

Original Research Article

Femoral fractures in children's-early fixation with elastic nail

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Abstract: In past there were different opinions and controversies about operative treatment of paediatric femoral fractures. There has been a resurgence worldwide for operative fixation and now with availability of elastic nail (titanium or steel), improvement in technique, availability of low cost of treatment shorter hospital stay, imaging and fewer complications, and better nursing care, early mobilization & early return to school, elastic nails is becoming choice of treatment in children of age group 5-14. A prospective study of 16 paediatric femur fractures was done which were treated with elastic nails (steel or titanium in age group of 5 -14 yrs and patients were evaluated according to Flynn criteria in which 15 cases showed good to excellent results.

Keywords: Children, femur, fracture, TENS nailing, management, results.

INTRODUCTION:

Femoral shaft fractures in children is a crippling injury, there are multiple methods of treatment 3,6 in age groups 5-14 years, as conservative methods i. e. traction, spica cast 16, traction followed by spica cast & operative methods i. e. external fixator, extra medullary fixation, with plates & screws, intra medullary fixation with elastic nails. Treatment modalities may be influenced by age of the patient, level & pattern of fractures, to a great extent by availability of facilities and preference of surgeon. Generally outcome tends to be good irrespective of modality of treatment used. A systemic review of literature provides little evidence to support one method of treatment over other. Over the past two decades the advantages of fixation and early mobilization has been increasingly recognized. Early discharge from the hospital & to reduce the treatment cost, better nursing care are the factor because of which newer technique are being popular. Elastic table [1, 2] intramedullary nailing (ESIN) is a load bearing internal splint that maintains the reduction and leads to rapid biological healing[3,6]. The present prospective study is aimed at the evaluations of intramedullary fixation with elastic nails in children with femoral shaft fractures.

MATERIAL & METHODS:

The study was conducted at Irwin hospital, Muzaffarnagr and Muzaffarnagr Medical College & Hospital, Begrajpur Muzaffarnagr from July 2013 to November 2015. Total fifteen children (10 boys 5 girls) & 16 femoral shaft fracture in the Age group 5-14 years (Average Age 8-7) within 7 days of injury (Average duration 3-7 days) were internally fixed with elastic

nails. Fracture of right side was more common than left side (R -12, L - 4), three fracture were open thirteen were closed, radiologically most common type was transverse type (8 cases) followed by oblique type (5 case) & comminuted type (03 cases). All cases were operated within seven days of injury. The surgery was performed in supine position on radiolucent table, under general or spinal anaesthesia. Two elastic nails of identical diameter were used, according to flynn *et al.*; [2, 8,9] formula. (Nail diameter = diameter of isthmus of medullary canal x 0.4mm).

Nails were inserted in retrograde manner one from medial side & one from lateral side Entry was made 2.5 cm proximal to physical line. The nails were pre bent so that apex of bowed nail rested to fracture level to ensure a good, equal recoil force. Nails were inserted proximally in divergent manner & within 2 cm of physical lines.

In post operative period patient were nourished in supine position with limb elevated. No external support was given in any case. Non weight bearing knee mobilization & quadriceps exercises were started within 1st week. Patients were allowed to change position and move in the bed as desired or according to need during daily living activities.

Patients were regularly followed up initially at an interval of 4 weeks for initial 3 months & than at an interval of 12 weeks till the completion of 1 year after operation or till the publication of this series which ever was earlier.

Partial weight bearing was started at 4-6 week & full weight bearing by 8-10 weeks depending on fracture geometry & callus formation eg. Bone healing.

RESULTS:

All 15 patients were available for evolution after a mean of 12 month of union or till union. The union was achieved in all cases in a mean time 7-8 weeks. (5-10 weeks), the results were excellent in 13 cases (81.25%) good in 2 cases (12.5%) and poor in 1 case (6.25%) Full weight bearing was started at 8-12 weeks with a meantime of 8.5 weeks. Virus angulations of <50 was present in 13 cases, <10° was present in 2 patients, > 10° in 1 patient. No limb length discrepancy or shortening of < 1 cm was present in 13 cases, <2 cm was present in <2 cases, & > 2 cm shortening was present in 1 case. One case had minor soft tissue infection at entry site, & pain due to irritation by nail. The mean hospital stay was 7 days (4-12 days). Nails were removed after union earliest after 6 month of Surgery but routinely, after 8-9 months. No complications were associated with the nail removal procedure and no refracture were observed

DISCUSSION:

Conservative treatment is the accepted standard as for young children but complications such as malunion, joint stiffness & delay in functional recovery are common in older children if managed in this manner and also conservative treatment results in longer hospital stay, more burden and financial losses to family and hospital.

Elastic nailing has been advocated but controversy regarding ideal implant to treat Peadiatric femoral fractures still exist. In the present series elastic nails were used as a mode of fixation in different type of femoral fractures. In children between ages 5-14yrs. sixteen were operated and evaluated radiologically,

clinically & functionally for the efficacy of elastic nails. Several studies have shown good healing rates with lesser complications. Oh *et al.*; [14] observed that all 31 fractures in his series healed within 12 weeks (mean 10.5 weeks) without delayed union. Buechsenschuetz *et al.*; [12] reported that in 42 patients treated with ESIN fractures healed at a mean of 88 days from Injury Houshian *et al.*; [4] reported median union time of 7(5-9) weeks. In our series also mean union time was 7.8 weeks (5-10 weeks)

Flynnn *et al.*; [2, 8, 9] observed walking without support at an average of 8.5 weeks and 9.5 weeks respectively. In our series also mean full weight bearing averaged 8-10weeks. Early mobilization have benefits like less hospital stay, less school days loss, less joint stiffness & muscle atrophy, psycholglcal & economical advantage.

Herndon *et al.*; [5] showed that the hospital stay in non surgical group averaged 28 days and in surgical group averaged 12 days which was significant in present series average hospital stay was of 12 days less hospitalization time has resulted in the decrease in hospital bed occupancy and early return of patients to their home environment, earlier return of parents to their work.

No cases infection was seen in result series. This procedure require a small incision & less operative time that's why infections is not problem with this procedure, Herndon et a [15] showed the similar results regarding Infection. The results of present series are comparable to those of other series. It has definite advantages over other like early union, early mobilization, early weight bearing, high patients satisfaction rate, scar acceptance, easy implant removal. Elastic nails do not endanger either epiphyses or blood supply of femoral head.

Table – I: Showing type of fractures

S.No.	Type of fracture	No. of cases	Percentage
1	Transerse	9	56.25
2	Oblique	4	25
3	Comminuted	3	18.75

Table – II: Showing level of fractures

S.No.	Level of fracture	No. of cases	Percentage
1	Upper third	5	31.25
2	Middle third	8	50
3	Distal third	3	18.75

Table – III: Showing closed or open fractures

S.No.	Closed/open fracture	No. of cases	Percentage
1	Closed	14	87.5
2	Open fracture	2	12.5

Table -IV: Showing out come as per Flynn et al criteria[8, 9]

S. No.	Criteria		No. of	Results
1	Limb Length	Less than < 1 cm	13	Excellent (81.25%)
	Discrepancy	Less than <2 cm	03	Good (12.50%) Poor (6.25%)
		More than >2 cm	01	
2	Angular	Less than < 5°	13	Excellent (81.25%)
	Deformity	Less than <10°	02	Good (12.50%) Poor (12.5%)
		More than > 10°	01	
3	Pain	Absent	15	Excellent to Good (87.5%) Poor (1.2 %)
		Present	01	
4	Complications	Absent	15	Excellent to Good -100% Poor (0%)
		Present	01	
		(Minor soft tissue infection)		Poor (0 %)



Pre operative X –Ray



Post operative X-Ray



Post Operative X-Ray at 5 Weeks



Post Operative X-Ray at 9 Weeks



Patient Standing Unaided at 9 weeks



Patient Standing on fractured limb at 9 weeks



Patient Squatting at 9 weeks

CONCLUSION:

In paediatric femoral fracture requiring operative stabilization, closed intra medullary nailing with elastic nail is an excellent method. Though present data does not show that it is superior to other methods, yet this method has an advantage of providing better rehabilitation with biological healing of fracture, considerably reduced hospital stay resulting in early return of the patients to their home environment, low cost of treatment & psychosocial advantages, because of rapid fracture healing, early weight bearing, minimal disturbance of growth, early return to home environment, psychosocial & economic advantages¹⁸. Intramedullary nailing with elastic nails may be considered to be a method of treatment for fracture shaft of femur in children of 5-14 yrs of age.

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