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COMPARATIVE STUDY OF MANAGEMENT OF DIAPHYSEAL FEMUR FRACTURE WITH INTRAMEDULLARY INTERLOCKING NAIL AND K. NAIL

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ABSTRACT: This is a prospective study done on SZMCH in the Ortho-Surgery department from 1st January 2014 to 31st March 2015. A total of 66 cases of femoral shaft, half (33) treated with Kuntcher nail and half (33) treated with Interlocking nail. Most of the fracture were due to RTA. Out of 66 patient 45 were male and 15 were female. Age of the patients were 20 years to 60 years. Mean time of union was 14 weeks ranging from 12 to 15 weeks in interlocking nail and 17 weeks ranging from 15 to 19 weeks in k. nail. Functional outcome was excellent in 19 patients, good in 8 patients, fair in 5 patients and poor in 1 patient in Interlocking intramedullary nailing and excellent in17 patients, good in 9 patients, fair in 5 patients and poor in 2 patients in kuntcher nail. So Interlocking intramedullary nail is a good option for the treatment of fracture shaft of femur.

KEYWORDS: fracture; Interlocking nail; Kuntscher nail; Fluoroscopy.

1 INTRODUCTION

Femur is the largest bone of the body and one of the principal load bearing bones in lower extremity. Fracture of the shaft of femur is major cause of morbidity and mortality in patients. [1] Comminuted and segmental fractures of femoral diaphysis are often difficult to treat. These fractures most often result from high energy trauma; they are often associated with concomitant injury of internal organs. In 1940 Kuntscher first described the use of the clover-leaf nail for fixation of fractures of long bones like femur. But at present age, intramedullary nailing is the gold standard treatment for diaphyseal fractures of the femur. Among them, the main advantage of interlocking nailing over initial non-locking K-nail is that the former can provide rotational and longitudinal stability, especially when the fracture is comminuted or locates near the end of diaphysis [2].In cases of K-nail the fracture site is opened while in cases of Interlocking nail the fracture site opened through a small incision. the nail being stabilized by means of proximal and distal screws [3,4].Though the K-nails in compare to interlocking nails are very cheap, does not need any special instruments or image intensifier and easy to introduce, with the advent of Interlocking nail (IL-nail), Kuntcher nail (K-nail) is less preferred. [5].The purpose of this study was to compare the effectiveness of interlocking nail to Kuntcher nail in the management of diaphyseal fracture of femur. Majority of the patients of this study returned to their prefracture functional state and returned to work by the end of 24 weeks in case of ILnail and 32 weeks in case of K-nail. We had one instance of distal screws missing the holes in our series. There was no incidence of neuropraxia in our study. There was one case of superficial infection in this study. There was no significant difference between the two groups in terms of demographic data. The average time for the procedure in interlocking nail was 110+ 30 minutes (85-135mins), while in k-nail group it was only80+15.8mins (60-95 mins).Patient who underwent k-nail fixation had more early complications than those having interlocking nail, though the difference was not significant, In terms of early and late weight bearing periods the interlocking group bore weight significantly early than k-nail group. The fracture healing time in femoral shaft fractures treated with ILnail was average 14 weeks; whereas in case of k-nail group, average healing time was 17 weeks. Though for economic and technical reasons use of the kuntcher nail is still a viable option, interlocking intramedullary nailing is better than kuntcher nailing.

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2 PATIENTS AND METHODS

This prospective study was carried out from 1st January 2014 to 31st March 2015, in the Department of Orthopaedics, Shaheed Ziaur Rahman Medical College Bogra. In this comparative study 66 patients of femoral shaft fractures were managed by intramedullary nailing, Half (33) with Kuntschcr nail and half (33) with Interlocking nail. Amongst the 66 patients included in the study there were 51 (80%) males and 15 (20%) females. The age of the patients ranged from 20-60 years, mean age being 40 years. Forty five (68.18%) femoral shaft fractures were caused by road traffic accidents, twelve (18.18%) by fall from height, four (6.08%) by simple fall, three (4.54%) by physical assault, two (3.02.%) by sports injury. Right femoral shaft was fractured in 40(60.6%) and left in 26(39.4%). 16 fractures (25%) were located in the upper third of femoral shaft, 39 (60.60%) in the middle third and 11(16.16%) in the lower third. Twenty (20%) fractures were transverse, eighteen (18%) were oblique, Six (6%) were spiral and twenty two (22%) comminuted. Twenty six (26%) patients had open fractures, whereas in 40 cases the fractures were closed. Fifteen patients had significant associated injuries like fracture of tibia 5, and fracture around ankle 4, soft tissue injury around the knee 4,fracture forearm 2 .

After data collection and appropriate investigations all the patients underwent surgery. The cases were randomly assigned for K-nailing or IL-nailing. K- nailing and the IL-nailing were done in the lateral position .The main parameters compared included fracture healing time full weight bearing time and post-operative complication. In all cases of interlocking nails proximal 1 screw and distal 2 screws were used.

Table 1: Age distribution

S. No.	Age Group	Male	Female
1	20-29	23	8
2	30-39	12	4
3	40-49	8	2
4	50-59	6	1
5	60 and above	2	0

Table 2: Mode of Injury

S. No	Mode of Injury	Number of patients	Percentage
1	Road Traffic Accident	45	68.18
2	Fall From Height	12	18.18
3	Simple Fall	4	6.08
4	Physical Assault	2	3.03
5	Sports Injury	3	4.54

Table 3: Nature of Injury

S. No	Type	Number of Patients	Percentage
1	Transverse	20	30.30
2	Oblique	18	27.27
3	Spiral	6	9.09
4	Comminuted	22	33.33

Table 4: Location of fracture of femur

S. No	Location	Number of patients	Percentage
1	Upper 1/3rd	16	24.25
2	Middle 1/3rd	39	60.60
3	Lower 1/3rd	11	16.66

Table 5: Associated injuries in fifteen patients

Fracture of tibia	05
Fracture around the ankle	04
Soft tissue injury around the knee	04
Fracture of forearm	02

Table 6: Demographic features

Feature	K-nail(n=33)	IL-nail(n=33)	Total Patients
Sex			
Male	24	27	51
Female	9	6	15
Causes			
R.T.A	20	25	45
Fall From Height	8	4	12
Simple Fall	2	2	4
Physical Assault	1	1	2
Sports injury	2	1	3

Table 7: Details of Femoral Shaft Fracture

Features	K-nail (n=33)	IL-nail (n=33)	Total Patients
Side			
Right	18	20	38
Left	15	13	28
Nature			
Transverse	12	8	20
Oblique	9	9	18
Spiral	02	4	06
Comminuted	10	12	22
Location			
Upper 1/3rd	6	10	16
Middle 1/3rd	21	18	39
Lower 1/3rd	6	5	11
Type			
Open Fracture	6	8	14
Closed Fracture	27	25	52

3 RESULTS

There Majority of the patients of this study returned to their pre-fracture functional state and returned to work by the end of 24 weeks in case of IL nailing nail and 32 weeks in case of k-nailing. We had one instance of distal screw missing the hole in our series. There was no incidence of any neuropraxia in our study. There was one case of superficial early infection. Antibiotics were used during and after operation. Administration of antibiotic for a period of 5 days (5 days intravenous

followed by 10 days orally) drastically reduces the incidence of deep – seated infections. We found only 2 cases where improvement can be described as poor, among which in 2 cases K-nailing was used. The average time for the procedure in interlocking nail was 110±30 minutes (85-135 minutes), while in K-nail group it was only 80±15.8 minutes. (60- 95 minutes.)Patients who underwent k-nail fixation had more early complications than those having interlocking nail, though the difference was not significant, late complications were similar in both the groups in terms of early and late weight bearing periods the interlocking group bore weight significantly earlier than k nail group. The fracture healing time in femoral shaft treated with IL-nailing was average 14 weeks, where as in case of k-nailing groups, average healing time was 17 weeks. There was no significant difference between the two groups in terms of demographic data (age, sex), fracture type, hospital stay, metabolic diseases and associated co-morbidity. The post-operative hospital stay was on an average six days. All patients of K-nail group needed blood transfusion, while only 21 patients of interlocking group needed blood transfusion.

Patients who underwent K-nail fixation had more early complications than those having interlocking nail, though the difference was not significant; late complications were similar in both the groups. In our study the recovery of patients was graded as excellent, good, fair and poor. We found excellent recovery higher in IL-nailing whereas, the good recovery was higher in K-nailing. The cases and percentage of recovery was given in Table 8.

Table 8: Final Recovery of cases

Result	IL-nailing (n=33)	K-nailing n=33
Excellent	19(57.57%()	17(51.52%)
Good	8(24.2%)	9(27.3%)
Fair	5(15.2%)	5(15.11%)
Poor	1(3.03%)	2(6.07%)

In terms of early and late weight bearing periods, the Interlocking group bore weight significantly earlier than K-nail group. The fracture healing time in femoral shaft fractures treated with IL-nailing was average 14 weeks; where as in case of K-nailing group, average healing time was 17 weeks. Other authors have shown 12 weeks, 18 weeks and 16.3 weeks in their series. [6, 7, 8]

4 DISCUSSION

Different types of intramedullary nails have been employed by surgeons over 500 years in the management of diaphyseal femur fractures. The treatment in our hands has been filtered through many different methods from time to time. One advantages of using the K-nail is that the surgery is technically less demanding. Additionally, as the fracture is reduced via open method the K-nail procedure does not require the use of an image intensifier, so there is no unnecessary exposure to radiation and no radiographer is needed. The K-nail is also much less expensive as compared to standard IL-nailing, an important factor in countries with limited financial resources. Therefore, for economic and technical reasons, use of the Küntscher nail is still a viable option. But, interlocking nailing is the current treatment of choice for closed diaphyseal fractures of femur in adults, especially those with significant commination, long spiral fractures, and segmental fractures. In our study we found all patients of K-nail group needed blood transfusion and the healing time and early and late weight bearing time of K-nail group was significantly longer than IL-nailing system. As early mobilization may decrease the risk of mortality and morbidity and to reduce the healing time, dynamic devices are replaced with the static one; modern surgeons facilitated with image intensifier and radiographer, prefer Interlocking system more.

5 CONCLUSION

Interlocking intramedullary nail is used because of its less healing time. It also gives early mobility, lessens probability of blood transfusion during surgery. Though it is more expensive than K-nail system, prevention of rotation and angulation of bones and upward and downward migration of the implant, is preferred by the surgeon especially during treatment of upper and lower 1/3rd femoral shaft fracture.

BIOGRAPHY

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