



CLINICAL STUDY ON THE USE OF DYNAMIC COMPRESSION PLATE IN THE MANAGEMENT OF ACUTE DIAPHYSEAL FRACTURES OF THE RADIUS AND ULNA.

KEYWORDS

Diaphyses; forearm; fracture; internal fixation; prostheses and implants; fracture fixation; Cross-Sectional Studies; Data Interpretation; Statistical

Mahendra swami

3rd yr resident orthopaedics Dr s.n. medical college jodhpur

Arun vaishy

professor orthopaedics Dr s.n. medical college jodhpur

Ravi kumar

senior resident orthopaedics Dr s.n. medical college jodhpur

ankit soni

senior resident orthopaedics Dr s.n. medical college jodhpur

ABSTRACT

Background and Objectives : Fractures of the forearm bones may result in severe loss of function unless adequately treated. Severe loss of function may result even though adequate healing of the fractures occurs. To study the principles of dynamic compression plate. To assess the functional outcome of patient with reference to rate of fracture union & its complications. To study follow-up & restoration of function of the forearm

Methods : 20 patients with acute diaphyseal fractures of the radius and ulna were treated with open reduction and internal fixation with dynamic compression plate and screws at our centre. The recently developed AO compression plating apparatus seemed to satisfy the basic objectives of internal fixation ;namely (1) anatomical reduction (2) preservation of vascularity (3) mechanically stable fixation and (4) rapid mobilization of the joints in proximity. The 3.5 mm DCPB gave excellent results in patients who had a fracture of the forearm, and it minimized the risk of refracture.

Results : Excellent results were obtained in 60%, good results in 30%, fair and 10% of the cases.

Conclusion : To conclude, dynamic compression plate is an excellent fixation for displaced diaphyseal fractures of the forearm bones. With stable / rigid internal fixation, the external immobilization was not required in co-operative patients.

INTRODUCTION

The forearm, in combination with the proximal and distal radioulnar joints, allows pronation and supination, movements that are important to all of us in the usual activities of daily living. The forearm serves an important role in upper extremity function, facilitating positioning the hand in space, thus helping to provide the upper extremity with its unique mobility. Exact and decisive management is required after fractures of the shafts of the radius and ulna if function is to be restored. Many chronically disabling disorders of the forearm can be prevented by the competent initial management of diaphyseal fractures of the radius and/or ulna. The fracture of the shaft of the ulna with associated dislocation of the radial head was first described by Monteggia in 1814 and has been known as the Monteggia fracture since then. The single-bone fracture of the ulna without dislocation of the radial head is often called a nightstick fracture, an obvious reference to one of the mechanisms of injury. The single-bone fracture of the radius in the distal third associated with dislocation of the radioulnar joint has several eponyms. Galeazzi, of Italy, called attention to this treacherous injury in 1934, and since then it has been referred to as Galeazzi's fracture. Fracture of the forearm bones may result in severe loss of function unless adequately treated. Severe loss of function may result even though adequate healing of the fractures occurs. Hence a proper method of treatment is necessary to get back stability as well as normal range of function.

METHODOLOGY

In this study twenty patients with forearm fractures were treated by open reduction and internal fixation with dynamic compression plate (DCP) and screws, in patients with displaced fractures of the shaft of forearm bones, and attended follow up clinic regularly, formed the material of the study.

Inclusion and Exclusion Criteria :

- Inclusion Criteria :
- Patients with acute diaphyseal fractures of the radius and ulna.
- Isolated fracture of the radius or ulna.

- Type I, type II compound fractures of forearm bones.
- Both male and female
- Age above 14 years and below 60 years
- Both upper limbs (forearm bones)
- Monteggia and Galeazzi fractures
- Exclusion Criteria :
- Age group above 60 years
- Associated Neurovascular injury
- Pathological fractures
- Type III open fractures

There were 14 male and 6 female patients with an average age of 37 years.

Seven cases were both bone fractures, there were eight fracture shaft of radius

(Isolated) and four cases of fracture shaft ulna. The criteria suggested by F.M. Marek et al (1961) was used.

RESULTS

All the 20 patients in our study were followed up every one month and were asked specific questions and were evaluated subjectively on the basis of their answers. Our aim was to correlate the health status with objective and radiological outcomes in patients treated by open reduction and internal fixation for fractures of both bones of the forearm. The range of movement of the forearm and wrist, grip and pinch strength were measured objectively and standardized radiographs were evaluated. Operative stabilization of fractures of the radius and ulna led to a reliably acceptable functional outcome. The accumulated data were compared to the preoperative and immediate post operative records and the results analysed. The union of fractures (i.e. obliteration of the fracture line bridging of trabeculae) the criteria of Muller et al (1950) was used for evaluation. In our study twenty cases of forearm fractures were treated by open reduction and internal fixation with Dynamic

Compression Plate and screws in various age groups of both sex. The results were analysed and evaluated accordingly. In our study the age group of the patients were ranging from above 14 and below 60 years. In our study twenty patients with closed diaphyseal fractures of one or both forearm bones were treated by open reduction and internal fixation with dynamic compression plate and screws. There were 14 males and 16 females with their ages ranging from 15 to 60 years. Among them six patients had both bone fractures, eight patients had isolated fracture shaft radius, five patients with isolated fracture shaft ulna and one patient had Monteggia fracture dislocation.

All the patients in our study presented with pain, deformity and loss of function of the effected part. Separate incisions were used for radius and ulna. Thompson's approach was used for upper half of radial fractures. Anterior Henry's approach for lower half of radial fractures and Galeazzi fracture dislocations. Ulnar fracture was exposed by direct approach. (The subcutaneous border of the ulna between the olecranon and the ulnar styloid process). In most cases six hole 3.5 mm DCP was used. Post operative cast protection was given for two weeks in few cases who were not compliant with treatment. On an average the follow up period of these patients varied from six to twelve months. Some of the patients deferred follow-up. Radiological union of the fracture occurred in all cases and was satisfactory.

discussion-

The forearm serves as important role in upper extremity function, facilitating positioning the hand in space, thus helping to provide the upper extremity with its unique mobility. The forearm, in combination with the proximal and distal radioulnar joints, allows pronation and supination, movements that are important to all of us in the usual activities of daily living. Exact and decisive management is required after fractures of the shafts of the radius and ulna if function is to be restored. Many chronically disabling disorders of the forearm can be prevented by the competent initial management of diaphyseal fractures of the radius and /or ulna. It is difficult to achieve a satisfactory closed reduction of displaced fractures of the forearm bones, and if achieved, it is hard to maintain. Unsatisfactory results of closed treatment have been reported to range from 38% to 74%. For this reason, open reduction with internal fixation is routine except for undisplaced fractures. Undisplaced single bone fractures should be treated in a long-arm cast until there is roentgenographic evidence of union or definitive evidence of delayed union. Fractures of both bones or a displaced isolated fracture of the radius or ulna should be treated by open reduction, plate fixation and cancellous bone grafting whenever there is bone loss. This treatment is carried out as a semi-elective procedure as soon as the patient's condition warrants; reduction is easiest when the fracture is treated within the first 48 hours. At a minimum, there must be screws engaging six cortices above and below the fracture site. The use of 3.5 mm plate systems has nearly eliminated the problem of refracture after plate removal. Eight hole plates are used most often. Cancellous bone grafting to these fractures, in addition to plate fixation, should be considered, as the union rate using this method of treatment has been nearly 100%. The arm is immobilized in a long-arm plaster cast until there is roentgenographic evidence of union. Reliable patients may be placed in a removable splint and early motion started as soon as wound healing is complete.

The AO formulated four treatment principles which were expected to improve the results of fracture treatment in general and of internal fixation in particular (Muller et al. 1984).

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