

Original Research Article

Early result of pediatric shaft femur fractures treated by hip spica cast in children upto 10 years of age

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ABSTRACT

Background: Fracture shaft of femur is constitute 1.6% paediatric fractures. Traditionally most femur fractures in children were treated conservatively, however with the coming of new implants, the indications of operating have increased. We believe guidelines based on age are from western literature where children are usually of big frame, our children being of smaller frame, the conservative management by hip spica can be extended to older children.

Methods: This study was done to see the results of conservative management of femur fractures in form of hip spica and traction followed by spica in children less than 10 years of age. Patients less than 6 months of age (treated by Pavlik harness), having compound fractures and those with associated injuries were excluded from the study

Results: Follow up was done in OPD after 1,4,6,10,12 weeks with check X-rays taken after spica application and at 6, 10, 12 weeks and at removal of spica cast. All fractures united with average union time of 7.3 weeks. At final follow up of 1 year 23 patients had a limb length difference of more than 1cm. average hospital stay was 13.5 days. We had 4 cast complications in form of skin excoriation and superficial skin ulceration in 2 children and broken spica in 2 children.

Conclusions: Traction followed by spica cast is safe and effective method of treating fracture of paediatric femur fractures.

Keywords: Femur fracture, Paediatric, Skin excoriation, Spica cast

INTRODUCTION

Fracture femur in children constitute about 1.6% of all fractures in paediatric age group.¹ Paediatric age group includes new born babies to 18 years old, treatment guidelines are based on the age of the child and by the fracture pattern. Pavlik harness is used for children less than 6 months of age, spica cast for children 6 months to 6 years, elastic nailing or biological plating for 6 to 14 years and interlock nailing for more than 14 years of age.² Traditionally fracture shaft of femur in children have been managed conservatively.³ In recent times, due to advent of new implants trend is towards treating these

fractures surgically, but the surgical management is not without complications of infection, implant failure and resurgery for implant removal. Since children have very good fracture healing potential skin traction followed by spica cast gives good results and should not be excluded as a viable option for treatment in older children.⁴ We believe the treatment guidelines for fracture shaft of femur in children as based on western literature, where the children are of big frame, our children being smaller in size can be managed by spica cast even upto extended age of 10 years.⁵ Present aim was to see the results of traction followed by spica for fracture femur in age group extending to 10 years.

METHODS

The study was carried in department of orthopaedics Government medical college Jammu from January 2015 to January 2016. 52 cases with isolated closed fractures of shaft of femur were included in the study. Children less than 6 months, with open fractures or polytrauma patients were excluded from the study. After admission, immediate spica cast was given in children in whom fracture was minimally displaced. In other children, the injured limb was put on skin traction using weight appropriate for age, limb position was adjusted with sand bags. X-rays were taken after 4-5 days of skin traction to check fracture alignment.

After 7-21 days of traction, when fracture had become sticky, well moulded one and half spica was applied under GA. Acceptable alignments were according to age as given in Table 1.

Table 1: Acceptability criteria for closed reduction of fracture shaft of femur as per age.⁶

Age (years)	Shortening	Angulation anterior-posterior	Angulation varus/valgus
Birth to 2	15	30	30
2-5	20	20	15
6-10	15	15	10
11 to maturity	10	10	5

Parents were given instructions regarding spica care before discharging the patients. Regular follow up at 1,4,6,10,12 weeks. At each visit spica was checked for cracks and skin of child was examined. X-rays were taken at 6, 10 and 12 weeks. After the spica was removed clinical examination was performed to evaluate gait, LLD, malalignment according to the recommended criteria.

RESULTS

52 children were included in the study, with a mean age of 4.32 years range (8months to 10 yrs.). Age distribution is shown in table 2. 33 were males and 19 females. Right side was involved in 21 patients and 31 had left side involvement. The mode of injury was fall in 31 patient's RTA in 19 and child abuse in 2 patients. Average duration of skin traction was 9.7 days range (0-21) days. Average duration of hospital stay was 13.5 days range (2-22) days.

Average time for fracture union was 7.3 weeks range (4-12) weeks. At final follow-up of one year 4 (7.6%) children had limb length discrepancy (LLD) of more than 1.5cm, 4 (7.6%) children had LLD of 1.5 cm, 15 (28.8%) had LLD of 1 cm, 20 (38.4%) had LLD of 0.5cm, while 9 (17.3%) children had no LLD. This is shown in Table 3.

Only 3 (5.76%) children has a short limb gait at follow up of one year. 2 (3.8%) patients needed wedging of cast at second week to correct malalignment. 2 patients (3.8%) had superficial skin excoriation around perineal region. None of the patients needed cast removal for any cast related complication.

Table 2: Age distribution of patients.

Age (years)	No. of patients
6 months to 1 year	1
1-2	4
2-3	3
3-4	7
4-5	10
5-6	13
6-7	7
7-8	5
8-9	0
9-10	2
Total	52

Table 3: Limb length discrepancy.

Limb length discrepancy	No. of patients
Nil	9
Less than 5mm	20
5mm to 10mm	15
10mm to 15mm	4
More than 15mm	4

DISCUSSION

Management of fracture shaft femur in children is based on age with conservative management for children less than 5 years, surgery for more than 11 years. Treatment for 6-11 age group is controversial.¹ These guidelines are from western literature where body frame of children is usually big, we believe in Asian setting the age group for spica cast can be increased as our children are usually of small frame and stature.

More recently trend is to treat such fractures surgically by plating or nailing. Surgical fixation of femoral fractures is not without risk of complications. Complications such as infection, growth plate disturbances and implant failure have been reported.⁷ More-over another surgery for implant removal is often needed. Spica cast has been used successfully for paediatric femur fractures and is proven to be very effective and safe by literature.⁸

Results of present study are comparable with other similar studies. Jamaluddin in his prospective study treated 24 children aged 3 months to 10 years having fracture shaft of femur by early spica cast. He applied cast under sedation. The average hospital stay in the Jamaluddin study was 3.5 days. The average hospital stay in present study was 13.5 days. Shortening was seen in all

patients, average 15mm at the time of fracture union in the Jamaluddin study. Shortening was noted in 43 (82.6%) of our patients, with average of 1.2cm.⁹ Shortening in all patients and short hospital stay in his study may be due to early spica cast application, where as we applied cast after preliminary skin traction in our patients. We applied early spica cast in those patients only who were less than one year or had relatively undisplaced fracture. However a shortening of upto 2cm is expected and usually has no clinical impact on a growing child.^{10,11} Angulation was within acceptable limits in all his patients, we observed the same in our study.

Sugi et al have treated 191 children upto 10 years of age by spica cast. They included only middle third fractures for fear of malunion. We applied spica at all levels of shaft and did not find any difference in rate of malunion. They accepted upto 20 degree of anterior angulation, 20 mm of shortening and 15 degree valgus angulation, but no posterior angulation or varus.¹² At removal of spica, shortening was seen in all of their patients. Shortening was seen in only 43 (82.6%) of our patients which was within acceptable limits. 9 (4.7%) patients had complication due to spica, including pressure effects, malalignment of fracture and breakage of spica in Sugi and Cole study. 4 (7.6%) of our patients had spica complication including skin excoriation and cast breakage. At 4.5 to 8 year follow up all of their patients had shortening 9mm to 20 mm. We had follow up of only one year and by the end of one year only 4 (7.6%) patients has LLD of more than 1.5cm.

Mehdinasab et al however reported spica cast has lot of undesired outcomes in the form of longer hospital stay, leg length discrepancy, and unacceptable angulations which may not be tolerated by agitated child or parents.¹³ Our patients had no complaints regarding hospital stay and only 4 (7.6%) of our patients had LLD of more than 1.5cm.

CONCLUSION

Traction followed by spica cast is a safe and effective method for closed fracture shaft of femur with very low risk of complication and no need of re-surgery for implant removal. If used properly it can be extended to children of 10 years of age particularly in child population of our region who usually have small frame.

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