Original Research

Analysis of Patients with Paediatric Femur Fractures Undergoing Treatment with Ender Nailing: An Institutional Based Study

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Abstract

Background: Femoral shaft fracture is an incapacitating paediatric injury.This study was conducted to assess the functional outcome of paediatric femur fractures treated with Ender nailing in the age group of 5 to 16 years.

Materials and Methods: We collected the records of the patients by special proforma. Essential investigations of all the patients were done. Patients were followed up at intervals of 6 weeks, 12 weeks and 24 weeks. At follow ups, patients were studied regularly by clinical findings and x-rays. Documentation was made according to the proforma. As soon as the patient was brought to casualty, the patient's airway, breathing and circulation were assessed. Then a complete survey was carried out to rule out other significant injuries. Plain radiographs of AP and lateral views of the thigh including hip and knee joints to assess the extent of fracture comminution, the geometry and the dimensions of the fracture.

Results: Surgery was done in less than 7 days for 92% of cases and more than 7 days for 8% of cases, the mean duration being 3.42 days. The mean duration of time for fracture union was 8.4 weeks. The average hospital stay was 7.56 days. The mean duration for starting full weight bearing was 10.12 weeks.

Conclusion: In the present study, there are 25 (50%) Right side fractures and 25 (50%) left side fractures. The right to left ratio is 1: l in our study. Thus, there is an equal distribution of left and right fracture in the study. The most common mechanism of injury in our study was found to be due to RTA. Out of 50 patients, 31 patients had injuries due to RTA whereas 19 patients had injury due to fall. These findings are comparable with other series. In the present study, 12 (24%) patients had proximal l/3rd of shaft femur fracture, 34 (68%) had fracture of middle l/3rd and 4 (8%) patients had fracture of the distal 1/3 d shaft of femur. Hence, the most common level of fracture is the middle 1/3rd of the shaft of femur. This was comparable with the other series. In our study, out of 50 patients 45 (90%) patients had closed fracture of shaft of femur, 2 patients had Open grade 1 fracture of shaft of femur and 3 patients had Open grade 2 fracture of the shaft of femur.

Keywords: Femur,Fracture, Ender Nailing.

INTRODUCTION

Femoral shaft fracture is an incapacitating paediatric injury.[1,2] The treatment has traditionally been age-related, influenced by the type of injury, associated injuries and the location and type of the fracture. To a great extent, the treatment options vary according to the surgeon's preference.[3] Near the end of skeletal maturity accurate reduction is necessary as angular deformity is no longer correctable by growth[4] Availability of locked intramedullary nail has made the treatment of femoral shaft fractures in skeletally matured children well established. We report a prospective study with the objective of evaluating the role and efficacy of ender's nailing in diaphyseal femoral shaft fractures in 6-16 years of age group.Femoral shaft fracture is the most common major pediatric orthopedic injury requiring hospitalization'. It represents 1.6% of all bony injuries in children. It is more common in boys. It occurs as a bimodal distribution with age groups peaking in toddlers (simple falls) and early adolescence (high energy trauma).[4,5] ln the pediatric age, remodeling of bone occurs from weak woven bone to strong lamellar bone. Bone strength increases with increasing diameter and area of bone. This explains the incidence of relative weakness of pediatric bones which break under loading conditions. But in adolescence high velocity trauma is required to cause fracture.

Controversy persists regarding the patients aged between 5—15 years, with several available options like traction followed by hip spica, external fixation, flexible stable intramedullary nails (Ender or titanium), plate fixation, and locked intramedullary

nailing with no clear consensus for the preferred treatment.

Over the past two decades the advantages of fracture fixation and early mobilization have been increasingly recognized. Thus, there is an increasing trend towards internal fixation of pediatric femoral fractures.

Due to rapid union rate and spontaneous correction of angulation, most of the diaphyseal femoral fractures in children aged less than 5 years can be treated conservatively by early closed reduction and spica cast application. Patients more than 5 years of age group has the risk of limb length shortening, knee stiffness and malunion when compared with younger children due to prolonged immobilization when treated conservatively. In skeletally mature children, in the age group between 5-16 years of age, there has been an increasing trend towards internal fixation using flexible intramedullary nail. Ender nails are also an option for the fixation of shaft of femur fracture. It is a safe, efficacious, cost-effective technique and has a short learning curve. Hence, it is one of the choices of stabilization of femur fractures in the pediatric age group.The advantageof this technique includes early fracture union due to repeated micromotion at the fracture site causing abundant callus formation, less chance of physeal injury, early weight bearing, early knee mobilization, easy implant removal and good satisfaction rate.[6] Less duration of hospital stays and early return of child to school are the advantages of this technique'. The primary limitation is the lack of Rigid Fixation.The aim of this study is to evaluate the results of treatment of pediatricfemoral shaft fractures with Ender's nail.

MATERIALS AND METHODS

This is a study of using Ender's nailing for the fixation of shaft femur fractures in 50 patients between the age group of 5 to 16 years, between the time periodof April 2019 to May 2021. Patients meeting the inclusion criteria and the exclusion criteria during the study period were the subjects of this study.X-ray of Thigh Full length with Hip and Knee AP and Lateral view was done.Alignment Sagittal/Coronal Angulation (<l0 or >10 degrees). Rotational Malalignment (<l0 or >l0 degrees). Circumferential Callus formation — good/adequate/poor. Visibility of fracture line — seen clearly/masked/not seen. We collected the records of the patients by special proforma. Essential investigations of all the patients were done. Patients were followed up at intervals of 6 weeks, 12 weeks and 24 weeks. At follow ups, patients were studied regularly by clinical findings and x-rays. Documentation was made according to the proforma. As soon as the patient was brought to casualty, patient's airway, breathing and circulation were assessed. Then a complete survey was carried out to rule out other significant injuries. Plain radiographs of AP and lateral views of the thigh including hip and knee joints to assess the extent of fracture comminution, the geometry and the dimensions of the fracture.On admission to ward, a detailed history was taken, relating to the age, sex and occupation, mode of injury, past and associated medical illness. Routine investigations were done for all patients. These included major preoperative blood profile. Patients were operated on as early as possible once the general condition of the patient was stable and the patient was fit for surgery. After prior informed consent, a pre-operative anesthetic evaluation is done.

RESULTS

Surgery was done in less than 7 days for 92% of cases and more than 7 days for 8% of cases, the mean duration being 3.42 days.The mean duration of time for fracture union was 8.4 weeks. The average hospital stay was 7.56 days. The mean duration for starting full weight bearing was 10.12 weeks.

Table 1: Interval between trauma and surgery

Time interval	No. of cases	Percentage
<7 days	46	92%
>7 days	04	08%

Table 2: Time for fracture union.

Time for union	No. of cases	Percentage
0-8 weeks	33	66%
9-12 weeks	17	34%

Table 3: Duration of hospital stay

Duration of hospital stay	No. of cases	Percentage
<7 days	29	58%
8-14 days	18	36%
>14 days	03	06%

Table 4: Time for full weight bearing

Time for full weight bearing	No. of cases	Percentage
0-8 weeks	18	36%
9-12 weeks	27	54%
>12 weeks	05	10%

DISCUSSION

Paediatric Femoral shaft fractures are one of the common paediatric injuries treated by the orthopaedic surgeon in the emergency. To prevent the effects of prolonged immobilization due to casting and to reduce the loss of school days, operative approach has gained popularity over conservative approaches for the last 2 decades.

The ideal treatment for the fracture of the shaft of femur in the paediatric age group should provide rotational and angular stability of the fracture and controls limb length and alignment.

Recently, flexible intramedullary nails like the Enders nail is the ideal treatment for paediatric femoral shaft fractures. Many literatures and studies support the surgical treatment as the best and safest method in treating paediatric femoral shaft fracture in the age group of 5-16 years.

We undertook the present study of 50 cases of fracture shaft femur in paediatric population treated with Enders nailing in paediatric population in both the sexes. The observations were made, and the results were analysed. The study was also compared with the studies of other authors.Most of the patients in the present series were between 5-8 years of age. The youngest patient was 5 years old and eldest patient was 16 years old. The mean age in the present series was 10.44 years. The Sex distribution in our series is comparable to other studies, in which every study had a male predominance except in the study by McGraw et al having a female predominance.Lohiya R et al studied paediatric femoral fractures treated with titanium or stainless-steel flexible nails at their institute with a minimum of 5 years follow up. They included 73 femoral shaft fractures in 69 patients treated with retrograde flexible intramedullary nailing with a minimum follow up of 5 years. Final limb length discrepancy and any angular or rotational deformities were determined.Mean age at final follow up was 15.5 years (10-21 years). Mean follow up was 7.16 years (5.0-8.6 years). Titanium and stainless-steel nails were used in 43 and 30 cases respectively. There were 51 midshaft, 17 proximal, and 5 distal fractures.All fractures united at an average of 11 weeks but asymptomatic malalignment and LLD were seen in 19% and 58% fractures respectively. LLD ranged from -3 cm to 1.5 cm. Other complications included superficial infection (2), proximal migration of nail(3), irritation at nail insertion site(5) and penetration of femoral neck with nail tip(1). There were 59 excellent, 10 satisfactory and 4 poor results.Flexible intramedullary nailing is reliable and safe for treating Paediatric femoral shaft fractures.[13]

CONCLUSION

The most common level of fracture is the middle 1/3rd of the shaft of femur. This was comparable with the other series. In our study, out of 50 patients 45 (90%) patients had closed fracture of shaft of femur, 2 patients had Open grade 1 fracture of shaft of femur and 3 patients had Open grade 2 fracture of the shaft of femur.

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