CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3404052

Available online at: http://www.iajps.com ***Research Article***

OUTCOME OF DYNAMIC COMPRESSION PLATING IN ADULT TIBIAL SHAFT FRACTURES- A STUDY OF NORTHERN PUNJAB

[1]Dr Omer Farooq Tanveer, [2]Dr Tanveer Haider, [3]Dr Rizwan Anwar, [4]Dr Mohammad Abdul Hanan, [5]Dr Muhammed Arif, [6]Dr Zahid Siddique

[1,2]Assistant Professor Orthopedics Khawaja Mohammad Safdar Medical College Sialkot, [3,4]Senior Registrar Khawaja Mohammad Safdar Medical College Sialkot, [5]Assistant Professor, Islam Medical College Sialkot, [6]Assistant Professor, Nawaz Sharif Medical College Gujrat.

Article Received: July 2019 **Accepted:** August 2019 **Published:** September 2019

Abstract:

Background: *Fixation of Diaphyseal tibial fractures by dynamic compression plates is not considered the best option due to complications that may eventually arise; however, if principles of stability and proper surgical technique are used, it is possible to obtain fracture consolidation without major risks.*

Objective: *To determine the outcome of dynamic compression plate in adult tibial shaft fractures.*

Study Design: *Descriptive Study*

Place and Duration of Study: *Department of orthopedic surgery, Khawaja Mohammad Safdar Medical College Sialkot, from September 2015 to June 2108.*

Methodology: *We selected 51 tibial diaphyseal fractures in which open reduction was done followed by dynamic compression plate fixation using single technique by same surgical team. Fracture healing and wound infection following tibial plating was studied.*

Results: *51 patients were included in the study 40 patients were male and 11 were females. Mean age at the time of surgery was 43 years. 42 (82.35%) were closed fractures and 09 (17.65%) were open injuries. Patients were followed for wound infection at 14th postoperative day and union at 12 weeks. 49 (96.07%) had no wound infection and 02 (03.93%) developed wound infection. 50 (98.03%) fractures healed in 12 weeks while 01 (01.97%) went into non-union.*

Conclusion: *Dynamic compression plate is an excellent option for the treatment of adult tibial shaft fractures and can produce good outcome if principles of stability, minimum soft tissue stripping, proper tissue handling and optimal surgical technique are applied.*

Key words: *Tibial Diaphyseal Fractures, Adults, Dynamic Compression Plate.*

Corresponding author:

Dr. Omer Farooq Tanveer,

Assistant Professor Orthopedics Khawaja Mohammad Safdar Medical College, Sialkot.

QR code

Please cite this article in press Omer Farooq Tanveer et al., ***Outcome of Dynamic Compression Plating in Adult Tibial Shaft Fractures- a Study of Northern Punjab.,*** *Indo Am. J. P. Sci, 2019; 06(09).*

INTRODUCTION:

Fractures of the tibia are the most common type of long bone fracturs. [1] There is a controversy in the literature about appropriate treatment of these fractures, and it has been said that when an issue is both common and a subject of controversy, it is worthy of attention which is correct in this case. [2]

From the beginning of the modern era of osteosynthesis, fixation plates constituted the first choice for surgical treatment of fractures of the tibial shaft. with the advent of intramedullary nailing and due to postoperative problems associated with fixation plates, which are essentially due to two factors, very broad approaches were adopted to expose the area of surgery thus lacking coverage of soft tissues of the tibia, leading to infection. Hence there was a non-consolidation in the affected zone; the use of plates for the management of diphyseal tibial fractures went into a secondary role and was relegated to epiphysial, proximal and distal metaphyseal tibial fractures. [3] However, given our better understanding of fixation principles, the importance of soft tissue management and availability of new plate designs, osteosynthesis plates have become a viable option for diaphyseal tibial fractures once again.[4]

Moreover, it is a well-known fact that intact fibula may prevent compression at fracture site. So in these cases, intramedullary nailing may just preserve the alignment of the bone, and it may be better to use a dynamic compression plate, which can maintain the alignment of the bone and also provide compression to the broken segments.

The aim of this study is to present outcome of dynamic compression plate in adult tibial shaft fractures.

Methodology:

Patients for this study were selected by non-random purposive sampling technique in orthopedic department of Khawaja Mohammad Safdar Medical College Sialkot from September 2015 to June 2018. Patients included in this study had tibial shaft fractures. Most of the patients presented following road traffic accident while few of them had history of fall from height.

Inclusion Criteria: All the patients with following common properties were included in the study.

1. Patients of both genders and age group between 11 to 75yrs.
2. Fresh post traumatic tibial shaft fractures (closed and Gustilo type I &II open).
3. Neglected fractures.

Exclusion Criteria:

1. Patients with type III open tibial shaft fractures.
2. Patients with pathological fractures.
3. Patients unfit for anesthesia.

All the patients were treated by a single surgical team by using same surgical approach using same implant. All the fractures were fixed with dynamic compression plate. Patients were discharged on 3rd postoperative day. Stitches were removed after two weeks. Further follow up was done on 6th and 12th week postoperatively to assess the union by obtaining radiographs. Partial weight bearing started at 6th week and full weight bearing was allowed at 12th week following surgery.

RESULTS:

There were a total of 51 cases falling in our inclusion criteria. Open reduction and internal fixation with dynamic compression plate was done in all patients. Youngest patient was 11 years old while oldest one was 75 years of age. Mean age was 43(Table 1).

There were 40 (78.43%) male and 11 (21.57%) female patients (Table 2). Tibial shaft fractures encountered in this study were described according to their respective geometry of fractures (table 3). Fractures were also described according to Gustilo Anderson classification (Table 4).

Out of 51 fractures 42 (82.35%) were fresh fracture while 9 (17.75%) were neglected fractures. These neglected fractures were between 3 to 11weeks old.

Outcome of the patients was based upon wound infection which was assessed on 14th postoperative day and union at 12 weeks. 49 (96.07%) had no wound infection while 2 (3.93%) patients developed wound infection (Table 5). 50 (98.03%) fractures healed in 12 weeks but 1(1.97%) fracture did not unite in 12 weeks and went into nonunion (Table 6).

Table 1: Age Distribution

	N	Minimum	Maximum	Mean
Age	51	11	75	43

Table 2: Gender Distribution

	Frequency	**Percentage**
Male	40	78.43
Female	11	21.57
Total	51	100

Table 3: Geometry of Fracture Distribution

	Frequency	**Percentage**
Simple Transverse Fracture	39	76.47
Oblique fracture	07	13.73
Segmental Fracture	03	5.88
Comminuted Fracture	02	3.92
Total	51	100

Table 4: Distribution according to Gustilo and Anderson classification

	Frequency	**Percentage**
Type I Open	06	11.77
Type II Open	03	5.88
Closed	42	82.35
Total	51	100

Table 5: Wound Infection on 14th Postoperative Day

	Frequency	**Percentage**
No wound infection	49	96.07
Wound infection	02	03.93
Death	00	00
Total	51	100

Table 6: Frequency of Union of Fracture after 12 Weeks

	Frequency	**Percentage**
Union in 24 weeks	50	98.03
Non-union	01	01.97
Total	51	100

DISCUSSION:

The long bone fractures occur most frequently in the tibial shaft. [5] Because one third of tibia surface is subcutaneous through most of its length; open fractures are most common in the tibia than in any other major long bone. The blood supply to the tibia is more precarious than that of bones enclosed by heavy muscles. High energy tibial fractures may be associated with compartment syndrome, neural or vascular injury. The presence of hinge joints at the knee and ankle allows no adjustment for rotary deformity after fracture, and special care is necessary during reduction to correct the deformity. Delayed union, non-union, and infection are relatively common complications of tibial shaft fractures. [6]

Treatment of tibial shaft fractures is still discussed controversial. Solid bone union without hypertrophy, fast mobilization and full range of motion without further soft-tissue damage are the aims of the therapy. [7]

Plates, intramedullary nails and external fixators are three well-accepted and effective methods, but each has been historically related to complications. [8] Closed reduction with intramedullary interlocking nailing is generally accepted by surgeons to be the most popular method for fixation of tibial fractures in adults. The advantages of interlocking nailing are (a) it provides adequate mechanical stability with better fracture alignment as in open reduction and internal fixation and (b) it maintains proper biological environment including intact soft tissues with blood supply as is found in closed reduction and plaster of Paris application. [9]

Problems associated with the use of fixation plates such as infection, osteosynthesis material exposure, and the delay in fracture consolidation have restricted their use. [3] However, we find that the adequate understanding of fixation principles, the proper management of soft tissues and the availability of new plate designs have yielded favorable outcomes in the management of diaphyseal tibial fractures. [4]

Sandoval CMJ et al [3] conducted a cross sectional study of 45 patients of tibial diaphyseal fractures who were treated surgically by osteosynthesis plates. Out of 45 patients one (2.22%) patient had nonunion resulting in implant failure at 6 months. Intramdullary nailing and bone grafting were performed to achieve consolidation in this case. Three (6.66%) cases of infection were observed. All infections were treated and resolved by debridement, surgical scrubbing and antibiotic treatment.

In this particular study we operated 51 cases of tibial diaphyseal fractures, out which few of them were open fractures while some of the fractures were segmental and comminuted. Remaining were closed stable fractures. We evaluated the most important complications of infection and non-union after plating of tibial diaphyseal fractures. Two (3.93%) patients got infection following surgery. One of them was a case of immediate wound infection that was treated with antibiotic therapy while the other had late wound infection. In that particular patient union was achieved and infection was managed by removal of implant and antibiotic therapy at six months. One (1.97%) patient had nonunion at 8 months following surgery leading to implant failure. Union was achieved by performing intramedullary nailing and bone grafting.

Mukherjee et al. [9] followed 41 tibial shaft fractures in his study which were treated with open reduction and plate fixation. They found nonunion and infection in 2(4.9%) patients and also ankle joint stiffness in 2(4.9%). On the other hand Shah FA [10] reported 72% excellent and 28% good functional results in the closed tibial diaphyseal fractures after fixation with dynamic compression plate.

Similarly, Sonderegger J et al [11] Studied the effect of dynamic compression plate on fracture healing in a case series of 47 with a mid- or distal tibial shaft fracture. The mean age was 46 years. There were six open and 41 closed fractures. Bone union was achieved in all cases. There were no wound infection and no rotational alignment.

Open reduction and internal fixation with plates and screws provide a rigid fixation and anatomical alignment. [12] so it is possible to obtain favorable outcome in the diaphyseal tibial fracture using plates and screws. It is a very simple, easy, rapid, reliable and effective method for management of tibial shaft fractures in adults, especially in terms of patient satisfaction.

CONCLUSION:

Internal Fixation of diaphyseal tibial fractures with plating in not often considered the treatment of choice due to complications that may eventually arise; however, Dynamic Compression plates are a viable option and can produce excellent outcome if principles of stability, minimum soft tissue stripping, proper tissue handling and optimal surgical technique are applied appropriately.

REFERENCES:

1. Pan RH, Chang NT, Chu D, Hsu KF, Hsu YN, Hsu JC, et al. Epidemiology of orthopedic fractures and other injuries among patients admitted due to traffic accidents: A 10-year nationwide survey in Taiwan. Scientific World Journal 2014; 63:787-2.
2. Saied A, Ostovar M, Mousavi AA, Arabnejhad F. Comparison of intramedullary nail and plating in the treatment of diaphyseal tibial fractures with intact fibulae: A randomized controlled trial. Indian J Orhto 2016; 50: 277-82.
3. Sandoval CMJ, Rueda OLJ, Daza SA. Management of diaphyseal tibial fractures by plate fixation with absolute or relative stability: a retrospective study of 45 patients. Tasco-2016; 10:11-36.
4. Madadi F, Eajaz A, Madadi F, Besheli LD,

Sadeghian R, Lari MN. Adult tibial shaft fractures-different patterns, various treatment and complications. Med Sci Monit 2011; 17: CR640-5.
5. Kojima KE, Ferreira Rv. Tibial Shaft Fractures. Rev Bras Orthop. 2015 Dec 6; 46(2): 130-5.
6. Habib MK, Abbas z. Outcome of reamed intramedullary interlocking nail in tibial diaphyseal fractures in terms of frequency of union and wound infection. JPOA 2015; 27: 1-4.
7. Bode G, Strohm PC, Sudkamp NP, Hammer TO. Tibial shaft fractures-management and treatment options. A review of the current literature. Early and late complications. Acta Chir Orthop Traumatol Cech.2012; 79(6):499-505.
8. Yongchuan Li, Xi Jiang, Qinghe Guo, Lei Zhu, Tianwen Ye, and Aimin chen. Treatment of distal tibial shaft fractures by three different surgical methods: a randomized, prospective study. Int Orthop.2104 jun; 38(6): 1261-1267.
9. Mukherjee S, Arambam SM, Waikhom S, Santosha, Masatwar VP, and Maske GR. Interlocking nailing versus plating in tibial shaft fractures in Adults: A Comparative study. J Clin Diag Res. 2017Apr; 11(4): RC08-RC13.
10. Shah FA, Alam W, Ali MA. Tibial Shaft Fractures: Interlocking Nail versus plating. J Surg Pakistan. 2017; 22(1):3-7.
11. Sonderegger J, Grob RK, Kuster SM. Dynamic plate osteosythesis for fracture stabilization: how to do it. Orthop Rev (pavia).2010 Mar 20; 2(1): e4.
12. Shani G, Mann SH, Singh R, Bhalla T. Comparative study of interlocking nailing versus Dynamic compression plating in fracture tibia- A Study of sixty cases. Indian journal of orthopedic surgery 2015; 1(4): 197-204.