

COMPARISON OF MEAN ANTERIOR KNEE PAIN BETWEEN MEDIAL PARAPATELLAR TENDON APPROACH VERSUS TRANSPATELLAR TENDON APPROACH IN TIBIAL MEDULLARY NAILING FOR TREATMENT OF TIBIAL SHAFT FRACTURE

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ABSTRACT

Background: Tibial medullary nails are largely inserted by a transpatellar tendon approach or medial parapatellar tendon approach in fracture of shaft of tibia. One of the common complication of the tibial nailing is anterior knee pain. **Objective:** To compare the mean knee pain between Medical Parapatellar Tendon approach and Trans Patellar Tendon approach in Tibial medullary nailing for tibial shaft fracture. **Methodology:** Study Design: Randomized controlled trial. Study Duration: From 16th November 2015 to 15th May 2017. Settings: Department of Orthopedics, Bahawal Victoria Hospital, Bahawalpur. A total of 60 patients of closed or type I open fractures of tibial shaft, in 20-60 years of age, of either gender were included. Patients were placed randomly into two groups. In groups A patients, tibial medullary nailing was done by the Medical Parapatellar Tendon approach (MPT) while in group B, Tibial medullary nailing (TMN) was done by Trans patellar tendon approach (TPT). Follow up was regular post-operatively and final knee pain was measured at the end of 2nd week. Data was analyzed by using SPSS version 16. **Results:** The mean age of patients in group A was 38±11 years and in group B was 38±9 years. Out of these, 60 patients, 45 (75%) were male and 15 (25%) were females with ratio of 3:1. Mean knee pain in Group A (MPT approach) was 4.47 ± 1.53 while in Group B approach) was 6.30 ± 1.57 (p-value = 0.000). **Conclusion:** Mean knee pain was less after Medical Parapatellar Tendon approach as compared to approach in Tibial Medullary Nailing for treatment of Tibial shaft fracture. **Keywords:** Tibial, Fractures, Medial parapatellar, Transpatellar, Knee pain.

INTRODUCTION

High energy trauma like motorcycle accidents is major cause of tibial shaft fracture.¹ These fractures are either close with intact skin or open with broken skin.¹ These fractures may be simple or complex or multiple. Fracture lines may be transverse, oblique or spiral. Incidence of this fracture is 2 per 10000.² but it becomes low where traffic safety measures are observed strongly. This fracture is also common in old females.³ Factors like density of bone, age of patient, fracture type, soft tissue insult or any complication in initial injury also alters the method of treatment.³ There are many methods of fixation of tibial shaft fracture in which most common is reamed or unreamed tibial medullary nailing (TMN).^{4,5} In this method nail is inserted from proximal site and is locked by proximal and distal locking screws after proper reduction of fracture of tibia either by Trans patellar tendon (TPT) approach or Medical Parapatellar Tendon (MPT) approach.^{4,7} Common complication of this treatment method is anterior knee pain (AKP) at the site of insertion of nail.⁶⁻¹⁰ The Purpose of this study was to compare the Anterior Knee Pain in Trans patellar tendon approach and Medical Patellar tendon approach in treatment of tibial shaft fracture by Tibial Medullary Nailing.

METHODOLOGY

This was a randomized controlled trial conducted at department of Orthopedic surgery, Bahawal Victoria Hospital, Bahawalpur, from 16th November 2015 to 15th May 2017. A total of 60 cases (30 cases in each group) with closed or type 1 open tibial shaft fractures operated within 1 week, of both gender, having age 20-60 years, were enrolled. Patients with prior operations of the knee (assessed on history), neurovascular compromise (assessed clinically), non-ambulatory, with chronic CRF or CLD, on steroid intake (assessed on history and medical record) or not willing to be included in the study, were excluded. For anesthesia fitness, CBC, Serum sugar, RFT, ECG, Echo and x-rays of tibia were done. In groups A patients, TMN was done by the MPT approach while in group B, TMN was done by TPT approach. Follow up on regular basis was done post-operatively and Anterior Knee Pain was measured at the end of 2nd week. Age, duration of fracture and knee pain was presented as mean and standard deviation. Data was analyzed by using SPSS Version 16.

RESULTS

In this study, overall mean age was 38±10 years (range 20-60 years). The mean age of patients in group A was 38±11 years and in group B was

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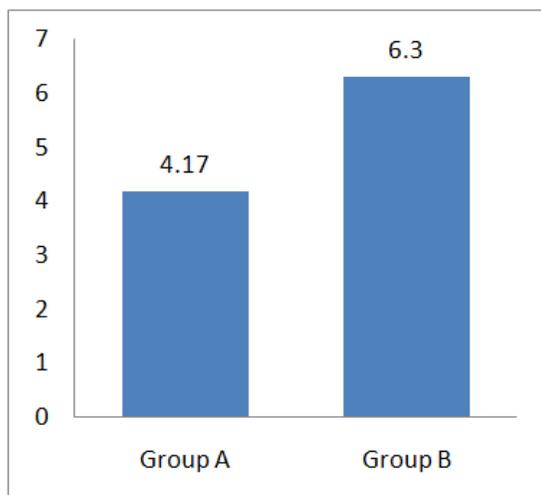
38±9years.

Out of these 60 patients, 45 (75.0%) were male and 15 (25.0%) were females with ratio of 3:1. Overall duration of fracture was from 1-7 days with mean duration of 3.17 ± 1.89 days. The mean duration of fracture in group A was 3.27 ± 1.96 days and in group B was 3.07 ± 1.84 days. Table I shows base line characteristics of both groups.

Table I: Baseline characteristic in both groups. (n=60)

Variables	Group A (n=30)	Group B (n=30)	Total (n=60)
	No (%)	No (%)	No (%)
Age (years)			
20-40	17 (56.67)	16 (53.33)	33 (55)
41-60	13 (43.33)	14 (46.67)	2 (45)
Duration (days)			
1-3 days	19 (63.33)	20 (66.67)	39 (65)
4-7 days	11 (36.67)	10 (33.33)	21(35)

Figure I: Mean knee pain in both groups



Mean knee pain in Group A (MPT approach) was 4.17 ± 1.53 while in Group B (TPT approach) was 6.3 ± 1.57 as shown in Figure I (p-value = 0.000). Stratification of mean knee pain with respect to age groups, gender, duration and type of fracture is shown in table II:

Table II: Knee pain with respect to age groups, gender, duration of fracture and type of fracture in both groups

Age of patients (years)	Knee pain		P-value
	Group A (n=30)	Group B(n=30)	
	Mean ± SD	Mean ± SD	
20-40	4.08 ± 1.50	5.57 ± 1.50	0.0077
41-60	4.24 ± 1.60	6.94 ± 1.34	0.0001
Gender Versus knee pain			
Gender	Knee pain		P-value
	Group A (n=30)	Group B (n=30)	
	Mean ± SD	Mean ± SD	
Male	4.00 ± 1.38	6.26 ± 1.54	0.0001
Female	4.63 ± 1.92	6.43 ± 1.73	0.0817
Duration of fracture versus knee pain			
Duration of fracture (in days)	Knee pain		P-value
	Group A (n=30)	Group B (n=30)	
	Mean ± SD	Mean ± SD	
1-3 days	3.67 ± 1.29	6.00 ± 1.62	0.000
3-7 days	4.67 ± 1.63	6.56 ± 1.50	0.0123
Type of fracture versus knee pain			
Type of fracture	Knee pain		P-value
	Group A (n=30)	Group B (n=30)	
	Mean ± SD	Mean ± SD	
Closed	4.14 ± 1.68	6.15 ± 1.46	0.0002
Open	4.22 ± 1.20	6.60 ± 1.78	0.0023

DISCUSSION

Tibial diaphyseal fractures are very common fractures of long bone in orthopaedics.¹¹ Mostly these fractures are treated by TMN.¹² This treatment has low incidence of malunion, nonunion, compartment syndrome & infection.¹³⁻¹⁵ AKP is common reported problem.¹⁶ Reports of AKP is 10-86% in TMN treatment.¹⁷ The exact etiology of AKP after TMN remains unknown.¹⁸

According to Court-Brown et al AKP is observed in daily activities likes sitting, running, climbing, jumping, walking, squatting and even in rest.¹⁹ In Keating et al studies, knee pain was 77% in TPT approach and was 50% in MPT approach and this pain was not due to nail protrusion but was due to tissue insult which was more in TPT approach.²⁰ This study is conducted to compare the mean knee pain between MPT approach & TPT approach in TMN for treatment of tibial fracture. Mean age is 38.73 ± 10.60 years (range 20-60 years). Out of 60 patients, 45 (75.0%) were male and 15 (25.0%) were females. Mean AKP in Group A (MPT approach) was 4.47 ± 1.53 while in Group B (TPT approach) was 6.30 ± 1.57 (p-value = 0.000).

Tornetta²¹ and Cole²² used MPT incision. Although incision was large but proper reduction of fracture site was achieved. AKP and other complication were less and ROM was satisfactory after two weeks of operation. Toivanen et al showed, in both TPT & MPT approaches the problem of AKP was remained

same. So there was no advantage of MPT approach on TPT approach in TMN treatment.²³ Karladani et al²⁴ found that MPT approach was better than TPT approach with reference to AKP and pain score was improved in MPT approach.

CONCLUSION

This study concluded that mean Anterior Knee Pain is low after Medical Parapatellar Tendon approach as compared to Trans Patellar Tendon approach in Tibial Medullary Nailing for treatment of tibial fracture. So, it is recommended that Medical Parapatellar Tendon approach should be used in priority for treatment of tibial shaft fracture.

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