

5 years Experience of Hand Fractures in a Private Setup

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ABSTRACT:

Objective: To know the aetiology, features and management of hand fractures presenting in a private setup are discussed.

Materials and Methods: The descriptive study was carried out in a private setup from June 2005 to May 2010. Patients of all ages and gender presenting with acute injuries to the hand were included. The patients presenting with amputated digit/s and those undergoing micro-surgical replantation were excluded from the study. The aetiology, site and side of the fractures were noted. All the patients were X-rayed pre-operatively. Various operative modalities were used including Krischner's wire, screws, microplates, miniplates or dental wires. The treatment was done under local anaesthesia. After reduction, immobilization of fractures site was done for 3 – 4 weeks and any complications observed in the patients were also noted.

Results: A total of 67 male having 96 fractures and 43 females having 59 fractures were included in the study. Majority of the patients (70.9%) presented with single fracture followed by two fractures in 19.1% patients. The mean age of the male patients was 33.8 years and 27.4 years in female, Road traffic accident was the leading cause of the hand fractures (36.4%) followed by assault (19.1%). Majority of the patients had fractures of proximal phalanx of the finger (27.7%) more than 95% of the patients underwent some kind of operative treatment. Percutaneous K-wiring was done in 30.3% patients. In 65.1% of the patients open reduction internal fixation was undertaken. 1.8% of the patients developed infection 8.1% of the patients had joint stiffness and 4.5% had limited joint movements.

Conclusion: Open reduction internal fixation gave the excellent results. It gave an added advantage of early mobilization of hand thereby reducing the stiffness and morbidity.

Keywords: Hand Fractures Open reduction internal fixation K-wires Phalangeal fractures

Introduction:

The human hand serves a unique function and separates man from the rest of the animal kingdom. The physical characteristics of the hand often adapt to an individual's patterns of function or occupation¹. The use of hand clearly influences the level of function². Injuries to the hand are very common and may have severe consequences. The fractures of

phalanges and metacarpals are approximately 10% of all the fractures of the skeletal system³. These injuries account for between 0.2% to 3% of all patients visiting an accident and emergency unit⁴. Unfortunately these fractures were neglected or regarded as trivial injuries⁵. Majority of these fractures can be successfully managed by nonoperative techniques⁶. Selection of optimum treatment depends on a number of factors including fracture location, fracture geometry, deformity, open or closed, associated bony and soft tissue injuries and fracture stability⁷. Surgical treatment is necessary when the fracture is displaced and reduction is not

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possible, or when the fracture is unstable for reduction. If the fracture is spiral or comminuted, or when midshaft or articular fracture occurs with displacement of the fragments, the surgical treatment is also indicated. Finally, surgical treatment is also preferred when there is substantial associated soft tissue trauma^{3,8}. In this article, the aetiology, features and management of hand fractures presenting in a private setup are discussed.

Materials and Methods:

The descriptive study was carried out in a private setup from June 2005 to may 2010. Patients of all ages and gender presenting with acute injuries to the hand were included in the study. The patients presenting with amputated digit/s and those undergoing micro-surgical replantation were excluded from the study. The aetiology, site and side of the fractures were noted. All the patients were X-rayed pre-operatively. These patients underwent conservative or operative treatment. Patients undergoing only closed reduction (e.g., buddy's taping, splintage with immobilization etc) included elderly patients, or patients with minimal or no fracture segments displacement or patients with comorbid conditions like uncontrolled diabetes mellitus etc. the patients in whom some operative procedure was carried out included in whom closed reduction was not possible or those having associated soft tissue injuries. Various operative modalities were used including Kirschner's wire, screws, microplates, miniplates or dental wires. The treatment was done under local anaesthesia. After reduction, immobilization of fractures site was done for 3 – 4 weeks and any complications observed in the patients were also noted.

Results:

A total of 67 male having 96 fractures and 43 females having 59 fractures were included in the study. Majority of the patients (70.9%) presented with single fracture followed by two fractures in 19.1% patients (Table 1).

Table 1: Fractures Distribution (n=155)

| No. of Fracture | Total fractures | Males | Females |
|-----------------|-----------------|-------|---------|
| Single fracture | 78 | 47 | 31 |
| Two fractures | 42 | 26 | 16 |
| Three fractures | 27 | 15 | 12 |
| Four fractures | 8 | 8 | 0 |

The yearly distribution of the patients is shown in Fig. 1

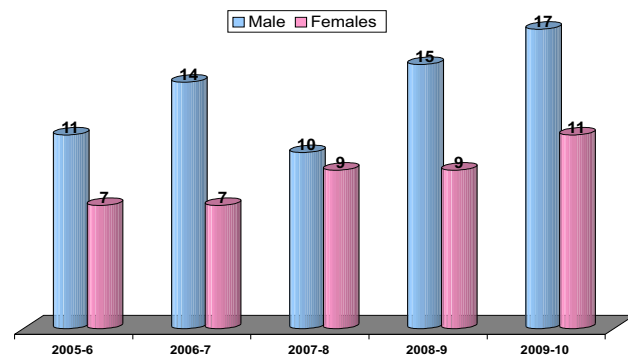


Fig. 1 Yearly Distribution (n=110)

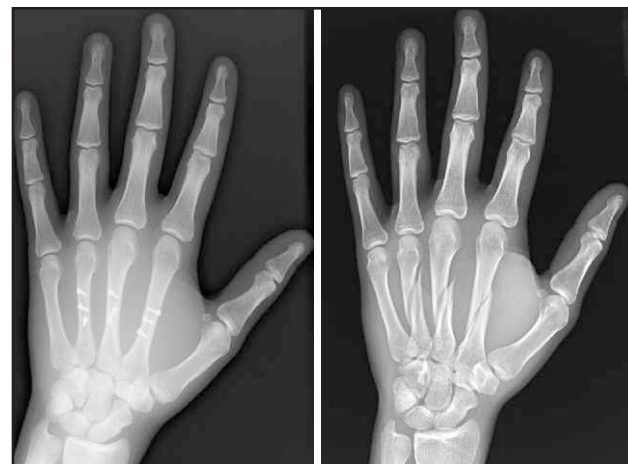


Fig. 2. X-Ray

The mean age of the male patients was 33.8 years (range; 9 – 61 years) and 27.4 years (range; 7 – 59 years) in female patients with male to female ratio of 1.4:1. road traffic accident was the leading cause of the hand fractures (36.4%) followed by assault (19.1%). Fractures due to sports injuries were seen in 4.5% of the patients (Table 2).

Table 2: Causes of Hand Fractures (n=110)

| Cause | Male | Female |
|-------------------------|------|--------|
| Road Traffic Accidents | 25 | 15 |
| Crush injury | 3 | 1 |
| Electric saw | 4 | 1 |
| Fall | 6 | 4 |
| Assault | 13 | 8 |
| Sports injuries | 4 | 1 |
| Sickle injury | 3 | Nil |
| Glass injury | 1 | 1 |
| Firearm injury | 1 | Nil |
| Domestic accidents | 4 | 5 |
| Fall of an object | 1 | 4 |
| Door entrapment | 1 | 2 |
| Human bite | Nil | 1 |
| Chopping machine injury | 1 | Nil |

Majority of the patients had fractures of proximal phalanx of the finger (27.7%) followed by metacarpal fractures (20%). Proximal phalanx of thumb was involved in 17.4% of the patients as compared to 4.5% of distal phalanx (Table 3).

Table 3: Areas Involved (n=155)

| Areas | Males | Females |
|------------------|-------|---------|
| Finger | | |
| Proximal phalanx | 27 | 16 |
| Middle phalanx | 19 | 10 |
| Distal phalanx | 11 | 7 |
| Thumb | | |
| Proximal phalanx | 17 | 10 |
| Distal phalanx | 3 | 4 |
| Metacarpals | 19 | 12 |

Conservative treatment was done in only 4.5% of the patients; the remaining 95.5% underwent some kind of operative treatment. All the procedures were performed under local anaesthesia. Percutaneous K-wiring was done in 30.3% of the patients which was followed by immobilization. In 65.1% of the patients open reduction internal fixation was undertaken (Table 4).

Table 4: Treatment Modalities used (n=155)

| Treatment | Patients | % | |
|-------------------------------|--------------|------|------|
| Aluminum splint only | 2 | 1.3 | |
| Buddy's taping | 3 | 1.9 | |
| Splintage with immobilization | 2 | 1.3 | |
| K-wire alone | 47 | 30.3 | |
| ORIF | k-wire | 29 | 18.7 |
| | Screws | 24 | 15.5 |
| | Plates | 17 | 11 |
| | Dental wires | 31 | 20 |

Majority of the patients (20%) had ORIF with dental wires; micro and miniplates were used in 11% of the patients whereas different screws were used in 15.5% of the patients. Only 1.8% of the patients developed infection. 2.7% had malunion, 5.5% had pain at the fracture site after 6 months. 8.1% of the patients had joint stiffness and 4.5% had limited joint movements.

Discussion:

Hand fractures are common injuries that may significantly affect hand function if not properly managed⁹. Closed treatment has been the historical mainstay of the treatment⁹. Percutaneous pinning allowed the conversion of more unstable fracture patterns to stable configurations capable of tolerating early motion⁹. The rate of 1.4 fracture per patient in

our study is close to the previous study reported by Lister¹⁰. Similarly the male to female ratio was 1.4:1, is similar as reported in other studies^{8, 11, 12}. Right hand was predominantly involved in our study (60.1% right vs 42.7%left) which is similar to the observation noted by Onselen et al¹¹. The ratio of fracture in right to left hand was 1.3:1. The distal part of hand (74.2%) was found more affected than the proximal part (25.8%). Similar observation was noted by Onselen et al¹¹. The main cause of hand fractures in our study was road traffic accidents (36.4%) followed by assault (19.1%). Crush injury was only 3.6% in the present study whereas it was 52% in the study by Oosterom⁸. There was no seasonal variations in the present study.

Fracture stability is dependent on location, fracture orientation and degree of initial displacement¹². Only 4.5% of the cases were managed conservatively in the present study using buddy's taping, POP cast and Aluminum splintage to immobilize the fracture site. In majority of the cases (30.3%), the satisfactory fracture stability was achieved by passing the k-wire whereas 65.2% of the patients underwent open reduction internal fixation. We used different sized screws, lag screws, microplates, miniplates, dynamic compression plates (Fig. 2).

In 20% of the cases, the dental wires were used to fix the fracture segments. Only 2 patients in the present study developed postoperative infection. One of them was a patient who had fracture due to road traffic accident. The K-wire was removed after two weeks. The second patient had a fracture due

to firearm injury. The fracture was fixed using K-wire and dental wires which were removed on 12th postoperative day. Systemic antibiotics were given according to the microorganisms sensitivity. 8.1% of the patients had joint stiffness (5 of these patients had intra-articular fracture of metacarpophalangeal joint). All of these 5 patients had some degree of limited joint movements.

Conclusion:

We conclude from the study that the results of ORIF were excellent. It gave an added advantage of early mobilization of hand thereby reducing the stiffness and morbidity. It also gave a high level of patients satisfaction as well

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