ORIGINAL ARTICLE

Comparison of Titanium Elastic Nailing vs Hip Spica Cast in Treatment of Femoral Shaft Fractures in Children between 6-12 Years of Age

ISHFAQ AHMAD[1], HAROON-UR-REHMAN GILANI[2], KASHIF RASOOL[3], *ADNAN RASOOL[4]*

ABSTRACT

Background: Fracture treatment in children relies on rapid healing and spontaneous correction of angulated fractures; therefore most of the diaphyseal fractures can be treated by plaster alone. Operative treatment of children's fractures is often looked at critically.
Aim: To compare mean duration of bone union in traction followed by Spica cast versus titanium elastic nailing for fracture shaft of femur in children of age 6-12 years.
Methods: This randomized control trials was carried out in the Department of Orthopaedic Surgery, Nishtar Hospital Multan from November 2013 to May 2014. A total of 60 patients were included.
Results: Out of 60 patients, 31 were male and 29 were female. The mean ages of patients were 8.84±2.035 of males and 8.97±2.009 of females. The outcomes in Spica casting were have mean duration 8.78±1.88 weeks while in Titanium elastic nailing were have mean 11.90±20.303. Statistically the difference between the two groups was significant (P = 0.012).
Conclusion: According to this study TEN has better outcomes as compared to the traction followed by Spica cast.
Key Words: Femur, Hip spica, Titanium elastic nailing, Femoral shaft

INTRODUCTION

The femoral shaft fractures are the commonest pediatric injuries being encountered and treated by orthopedic surgeons[1]. The incidence rate of femoral shaft fracture is 1.6% of all pediatric fractures.[2] Amongst pediatric fractures management of femoral shaft fractures, it is responsible for longer hospital stay, immobilization in cast, absence from school and daily activities[2,3]. Femur is the longest and main weight bearing bone of the body. Complications of this fracture can be catastrophic for the child as well as for the family. Common causes of this fracture are child abuse, road traffic accidents, fall from height and fall of heavy objects on the affected limb[4,5,6].

Although fracture shaft of femur in children can be treated in a number of ways[7], but choice of specific method is, in general, based upon the fracture pattern, age of the child, weight of the child and experience of the surgeon. Age is one of the most important factor[8]. Treatment modalities changes with age. Children of age less than 6 years are best managed by Spica casting while those who are above 12 years are treated by intramedullary nailing. Treatment of children between ages 6-12 years is a matter of much debate[9,10].

Department of Orthopaedics, [1,4]Nishtar Medical College, Multan, [2]Sahiwal Medical College Sahiwal, [3]Red Crescent Medical College, Dinanath Stop Multan Road, Kasur
Correspondence to Dr. Ishfaq Ahmad, Assistant Professor, Department of Orthopaedic, Nishtar Medical College/Hospital, Multan

The most common treatment modalities, which are in current practice for treating femoral shaft fractures in children between age 6-12 years, are traction followed by Spica cast and titanium nailing[11,12]. Traditionally this age group had been managed by traction followed by Spica cast.[13] However this treatment method is fraught with many complications[14,15,16]. Delayed union is one of those complications which in turn cause longer hospital stay, absence from school and daily activities of life and puts socioeconomic burden on the family. Titanium elastic nail is an advance method of treatment for femoral shaft fracture in children between 6-12 years of age which is associated with early bone healing and low rate of complications[17,18].

Titanium elastic intramedullary nailing (TEN) for fractures of long bones in the skeletally immature patient (e.g., children) has gained widespread popularity, because of its effectiveness and low rate of complications. Titanium elastic nailing is commonly used to stabilize femoral fractures in school-aged children, but there have been few controlled studies, with only relatively short-term follow-ups assessing the risks and benefits of this procedure compared with those of the traditional traction and application of a Spica cast. A similar study conducted by Saseendar[17] in 2010, shows bone union occurred in 6.47 weeks (range 5-8 weeks) in the nailing group and 8.25 weeks (range 6-12 weeks) in the Spica group.

MATERIAL AND METHODS

This randomized control trials was carried out in the Department of Orthopaedic Surgery, Nishtar Hospital Multan from November 2013 to May 2014. A total of 60 patients were included in the study. The patients of both sexes with age between 6-12 years, close fracture shaft of femur and fracture reported within one week of injury were included. Those patients who have open fractures, pathological fractures, comminuted and segmented fractures, trochanteric fractures and poly trauma were excluded from the study.

RESULTS

Out of 60 (100%) patients, 31(51.7%) were males and 29 (48.3%) were females (Table 1). As regard to the age of patients n=60, 31 males have mean±SD age of 8.84±2.035 years, similarly 29 females have mean±SD 8.97±2.009 years (Table 2). As regard to the outcomes group 1 with Spica casting have mean duration 8.78±1.88 weeks. Similarly in group 2 titanium elastic nailing have mean 11.90±20.30 weeks (Table 3). After applying 't' test P value calculated as P=.012 which is a significant value.

Table 1: Frequency of gender (n=60)

Gender	n	%age
Male	31	51.7
Female	29	48.3

Table 2: Mean±standard deviation (SD) according of age according to gender

Gender	n.	Mean±SD
Male	31	8.84±2.03
Female	29	8.97±2.00
Total	60	8.90±2.00

Table 3: Cross table of outcomes

Group	No.	Mean±SD
Casting spica	30	8.77±1.88
Titanium elastic nailing	30	11.90±20.30
P value	0.403	

DISCUSSION

Even though spica casting and skeletal traction in adjunct are usually used for femoral-shaft fractures in children, latest research have reported its possible consequence on social, economic, educational, and emotional costs. On the contrary, elastic intra-medullary nailing of femoral-shaft fractures has recently achieved immense popularity for its superior clinical and psycho-socioeconomic result with lesser frequency of complications[19,20]. In the current study, the outcome of the TEN surgical methods versus traction and Spica casting are compared with respect to hospital stay. Findings of the present study are coincident with the results of earlier studies that reported the superiority of elastic nails for the treatment of femoral-shaft fractures. In a study conducted by Ligier et al[21] more favorable results were achieved in 120 femoral-shaft fractures treated with TEN. In that study, elastic intra-medullary nail with Kirschner wires or pins was applied. Reeve et al[22] reported higher rate of complications in the traction and casting group (41 patients with shaft fractures) as compared to the group undergoing intra-medullary nailing surgery (49 patients).

Our study shows that hospital stays are significantly longer in the traction and spica cast group than in the TEN group. This is in agreement with other similar studies[23,24], which stated shorter hospital stays in case of TEN, but is contrary to Saseendar's study[17]. This discrepancy in outcomes was due to the fact that in Saseendar's study, patients in the TEN group were discharged from hospital only after removal of suture, to monitor the occurrence of early postoperative complications, and the spica patients were generally discharged a day or two after Spica casting, once the presence of plaster-of-Paris-related complications were assessed.

CONCLUSIONS

There was a mark difference in mean duration of bone union in titanium elastic nailing vs traction followed by Spica casting for treatment of fracture in children between 6-12 years of age. According to this study TEN has better outcomes as compared to the traction followed by spica cast.

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