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Evaluation of Different Mode of Treatment in Tibia Shaft Fracture

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ABSTRACT

Background : Ever since mankind came into existence and progressed to modern civilization, the incidence of trauma has increased by leaps and bounds. In particular, fractures of the shaft of the tibia and fibula present one of the most challenging problems in orthopaedic surgery today. there is also no data establishing how the characteristics of the patients and the quality of their fractures should be considered in choosing an appropriate mode of treatment. The purpose of this study is to evaluation of different mode of treatment in tibia shaft fracture

Methods: A series of a consecutive 100 cases of fractures of the shaft of the tibia and fibula, was studied. Closed and open fractures were studied and the overall results of the whole study, were evaluated.

Result : In our study, 33 patients underwent open reduction and rigid internal fixation in the form of a plate. Of these 8 cases (24 %) were closed fractures and 25 cases (76 %) were open fractures which were further subdivided as 18 cases of Grade I open fractures, 6 cases of Grade II and 1 case of Grade III.

Conclusion : We still find external fixation with delayed plating convenient because of ease of application of the plate and decreased risk of infection as compared to nailing where the infection might spread throughout the medullary canal leading to endosteal infection.

KEYWORDS

Introduction

Tibia shaft fractures are the most common long bone fractures . They usually occur in young and active patients and are often due to high-energy trauma like motor vehicle accidents, sports or falls from height. [1] Direct trauma like road traffic accidents often cause concomitant severe soft tissue damage with a high incidence of open fractures. The lack of soft tissue covering of the tibial shaft and difficult blood supply make these fractures vulnerable to infection and non-union .[2,3] Tibial shaft fractures are severe injuries and may result in permanent disability. Fractures of the leg bones are one of these. In particular, fractures of the shaft of the tibia and the fibula present one of the most challenging problems in orthopaedic surgery today.

In recent years surgeons have moved away from plates and external fixators in favor of intramedullary nails in the operative treatment of both closed and open tibial fractures. Given the published clinical data, intermedullary (IM) nailing techniques were developed to minimize surgical insult to the fracture and adjoining soft tissues . [4,5,6,] It has become standard care for the majority of displaced tibial shaft fractures, but it has also been associated with some complications in these patients; therefore, some orthopaedic surgeons prefer plate fixation for tibial shaft fractures . Minimally invasive plating techniques reduce surgical trauma and maintain a more biologically favorable environment for fracture healing . [7,8,9]

To the best of our knowledge, there is insufficient evidence from previous studies to consider post-operative complications in relation to both surgical methods and the types of fractures; there is also no data establishing how the characteristics of the patients and the quality of their fractures should be considered in choosing an appropriate mode of treatment. The purpose of this study is to evaluation of different mode of treatment in tibia shaft fracture

Material & Methods

This study was conducted in the Department of Orthopaedics, at Krishna Hospital and Medical Research Centre, Karad, during the period from January 1992 to January 1994.

A series of a consecutive 100 cases of fractures of the shaft of the tibia and fibula, was studied. Closed and open fractures were studied. No single method of management was used and the overall results of the whole study, were evaluated.

Majority of the fractures were the consequences of road traffic accidents, agricultural mishaps, and a few had as-sault injuries and fall from a height. Table No.1 shows the distribution according to the aetiology in this series.

The best method for treatment of fractures of the shaft of the tibia and fibula continues to be a controversial subject.

Plaster cast or internal fixation is effective in Grade I injuries. But these techniques usually fail in Grade II or III injuries. External skeletal fixation is claimed to be an effective alternative in such situations.With improvement in various techniques and new instrumentations, complication rates are becoming less common and less serious. [10,11,12,]

Here an attempt has been made to evaluate the utility and efficiency of various methods of treatment of tibial shaft fractures.

This is a prospective study of a 100 fractures of the shaft of the tibia and fibula.

With all methods of treatment of tibial fractures the major problems encountered are infection, nonunion, joint stiffness and malalignment. All these complications prolong the patients' disability. Consequently every method of treatment should aim to provide rapid restoration of bone continuity with no significant malalignment, without risk of infection, as well as minimal interference with normal activities during treatment. [13,14,15,16]

This includes analysis of the various methods of treatment of the fracture of the shaft of the tibia and fibula, employed in the present study.

Results :

Table 1 : Mode of treatment

Conservative Treatment	Closed Reduction	Open Reduction & Internal fixation
14	29	57

TABLE NO.2: Conservative treatment

Type of #	No. of cases
Closed	8
Open I	6

14 cases in this series were managed conservatively which is shown below

TABLE NO.3 CLOSED REDUCTION

Type of #	No. of cases
Closed	15
Comp. I	12
Comp. II	2

The nature of injury and the proposed treatment was explained to the patient. In this series 29 cases were treated by this method

Discussion

Most of the patients in whom the cast was removed after the first follow up developed knee and ankle stiffness. After good physiotherapy knee stiffness was not a problem but stiffness of the ankle and subtalar joints persisted for quite a long time. 3 cases had ankle stiffness while 10 cases had subtalar joint stiffness.

In our study, 33 patients underwent open reduction and rigid internal fixation in the form of a plate. Of these 8 cases (24 %) were closed fractures and 25 cases (76 %) were open fractures which were further subdivided as 18 cases of Grade I open fractures, 6 cases of Grade II and 1 case of Grade III.

Primary fixation by plate was not done for any of the patients as we were not sure of the lapse of time between the time of the accident and the patients' arrival at the hospital.

All cases underwent plating on the medial surface exceptfor 2 cases who underwent plating on the lateral surface. Primary bone grafting was not done. There was no case of implant failure reported.

Out of the 33 patients here, 3 were lost to follow up. The average shortening seen was 0.5 cm, while the maximum recorded was 1.5 cm Superficial wound infection developed in 3 cases (10%) and 4 cases (13 %) had deep infection. There were 3 cases (10%) who developed osteomyelitis and all three had open fractures. There was 1 case (3 %) who developed compartment syndrome.

Comparing with the study of **Ruedi et al (1970)** [17] they reported 3 cases of osteomyelitis out of 323 patients (0.9 %) with closed tibial fractures treated by DCP. In our study no case of closed fracture developed osteomyelitis.

Nicoll (1964) [18] stated, There can only be one reason for submitting a patient to additional hazards of surgery and that is to ensure a good functional result unlikely to be achieved by conservative treatment.

We believe that our results show that the traditional fear of plating a Grade I or Grade II open fracture is unjustified. Moreover rigid fixation allows easy unencumbered access to the patient for treatment of his tibial wounds and by effecting anatomical reduction and allowing early mobilization, it produces excellent results in terms of function. This is particularly important in patients with high energy trauma who are prone to other complications and severe fracture disease.

17 cases in these series were treated with external fixators. 12 of these were treated by open reduction and enteralfixation and after the formation of sticky callus, an above knee cast was applied and fixator was removed. The remaining 5 were treated primarily by external fixation and then delayed internal fixation by plating was carried out. No closed fracture was treated by this method. 5 cases were lost to follow up.

Out of the 12 patients treated with external fixator and cast, 4 cases were lost to follow up. 5 cases united at an average union time of 26 weeks and 2 cases had delayed union. Non union was seen in 1 case.

Out of the 5 patients treated with external fixation and delayed plating, 1 case was lost to follow up, 2 cases had delayed union and 2 cases, non union.

The overall percentage of delayed union was 33 % and that of non union was 25 %.

One case developed external rotation deformity of the tibia up to 10x. Pin tract infection was a common problem but none of the patients developed deep infection or sequestrum at the pin site. Maximum shortening noted was 2.5cm.

We still find external fixation with delayed plating convenient because of ease of application of the plate and decreased risk of infection as compared to nailing where the infection might spread throughout the medullary canal leading to endostealinfection. **Bach and Hansen (1989)** [19] suggested that external fixation using the one-half pin technique should be regarded as a primary method of stabilization for Grade II and Grade III open tibial shaft fractures.

The treatment of tibial fractures remains controversial. Identifying treatment alternatives that reduce the risk of need for a subsequent operation, as well as costs to the health care system, will be a significant contribution to the practice of orthopaedics.

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