EVALUATION OF FUNCTIONAL OUTCOME IN MANAGEMENT OF FRACTURE SHAFT FEMUR IN CHILDREN BY ELASTIC NAILS

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ABSTRACT

BACKGROUND

Treatment for femoral diaphyseal fractures in the age group of 4 - 16 years is controversial.¹ In recent years, fixation with flexible intramedullary (TENS) nails has become a popular technique^{2,3,4,5,6} for stabilising femur fractures in children.

MATERIALS AND METHODS

We conducted a prospective observational study in 30 children with femoral shaft fractures treated by TENS. Two nails were inserted in a retrograde manner from medial and lateral entry points above the distal physis. Postoperatively, all the patients were followed for a period of 24 weeks between March 2012 and Feb 2016 at Govt. General Hospital, Guntur. The mean age was 9.6 years (range 4-16 years) and mean hospital stay was 7 days (range 6-10 days). All fractures were radiographically united at a mean of 12.1 weeks (range 6-18 weeks). No angular deformity was observed and followed up until 24 weeks.

RESULTS

Final outcomes were classified as excellent, satisfactory or poor according to the Flynn scoring criteria for elastic flexible nail fixation. In the present study the final outcome was excellent in 18 (60%) cases, satisfactory in 12 (40%) cases and there were no poor outcome cases.

CONCLUSION

We conclude that elastic stable intramedullary nailing technique is an ideal method for treatment of paediatric femoral diaphyseal fractures. It gives elastic mobility which promotes rapid union at fracture site and stability which is ideal for early mobilisation.

KEY WORDS

Fracture Shaft Femur, Elastic Nails, Outcome, Flynn Scoring, Complications.

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BACKGROUND

After acute infections, trauma is a leading cause of morbidity and mortality in children. Femoral shaft fractures account for 1-2% of all paediatric fractures.

Femoral fracture is about 2.5 times more common in boys than in girls. Patients with a femoral shaft fracture usually have a history of fall or a motor vehicle accident. In recent years, fixation with flexible intramedullary nails have become popular technique for stabilising femur fracture in children. In the age limit of 4 - 16 years, intraarticular fractures of femur were excluded. Femoral fractures in children were typically stabilised with two nails inserted in a retrograde manner from medial and lateral entry points above the distal physis.

This technique offers several advantages. TENS is a simple, effective and minimally invasive technique. It gives stable fixation^{7,8,9} with rapid healing and prompt return of child to normal activity without any limb length discrepancy. Technique of insertion being close to the fracture haematoma

is preserved and with very minimal risk of infection,¹⁰ damage to the growth plate is almost negligible. Flexibility of the nails provide dynamic controlled motion at the fracture site, which stimulates periosteal callus formation. Nails are load sharing implants and allow early mobilisation and weight bearing.

MATERIALS AND METHODS

In our prospective observational study, we have taken 30 children with diaphyseal femoral fractures who are admitted in govt. General hospital, Guntur, between March 2012 and Feb 2016 after obtaining their consent. Femoral fractures in children are typically stabilised with two nails inserted in a retrograde manner from medial and lateral entry points above the distal physis of femur. Postoperatively, all the patients were followed for a period of 24 weeks. Results were analysed by both clinical and radiological.^{11,12,13}

Inclusion Criteria

Femoral diaphyseal fractures in children aged between 4 - 16 yrs.

Exclusion Criteria

- Fractures with intraarticular extension.
- Gustilo-Anderson grade 2 and 3 compound fractures.
- Associated co-morbid conditions making the patient unfit for surgery.

Study Design

Prospective Observational Study.

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RESULTS

Study Design

Prospective observational study on 30 children with femoral diaphyseal fractures was undertaken to evaluate the outcome of Titanium elastic nails fixation in paediatric femoral shaft fractures.

Age Distribution of Patients Studied

4 - 8 yrs. 13 patients (43.3%), 9 - 12 yrs. 7 patients (23.3%), 13-16 yrs. 10 patients (33.3%).

Mode of Injury of Patients Studied

RTA 16 patients (53.3%), fall 11 patients (36.7%) and fall from height 3 patients (10%).

Time for Union

24 patients (80%) < 8 - 12 weeks, 6 patients (20%) > 12 - 18 weeks.

Range of Movements in Degrees	No. of Patients	%
Full Range	28	93.33
Mild Restriction	2	6.66
Moderate Restriction	0	0
Severe Restriction	0	0
Total	30	100

Table 1. Range of Movements at 24 Weeks (Degrees)

Outcome	No. of Patients (n= 30)	%
Excellent	18	60.00
Satisfactory	12	40.00
Poor	0	0.00

Table 2. Functional Outcome with Percentage

Complications	Minor	Major	Nil	Total
No. of Patients	12	0	18	100
Percentage	40	-	60	100

Table 3. Postoperative Complications

Figure 1. Postop Complications in Graphical Form

Figure 2. Pre- and Postop X-Rays

DISCUSSION

In this prospective observational study trauma is a leading cause of morbidity and mortality in children. We had chosen 30 patients, out of that 13 (43.3%) were 4 - 8 years, 7 (23.3%) were 9 to 12 years and 10 (33.3%) were 13 to 16 years' age group with the average age being 9.6 years. There were 9 (30%) girls and 21 (70%) boys in the present study. RTA was the most common mode of injury accounting for 16 (53.3%) cases, self-fall 11 (36.7%) cases and fall from height 3 (10%) cases. Average duration between trauma and surgery was 3.9 days in this study; 21 (70%) cases were immobilised (long leg cast) postoperatively for 6 weeks followed by active hip and knee mobilisation with non-weight crutch walking. Union was achieved in < 3 months in 24 (80%) of the patients and 3 - 4.5 months in 6 (20%). Average time to union was 12.1 weeks, unsupported walking on full weight bearing was started in <12 weeks for 24 (80%) patients between 12 and 18 weeks in 6(16.7%) patients. The average time of full weight bearing was 11.5 weeks.

Superficial infection was seen in 1 (3.3%) case, which was controlled by antibiotics. All patients had full range of hip and knee motion in the present study and 2 (6.66%) patients had mild restriction in knee flexion at 12 weeks, but normal range of knee flexion was achieved at 16 wks. Nail back out was not seen in any of the cases. Some degree of angular deformity is frequent after femoral shaft fractures in children, but this usually remodels during growth. 2 (6.7%) patients presented with varus angulation, 1 (3.3%) patient presented with valgus angulation and they were within the acceptable limits. No patients had significant antero-posterior and rotational deformity.

In the present study, the final outcome was excellent in 18 (60%) cases, satisfactory in 12 (40%) cases and there were no poor outcome cases.

CONCLUSION

Based on the results in our prospective observational study, we conclude that Elastic Stable Intramedullary Nailing technique is an ideal method for treatment of paediatric femoral diaphyseal fractures. It gives elastic mobility promoting rapid union at fractures site and stability which is ideal for early mobilisation. With shorter operative time, lesser blood loss, less radiation exposure, shorter hospital stay and reasonable time to bone healing, it gives lower complication rate, good outcome when compared with other methods of treatment.

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