Original Research Article

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Management of isolated shaft femur fractures by traction and single-leg spica cast in children

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ABSTRACT

Background: Objective of the study was to find out the advantages of traction and single-leg spica cast in treatment of isolated femoral shaft fracture in children. Study design was Descriptive and place of the study was Darbhanga Medical College and hospital, Laheriasarai, Darbhanga, Bihar, India.

Methods: 24 patients, age below 10 years, with a mean age of 5.37 years range with closed isolated femoral shaft fractures were included in the Study. Patients having compound fractures and those with associated injuries were excluded from the study. Spica cast was applied under sedation after preliminary skin traction, however immediate spica was given in children less than 2 year and those who had less than 2 cm shortening on telescopy. Follow up was done in OPD after 1,4,8,12,24 weeks with check x-rays taken at every visit.

Results: 24 children were included in the study, with a mean age of 5.37 years range (2 months to 10 years). Average duration of skin traction was 14.8 days range (0-21) days. Average duration of hospital stay was 16 days range (2-22) days. Average time for fracture union was 7.4 weeks range (4-12) weeks. At final follow-up, 2 patient had Limb - Length Discrepancy (LLD) of 1.5 cm, 2 had LLD of 1 cm, 4 had LLD of 0.5cm, while 18 children had no LLD. None of the patients had short legged gait. None of the patients needed cast removal for any cast related complication.

Conclusions: Traction followed by spica cast is a safe and effective method for closed fracture shaft of femur with very low risk of complication and can be done in children in less than 10 years of age.

Keywords: Femur, Fracture, Hip spica, Traction

INTRODUCTION

Fracture shaft of femur comprises 1.6% of all fractures in paediatric age group. Paediatric age group includes new born babies to 18 years old, and as such a variety of treatment options are available. Traditionally fracture shaft of femur in children have been managed conservatively. 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 and implant failure. 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.

METHODS

This study was carried in department of orthopaedics Darbhanga Medical College and Hospital, Darbhanga, Bihar, India from March 2014 to March 2016. 24 cases with isolated closed fractures of shaft of femur (Figure 1) were included in the study. Patients with compound fractures or polytrauma patients were excluded from the study. After admission, immediate spica cast was given in children less than two year and in whom shortening of

less than 2 cm was present on telescopy. 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 7 days of skin traction to check fracture alignment.

After 7-21 days of traction, when fracture had become sticky, (Figure 2) well molded Single-Leg spica cast (Figure 3) was applied under sedation. Acceptable alignments were according to age as follows (Table 1).



Figure 1: Fracture at the time of presentation.



Figure 2: Fracture at the time of presentation.

Table 1: Acceptable alignments according to age.

Age (years)	Shortening (in mm)	Varus/valgus angulation	Anterior/ posterior angulation
<2	15	30	30
2-5	20	15	20
6-10	15	10	15
11 to maturity	10	5	10

Spica care instructions were given to parents before discharging the patients. Regular follow up at 1, 4, 8, 12, 24 weeks, with X-rays taken at each visit to monitor fracture alignment. After the spica was removed clinical

examination was performed to evaluate gait, LLD, malalignment according to the recommended criteria.



Figure 3: Hip spica cast.

RESULTS

24 children were included in the study, with a mean age of 5.37 years range (2 months to 10 years), 15 were males and 9 females. Right side was involved in 16 patients and 8 had left side involvement. The mode of injury was fall in 14 patients and RTA in 10 patients. Average duration of skin traction was 14.8 days range (0-21) days. Average duration of hospital stay was 16 days range (2-22) days. Average time for fracture union was 7.4 weeks range (4-12) weeks. At final follow-up 2 patient (8.33%) had LLD of 1.5 cm, 2 (8.33%) had LLD of 1 cm, 4 (16.66%) had LLD of 0.5cm, while 16 (66.66%) children had no LLD. None of the patients had short legged gait. 2 (8.33%) patients needed wedging of cast at second week to correct malalignment. One patient (4.16%) had superficial skin excoriation around perineal region. None of the patients needed cast removal for any cast related complication.

DISCUSSION

The management of femoral shaft fractures in children is controversial. Management based on age has been suggested with conservative management for children less than 5 years, surgery for more than 10 years. Treatment for 6-10 yrs age group is controversial. In developing countries, other factors may influence the choice of a method, including the presence of adequately trained providers, equipment, and inpatient beds. The optimal treatment method in this setting should be relatively simple to apply, rely upon resources available locally, be associated with few complications, more recently trend is to treat such fractures surgically by plating^{1,2} or flexible intramedullary nailing.³⁻⁷ Surgical fixation of femoral fractures is not without risk of complications. Complications such as infection, growth plate disturbances and implant failure have been reported. Skin or Skeletal traction with or without spica casting.⁸⁻¹² is much more simple and economical than operative methods. Results of the study are comparable with other similar studies. Sugi and cole have treated 191 children upto 10 years of age by spica cast. 13 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. At removal of spica, shortening was seen in all their patients. Shortening was seen in only 10 (32.2%) 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. 3 (9.6%) of our patients had spica complication including skin excoriation malalignment. At 4.5 to 8 years follow up all of their patients had shortening 9mm to 20 mm. We do not have long term follow up so long-term results cannot be compared.

Jamaluddin in his prospective study treated 24 children aged 3 months to 10 years having fracture shaft of femur by early spica cast. 14 He applied cast under sedation. The average hospital stay in the Jamaluddin study was 3.5 days. The average hospital stay in the study was 13 days. Shortening was seen in all patients, average 15 mm at the time of fracture union in the Jamaluddin study. Shortening was noted in 10 (32.2%) of our patients, with average of 2.4mm. 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 children more than two year and children who had shortening of more than two cm on telescopy. We applied early spica cast in those patients only who were less than two years or had less than 2 cm shortening on telescopy. Angulation was within acceptable limits in all his patients, we observed the same in the study.

CONCLUSION

In summary, these preliminary results suggest that the traction spica cast is an excellent option for managing isolated femoral shaft fractures in children. This technique is applicable in a setting of limited resources, is associated with a low incidence of complications, and offers results comparable to other treatment methods. The length of hospitalisation is shortened, which frees up inpatient beds and allows patients and their families to resume a more normal lifestyle throughout the course of treatment. Traction followed by Spica cast is a safe and effective method for closed fracture shaft of femur with very low risk of complication and should be recommended in children in less than 10 years of age.

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Ethical approval: The study was approved by the

institutional ethics committee

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