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Management of associated injuries and early complications in treatment of fracture shaft of tibia and fibula

Medical Science

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ABSTRACT

Background :The mechanism of the fractures is many a time due to high energy trauma with comminution and displacement, leading to a delay in healing. If attention is not paid to proper rotational and axial alignment, severe functional disability may result. Associated injuries were often the important determinant of treatment so for careful evaluation of fractures when treating the patient is essential. So the purpose of the study was to highlight on management of associated injuries and early complications in treatment of fracture shaft of tibia and fibula.

Material & 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. 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.

Results : In the present series, 62 % of the cases had associated injuries involving the axial and appendicular skeleton and other organs and viscera. These included blunt trauma to the abdomen (3 %), blunt trauma to the chest (1 U. head injury (15 %) other bony injuries (31 %), dislocations (7 %), and soft tissue injuries (7 %).

Conclusion : In this present series the overall rate of infection was higher, this is because, increased incidence of high energy trauma, contaminated wounds, delay in reporting to the hospital, low resistance of the patient due to chronic anaemia and resistant strains of infecting organisms.

KEYWORDS

Introduction :In this era of modern industrialisation, with increasing road traffic, mechanisation of agricultural methods and various recreational sports, life has become very busy and active. As a consequence people are more exposed to risk factors which cause accidents. These accidents cause different types of fractures and injuries. 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. [1-4]

The mechanism of the fractures is many a time due to high energy trauma with comminution and displacement, leading to a delay in healing. Cosmetic disfigurement results if the apposition of the bone fragments is imperfect,or if the fracture is open with soft tissue lacerations.If attention is not paid to proper rotational and axial alignment,severe functional disability may result. The soft tissue injury can cause tethering of tendons, clawing of toes, equinus deformity and a range of other complications. Also,stiffness of the knee, ankle and subtalar joints can be a troublesome problem to tackle. [5-8]

It would be improper to consider results only in terms of union associated injuries , infection and capacity to work are important factors to be considered.

Therapeutic principles vary considerably between different centres. Management can be conservative, operative or a combination of both. Each method has its own merits, and every effort should be made to adopt a method best suitable to the individual patient with the available resources. This is the era of preservation, the management of the fracture does not stop at saving life and limb. Our main purpose today is to return full function in the shortest possible time. Associated injuries were often the important determinant of treatment so for careful evaluation of fractures when treating the patient is essential. [9-12]

So the purpose of the study was to highlight on management of associated injuries and early complications in treatment of fracture shaft of tibia and fibula.

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.

Closed fractures were immediately splinted by a Plaster of Paris slab or. Thomas' splint with elevation of the extremity over the pillow. This reduces the soft tissue damage and oedema and prevents nerve and vessel injury which can be caused by the fracture fragments.

In case of open fractures the wounds were thoroughly cleaned with savlon, hydrogen peroxide and normal saline. Haemostasis was achieved. Sterile dressings were used and the limb was splinted. Details of soft tissue treatment is discussed later.

If any infection developed, it was classified as superficial or deep (Superficial infection involves structures above the deep fascia and deep infection, below the deep fascia).

Cultures were obtained from the wound, to know the organisms and their sensitivity to the proper antibiotics. The cases which developed infection were treated by leaving the wound open with regular dressings. Cultures were obtained and after proper antibiotic sensitivity tests, antibiotics were given for a sufficient time in adequate dosages.

Result :

Table No.1 shows the distribution of associated injuries

Associated Injury	No. of cases
A) Bone Injury	
Fracture shaft femur	9
Fracture shaft humerus	4
Fracture shaft ulna	4
Fracture shaft radius	3
Fracture pelvis	3
Fracture clavicle	2
Fracture scapula	2
Fracture patella	2
Fracture mandible	1
Fracture calcaneum	1
B) Head Injury	15
C) Joint Dislocations	
Hip	2
Knee	1
Ankle	1
Tarso-metatarsal	1

D) Blunt trauma abdomen	3
E) Blunt trauma chest	1
F) Soft tissue injury	
ACL tear	1
Brachial plexus	1
Rupture of tibialis anterior	1
Burns	1
EHL and dorsalispedis cut	1

Early complications

	Number of cases
Neurovascular compromise	2
Compartment syndrome	2
Valgus angulation	1
Anterior bowing of tibia	1
Superficial wound infection	16
Deep infection	10

Discussion :

In the present series, 62 % of the cases had associated injuries involving the axial and appendicular skeleton and other organs and viscera. These included blunt trauma to the abdomen (3 %), blunt trauma to the chest (1 U. head injury (15 %) other bony injuries (31 %), dislocations (7 %), and soft tissue injuries (7 %).

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.[13-15]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.

Shortening was again a common complication associated with fractures of the shaft of the tibia and fibula.[16-18] Most of the comminuted, oblique and segmental fractures had some initial shortening but after treatment the shortening was reduced. The average shortening was 0.9 cms. The minimum recorded was 0.05 cms. and maximum was 2.5 cms. Approximately 30% cases had less than 1 cm. shortening.

In the present series, 62 % of the cases had associated injuries involving the axial and appendicular skeleton and other organs and viscera. These included blunt trauma to the abdomen (3 %), blunt trauma to the chest (1 U. head injury (15 %) other bony injuries (31 %), dislocations (7 %), and soft tissue injuries (7 %).

Infection in association with non union was disastrous and always resulted in long term disability.[19] So if infection occurs, it is associated with poorer prognosis in terms of healing and long term clinical results We had 2 cases of peroneal nerve damage leading to foot drop. These patients were put up on Bohler's frame and foot drop stop pulley was used. Both the patients recovered well after a period of about six months indicating that it was neuropraxia. No case of vascular injury causing vascular insufficiency to the lower limb demanding arty kind of plumbing procedure was noted in the present series.

Oedema has been a major and a common problem following factures of the shaft of the tibia and fibula. Elevation of limb reduces the oedema in most of the cases. Cases treated conservatively by a cast required bivaiving of the cast if elevation of the limb did not help.[20-21]

Decompression of the fascia' compartments was done in 2 cases in the present series as they showed tenseness of the compartments. No compartmental pressure analysis was carried out and decision of fasciotc.my was more clinical than objective. Open fasciotomy was carried out in both the cases. No case showed early signs of infection. It is possible that in some of the cases which showed delayed infection, the early features of infection were masked due to antibiotics. There was no incidence of fat embolism in this series.

As noted before, superficial wound infection was present in 16 cases and deep infection in 10 cases which is tabulated below. Superficial infection was limited above the deep fascia and the deep, below the deep fascia. In the present series superficial wound infection was present in 16 cases (24 %) and deep infection in 10 cases (15 %) thus causing delay in healing of the wounds.

The superficial infection was controlled within a weeks time by proper sterile dressing and antibiotics of proper sensitivity. Of the 10 cases of deep infection 8 cases developed chronic osteomyelitis.6 cases from Grade II, 3 cases from Grade IIIa, 1 case from Grade I and 1 from Grade IIIb.

Three cases were treated by internal fixation in the form of plate. 2 cases were treated by external fixator and later changed to plate. Remaining 3 cases were treated with nail, interfragmental screw and external fixation. No case of closed reduction and cast developed deep infection.

The commonest organisms causing osteomyelitis were Klebsiella, Pseudomonas and coagulase positive Staphylococci. Out of 9 cases of Grade III fracture 5 cases developed deep infection (55.5 %) .Recently in Gustilo's (1982) series of open fracture the infection rate was 30 % in Grade III fractures. Ruedi et al. (1976) reported 3 cases of osteomyelitis in 323 patients (0.9 %) with closed tibial fractures treated by DCP according to AO techniques. In this present series there was no case of osteomyelitis in closed tibial fractures.

In this present series the overall rate of infection was higher, this is because, increased incidence of high energy trauma, contaminated wounds, delay in reporting to the hospital, low resistance of the patient due to chronic anaemia and resistant strains of infecting organisms.

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