Prospective Study of Management of Diaphyseal Fractures of Femur in Paediatric Age Group by Titanium Elastic Nailing System

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Abstract: Background: The conventional method of treatment of paediatric femur fracture by traction, splinting & cast application have reduced over the decade & given way to minimally invasive internal fixation.

Methods: Overall result achived were Excellent in 18 patients. Satisfactory in 2 patients. No patient showed Poor results. All fractures healed with an average time of union of 6- 10 weeks. Soft tissue irritation around the knee was the most common problem encountered. Shortening and restriction of flexion were hardly observed. There was no delayed union , or non union , or refracture. Removal of nail of 2 mm and proximal migration was technical problem encountered in few cases.

Conclusion: We strongly belive that with proper intra operative technique . Appropriate instrumentation , and after care, TENS may prove the most ideal implant for pediatric femoral fracture.

THESIS SUMMARY

Introduction

Pediatric diaphyseal fractures account for 1.4% to 1.7% of all fractures in the pediatric population. Orthopaedic Surgeons from a long time have choosen that paediatric femoral diaphyseal fractures to be treated by conservative method such as Hip Spica due to good remodelling of bone in this age group , but with time and experience it has been found that all paediatric diaphyseal fractures are not united properly and angulation , malrotation & Shortening , have been observed. Beyond doubt children below 6 year of age are well treated by Spica cast , & children above 16 yeras are generally well treated by Interlocking nail , but the biggest Debatable age agoup is 6- 14 yeras of age , and for this age group many different modality of treatments are available such as eg: Traction followed by casting , Plate fixation , External fixation and Flexible Intramedulary nails with no clear cut guidlines to a preferred treatment. In recent times the trend have been shifted to a more aggressive and Operative approach and to avoid complication that might come with conservative treatment as Shortening , Malrotation , and Angulation . Operative Fixation allowes rapid recovery, early mobilization and reintegration of patient. It avoides prolonged hospital stays ,and relief from difficulties to family and care takers. It also has psychological , social , educational and economic advantage over conservative treatment.In recent times Ideal fixation device that have surfaced is flexible Intramedullary Nail , Notably Titanium Elastic Nail , which is a Load sharing Internal Splint ,and which maintains length and reduction . It also prevent Physis damage . Titanium elasticity promotes callus formation by limiting stress shielding. Titanium also has excellent biocompatibility. The biomechanical principle of TENS is based on the symmetrical bracing action of two elastic nail inserted in to the metaphysis ,each of which bears against the inner bone at three points.

Methods

After obtaining Approval from Institutional board and Informed consent prospective study of patients presenting with diaphyseal fracture of femur in age group of 5- 12 Years was done. Study was conducted on 20 Patients with diaphyseal fracture of femur with 12 boys and 8 girls in the study. Patients were treated with 2 titanium elastic nails. Follow up of patients was done both clinically and radiologically for one year . Fresh Closed displaced / undisplaced and fresh type 1 and type 2 open femoral diaphyseal fractures were Included in study. Segmetal and Pathological fractures were also included. About 13 patietnts had right side fracture and 7 had left side fracture. Majority of patients had transverse fracture followed by Oblique and spiral fracture. Following Variable analysed were also evaluated such as duration of hospital stay , duration of union , return to activities in days , duration of implant removal , any LLD or malalignment. Final outcome was evaluated based on Flynn Criteria.

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Results

Results were evaluated based on Flynn et al criteria , 90% of patients had excellent result and 10% had satisfactory results. Majority of patients return to activity by 9-11th week. In majority 40 % of patients, the implant were removed by 5th Month. 90% of patient had LLD of less then 1cm. Majority,70% of patients had no complications, Only 20% had Irritation at entry site , 5% had Infection and proximal nail migration. There were no delayed union , non-union or refracture . Majority 90 % of the patients were discharged before 10 th post op day. Radiologically callus formation was seen by 8th week in 50 % patients.whereas 40 % patients had callus formation by 5-6th week.

Conclusion

We Strongly belive that Titaninum elastic nailing is by far the safest , and the most ideal modality of treatment for pediatric femoral diaphyseal fractures. It has considerably decreased the hospitalisation time, resulting in early return to home by the patient, thus cutting the cost of the treatment and also has psycological benefits. It is a simple technique and minimum invasive method for stabilisizing pediatric femoral shaft fractures .The incidence of knee Stifness , malrotation , Angulation and delayed union which devlope with Conservative treatment such as Spica cast application is significantly reduced. Incidence of pin site infection which develop with External fixation is also reduced. TENS allows a biological environment that enhances both the rate of fracture healing and quantity of callus formation. Most of the complication associated with it are infact features of inexact technique and can be eliminated by strictly adhering to the basic principles and technical aspects. However we belive that with appropriate instrumentation and proper post operative rehabilitation TENS may prove to be the most ideal implant for pediatric femoral diaphyseal fractures.

Key Words

Pediatric ; Femur ; Titanium Elastic Nail.

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