ORIGINAL RESEARCH PAPER
Volume - 9 | Issue - 8 | August - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

TO STUDY THE EPIDEMIOLOGY OF CLOSED DISPLACED METACARPAL FRACTURES IN A PERIPHERAL TERTIARY CARE CENTRE

Orthopaedics

Dr Rajesh Ambulgekar Hod Dr SCGMCH Nanded

Dr Sayed Shahbaz Hasan* Resident Dr SCGMCH Nanded *Corresponding Author

ABSTRACT

BACKGROUND: Fractures of metacarpals and phalanges are the most common fractures of the upper extremity and account for 10% of total such case1.70% of these fractures commonly occur between the ages of 10-45 years. **AIM:** To assess the epidemiology of of Closed Displaced Metacarpal Fractures in a tertiary care centre. **RESULTS:** In our study of 30 cases of closed displaced metacarpal shaft fractures excluding thumb metacarpal, the Mean age in the study was 36.63 years.(range 20-65 years) ,Male to female ratio was 6.5:1., In 11 cases (36.66%) mode of injury was road traffic accident, self-fall in 10 patients (33.33%) and assault in 9 patients (30%) ,Fifth metacarpal shaft fracture (43.33%) was most common involved metacarpal followed by second metacarpal shaft fracture (30%). Third metacarpal shaft fractures are the least commonly involved (3.33%). The Most common associated injury was ulna shaft fracture in 2 cases (6.67%). Both cases were of assault. One patient (3.33%) of road traffic accident had distal tibia shaft fracture.1 patient (3.33%) had distal end radius fracture and 1 patient (3.33%) had head injury. 25 Patients (83.33%) had no associated injuries with the metacarpal fracture. **CONCLUSION:** Metacarpal fractures commonly occurs in people of young age male population due to increased rate of assault and road traffic accidents in young age group.

KEYWORDS

mertacarpal fractures, closed displaced, open reduction,epidemiology

INTRODUCTION-

Hand is one of the most frequently injured parts of the body1. Metacarpal fractures contribute approximately 18% of all below elbow fractures and approx 30% of all fractures of hand2, 3, 4. Metacarpal fractures are most commonly seen in second to third decade5. The mechanism of injury depends upon the magnitude, direction, point of contact and type of force. Most of these fractures are due to direct blow to another individual or objects as seen in assault and closed fist injury. They are also seen in accidental falls and road traffic accidents. Various modalities of treatments are available for metacarpal fractures. Close reduction and cast immobilisation in clam digger position6 is the most widely used and acceptable procedure. Most hand fractures can be treated by conservative methods with good functional outcome7. Conservative treatment is particularly suitable for stable fractures, and in patients who are not fit for surgery. This method is cost effective but has complications like malunion and stiffness due to immobilisation. But in few percentages of unstable displaced metacarpal fractures, results of closed treatment are unsatisfactory.

The use of low profile mini-plates in fractures of metacarpal provides a anatomical stable fixation and allows early movement, hence good functional results8. However, stiffness of hand joints, especially metacarpo-phalangeal joint is of major concern and physiotherapy plays a major role to prevent stiffness8. In view of all this said in the above, we conducted a study to assess the epidemiology of closed displaced metacarpal fractures in tertiary care centre.

MATERIALS AND METHODS-

This was a prospective type of study of 30 patients with closed displaced unstable 2-5th metacarpal shaft fractures came to outpatient department and in-patient department of our tertiary care centre. General information like name, age, sex, occupation and address were noted. Then a detailed history was elicited regarding mode of injury like self-fall, Road traffic accident, Assault. Enquiry was made to note site of pain and swelling over the affected metacarpal.

After obtaining informed consent and approval from the Institutional ethics committee patients were selected according to the following inclusion and exclusion criteria:

Inclusion criteria:

- All patients of age group >18
- All closed displaced 2-5th metacarpal shaft fractures
- Mono or poly trauma.
- Medically fit for surgery.

Exclusion criteria:

- Age less than 18years.
- Any medical contraindication to surgery (Heart diseases, renal failure or activechemotherapy).
- Patients not willing for operation
- Intra-articular fractures
- Fractures of head and neck of metacarpal
- Thumb metacarpal Fractures
- Pathological fractures
- Compound fractures

RESULTS

The present study consists of 30 cases of closed displaced metacarpal fractures. The age of patients ranged from 20-65 years with mean age of 36.63 years. The number of patients between 20-29 years constituted maximum (43.33%) in this study. Among the 30 patients included, 26(86.7%) were male and 4(13.3%) were female patients. This suggests higher affection in male population. Right side was involved in 23 cases (76.6%) and left in 7 cases (23.3%).

Dominant side was involved in 76.6% of patients. In 10 patients (33.33%) mode of injury was fall while 9 patients(30%) were of road traffic accidents and 11(36.66%) patients of assaults. 27 cases (90%) out of 30 cases were having single isolated metacarpal fracture. Transverse fracture pattern cases were 16(53.33%), oblique pattern cases were 9(30%), spiral pattern fracture cases were 4(13.33%) and 1(3.33%) was of commented fracture pattern. There were 13 patients (43.33%) of fifth metacarpal fracture, 9 patients (30%) of second metacarpal fracture, 4 patients (13.33%) of 4th metacarpal fracture, 1 patient (3.33%) of third metacarpal fracture and there were 3 patients (10%) with multiple metacarpals fracture. It was found that fifth metacarpal shaft fracture was more common followed by second metacarpal shaft. The Most common associated injury was ulna shaft fracture in 2 cases (6.67%). Both cases were of assault. One patient (3.33%) of road traffic accident had distal tibia shaft fracture.1 patient (3.33%) had distal end radius fracture and 1 patient (3.33%) had head injury. 25 Patients (83.33%) had no associated injuries with the metacarpal fracture.

AGE INCIDENCE :

Table –1

Age in Years	No.of patients	Percentage
20-29	13	43.33%
30-39	6	20%
40-49	5	16.67%
50-59	3	10%

>60	3	10%
TOTAL	30	100%

The mean age was 36.63 years (20 years- 65 years)

Table –2 SEX INCIDENCE:

Sex	No. of metacarpal fracture	%
Male	26	86.7%
Female	4	13.3%
Total	30	100%

Table -3 SIDE AFFECTED :

Side	Male	Female	Total
Right	21	2	23(76.6%)
Left	5	2	7(23.67%)
Bilateral	0	0	0(0.00%)

Graph 1- Mode of injury

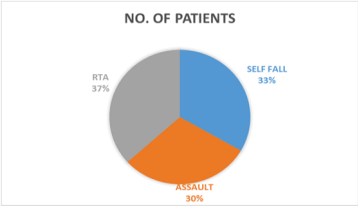

Table 4 Fracture Pattern

Fracture Pattern	Number Of Cases	Percentage
Transverse	16	53.33%
Oblique	9	30%
Spiral	4	13.33%
Communited	1	3.33%
Total	30	100%

Graph 2 -Associated Injuries

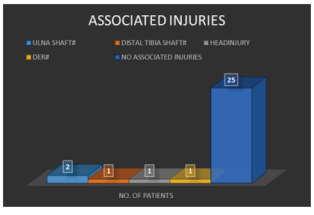

Table-5 Type Of Metacarpal Bone Involved:

Type of Metacarpal bone involved	Number of Cases	Percentage
Second Metacarpal	9	30%
Third Metacarpal	1	3.33%
Fourth Metacarpal	4	13.33%
Fifth Metacarpal	13	43.33%
Multiple Metacarpals	3	10%
Total	30	100%

DISCUSSION

Metacarpal fractures are one of the major causes of Hand injuries. About one third of the hand fractures are metacarpal fractures. Most of the metacarpal fractures are considered as trivial injuries and treated conservatively. Unstable and displaced metacarpal fractures if treated conservatively may lead to mal-union, stiffness and deformity. So, now a day these fractures are treated operatively. Open reduction and internal fixation provides absolute stability and promoting early union and early mobilisation of joints. In our study of 30 cases of displaced metacarpal fracture, majority of patients are from young age group. The mean age was 36.63 years, youngest patient was of 20 years and eldest was of 65 years. In study conducted by V Radhvendra8 et al mean age was 38 years and in another study by Nalbantoglu et al9 mean age was 31 years. In the present study male were 26 (86.67%) and females were 4(13.33%) with male to female ratio of 6.5:1. The male ratio in our series was higher, which could be attributed to the Indian social pattern, where males were generally more engaged in driving vehicles and role in assault, thus exposing them to a greater risk. Al Madaway10 et al (males 93.33% vs females 6.66%) and A Joshi11 et al (males 87.5% vs females 12.5%) also found males as majority cases in their study. In 23(76.66%) patients had right sided metacarpal shaft fracture while 7 patients (23.33%) had left sided fractures. Following is the comparisons of side involvement with other study. It is due to fact that most of the people has right dominant hand and it is most commonly involved in fist fight which leads to metacarpal fractures. Bing Zhang et al12 (Right 94.36%)and V Raghvendra et al8 (Right 73.33%)also observed the same pattern.

In 10 patients (33.33%) mode of injury was fall while 9 patients(30%) were of road traffic accidents and 11(36.66%) patients of assaults. P V Pugalentgi et al13 also found assault(55.5%) as a major mode of injury for metacarpal fractures. In study by G Shah14 et al road traffic accident (83.33%)was the common mode of injury. In this study, 27 cases (90%) out of 30 cases were having single isolated metacarpal fracture. Transverse fracture pattern cases were 16(53.33%), oblique pattern cases were 9(30%), spiral pattern fracture cases were 4(13.33%) and 1(3.33%) was of commented fracture pattern. In a study by V. Raghvendra et al8 they also found transverse pattern of metacarpal shaft fracture in 16 patients (53.3%) as the common pattern of fracture. There were 13 patients (43.33%) of fifth metacarpal fracture, 9 patients (30%) of second metacarpal fracture, 4 patients (13.33%) of 4th metacarpal fracture, 1 patient (3.33%) of third metacarpal fracture and there were 3 patients (10%) with multiple metacarpals fracture. It was found that fifth metacarpal shaft fracture was more common followed by second metacarpal shaft. In our study least fractured metacarpal was third metacarpal. In a study conducted by S. Akyut et al15 second metacarpal was the commonest metacarpal to get fractured. The Most common associated injury was ulna shaft fracture in 2 cases (6.67%). Both cases were of assault. One patient (3.33%) of road traffic accident had distal tibia shaft fracture.1 patient (3.33%) had distal end radius fracture and 1 patient (3.33%) had head injury. 25 Patients (83.33%) had no associated injuries with the metacarpal fracture. 25 patients (83.33%) were operated between 4th to 7th day post injury, 1 patient (3.33%) operated within 3 days while 4 patients (13.33%) were operated after 7 days post injury. Metacarpal fractures are considered as a trivial trauma in rural setup. So, patient present late in a tertiary care centre. Results of our study were comparable to other previously done studies However, a large sample size is needed to determine the epidemiology more accurately.

CONCLUSION:

Metacarpal fractures commonly occurs in young age male people due to involvement in assault and males are more engaged in driving vehicles which leads to road traffic accident. Although metacarpal fractures are consider as a trivial trauma in a rural part of India, proper and timely management offers a long term solution for working population to return to pre-injury level and resume their job.

REFRENCES

1. EMMETT J, BRECK L. A Review and Analysis of 11,000 Fractures Seen in a Private Practice of Orthopaedic Surgery 1937-1956. The Journal of Bone & Joint Surgery. 1958;40(5):1169-1175.
2. Aitken S, Court-Brown CM. The epidemiology of sports-related fractures of the hand. Injury 2008; 39(12):1377–83.
3. Chung KC, Spilson SV. The frequency and epidemiology of hand and forearm fractures in the United States. J Hand Surg Am 2001;26(5):908–15.
4. Van Onselen EB, Karim RB, Hage JJ, et al. Prevalence and distribution of hand fractures. J Hand Surg Br 2003;28(5):491–5.
5. Stanton JS, Dias JJ, Burke FD. Fractures of the tubular bones of the hand. J Hand SurgEurVol 2007;32(6):626–36.
6. Wilson RL, Carter MS: Management of hand fractures.In: Hunter JM, Schneider LH, Mackin EJ, et al ed. Rehabilitation of the Hand, St. Louis: CV Mosby;1978:180-194
7. Barton N. Conservative treatment of articular fractures in the hand. The Journal of Hand Surgery. 1989;14(2):386-390
8. Venkatesh, Raghavendra&Kerakkanavar, Shivakumar. (2017). Functional outcome of closed metacarpal shaft fractures managed by low-profile miniplateosteosynthesis: A prospective clinical study. Journal of Orthopaedics and Allied Sciences.2017, 5(2): 63-67
9. Nalbantoglu U. Treatment of metacarpal fractures with open reduction and low-profile plate and screw fixation. ActaOrthopaedicaetTraumatologicaTurcica. 2008;:303-309
10. AL-Madawy A, Hasanin M, Al-Nahal A, Elatta M. The Use of Minilocked Plate for Management of Unstable Metacarpal Fractures. Journal of Hand and Microsurgery. 2016;08(03):159-164.
11. Joshi A, K.C.BR, Chand P, Thapa BB. Early Experience with Low Profile Plate Osteosynthesis for Metacarpal fracture J Nepal Health Res Council 2009; (7):19-24
12. Zhang B, Hu P, Yu K, Bai J, Tian D, Zhang G et al. Comparison of AO Titanium Locking Plate and Screw Fixation versus Anterograde Intramedullary Fixation for Isolated Unstable Metacarpal and Phalangeal Fractures. Orthopaedic Surgery. 2016;8(3):316-322.
13. Pugalenthi PV, Ravichandran K, Thanappan N, et al. Functional outcome of closed metacarpal fractures treated with mini fragment plates and screws. J. Evolution Med. Dent. Sci. 2017;6(33):2752-2761
14. Shah G, KC B, Chand P, Sah D. Functional outcome of Metacarpal Fracture managed with Miniplate and Screws. Janaki Medical College Journal of Medical Science. 2018;6(1):43-48.
15. Aykut S. Results of surgical treatment in metacarpal shaft fractures using low profile mini plates. Turkish Journal of Trauma and Emergency Surgery. 2015;.