

EPIDEMIOLOGY OF HAND INJURIES IN A TERTIARY CARE CENTER

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ABSTRACT:

INTRODUCTION:

This retrospective review was performed to identify the incidence, causes, and details of hand injuries in patients presenting to a tertiary hospital of Kathmandu.

MATERIAL & METHODS:

Records of all patients who had sustained hand injuries for last 5 years were collected from the Medical Record section. 832 injuries of the hand in 484 patients were reported in this review. These patients were reviewed for age at the time of injury, gender, location of the incident, mechanism of injury, and fracture specifics.

RESULTS:

Majority (85.5%) of patients were males with a mean age of 28.79 ± 12.81 years and the rest were females with a mean age of 30.43 ± 17.13 yrs. Machinery injuries (25.2%) were the most common cause of injuries followed by road traffic accidents (14.5%). Metacarpal bone fractures (34.6%) were the commonest injuries of the hand. Most of the patients were treated with open reduction and fixation with K wires.

CONCLUSION:

The study revealed the aetio-epidemiological and clinical profile of hand injuries, and its burden in eastern Nepal.

KEYWORDS: Retrospective study, hand injuries, treatment modalities

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INTRODUCTION:

Hand has an intricate design and function with amazing work of anatomy. It is interesting fact that form follows function in the hand. Therefore, any injury to the structures of the hand results into handicap. To reduce this risk, even the smallest hand injuries require a good medical evaluation. The injuries to the hand need rapid and accurate initial evaluation, allowing medical treatment to be started quickly so that the short and long term complications can be improved. The hand contains 27 bones including the 8 carpal bones. When the other associated structures (nerves, arteries, veins, muscles, tendons, ligaments, and joint cartilage) are involved, the potential for a variety of injuries exists when trauma involves the hand. Hand injuries account for nearly 10% of hospital Emergency Department visits. A recent series of 1,000 consecutive hand injuries showed the following distribution: 42% lacerations (cuts), 27% contusions (bruises), 17% fractures (broken bones), and 5% infections. The most common cause of the injuries was blunt trauma (50%) followed by injury from a sharp object (25%). Hand injuries can be divided into 5 general categories: (1) lacerations (cuts), (2) fractures and dislocations, (3) soft tissue injuries and amputations, (4) infections, and (5) burns.¹

MATERIAL & METHODS:

A retrospective survey of the medical charts of all hand injury patients attending Department of the Orthopaedics via Emergency Room and/or OPD was done from January 1, 2010 to December 31, 2015 was performed. The study included injuries to phalanges, metacarpals, carpal bones along with injuries to tendons distal to the wrist joint. Both open and closed fractures and dislocation of hand bones and joints were included. Pure tendon cuts were excluded from the study, but fractures or fracture/dislocations associated with tendon injuries were included. Only patients from the eastern region of Nepal were included. Age, sex, occupation, time since injury, cause of injury, pattern of injury, diagnosis and treatment given were noted in the proforma. Permission to carry out this research was granted by IRC of KIST Medical College vide their letter No.0117/2016/17 dated 01.09.2016.

RESULTS:

The patients consisted of 70 (14.5%) females and 414 (85.5%) males, with a mean age of 30.43 ±17.13 yrs in females and 28.79± 12.81 yrs in males. There was right sided preponderance of hand fractures.

Machinery injuries (25.2%) were the most common causes of

injuries followed by RTA (14.5%), accidental sharp cut injuries (14.5%) and playground injuries (14%). The causes of injuries are shown in Table 1. Metacarpal bone fractures (48%) followed by proximal phalanges (23.5%) were commonest fractures that occurred in hand injuries.

Major five Causes	No. of patients	Percentage
1. Machinery injury	122	25.2%
1) Roller belt	23	
2) Grinding machine	19	
3) Agricultural machinery injury	42	
4) Wood cutting machine	27	
5) Others	11	
2. Physical Assault by Khukuri	70	14.5%
3. Road Traffic Accident	70	14.5%
4. Accidental sharp cut injury	68	14%
5. Playground injury	40	8.3%
6. Others	114	23.55%
	484	100%

Table 1. Etiology of Hand injuries

Table 2 describes the fracture pattern of hand injuries. The table also showed isolated tendon injuries without fracture and pure dislocations without fractures.

Descriptions	Total numbers (in Patients)	Percentage (%) / Ratio
1. Closed : Open Fractures / Dislocations	265: 567	31.85: 68.14
2. Total fractures without dislocations (± Tendon cut)	658	79.08
3. Transverse/Oblique/Spiral: Comminuted fracture	528: 189	73.64: 26.35
4. Intra-articular extension	147	17.66
5. Fractures associated dislocations	174	20.92
6. Fracture / Dislocations associated tendon injuries	465	55.8
a. Extensor tendons	276	
b. Flexor tendons	189	
7. Isolated tendon injuries without fracture (total number of tendons)	378	45.5
a. Extensor tendons	243	
b. Flexor tendons	135	
8. Pure dislocations without fractures	115	13.8

Table 2. Fracture patterns

The severity of the injury, availability of time for emergency operation, and most importantly affordability of the patient for operation determined the treatment and admission of the patients with hand injuries. The admission of patients was done into the observation room of ER or orthopaedic inpatient department according to severity of injury and availability of beds.

Table 3 reveals the number of patients admitted in the inpatient department, observation room of ER and duration of hospital stay as well as the patients discharged from ER after emergency management.

	No. of patients / Duration	Percentage (%)
Hospital admissions and stay		
1. Numbers of patients admitted	188	38.84
2. Duration of hospital stay	2.24 ±0.866 days	
Emergency Care and stay at ER		
3. Numbers of patients kept in Observation Room of Emergency Department	147	30.37
4. Duration of patient stay in Observation room of Emergency Department	10.56±5.77 hrs	
Immediate discharge after care from Emergency		
5. Discharge immediately after treatment	149	30.78

Table 3. Hospital Care Statistics

Most of the patients were treated by open reduction and internal fixation in the emergency operating room on the day of injury. Thorough wound debridement was done in all cases of open hand injuries. K-wires, External fixators (pins and rods, JESS fixator), screws/plates were used to fix the fractures. For intra articular fractures, where possible, pin and rubber traction method was used, which showed good outcome in most of the cases. Except in cases with amputations and disarticulations, tendon repairs were done. Overall picture of different treatment modalities is shown in Table 4.

Treatment Modalities	No. of patients
Wound Debridement and K-wires fixation	197
Open Reduction Internal fixation with K- wires	355
Conservative treatment with B/E slab	127
Conservative treatment with Buddy's strapping	45
Open Reduction Internal Fixation with screw/plates	40
Wound Debridement and Pin and Rubber traction	26
Wound Debridement and External Fixator	42
Disarticulation through joints	43
Amputation of fingers	66
Tendon repairs	297

Table 4. Treatment Modalities

DISCUSSION:

Little is known about the magnitude of hand injuries at our national level. This paper quantifies and characterizes the incidence of hand injuries that required acute medical attention at the Emergency Departments. This will be helpful in understanding the burden of such injuries in Nepal. Hand injuries resulting mainly from machinery injury and physical assault occur mostly between the ages of 20 and 30. The majority of injuries affect the metacarpals and can result in superficial injuries, open wounds and fractures. A small proportion of the victims were admitted in the hospital. Data recording on the background of accidents and their long term consequences should be improved². This study correlates the productive group being affected from such injuries as per our study and it also correlates that most of patients denied for admission for care during injuries and during rehabilitation phase.

Angermann P et.al reports the causes, characteristics and treatment of injuries to the hand and wrist presented to accident and emergency departments in a 2-year survey of 13% of the Danish population. The rate of injury to the hand or wrist was 28.6% of all injuries, or 3.7 per 100,000 inhabitants per year. 34% of the accidents were domestic, 35% were leisure accidents, 26% were occupational and 5% were traffic accidents. Only 2% of the patients were admitted to hospital for further treatment or observation and 13% were referred to a hospital as outpatients. The most frequent causes for admission were fractures (42%), tendon lesions (29%) and wounds (12%).³

The overall incidence of self-reported occupational hand injuries in a Danish population was estimated to be 4.7%, with the highest incidence among the young men and employees in the production and building industries. The life-time risk was 93% for men and 73% for women. Age and gender were found to be independent risk factors for occupational hand injuries. Prevention-trials against hand injuries should therefore have a high priority, and it is recommended that hospital data files should be increasingly used in future prevention programs⁴.

The study done by Hansen TB et al. showed the incidence of hand injuries due to farming accidents in a defined population with a representative mixture of agricultural activities⁵. Our study showed that the majority of machinery injuries were agriculture related. This study helped us to know the pattern of agriculture related injuries even in the developed world. The study incited us to develop a hand registry for such important injuries in our country.

The retrospective survey done by Packer GJ et al. emphasizes the differences between hand injuries and injuries of other sites, identifies the risk factors for hand injuries and has implications for the management of hand injuries in a District General Hospital⁶. In this survey of patients, comparison was made between patients with fractures and dislocations in the hand and fractures and dislocations of other sites. 28% of the total patients seen were of patients with hand injuries with the ages of 10 and 40 years. Leisure activities outside the home formed the commonest etiological factor. Only 66% of patients with hand injuries attended the Accident department within 24 hours of injury. This study implied that reporting of hand injuries within 24 hours was less as it correlated with our study.

In one of a retrospective survey of patients with fractures and dislocations attending the Accident Department of a District General hospital, comparison was made between patients with fractures and dislocations in the hand and fractures and dislocations of other sites. Patients with hand injuries accounted for 28% of the total patients seen. They were more likely than other fracture patients to be male and between the ages of 10 and 40 years⁷.

A retrospective survey of the medical charts of all 36,518 patients attending the Accident and Emergency Department of the VU University Medical Centre, in Amsterdam, was performed. Of these, 4303 sustained one or more fractures, and hand fractures accounted for 19% of all fractures. Patients with hand fractures were typically men aged between 15 and 35 years. The right hand was involved as often as the left. Most of the hand fractures involved the metacarpals but, as a group of bones, the combined phalanges were most commonly fractured⁸. This large retrospective study helped us to correlate with our study and it was similar as they had found in their study. It encouraged us to develop detailed medical records in each and every centers of Nepal to know the burden of this injuries and its implications and to explore the steps for their prevention.

One thousand consecutive fractures of the metacarpals, phalanges, and carpal bones have been recorded over a period of about 10 months in Bergen, Norway, to find out the relative incidence of these fractures in an unselected series: this corresponds well with the few other reports of the incidence of hand fractures that of our study. This study concluded that epidemiological study of hand injuries, pattern, and its management was important aspects to be considered as it accounted around more than 30 % of all injuries. This study emphasized and enlightened us the importance of hand injuries even in our scenario.⁹

During investigation of 723 cases involving injury in the agricultural work place, Boyd J et al recorded 94 cases of injury to the wrist, hand or finger; 40% of these resulted in permanent impairment. Agricultural equipment caused 71% of the injuries, and animals caused 15%. Amputation, fracture, laceration, and contusion were the injuries most frequently recorded, and fingers were the parts most affected. It might be regarded as a less than major injury and a need for additional attention to engineering based interventions and injury prevention¹⁰.

It is shown that hand injuries are extremely usual and imply enormous costs to the community. Postgraduate training in hand surgery is therefore desirable for all those general and orthopedic surgeons, who deal with the treatment of patients with hand injuries¹¹.

Epidemiological data about hand injuries that affect young patients of productive age, are important to optimize resources and organization of the health care system¹².

CONCLUSION:

Young patients who are in the productive age group and are important human resources for the nation building commonly sustain hand injuries. It will be worthwhile to explore its preventive measures with special attention to the industrial sector where a majority of these occupational accidents occur. In addition, a prospective study should be performed to understand the long term results of the hand injuries as it is more disabling later due to lack of good rehabilitative measures, along with long term consequences of economic loss to the family, society and to the nation.

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