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ORIGINAL ARTICLE

Comparison of Retrograde Femoral Interlocking Nail Versus Dynamic Condylar Screw in Distal Femoral Shaft Fractures

MUHAMMAD KAMRAN SHAFI[1], FRAZ NOOR[2], SYED ALAM ZEB[3], MUHAMMAD ISHFAQ[4], YOUSAF BIN TAHIR[5], TAUQEER NAWAZ KHAN[6]

[1]*Assistant Professor Orthopaedics BVH/QAMC, Bahawalpur*
[2]*Assistant Professor Orthopaedics Sahara Medical College, Narowal*
[3]*Specialist / Senior Registrar Orthopaedic Surgery, Dr. Sulaiman al Habib Medical Group, Riyadh KSA*
[4]*Senior Registrar Orthopaedics, Nishtar Medical University and Hospital, Multan*
[5]*Medical Officer Orthopaedic department Nishtar Hospital, Multan*
[6]*Orthopedic Consultant DHQ hospital, Muzaffargarh*
Corresponding author: Dr. Muhammad Kamran Shafi, E-mail: kamranshafi35@gmail.com, Contact: +923216864243

ABSTRACT

Objective: The aim of this study is to compare the effectiveness of retrograde femoral interlocking nail versus dynamic condylar screw in distal femoral shaft fractures.

Study Design: Prospective/Randomized comprehensive

Place and Duration: Department of Orthopaedic Surgery Bahawal Victoria Hospital (BVH) / QAMC, Bahawalpur for duration of eight months i.e July 2020 to February 2021.

Methods: Total 65 patients of both genders were presented in this study with age ranges between 20-40 years. Patients detailed demographics age, sex and BMI were calculated after taking informed written consent. Patients were divided into 2- groups, I and II Group I had 32 patients and underwent for retrograde femoral interlocking nail and group II had 33 patients and received dynamic condylar screw. Mean operative time, mean union time of bones and complications were calculated. Effectiveness among both groups was calculated by HSS score. Complete data was analyzed by SPSS 22.0 version.

Results: Most of the patients were males 40 (61.54%) and 25 (38.46%) were females. Mean age of the patients in group I was 26.46±4.28 years and in group II mean age was 30.78±8.22 years. Mean operative time in group I was 82.8±7.14 minutes while in group II it was 90.6±8.19 minutes. Mean union time in group I was 22.7±2.5 weeks and in group II was 26.21±5.3 weeks. According to HSS score in group I 16 (50%) results were excellent, 11 (34.38%) was good, 3 (9.8%) showed moderate and 2 (6.25%) was poor, while in group II excellent results were 15 (45.45%), 10 (30.30%) was good, 5 (15.15%) showed moderate and 3 (9.09%) showed poor results. Complications were observed joint stiffness, delayed union, non union and varus deformity were significantly lower in group I as compared to group II.

Conclusion: We concluded in this comparison of study that bothretrograde femoral interlocking nail and dynamic condylar screw was useful and effective methods for trauma in distal femoral shaft fractures. But less union time and good outcomes were observed in interlocking nail as compared to dynamic condylar screw.

Keywords: Distal femoral shaft fractures, Trauma, Dynamic condylar, Interlocking nail

INTRODUCTION

There is controversy about the optimum approach to treat distal femoral fractures. These fractures are also complicated and managed with a variety of possible complications[1]. Varus and Valgus malalignment and malrotation are usually unsatisfactory, with high levels of ankylosis[1]. Implants, instrumentation and advanced surgical experience have been the traditional management of these fractures through surgical procedure. 1 The advent of locked plates enabled the biological percutaneous fixation of distal femoral fractures to be effectively used over a period [1-2].

Intramedullary fixation is a common technique for the stabilization of distal femour fractures since it is a biological method and also load-sharing that makes weightbearing easier.[3]

Intramedullary nailing may either be used to strengthen certain fractures in an antegrade or retrograde fashion. AIMN may lead to complications such as the Trendelenburg gait or the associated implant pain. Intramedullary (RIMN) retrograde nailing can cause complications, including damage to the cartilage around the intercondylar notch and knee dysfunction.

The standard management of Femur's displaced supracondyl fracture follows Watson Jones and John Charnley's principles, which consist of skeletal traction, fracture manipulation and external cast- and cast bracings immobilization. Complications such as deformity, cutting, long bed resting, stiffness of the knee, angulation, incongruity of joints, malunion, quadriceps, knee weakness and post-traumatic osteoarthritis were present in these approaches. Present developments include the application of AO blade plates, condylar screws and other implant systems such as supracondylar intramedullary nails. The shaft of Femur is frequently pushed laterally to the anatomical axis of the condyle by the application of an AO blade plate or a dynamic condylar screw. This generates rotary motions on the split spot, causing blade plate or condylar screws to be pulled off and the plate is fatigued. In addition, osteoporotic bone contributes to implants failures by cutting the soft bone off with screws and plates. A minimally invasive procedure, whether using a nail or a plate, is essential to avoid these problems[4]. Stabilization of femoral distal fractures by retrograde nailing is a speedy procedure which does not require a comprehensive approach, and can therefore be performed with minimal

blood loss by small incision[5]. In well selected patients, retrograde fémoral nailing using the updated technology was found healthy and successful[6,7].

Retrograde intramedullary nailing showed clinical outcomes comparable to dynamic condylar screws (DCS) and newer fixed-angled systems, such as the Less Invasive Stabilizing System (LISS).[8-10]

The aim of this survey is to carry out a randomized, systematic treatment review in distal femoral fractures between the retrograde femoral nail and the dynamic condylar screw.

MATERIAL AND METHODS

This Prospective/Randomized comprehensive study was conducted at Department ofOrthopaedic Surgery Bahawal Victoria Hospital (BVH) / QAMC, Bahawalpur for duration of eight monthsi.e July 2020 to February 2021 and consists of 65 patients. Patients' detailed demographics age, sex and body mass index were calculated after taking informed consent. Patients with pathological fractures, unfit for anaesthesia and those did not give written consent were excluded from this study.

20-40 years of patients were presented in this study. Patients were divided into two groups, I and II. Group I had 32 patients and underwent for retrograde femoral interlocking nail and group II had 33 patients and received dynamic condylar screw. Types of fractures were classified by OTA technique, A1,A2 and A3. Mean operative time, mean union time of bones and complications were calculated. Effectiveness among both groups was calculated by HSS score. Categorical variables were assessed by frequency and percentage but descriptive variables were calculated by standard deviation. Complete data was analyzed by SPSS 22.0 version.

RESULTS

Most of the patients were males 40 (61.54%) and 25 (38.46%) were females. Mean age of the patients in group I was 26.46±4.28 years and in group II mean age was 30.78±8.22. Mean operative time in group I was 90.8±7.14 minutes while in group II it was 78.6±8.19 minutes. 45 (69.23%) fractures were caused due road accidents, falling from height were 17 (26.15%) and 3 (4.62%) were others.(Table 1)

Table-1. Baseline detailed demographics on enrolled cases

Variables	Group I (n=32)	Group II (n=33)
Gender		
Male	20 (30.8%)	20 (30.8%)
Female	12 (18.5%)	13 (20%)
Mean age (years)	26.46±4.28	30.78±8.22
Mean operative time (mins)	82.8±7.14	90.6±8.19
Types of fractures		
A1	20 (30.8%)	20 (30.8%)
A2	9 (13.85%)	8 (12.31%)
A3	3 (4.62%)	5 (7.7%)
Causes of fractures		
Road Accidents	23 (35.4%)	22 (33.84%)
Fall from height	8 (12.31%)	9 (13.85%)
Others	1 (1.54)	2 (3.1%)

Mean union time in group I was 22.7±2.5 weeks and in group II was 26.21±5.3 weeks. According to HSS score in group I 16 (50%) results were excellent, 11 (34.38%) was good, 3 (9.8%) showed moderate and 2 (6.25%) was poor, while in group II excellent results were 15 (45.45%), 10 (30.30%) was good, 5 (15.15%) showed moderate and 3 (9.09%) showed poor results. (Table 2)

Table 2: Association of outcomes among both groups

Variables	Group I (n=32)	Group II (n=33)
Mean union time (weeks)	22.7±2.5	26.21±5.3
Outcomes (HSS score)		
Excellent	16 (50%)	15 (45.45%)
Good	11 (34.38%)	10 (30.30%)
Moderate	3 (9.8%)	5 (15.15%)
Poor	2 (6.25%)	3 (9.09%)

Complications were observed joint stiffness, delayed union, non union and varus deformity were significantly lower in group I as compared to group II. (Table 3)

Table 3: Comparison of complications among both groups

Complications	Group I (n=32)	Group I (n=33)
Joint stiffness	3 (3.98%)	5 (15.15%)
Delayed union	2 (6.25%)	3 (9.09%)
Non-union	1 (3.13%)	2 (6.06%)
Varus deformity	1 (3.13%)	1 (3.03%)

Rate of satisfaction among patients who received retrograde femoral interlocking nail were higher (78.13%) as compared to the patients of dynamic condylar screw (66.67%). (Table 4)

Table 4: Rate of satisfaction between both groups

Variables	Group I (n=32)	Group I (n=33)
Satisfaction		
Yes	25 (78.13%)	22 (66.67%)
No	7 (21.87%)	11 (33.33%)

DISCUSSION

Non-surgical treatment of distal femoral shaft fractures has been forgotten because of non-union, and mal-union [11]. Different forms of implants were used to repair these fractures over time[12, 13]. Intra-medullary nails[14], antegrade nailing with modified as well as external fixing allow fracture to be reduced and stabilized at minimum exposures, with the soft tissue dissection at the fractures location [15-16].In present study 65 patients of both genders were presented with age ranges 20-40 years. Majority of the patients 61.54% were males. Patients were classified into 2-groups, I and II. Group I had 32 patients and underwent for retrograde femoral interlocking nail and group II had 32 cases with dynamic condylar screw. There was no age (26.46±4.28, 30.78±8.22) difference among both groups. Our finding were similar to the previous some studies [17,18].

In present study Mean operative time in group I was 82.8±7.14 minutes while in group II it was 90.6±8.19 minutes [19]. Mean union time in group I was 22.7±2.5 weeks and in group II was 26.21±5.3 weeks. [20]A retrograde nailing with limited communation in extra-articular fractures will achieve a perfect and stable fixation. Since the soft tissue is preserved and the distal fracture fragment is best hold at a fracture site. The union rate is strong and the long-term complications are rare. Fixing

fractures with multiple fractures can be also made easier in Polytrauma patients [21].

Both techniques were effective in our study but retrograde nailing was more effective. According to HSS score in group I, 16 (50%) results were excellent, 11 (34.38%) was good, 3 (9.8%) showed moderate and 2 (6.25%) was poor, while in group II excellent results were 15 (45.45%), 10 (30.30%) was good, 5 (15.15%) showed moderate and 3 (9.09%) showed poor results.These results showed resemblance to the previous many studies.[21-23] Most studies have concluded that placing Dynamic screw and RIMN in extra-articular distal femoral fractures are similar. Clinical outcome depends primarily on surgery rather than implant choice[25]. In both cases, patient satisfaction during the procedure is improved because less surgical dissection leads to less damage of soft tissue. You can easily use both methods. [26] However, there are also drawbacks of all of these approaches. The most significant drawback of the intramedullary nail procedure is that the implant must be placed by exposure of joint and, thus, septic arthritis may be caused. In the corresponding literature, septic arthritis was stated to be 0-14 per cent following retrograde nails. In our sample there have not been any retrograde nail infections or septic arthritis. [27, 28]

The majority of road traffic accidents were attributable to 69.23% and fall from heightis 26.15% and 4.62% due to other incidents. These observations were identical to the other. [22,23] Joint stiffness, delayed union, no union and deformity of the varus were observed in Group I significantly lower than in Group II. Compared to patients with dynamic condylar screws (66.67%), satisfaction was higher among the patients who received retrograde femoral nails (78,13%). While two methods tend to be equivalent to an excellent outcome for bone union in terms of lower blood loss and shorter operating period, Retrograde intramedullary nailing is better than DCS. [29] The following inference is therefore the same as the distal femoral nail of Handolin et al. is a reliable alternative in the treatment of distal femoral fractures with low complication rates. [30]

CONCLUSION

We concluded that bothretrograde femoral interlocking nail and dynamic condylar screw was useful and effective methods for trauma in distal femoral shaft fractures. But less union time and good outcomes were observed in interlocking nail as compared to dynamic condylar.

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