shown in Table-I and Figure-1 respectively.

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Time (weeks) of healing	25	12	21	395	15.80	2.646

Table-I. Time of Healing

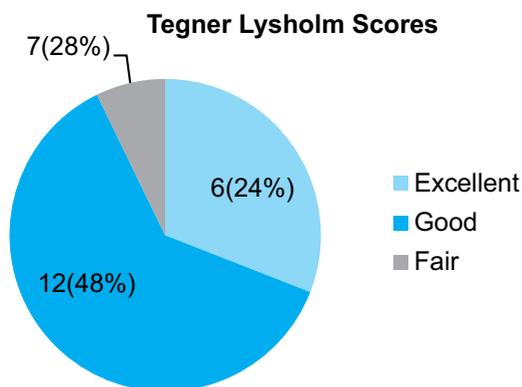


Figure-1. Outcome in terms of Tegner Lysholm knee scoring system

DISCUSSION

Retrograde nail for the femur fractures is a well accepted and convenient option for most of the extra articular supracondylar fractures of the femur.¹⁴ It has been advocated as a better option compared to previously used blade plates, condylar screws and locked plates in terms of stability, operative time, surgical exposure and healing time.¹⁵ Nails are load sharing devices providing better stability at fracture site and are done with closed technique.¹⁶ Retrograde nails are reported to have very low complication rate compared to other method used for fixation of the supracondylar femur fractures.¹⁷

The study was conducted over 25 patients. Out of 25 patients 20 were male and 5 were female patients. The mean time of healing was 15.7 weeks compared to study¹⁸ in which the mean healing time was 25 weeks and all the supracondylar femur fractures were fixed with standard retrograde femoral nails. None of the patients had nonunion or malunion.

A study¹⁸ in which¹⁹ cases were treated with femoral nails showed excellent results in five femurs (29.4%), good in six femurs (35.3%), moderate in five femurs, and poor in one femur (5.9%) which are comparable to our study in which all patients were treated with tibial nails.

Only 3 patients in our study developed coronal deformity. 1 patient who was severely obese

developed valgus deformity and the other two patients developed varus deformity compared to the study conducted in Turkey¹⁸ in which Postoperative radiographic examination showed varus angulation (10°) in four patients (23.5%), and posterior angulation (10-20°) in four patients.

In our study 7 patients developed flexion contracture which was not very severe. The contracture mostly of flexion type and not more than 5 degrees and only one patient developed extension contracture. Mostly contractures developed because of poor compliance of physiotherapy on patients behalf. There was no nail with its end protruding into the joint space. The operative time, although not recorded was comparatively short compared to the other surgical options for the distal femoral fractures. The length of the nail in our study was always kept up to the level of lesser trochanter of femur, regardless of patients height, to reduce the chances of stress fracture.

In our study all cases were operated closed and not a single case was opened compared to a study¹⁹ in which 5 patients out of 20 patients were opened for reduction of the fracture fragment. All patients in this study were stabilized by using the tibial nail.

In the same study¹⁹ 65% excellent results were found. The average healing time in this study was 16.2 weeks. Average knee flexion was 108 degrees with an extensor lag of 4.15 degrees.

A Taiwanese study²⁰ done on saw bones showed that a femoral locked nail had better stability than a tibial locked nail and declared femoral nails a better option compared to the tibialnails. This allegation has also been made by another study of Bohler²¹ that stabilization by the tibial nail is not a rigid fixation.

We, however, did not find this to be true in our study. This was also confirmed by another case report²² that supracondylar femur fractures can be stabilized by using tibial nail without causing any shortening, rotational deformity and without delaying the recovery of the knee joint motion.

Another study by Sanders R²³ in which 18 patients with supracondylar femur fractures were stabilized by using AO Universal Tibial Nail (92%) fractures healed within 12 weeks. No case was associated with an infection, loss of reduction, or nail failure. Knee flexion averaged 122 degrees; only two knees had an extensor lag of > 5 degrees. Four cases resulted in mal-reductions (two valgus, two flexion).

Above all that, at the time of the study the cost of retrograde Smith and Nephew femoral nails was 2490\$(dollars) and that of Zimmer tibial interlocking nails was found to be 118\$(dollars), which is almost half the price. This was another strong reason to use retrograde tibial nails in supracondylar femur fractures for the patients who were not affording enough to buy retrograde femoral nails.

In a 4 year long followup of our study we did not see any other complications such as late postoperative infection, stress fracture, nonunion, loss of reduction, restricted range of motion or implant failure.

CONCLUSION

Keeping in view all of the above discussion we concluded that the retrograde tibial locking nails for stabilization of extra articular supracondylar fractures of femur are convenient, useful, cheaper and results in excellent functional outcome in most of the patients.

Copyright© 15 Oct, 2017.

REFERENCES

1. Wilson JN. **Watson Jones's fractures and joint injuries**. 6th ed., pg. 1003-1070 (1982).
2. Doshi HK, Wenxian P, Burgula MV, Murphy DP. **Clinical outcomes of distal femoral fractures in the geriatric population using locking plates with a minimally invasive approach**. Geriatric Orthopaedic Surgery & Rehabilitation. 2013 Mar 1; 4(1):16-20.
3. Kubiak EN, Fulkerson E, Strauss E, Egol KA. **The evolution of locked plates**. J Bone Joint Surg Am. 2006; 88(Suppl 4):189-200. Dec
4. Charnley J. **The closed treatment of common fractures**. Cambridge university press; 2003.
5. Leung KS, Shen WY, So WS, Mui LT, Grosse A. **Interlocking intramedullary nailing for supracondylar and intercondylar fractures of the distal part of the femur**. The Journal of Bone & Joint Surgery. 1991 Mar 1; 73(3):332-40.
6. Brumback RJ. **The Rationales of Interlocking Nailing of the Femur, Tibia, and Humerus: An Overview**. Clinical orthopaedics and related research. 1996 Mar 1; 324:292-320.
7. Bucholz RW, Jones A. **Fractures of the shaft of the femur**. The Journal of Bone & Joint Surgery. 1991 Dec 1; 73(10):1561-6.
8. Kumar N, Kalra M. **Evaluation of valgus intertrochanteric osteotomy in neglected fracture neck femur in young adults**. Journal of Clinical Orthopaedics and Trauma. 2013; 4(2):53-57. doi:10.1016/j.jcot.2013.03.003.
9. Iannacone WM, Bennett FS, DeLong Jr WG, Born CT, Dalsey RM. **Initial experience with the treatment of supracondylar femoral fractures using the supracondylar intramedullary nail: a preliminary report**. Journal of orthopaedic trauma. 1994 Aug 1; 8(4):322-7.
10. Fitzpatrick DC, Doornink J, Madey SM, Bottlang M. **Relative stability of conventional and locked plating fixation in a model of the osteoporotic femoral diaphysis**. ClinBiomech (Bristol, Avon) 2009; 24:203-209.
11. Wu CC. **Retrograde locked intramedullary nailing for aseptic supracondylar femoral nonunion following failed locked plating**. Journal of Orthopaedic Surgery. 2015; 23(2).
12. Ostrum RF, Agarwal A, Lakatos R, Poka A. **Orthopaedic trauma association Edwin G. Bovill, Jr., MD award: prospective comparison of retrograde and antegrade femoral intramedullary nailing**. Journal of orthopaedic trauma. 2000 Sep 1; 14(7):496-501.
13. Tegner Y, Lysholm J. **Rating systems in the evaluation of knee ligament injuries**. Clinical orthopaedics and related research. 1985 Sep 1; 198:42-9.
14. Papadokostakis G, Papakostidis C, Dimitriou R, Giannoudis PV. **The role and efficacy of retrograding nailing for the treatment of diaphyseal and distal femoral fractures: a systematic review of the literature**. Injury 2005; 36:813-22.
15. El-Kawy S, Ansara S, Moftah A, Shalaby H, Varughese V. **Retrograde femoral nailing in elderly patients with supracondylar fracture femur; is it the answer for a clinical problem?**. International orthopaedics. 2007 Feb 1; 31(1):83-6.

16. Ricci WM, Gallagher B, Haidukewych GJ. **Intramedullary nailing of femoral shaft fractures: current concepts.** J Am AcadOrthop Surg. 2009; 17(5):296–305. Page: 11352-11361, DOI: 10.14260/jemds/2015/1637

17. Moed BR, Watson JT. **Retrograde nailing of the femoral shaft.** J Am AcadOrthop Surg. 1999; 7(4):209–216.

18. Gurkan V, Orhun H, Doganay M, Salioğlu F, Ercan T, Dursun M, Bulbul M. **Retrograde intramedullary interlocking nailing in fractures of the distal femur.** Actaorthopaedicaetraumatologicaturcica. 2009; 43(3):199-205.

19. Rao DV, Chaitanya G, Sangepu A. **Supracondylar fracture femur treated with intramedullary nail: A prospective study.** Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 65, August 13;

20. Wu CC, Tai CL. **Retrograde nailing of a femoral supracondyle.** Orthopedics. 2012 Apr 1; 35(4):276.

21. Bohler J. **Closed intramedullary nailing.** Clin. Nailing. Springfield, Ill., Charles C. Thomas. Orthop. 1968; 60,51.

22. Qureshi MA, Girujuno MP. **Internal fixation of a segmental fracture of the femur with a Küntscher-Herzog tibial nail.** Injury. 1981 Jan 31; 12(4):340-2.

23. Sanders R, Koval KJ, Di Pasquale T, Helfet DL, Frankle M. **Retrograde reamed femoral nailing.** Journal of orthopaedic trauma. 1993 Aug 1; 7(4):293-302.

“
Ninety-nine percent of the failures comes from people who have the habit of making excuses.
 – George W. Carve –
 ”

AUTHORSHIP AND CONTRIBUTION DECLARATION			
Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Tawfeeq Safi Sarraj	Major	
2	Jehan Zaib Shah	Major	