ELASTIC INTRAMEDULLARY NAILING OF METACARPAL FRACTURES

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ABSTRACT

BACKGROUND

AIM

The goal of treatment in metacarpal fractures is to restore the normal function of the hand.¹ The main aim of this study is to evaluate the clinical and radiological outcomes of intramedullary nailing with titanium elastic nails.

MATERIALS AND METHODS

Eighteen patients with 21 metacarpal fractures who attended the orthopaedic OPD at King George Hospital, Visakhapatnam, from September 2014 to August 2015 were studied. All the nails were passed antegradely.

RESULTS

Functional evaluation was done based on DASH score at three months after fixation of fractures.

CONCLUSION

Fractures of metacarpal bones are one of the common fractures involving short long bones. Treatment with elastic nails is more encouraging with good functional results.

KEYWORDS

TENS, Elastic Nails, Metacarpals.

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INTRODUCTION

Fractures of metacarpals account for nearly 36% of all hand fractures.² while many metacarpal fractures can be treated with non-surgical means, unstable metacarpal fractures which are subject to malrotation, displacement, shortening and angulation require reduction and stable fixation.² Antegrade intramedullary pinning was shown to produce better functional outcomes than percutaneous transverse pinning or miniplate fixation.³ Cadaveric studies showed decreased hand function with metacarpal shortening beyond 5 mm and angulation beyond 30 degrees.⁴ Any rotation is poorly tolerated and needs correction.⁴ Elastic nails provide three point intramedullary fixation providing adequate stability and promote early motion.⁴

Uncorrected bone deformity and stiffness resulting from metacarpal shaft fracture can produce significant functional and cosmetic deformity.⁵ Intramedullary fixation of

metacarpal shaft fractures has been advocated to simplify the surgical treatment of these common injuries and minimize the complications associated with more extensive procedures.⁵

The principles of treatment include restoration of articular anatomy, stable fixation of the fractures, elimination of angular or rotational deformity and rapid restoration of mobility and function.⁶ It provides distinct advantages over other methods, because it is minimally invasive with minimal soft tissue dissection, stability of fixation and enhancing bone healing by preventing distraction at the fracture site. This is particularly a great option for patients presenting with multiple metacarpal fractures.²

This method can be offered as an effective and safe alternative in the treatment of closed displaced fractures of the 2nd to 5th metacarpals without significant complications.⁷

Mode of Injury

- RTA.
- Assault.
- Fall.
- Dog bite.

MATERIAL AND METHODS

Inclusion Criteria

Displaced fractures of the shaft and neck of metacarpals are included in this study.

Financial or Other, Competing Interest: None.

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Exclusion Criteria

1. All fractures of the phalanges.
2. Fractures involving the articular surface.
3. Grossly comminuted shaft fractures.
4. Badly crushed injuries.

SURGICAL TECHNIQUE

Selection of Implant

The size of the nail depends on the size of the medullary canal. The narrowest part of the medullary canal is taken into consideration. It is not uniform in all the bones. Usually one nail is sufficient. Multiple nails can be inserted if the fracture is unstable or for those who have wide medullary canal. Smaller diameter nails, i.e. 0.8 mm will bend while negotiating. Larger diameter nails are difficult to manoeuvre and chances of splintering the bone. Ideal size would be 1.5 and 2 mm nails.

Entry Point

In our series, all the nails were passed from the base of the metacarpals, i.e. antegradely.

PROCEDURE

The patient is given local anaesthesia with sedation/wrist block. After preparation under antibiotic cover and fluoroscopic control, site of entry wound is confirmed under C-arm. A stab incision is given over the base of the fractured bone. Blunt dissection is done up to the dorsal cortex to prevent damage to the extensor tendons. Entry point is made with K-wire or a drill bit of larger diameter than the nail. Then the TENS is held with T-handle and negotiated into the entry point.

The fracture is reduced. Nail is passed across the fracture site into the distal fragment. The nail is advanced up to the subchondral bone. Manual rotation of the nail can assist in final reduction. Final position of the reduction is checked under C-arm and the nail is cut after bending; average time taken for surgery is 15-20 min.

Post-Op

Physiotherapy was started immediately in post-operative period. Both active and passive movements of the metacarpophalangeal and interphalangeal joints were advised. Regular dressings were done and exposed nail tip is taken care of. Nails were removed at 6-8 weeks postop.

Complications

Nail back out	-Nil
Infection superficial	-01
Malunion	-nil
Stiffness	-01
Penetration of nail through the metacarpal head	-01
Delayed union/non-union	-Nil

RESULTS

All patients were followed for average period of 12 to 16 weeks. All fractures healed without rotational or angulational deformities. All patients have full ROM of

metacarpo- phalangeal and interphalangeal joints except 02 patients. Patients are satisfied functionally and cosmetically. All the patients were back to their previous job/work. The mean DASH score was 2.1-3.1 points.

Males	17
Females	01
Single bone fracture	15
Multiple bone fracture	03
Metacarpal fractures	21
Compound	01
Simple	17

CONCLUSION

Elastic stable intramedullary nailing of the metacarpals is safe, minimal invasive and technically easy option in displaced fractures that warrant surgical intervention achieving excellent long-term results.⁸

Fig. 1: Entry Point

Fig. 2: Entry Point under C. Arm

Fig. 3: Tens with T Handle

Fig. 6: ROM with Nail in situ

Fig. 4: Final Picture

Fig. 7: ROM with Nail in situ

Fig. 5: ROM with Nail in situ

Fig. 8: Postop X-ray

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