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To study the outcome of closed intramedullary flexible nailing in fracture shaft femur in children age more than 3 year and less than 13 year

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Abstract

Femoral shaft fractures account for 1.6% of all paediatric bony injuries. Spica casting remains the most popular accepted method for treatment of femoral shaft fracture in infants and toddlers. The aim of our study is to study the outcome of closed intramedullary flexible nailing in fracture shaft femur in children aged more than 3 years and less than 13 years. This is institutional based prospective study of 60 patients, aged 3 to 13 years, with fracture shaft of the femur were treated with retrograde flexible intramedullary (titanium elastic) nailing at Dr. Shankarrao Chavan Govt. Medical College Vishnupuri, Nanded. Statistical analysis done by chi-square test. In the present study, the final outcome was excellent in 40 (66.66%) cases, satisfactory in 10(33.33%) cases and there were no poor outcome cases. TENS is a simple, easy, rapid, reliable and effective method for management of paediatric femoral fractures between the age of 5 to 15 years, with shorter operative time, lesser blood loss, lesser radiation exposure, shorter hospital stay, and reasonable time to bone healing.

Keywords: Shaft femur fracture, TENS, outcomes

1. Introduction

In children fractures of the femoral shaft are commonly treated by various types of traction for about 3 weeks, followed by plaster cast immobilization^[1]. The two major drawbacks with this treatment are prolonged bed rest leading to separation of the child from routine activities and the expenditure incurred on the treatment during the stay in the hospital^[4].

Time and experience of many clinicians have shown that children with diaphyseal femur fracture do not always recover with conservative treatment^[2] Angulation, mal rotation and shortening are not always corrected effectively. The management of paediatric femoral shaft fractures gradually has evolved towards a more operative approach in the past decade. This is because of a more rapid recovery and re-integration of the patients and a recognition that prolonged immobilization can have a negative effect even in children^[6].

Plating of femoral shaft fracture offers rigid fixation, it requires a larger exposure with the potential for increased blood loss and scarring. It is a load bearing device and re-fracture is a risk. Ante grade nailing techniques have shown a risk of proximal femoral deformities and avascular necrosis of the femoral head.^{7,8}Elastic internal fixation in the form of flexible intramedullary nailing provides a healthy environment for fracture healing with some motion leading to increased callus formation^[9, 10]. It is simple, effective and minimally invasive. It allows stable fixation, rapid healing and a prompt return of the child to normal activity. Functional results are excellent and complications are minor^[7].

2. Methodology^[3-6]

This is institutional based prospective study of 60 patients, aged 3 to 13 years, with fracture shaft of the femur were treated with retrograde flexible intramedullary (titanium elastic) nailing at Dr. Shankarrao Chavan Govt. Medical College Vishnupuri, Nanded. Statistical analysis done by chi-square test. Inclusion criteria's were Children and adolescent patients between 3 to 13 years of

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age, Mono-trauma / polytrauma, Medically fit for surgery, < 2 weeks post fracture, Closed fractures. Routine investigations were done for all patients. Patients were operated as early as possible once the general condition of the patient was stable and patient was fit for surgery. Statistical analysis done by chi-square test.

3. Exclusion criteria: Patients less than 3 years of age and more than 13 years of age, Very comminuted and segmental fractures, Children with metabolic bone disease, non-ambulatory children, and children with neuromuscular disease (cerebral palsy) were excluded. Fracture due to malignancy, Grade I, II, IIIa, IIIb, IIIc compound fractures, Non-ambulatory previous fracture.

Medical contra-indication to surgery. Routine investigations were done for all patients. Patients were operated as early as possible once the general condition of the patient was stable and patient was fit for surgery. In patient medical records, outpatient clinic notes, and radiographs were reviewed for all patients. Data collected on each patient were demographics, surgery/injury date, diagnosis, surgical procedure (number of TENSs used), mechanism of injury, associated injuries, fracture location, fracture pattern, degree of comminution, nail type, nail size, intraoperative complications, and additional surgical procedures. Postoperative data collected were active immobilization, duration of non-weight-bearing, length of stay time to nail removal, range of motion (hip, knee, and ankle), LLD^[11], signs of irritation at nail insertion site, and major complications (non-union, delayed union, re-fracture). LLDs were evaluated clinically either in a Thomas splint or in skin traction.

Postoperative Care: Patients were kept nil orally 4 to 6 hours post operatively, IV fluids / blood transfusions were given as needed, IV antibiotics were continued, Analgesics and tranquilizers were given according to the needs of the patient, Foot end of the bed was elevated, IV antibiotics were continued for 3 days and switched over to oral antibiotics on the 3rd day and continued till the 10th day.

4. Result and Outcome

S. No.	Outcomes	No. of cases	Percentage
1.	Excellent	40	67%
2.	Satisfactory	20	33%
3.	Poor	0	0%

28 (47%) patients stay in hospital for about 8 – 12 days. Patients with Head injury, BAT, BCT pubic-diastasis and ipsilateral tibia fracture stayed for longer duration.

The treatment of femoral shaft fractures in children, particularly those who are between 3 to 13 years of age is controversial. Operative treatment is becoming well accepted. Each of the surgical methods described have specific advantages and potential complications that must be appreciated by treating surgeon

The present study was conducted to assess the results of titanium elastic nail fixation of femoral shaft fractures in children and adolescent patients. Because of the increasing cost of health care, surgical fixation of childrens fracture with resultant early mobilisation and discharge from the hospital has become increasingly popular.

In the present study, the final outcome was excellent in 40 (66.66%) cases, satisfactory in 10(33.33%) cases and there were no poor outcome cases.

5. Discussion

Based on our experience and results, we conclude that Titanium Elastic Nailing System is an ideal method for treatment of pediatric femoral fractures. It gives elastic mobility promoting rapid union at fracture site and stability which is ideal for early mobilization with lower complication rate, good outcome when compared with other methods of treatment.

It is a simple, easy, rapid, reliable and effective method for management of pediatric femoral fractures between the age of 5 to 15 years, with shorter operative time, lesser blood loss, lesser radiation exposure, shorter hospital stay, and reasonable time to bone healing.

Because of early weight bearing, rapid healing and minimal disturbance of bone growth, TENS may be considered to be a physiological method of treatment.

Use of TENS for definitive stabilization of femoral shaft fractures in children is a reliable, minimally invasive, and physal protective treatment method.

Our study confers all the advantages which the previous studies have shown at various institutes and is fairly a simple, reliable technique with a shorter learning curve imparting lot of advantages over other intramedullary technique or other methods followed for management of pediatric diaphyseal femur fractures. The TENS fixation for treatment of paediatric femur fractures, is a simple, safe technique as it avoids any growth disturbance by preserving the epiphyseal growth plate and it avoids bone damage or weakening through the elasticity of the construct, which works as a load sharing biocompatible internal splint.

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