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A study on occurrence of paediatric diaphyseal fractures of femur in Indian population

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Abstract

Background: There was an increased interest in the operative treatment of paediatric fractures in the past two decades, although debate persisted over its indications. There is a little disagreement concerning the treatment of femur fractures in children less than 5 years (POP cast) and adolescents older than 15 years (locked intramedullary nailing). Controversy persists regarding the age between 5 to 15 years. Several treatment options for femoral shaft fractures in children and adolescents have been described. Children below the age of 3 can be treated with cast or extensional devices. In the past two decades the management of displaced femoral shaft fractures in older children has gradually evolved toward a more operative approach due to a more rapid recovery, faster reintegration of the patients and possible negative effects of immobilization even in children. Orthopaedic surgeons will continue to face the challenge to treat this age group with less morbidity at a lower cost, as no clear guidelines have been available until now despite efforts done initially by French surgeons, later on by European surgeons and recently by the Paediatric Orthopaedic Society of North America (POSNA).

Conclusion: There was no significant association observed between clinical variables (age, gender, mode of injury, pattern of fracture and time interval between trauma and surgery) and incidence of complications.

Keywords: Paediatric diaphyseal fractures of femur, TENS

Introduction

There was an increased interest in the operative treatment of paediatric fractures in the past two decades, although debate persisted over its indications. There is a little disagreement concerning the treatment of femur fractures in children less than 5 years (POP cast) and adolescents older than 15 years (locked intramedullary nailing) [1]. Controversy persists regarding the age between 5 to 15 years. Several treatment options for femoral shaft fractures in children and adolescents have been described. Children below the age of 3 can be treated with cast or extensional devices. In the past two decades the management of displaced femoral shaft fractures in older children has gradually evolved toward a more operative approach due to a more rapid recovery, faster reintegration of the patients and possible negative effects of immobilization even in children [2]. Orthopaedic surgeons will continue to face the challenge to treat this age group with less morbidity at a lower cost, as no clear guidelines have been available until now despite efforts done initially by French surgeons, later on by European surgeons and recently by the Paediatric Orthopaedic Society of North America (POSNA) [3]. Titanium elastic nail (TEN) fixation was originally meant as an ideal treatment method for femoral fractures as it represents a compromise between conservative and surgical therapeutic approaches with satisfactory results and minimal complications [3].

Aim and objective of the study: To study the various aspects of managing diaphyseal fractures of femur in children aged between 5-15 years by using Titanium Elastic Nailing System in regard to Age, Gender, mode of injury, side affected, pattern of fracture, level of fracture, time interval between trauma surgery.

Material and Methods: All children and adolescent patients between 5-15 years of age with

diaphyseal fractures of femur admitted at Mamata General Hospital, Khammam, meeting the inclusion and the exclusion criteria during the study period from October 2018 to September 2020 were the subjects for the study.

Patients

Inclusion criteria

Children and adolescents between the age of 5 to 15 years having

The following type of diaphyseal fractures of femur:

1. Fresh closed displaced/ un displaced diaphyseal fractures.
2. Fresh Type I and Type II open fractures.
3. Closed comminuted fractures.
4. Segmental fractures.

Exclusion criteria

1. All open fractures having secondary infections or suspected deep infections or late presentations (>10 days)
2. All type III open fractures
3. Closed fractures more than two weeks old
4. All metaphyseal fractures with/ without the involvement of epiphysis
5. All pathological fractures

As soon as the patient was brought to casualty, patient’s airway, breathing and circulation were assessed. Following this, a complete survey was carried out to rule out any other significant injuries. Plain radiographs of AP and lateral views of the involved extremity, including one joint above and one joint below were taken to assess the extent and geometry of fracture.

Collection of data from children admitted with diaphyseal fractures of the femur was the history (relating to the age, sex, and occupation, mode of injury, time of injury and place of injury, past and associated present medical illnesses) taken by verbal communication from the child and/ or parents/ guardians.

Observations and Results

Results of the present study: An outcome surgical study of 20 patients with Diaphyseal fractures of the femur was undertaken to study the outcome of Titanium elastic nail fixation for femur fractures in children and adolescents aged 5-15 years.

Table 1: Age wise distribution of patients)

Age In years	Number of patients	Percentage (%)
5-8	9	45.0
9-12	7	35.0
13-15	4	20.0
Total	20	100.0

Table 2: Gender wise distribution of patients

Gender	Number of patients	Percentage (%)
Male	17	85.0
Female	3	15.0
Total	20	100.0

Table 3: Distribution of patients according to mode of Injury

Mode of Injury	Number of patients	Percentage (%)
RTA	10	50.0
Fat due to stumbling	7	35.0
Fat from height	3	15.0
Total	20	100.0

Table 4: Distribution of patients based on the side affected

Side affected	Number of patients	Percentage (%)
Right	10	50.0
Left	10	50.0
Total	20	100.0

Table 5: Distribution of patients based on pattern of fracture

Pattern of fracture	Number of patients	Percentage (%)
Transverse	9	45.0
Oblique	5	25.0
Spiral	4	20.0
Segmental	1	5.0
Comminuted	1	5.0
Total	20	100.0

Table 6: Distribution of patients based on level of fracture

Level of fracture	Number of patients	Percentage (%)
Proximal 1/3rd	10	50.0
Middle 1/3rd	8	40.0
Distal 1/3rd	2	10.0
Total	20	100.0

Table 7: Distribution of patients based on time Interval between trauma and surgery

Time of interval between trauma & surgery	Number of patients	Percentage (%)
< 2days	10	50.0
3-4 days	7	35.0
5-7 days	1	5.0
>7 days	2	10.0
Total	20	100.0

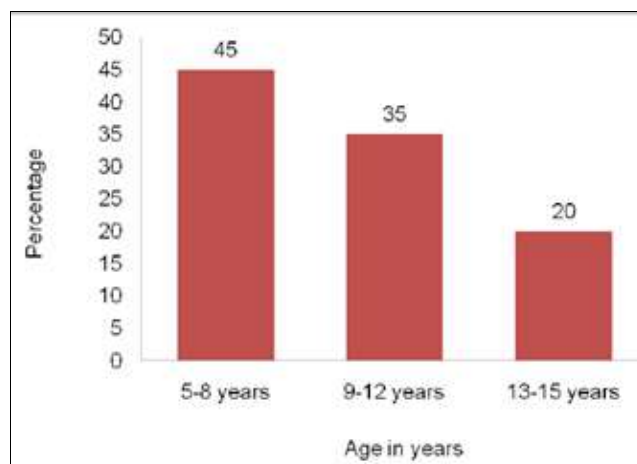


Fig 1: Age wise distribution of patients

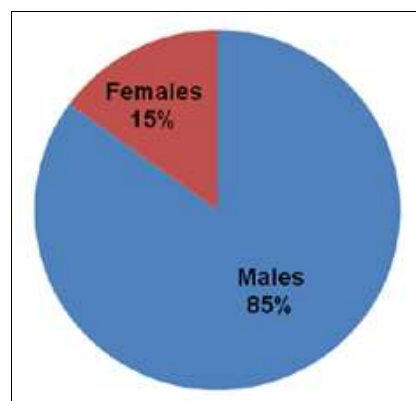


Fig 2: Gender wise distribution of patients

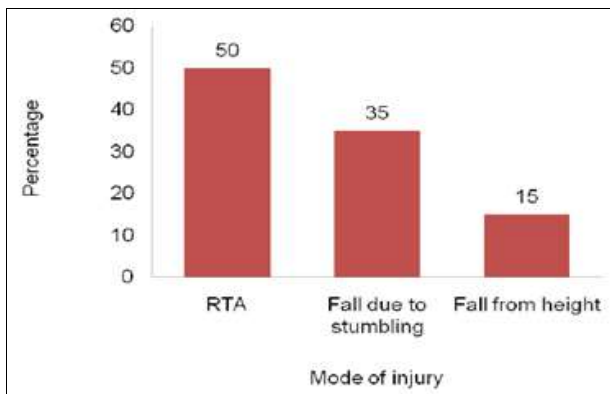


Fig 3: Distribution of patients according 10 mode of Injury

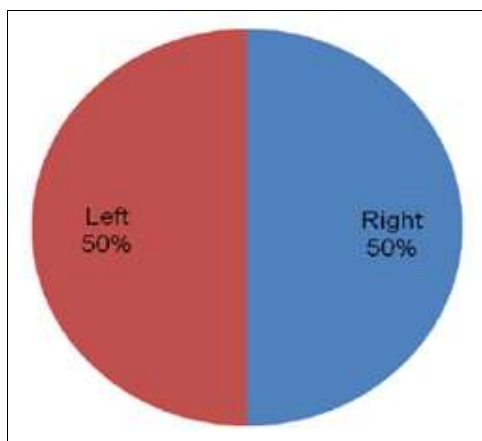


Fig 4: Distribution of patients based on the side affected

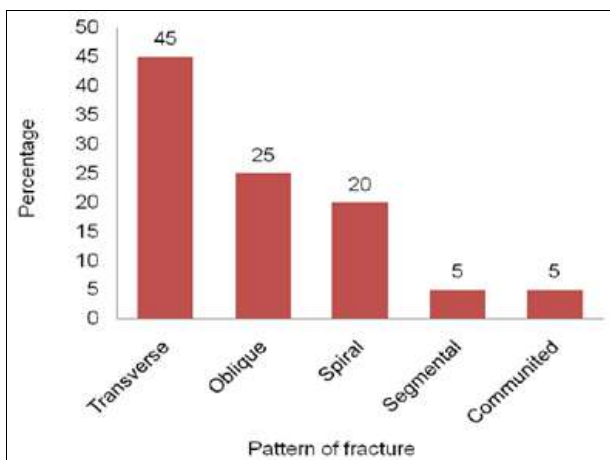


Fig 5: Distribution of patients based on pattern of fracture

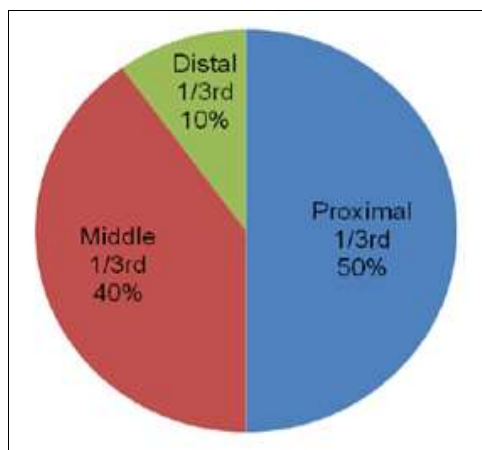


Fig 6: Distribution of patients based on level of fracture

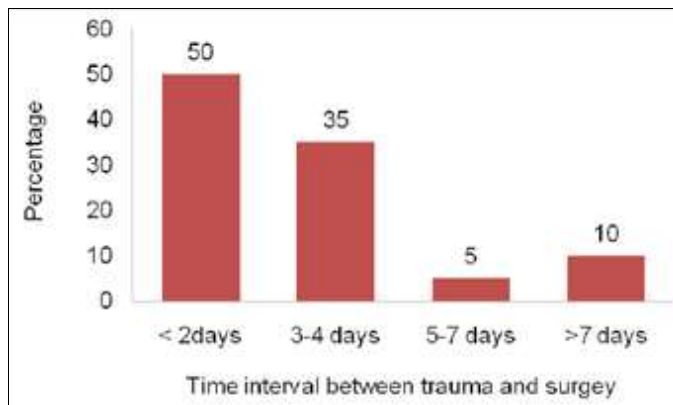


Fig 7: Distribution of patients based on time interval between trauma end Surgery

Conclusion

There was no significant association observed between clinical variables (age, gender, mode of injury, pattern of fracture and time interval between trauma and surgery) and incidence of complications.

References

1. Metaizeau JP. Stable elastic nailing for fractures of the femur in children. *J Bone Joint Surg Br.* 2004;86:954-957.
2. Kaiser MM, Zachert G, Wendlandt R, Rappa M, Rebecca E, Christine S, *et al.* Biomechanical analysis of a synthetic femoral spiral fracture model: Do end caps improve retrograde flexible intramedullary nail fixation? *Journal of Orthopaedic Surgery and Research.* 2011;6:46.
3. Gamal El-Adl, Mohamed Mostafa F, Mohamed Khalil A, Ahmed Enan. Titanium elastic nail fixation for paediatric femoral and tibial fractures. *Acta Orthop. Belg.* 2009;75:512-520.
4. Khazzam M, Tassone C, Liu XC, Lyon R, Freeto B, Schwab J, *et al.* Use of flexible intramedullary nail fixation in treating femur fractures in children. *Am J Orthop (Belle Mead NJ).* 2009 Mar;38(3):E49-55.
5. Saikia KC, Bhuyan SK, Bhattacharya TD, Saikia SP. Titanium elastic nailing in femoral diaphyseal fractures of children in 6-16 years of age. *Indian J Orthop.* 2007;41:381-385.
6. Flynn JM, Skaggs DL, Sponseller PD, Ganley TJ, Kay RM, Kellie Leitch KK. The operative management of pediatric fractures of the lower extremity. *J Bone Joint Surg Am.* 2002;84:288-300.
7. Moroz L, Launay F, Kocher MS, Newton PO, Frick SL, Sponseller PD, *et al.* Titanium elastic nailing of fractures of the femur in children: predictors of complications and poor outcome. *J Bone Joint Surg Br.* 2006;88:1361-1366.
8. Flynn JM, Hresko T, Reynolds RA, Blaiser RD, Davidson R, Kasser J. Titanium elastic nails for pediatric femur fractures - a multicenter study of early results with analysis of complications. *J Pediatr Orthop.* 2001;21(1):4-8.
9. Ligier JN, Metaizeau JP, Prevot J, Lascombes P. Elastic stable intramedullary nailing of femoral shaft fractures in children. *J Bone Joint Surg [Br].* 1988;70-B:74-7.
10. Hassan Al-Sayed, *et al.* Titanium elastic nail fixation for Paediatric femoral shaft fractures *Pan. Arab J Orth. Trauma.* 2006;10:7-15.
11. Michael Khazzam, Channing Tassone, Xue Liu C, Roger Lyon, *et al.* Use of Flexible Intramedullary Nail Fixation in Treating Femur Fractures in Children *Am J Orthop.*

- 2009;38(3):E49-E55.
12. Flynn JM, Schwend RM. Management of pediatric femoral shaft fractures. *J Am cad Orthop Surg* 2004;12(5):347-359.
 13. Khurram BARLAS, Humayun Beg Flexible intramedullary nailing versus external fixation of paediatric femoral fractures *Acta Orthop Belg.* 2006;72:159-163.
 14. Paterson JMH, Barry M. Flexible intramedullary nails for fractures in children. *J Bone Joint Surg.* 2004;86-B:947-953.
 15. Herndon WA, Mahnken RF, Yngve DA, *et al.* Management of femoral shaft fractures in the adolescent. *J Pediatr Orthop.* 1989;9:29-32.
 16. Nishikant K, Laljee C. Titanium Elastic Nails for Pediatric Femur Fractures: Clinical and Radiological Study. *Surgical Science.* 2010;1:15-19.
 17. Ranadeb Bandyopadhyay, Arindam Mukherjee. Short Term Complications of Titanium Elastic Nail in the Treatment of Diaphyseal Fracture of the Femur in Children; India. 2013.
 18. Salem K, Lindemann I, Keppler P. Flexible intramedullary nailing in pediatric lower limb fractures. *J Pediatr Orthop.* 2006;26(4):505-509.
 19. Huber RI, Keller HW, Huber PM, *et al.* Flexible intramedullary nailing as fracture treatment in children. *J Pediatr Orthop.* 1996;16:602-605.
 20. Versansky P, Bourdelat D, Al Faour A. Flexible stable intramedullary pinning technique in the treatment of paediatric fractures. *J Pediatr Orthop.* 2000;20:23-27.
 21. Bhaskar A. Treatment of long bone fractures in children by flexible titanium elastic nails. *Indian J Orthop.* 2005;39:166-8.
 22. Furlan D, Pogorelic Z, Biocic M, Juric I, Budimir D, Todoric J, *et al.* Elastic stable intramedullary nailing for pediatric long bone fractures: experience with 175 fractures. *Scandinavian Journal of Surgery.* 2011;100:208-215.
 23. Churchill Lingston. *Grace Anatomy.* 1995;38:678-684.
 24. Churchill Lingston. *Grace Anatomy.* 1995;38:691-697.
 25. Richard Drake L, Wayne Vogl, Adam Mitchell WM, Grays Bar-on E, Sagiv S, Porat S. External fixation or flexible intramedullary nailing for femoral shaft fractures in children. *J Bone Joint Surg [Br].* 1997;79-B:975-8.
 26. Robert Bucholz W, James Heckman D, Charles Court-Brown. Rockwood and green's fractures in children. 2006;6(25):1035-1037.
 27. Robert Bucholz W, James Heckman D, Charles Court-Brown. Rockwood and green's fractures in children. 2006;6(22):896-934.
 28. Wudbhav Sankar N, Kristofer Jones J, David Horn B, Lawrence wells. Titanium elastic nails for pediatric long bone shaft fractures. *J Child Orthop.* 2007 Nov;1(5):281-286.
 29. Gross RH, Davidson R, Sullivan JA, Peeples RE, Hufft R. Castbrace management of the femoral shaft fracture in children and young adults. *J Pediatr Orthop.* 1983;3(5):572-582.
 30. Carey TP, Galpin RD. Flexible intramedullary nail fixation of pediatric femoral fractures. *Clin Orthop.* 1996;332:110-118.
 31. Salem K, Lindemann I, Keppler P. Flexible intramedullary nailing in pediatric lower limb fractures. *J Pediatr Orthop.* 2006;26(4):505-509.
 32. Shannak AO. Femoral fractures in children: follow-up study. *J Pediatr thop.* 1988;8:306-310.
 33. Oh CW, Park BC, Kim PT, Kyung HS, Kim SJ, Inn JC. Retrograde flexible intramedullary nailing in children's femoral fractures. *Int Orthop.* 2002;26(1):52-5.
 34. Aksoy C, Caolar O, Yazyoy M, Surat A. Pediatric femoral fractures: A comparison of compression plate fixation and flexible intramedullary nail fixation. *J Bone & Joint Surg (Br).* 2003;85-B(III):263.
 35. Bar-on E, Sagiv S, Porat S. External fixation or flexible intramedullary nailing for femoral shaft fractures in children. *J Bone Joint Surg [Br].* 1997;79-B:975-8.
 36. Beaty JH, Austin SM, Warner WC, *et al.* Interlocking intramedullary nailing of femoral shaft fractures in adolescents: preliminary results and complications. *J Pediatr Orthop.* 1994;14:178-183.
 37. Ozturkman Y, Dogrul C, Balioglu MB, Karli M. Intramedullary stabilization of pediatric diaphyseal femur fracture with elastic intra medullary nails. *Acta Orthop Traumatol Jure.* 2002;36(3):220-7.
 38. Heinrich SD, Drvaric DM, Darr K, MacEwen GD. The operative stabilization of paediatric diaphyseal femoral fractures: a prospective analysis. *J Pediatr Orthop.* 1994;14:501-507.
 39. Ferguson J, Nicol RO. Early spica treatment of pediatric femoral shaft fractures. *J Pediatr. Orthop.* 2000;20:189-92.
 40. Garg S, Matthew BD, Perry LS, Scott JL, Gordon JE. Surgical treatment of traumatic pediatric femur diaphyseal fractures with titanium elastic nails. *J Child Orthop.* 2009 Apr;3(2):121-127.
 41. Gamal EA, Mohamed FM, Mohamed AK. *Acta Orthop. Belg.* 2009;75:512-520.
 42. Weiss JM, Choi P, Ghatan C, Skaggs DL, Kay RM. Complications with flexible nailing of femur fractures more than double with child obesity and weight >50 kg. *J Child Orthop.* 2009 Feb;3(1):53-8.
 43. Terry Canale S, James Beaty H. Campbell's operative Orthopaedics. 2007;11(23):1651-1666.
 44. Terry Canale S, James Beaty H. Campbell's operative Orthopaedics. 2007;11(23):1675-1689.
 45. James Beaty H, John Flynn M, David Skaggs L. Rock wood and Wilkin's fracture in children seventh edition. Chapter 22. 809.
 46. Robert Bucholz W, James Heckman D, Charles Court-Brown. Rockwood and green's fractures in children. 2006;6(25):1038-1064.
 47. Bernard Rosner. *Fundamentals of Biostatistics,* Duxbury. 2000;5:80-240.
 48. Robert Riffenburg H. *Statistics in Medicine,* second edition, Academic ress. 2005, 85-125.
 49. Sunder Rao PSS, Richard J. *An Introduction to Biostatistics, A manual for students in health sciences,* New Delhi: Prentice hall of India. 86-160.
 50. John Eng. *Sample size estimation: How many Individuals Should be Studied?* *Radiology.* 2003;227:309-313.
 51. Barry M, Paterson JM. Flexible Intramedullary nails for fracture in children. *J Bone Joint surg (Br).* 2004;86:947-953.