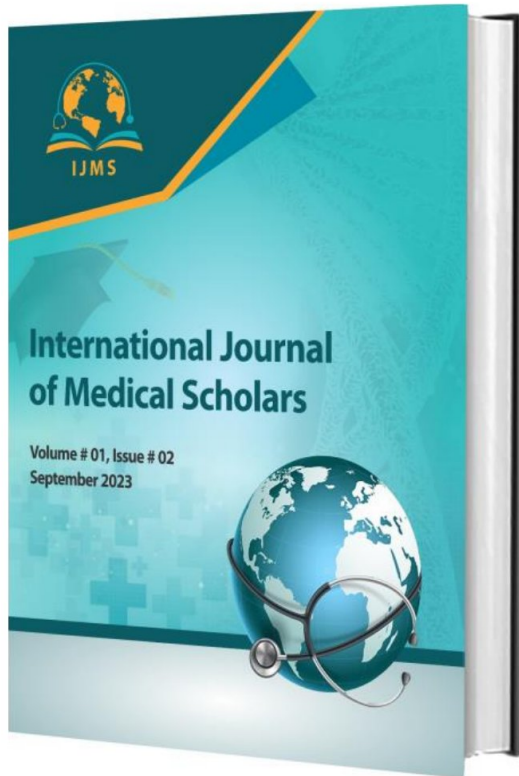


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Interlock nailing versus dynamic compression plating in transverse Fractures of tibia

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Authors

Bilal Tahir^{1*}, Muhammad Ilyas Ansari², Umair Hussain³

¹Sligo University Hospital, Ireland

²Cork University Hospital, Ireland

³Nishtar Hospital, Multan, Pakistan

*Corresponding Author Email:

Voiceofqmc@yahoo.com

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Interlock nailing versus dynamic compression plating in transverse Fractures of tibia

Bilal Tahir^{1*}, Muhammad Ilyas Ansari², Umair Hussain³

¹Sligo University Hospital, Ireland

²Cork University Hospital, Ireland

³Nishtar Hospital, Multan, Pakistan

*Corresponding Author Email: Voiceofqmc@yahoo.com

ABSTRACT

Objective: to determine the outcome and comparing the two different modalities of the treatment dynamic compression plating and interlocking nail.

Methods: Study includes seventy consecutive patients with closed transverse fracture tibia. Patients were divided into two groups (DCP and interlock). Group DCP treated with Dynamic compression plating and interlock with interlock nailing and were assessed clinically and radiologically. SPSS version 23 was used for data analysis.

Results: majority of the patients in interlock group was excellent i.e. 54.3%. While, in DCP group the excellent criteria were 22.9%. The difference was statistically significant, ($p=0.026$). Pearson correlation was also significant, ($p=0.003$).

Conclusion: Interlocking nails is a better treatment option in patients of transverse tibial fractures as compare to interlocking nailing group regarding excellent, good and poor results on basis of weight bearing, time of union and hospital stay.

Keywords: DCP, Diaphysial fracture, Fracture, Interlock nail, Implants, Tibia.

1. INTRODUCTION

High speed traffic accidents are common in this era of industrialization and transportation that can cause multiple traumas to human body¹. The most common place of injury due to traffic accidents is tibial shaft fracture that affects the young adults². Due to topography, frequency, type of treatment and mode of injury may cause permanent disability to that person. Beyond the latest inventions and interlocking tibial fracture is still a challenge for orthopedic surgeons due to infection and malunion. After the intervention of interlocking nails tibial fracture is no more an enigma^{3,4}.

All treatment modalities of tibial fracture depend upon the blood supply to bone⁵. Three main blood supplies are involved in long bone circulation; the nutrient, the epiphyseal and periosteal which are interrelated very closely⁶. Good and excellent functional outcomes can be obtained by managing the fracture with intramedullary or extramedullary nailing. Intramedullary nailing is more favorable when fracture is transverse⁷. Another treatment method is compression plating with active exercises. This technique gives more satisfaction and early recovery to physical activities^{8,9}. But skin necrosis and surgical site infection are common complications of this modality that need to be overcome.

Few decades before plating techniques were used to fix the long bone fragments and to align approximations¹⁰. Mechanical failure of screws and metal plates were also observed. This study was conducted to compare the outcomes of intramedullary nailing and dynamic compression plating in management of transverse tibial fractures.

2. METHODOLOGY

Study was conducted at orthopedic surgery department of Nishtar Hospital

Multan from January 2019 to January 2020 in one year duration. Study was started after ethical approval from hospital ethical board and detailed information to patient. Non-probability consecutive sampling was the sampling technique. Patients of closed tibial transverse fracture were selected for study. Patients were divided into two groups (group DCP and interlock). Patients in group DCP were treated with dynamic compression plating and interlocking nailing technique was used for group interlock patients.

Treatment started with prophylactic antibiotics, splintage, anti-inflammatory medicine, analgesic drugs and intravenous fluids. In DCP group open reduction and internal fixation was done after exposure of fracture site. For transverse fracture 8-10 hole DCP was used. Skin closure and aseptic dressing was applied. Some non-weight bearing exercises were also advised from 2nd to 3rd day of operation. Interlocking nailing technique was in group interlock. In this technique a 5 cm incision was given from medial border of patellar tendon and entry port was secured. Medullary canal was approached by inserting an awl into the metaphysis. Position of awl entry was confirmed on fluoroscopy from all views. Duration of awl was adjusted perpendicular to shaft at the time of penetration in cortex. If reaming technique was used canal should be reamed in 0.5 mm increment instrument. Diameter of nail should be 1.5mm smaller than the last reamer. Patients were radiologically and clinically assessed at 4 week interval regularly and function recovery and union was assessed.

SPSS version 23 was used for analysis of variables, mean and SD was calculated and presented for numerical variables like age and frequency and percentages were calculated and presented for categorical data like gender and union. Statistical tests were applied to see association among variables. P value less

than and equal to 0.05 was used as significant value.

3. RESULTS

Seventy patients were included in this study. The patients were randomized into two groups as DCP(Dynamic compression plating) and Interlock groups, thirty-five patients in each. The mean partial weight bearing time of DCP and interlock groups was 12.62±3.48 weeks and 4.51±2.81 weeks, respectively. The difference was statistically significant, (p=0.000). The mean full weight bearing time of DCP and interlock groups was 17.57±3.79 weeks and 10.02±2.46 weeks, respectively. The difference was statistically significant, (p=0.000). The mean time of union of group DCP and group interlock was 15.31±3.11 weeks and 13.37±2.31 weeks, respectively. The difference was statistically significant, (p=0.004). The mean hospital stay after surgery of DCP and interlock groups was 9.45±3.86 days and 5.95±1.79 days, respectively. The difference was statistically significant, (p=0.000). (Table. I).

Results as per criteria of DCP and interlock groups were shown in table. II. It was seen that majority of the patients in interlock group was excellent i.e. n=19 (54.3%). While, in DCP group the excellent criteria was n=8 (22.9%). The difference was statistically significant, (p=0.026). Pearson correlation was also significant, (p=0.003). (Table. II).

Table. I.

The mean partial weight bearing, full weight bearing, time of union and hospital stay of both the groups

Variable	DCP* n=35 (50%)	Interlock n=35 (50%)	P- value
Partial Weight Bearing (weeks)	12.62±3.48	4.51±2.81	0.000
Full Weight Bearing (weeks)	17.57±3.79	10.02±2.46	0.000
Time of union (weeks)	15.31±3.11	13.37±2.31	0.004
Hospital stay after surgery (days)	9.45±3.86	5.95±1.79	0.000

*Dynamic compression plating			
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Table. II.

Results as per criteria of both the groups

Result	DCP n=35 (50%)	Interlock n=35 (50%)	P-value
Excellent	n=8 (22.9%)	n=19 (54.3%)	0.026
Good	n=18 (51.4%)	n=13 (37.1%)	
Fair	n=6 (17.1%)	n=3 (8.6%)	
Poor	n=3 (8.6%)	n=0 (0%)	
Pearson correlation=-0.353, (p=0.003)			

4. DISCUSSION

Management of transverse fracture of tibia with minimal complications and malunion is a challenge for orthopedic surgeons. Different studies recommended different treatments as a best modality. In a study conducted by Wiss et al¹¹ in 1986 and recommended open reduction and internal fixation technique for its management and reported advantages of medullary nailing method of treatment. A main advantage of this method is avoidance from pin tract infection.

Another study was conducted by Finkemeier et al¹² on transverse, comminated fractures of tibial shaft and reported that medullary nailing brought revolution in field of orthopedic surgery specially for open and closed tibial shaft fractures. Furthermore development of interlocking nailing more sophisticates the specialty. Im et al¹³ conducted a similar study and used 10mm, 9mm and 8mm diameter nails and reported that open reduction and internal fixation with dynamic compression plating is better way of tranverse tibial fracture management.

Bedi et al¹⁴ conducted a study on comparison of DCP and interlocking nailing and observed that in interlocking nail group patients starts weight bearing after 6 weeks and in DCP group patients starts partial weight bearing after 12 weeks. No patients allowed to full weight bearing before 12

weeks until callus formation at fracture site. In 2008 Huang et al¹⁵ reported that comminuted fractures can be managed better with interlock nailing technique but for uncomminuted fractures DCP is better.

In our study male were more in ratio as compare to female because of more outdoor activities and social preponderance. Similar findings were found in a study by Court Brow et al¹⁶ that male patients with young age were more frequent. A study was conducted by Tyo li et al¹⁷ and reported that there was no difference regarding time of union in both groups average time of union in both groups was 12 to 24 weeks.

Kwok CS et al¹⁸ compared malalignment, wound infection, bone union and deep infection and reported that management of transverse tibial fractures with plate as compare to interlock nailing is associated with fewer complications. Another randomized control trial was conducted on this topic by Vallier et al¹⁹ and reported that high ratio of good results was obtained after both DCP and intramedullary nailing technique, both are equally effective.

Sahni G et al²⁰ also conducted a study on tibial shaft fracture and concluded that DCP is better mode of treatment with more excellent results in comparison with dynamic compression plating. In this study 90% patients have excellent results and zero percent patients have poor results. While in interlock group 10% patients have excellent results.

5. CONCLUSION

Interlocking nails is a better treatment option in patients of transverse tibial fractures as compare to interlocking nailing group regarding excellent, good and poor results on basis of weight bearing, time of union and hospital stay.

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