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Original Research Article

Clinical profile of patients with forearm and hand injuries

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ABSTRACT

Background: Hand injuries are among the most frequent injuries, constituting between 6.6% and 28.6% of all injuries. Hand and forearm injuries, however small or large they may be do have a significant impact on the society in terms of cost of treatment, hospital stay and costs of lost production and hence the importance of this study.
Methods: The study was conducted in the Department of Surgery, Himalayan Institute of Medical Sciences (HIMS), Swami Ram Nagar, Dehradun, over the period of 12 months. Subjects were recruited from patients presenting in emergency/surgery OPD, HIMS, Dehradun with a primary diagnosis of soft tissue injuries in the forearm and the hand. A total of 114 patients were included in the study.
Results: Overall mean age of the subjects in our study was 28.21±15.71. The highest incidence was in the age group of (20-40) years i.e. 62 (54.30%). Male to female ratio in our study was 6.6:1. Maximum injuries occurred as workplace and industrial injuries. This contributed to 34.2% (39 subjects) of overall injuries. 50% patients had crush injuries while lacerations, burn and avulsion were other form of injuries. 43 patients had bone and joint involvement,16 patients had neurovascular injuries and 20 patients had tendon injuries.
Conclusions: Hand and forearm injuries are more common in males and in the age group of 20 to 40 years leading to loss of productive working days causing a significant financial burden on the society.

Keywords: Profile, Hand and forearm injuries, Emergency

INTRODUCTION

For mankind, hands are essential organs due to their agility and dexterity and are vital to our activities of daily living. The hand is a very complex structure and is made up of an array of small bones which totals to 27 bones in number including the 8 carpal bones. In combination with this, there are the different muscles, nerves, tendons, ligaments and the neurovascular bundle which form a part of the machinery of the hand. Such a complex functional unit has the potential of a variety of injuries when involved in any.[2] Hand injuries are among the most frequent injuries, constituting between 6.6% and 28.6% of all injuries. Most of these injuries occur mainly during industrial activities; however, they also occur at home, in public venues, in traffic accidents, and during sports activities.[2] Hand and forearm injuries, however small or large they may be do have a significant impact on the society in terms of cost of treatment and hospital stay and costs of lost production.[3] A further loss occurs in terms of an increased time off work due to need for rehabilitation and in some cases due to the permanent loss or impairment of function of the hand.[4]

METHODS

The study was conducted in the Department of Surgery, Himalayan Institute of Medical Sciences (HIMS), Swami Ram Nagar, Dehradun, over the period of 12 months. Subjects were recruited from patients presenting in emergency/surgery OPD, HIMS, Dehradun with a primary diagnosis of soft tissue injuries in the forearm

and the hand. A written informed consent was taken from all the patients. The study was undertaken after ethical clearance from the ethics committee.

Study design

This was an observational study.

Sample size

Sample size was calculated keeping in mind the previous hospital records for such patients. However, all the patients who presented to the hospital emergency or OPD were included in the study if they met the inclusion criteria which amounted to 114 patients in this study.

Inclusion criteria

Inclusion criteria were patients of either sex and all age groups. All patients of soft tissue injuries in the hand and the forearm including burns. Patients with bony injuries in association with the soft tissue injuries.

Exclusion criteria

Exclusion criteria were patients with healed and chronic injuries including post burn contractures. Patients who did not give consent.

Study tools

Structured study instruments (formats/case recording form) developed, and used to generate data. Camera for capturing photographs.

Study protocol

A complete history of patients and detailed examination of patients was performed after obtaining the written informed consent of the patients. The findings were recorded and evaluated in following terms. Time since injury on admission, first aid/intervention done outside, mode of injury, history of alcohol intoxication at time of injury. Detailed clinical examination in the form of general examination and systemic examination.

Local examination which included details like the limb involved, examination of the would including its dimensions, neurovascular status, involvement of the tendons, any fracture of the underlying bones and involvement of joint. Investigations included both haematological and radiological investigations like complete hemogram and any X-rays of the affected limb.

Interpretation and analysis of obtained results were carried out using software SPSS version 22 and MS Excel by application of descriptive methods (e.g., mean, proportion, ratio etc). Data thus collected was analyzed and presented in the form of tables/charts.

RESULTS

A total of 114 subjects with soft tissue injuries of the forearm and hand were included in the study. They were subjected to detailed history and thorough examination as per investigation design proforma.

Overall mean age of the subjects in our study was 28.21±15.71 years. In this study, out of 114 subjects, the highest incidence was in the age group of 20-40 years i.e. 62 (54.30%). The number of cases in the age groups less than 20 years was 29 (25.4%) and in age groups more than 40 years was 23 (20.2%) (Figure 1).

Table 1: Distribution of patients based on type of wound (n=114).

Type of wound	Number	Percentage (%)
Crush injection	57	50
Laceration	32	28.1
Burn	18	15.7
Avulsion	4	3.5
Others	3	2.7
Total	114	100

Table 2: Distribution of patients based on bone and joint involvement (n=114).

Joint involvement	No of cases	Percentage (%)
Present	43	37.7
Absent	71	62.3
Total	114	100

Table 3: Distribution of patients based on neurovascular status (n=114).

Neurovascular status	No. of subjects	Percentage (%)
Intact	98	85.9
Compromised	16	14.1
Total	114	100

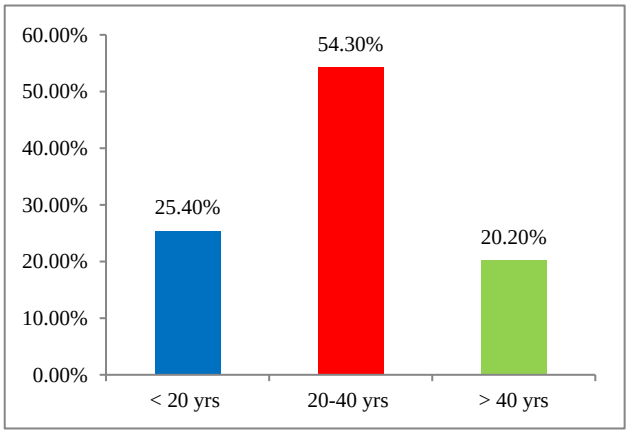

Figure 1: Age wise distribution of patients (n=114).

Majority of the subjects were males. Male to female ratio in our study was 6.6:1. Out of 114 subjects 99 (86.8%) were males while 15 (13.2%) were females (Figure 2).

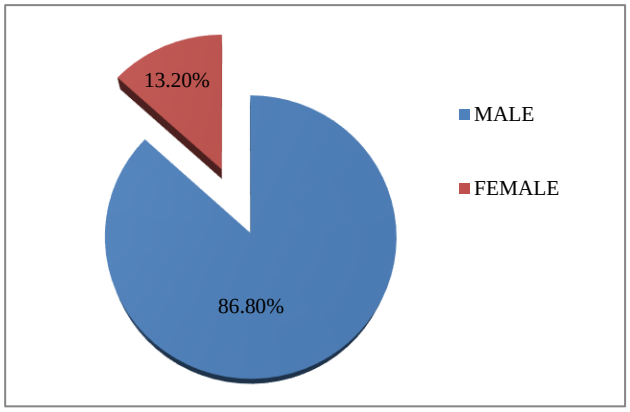

Figure 2: Gender wise distribution of patients (n=114).

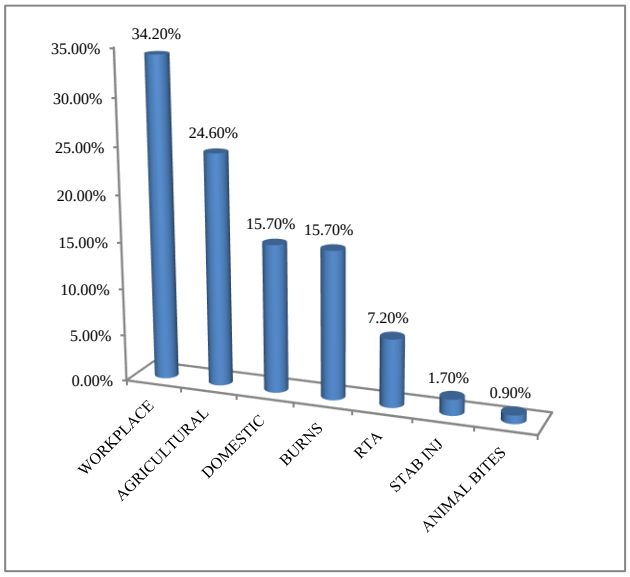

Figure 3: Distribution of patients according to mode of injury (n=114).

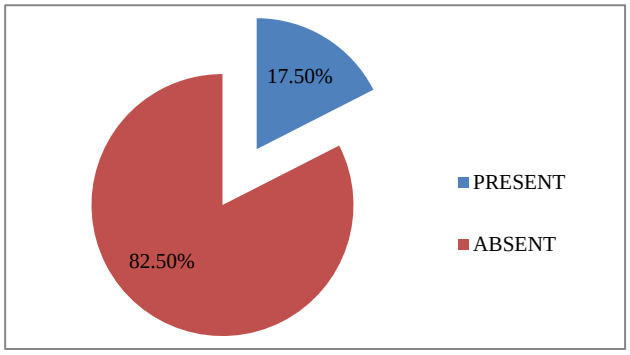

Figure 4: Distribution of patients based on tendon injury (n=114).

It was observed that maximum hand and forearm soft tissue injuries occurred due to workplace and industrial injuries. This contributed to 34.2% (39 subjects) of overall injuries. Out of the other injuries, 24.6% (28 subjects) were agricultural injuries and 15.7% (18 subjects) were due to burns and domestic injuries each. While 7.2% (8 subjects) were due to RTA, 2 subjects (1.7%) were of stab injuries and 1 patient (0.9%) was of animal bite (Figure 3).

In the present study it was observed that the maximum cases were of crush injuries accounting for 50% of the subjects (57 subjects). Lacerated wounds made up for 28.1% subjects (32 subjects). This was followed by burn injuries amounting to 15.7% cases (18 subjects) followed by avulsion injuries which were seen in 3.5% subjects (4 subjects). Other injuries were seen in 2.7% subjects (3 subjects) (Table 1).

Associated involvement of the joint was seen in 43 subjects (37.7%), whereas 71 subjects (62.3%) did not have any involvement of the joints (Table 2).

Neurovascular injury was seen in only 16 subjects (14.1%). Rest of the 98 subjects (85.9%) had no neurovascular involvement (Table 3).

Out of total 114 subjects, tendon injury was present in 20 subjects (17.5%) and rest 90 (82.5%) had no tendon injury (Figure 4).

DISCUSSION

Clinical profile of injuries is essential to describe the severity, morbidity, disability as well as defining the most important target for prevention and the management options available for the same.

The present study showed that injuries have been reported to occur most commonly i.e. 54.3 % in the age group of 20-40 years. These results are similar to Frazier et al who did a similar study and concluded that a majority of patients in their study were in the range of (16-32) years (60%).[5] Similarly, Ravikumar et al also found that the commonest age group for these injuries was (21-50) years (71.82%).[6] Prasad et al also saw that a majority of the patients were in the age group of (16-25) years (54%).[7] In a study done by Gupta et al also, the major share of the injuries was held by the economically productive age group of (21-55) years (67%).[8]

In the present study the mean age was seen to be 28.21 years which was similar to that seen in a study by Ng et al wherein the mean age was found to be 28.1 years.[9] This age group is the most active in terms of productivity and work. Injuries in this age group lead to significant losses in terms of loss of work and wages as well as the increased expenditure in the management of these injuries.[8]

The present study shows that males are more prone to such injuries in comparison to females with a male to female ratio of 6.6:1. Out of the 114 patients included in this study, 99 were male (86.8%) whereas only 15 were females (13.2%). Ravikumar et al also found similar results where the males were more commonly affected (83.64%) (6). Gupta et al concluded in their study that a male dominance was seen among the injured patients with a male to female ratio of 6.18:1.[8] In a study by Prasad et al, men accounted for 62% of the injured population.[7] Frazier et al saw the male to female ratio in contrast to that in the present study at 1.7:1.[5] However in all the studies, a male dominance was seen.

Higher sex ratio found may be attributed to the fact that males are bread earners for their families and therefore usually involved usually in outdoor activities exposing themselves to the risk of accidents. It may also be as a result of the major workforce employed in the industrial and agricultural domains are males thereby increasing the incidence of these accidents in the male population. However, in our scenario the male to female ratio is significantly higher as compared to some studies done in the western worlds. This could be due to the fact that the society studied is largely male dominated and the ratio of males to females in the workplace is as such skewed.

It was observed that maximum hand and forearm soft tissue injuries were workplace and industrial injuries. This contributed to 34.2% (39 patients) of overall injuries. This was in accordance with Gupta et al who noticed that work related injuries constituted about 26.23% of injuries in their study.[8] However Prasad et al concluded that a whopping 80% on injuries were related to the workplace.[7] Srihari et al noted that 43% of the injuries are a result of workplace trauma.[10] Garg et al quoted that the incidence of workplace injuries was around 70%, 60% and 31% in a Turkish, Danish and Kenyan studies respectively.[11] Out of the other injuries in the present study, 24.6% (28 patients) were agricultural injuries and 15.7% (18 patients) were due to burns and domestic injuries each. While 7.2% (8 patients) were due to RTA, 2 patients (1.7%) were of stab injuries and 1 patient (0.9%) was of animal bite. In a study by Ravikumar G et al agricultural injuries were seen in 11.25% of the patients.[6]

The majority of patients in the present study suffered injuries in the workplace or were of agricultural origin. This could be because of the fact that most of the patients belonged to a lower economic class and were employed either in factories or in agricultural hubs thereby increasing the incidence in these two groups. Another important group is burns and domestic injuries both of which have equitable distribution in the present study.

In the present study it was observed that the maximum cases were of crush injuries accounting of 50% of the patients (57 patients). Lacerated wounds made up for 28.1% patients (32 patients). This was followed by burn injuries amounting to 15.7% cases (18 patients) followed by avulsion injuries which were seen in 3.5% patients (4 patients). Other injuries were seen in 2.7% patients (3 patients). A similar result was seen in a study by Hung et al where crush injuries were seen in 37.8% of the patients.[12] Bazroy et al conducted a study in a glass manufacturing plant in Puducherry and found that the commonest injuries were cuts and lacerations 50.1%.[13] In a study by Srihari et al, crush injuries were a dominant mode accounting for 66.74% of cases.[10] Prasad noted that the leading cause was combined injuries (38%) followed by crush injuries (33%) and cut injuries (23%) in their study.[7] Gupta et al had contrasting results showing 67.21% cases with laceration and cut injuries and only 22.95% injuries with crush injuries.[8] Gupta et al noted that traumatic amputations were seen in 30% cases followed by crush injuries (25%), incised wounds (23%) and lacerated wounds (22%).[14]

This could be due to the fact that the present study was conducted at a tertiary care centre and most of the simple injuries like abrasions, contusions are managed at primary centers and complicated cases like crush injuries and mangled hand are referred for treatment.

The present study noted that bone and joint involvement was present in 43 patients (37.7%), whereas 71 patients (62.3%) did not have any involvement of the joints. These results were similar to Gupta et al where 23.52% cases had an associated fracture and 4.65% were associated with joint dislocations.[14] Gupta et al noted that of the 67.21% lacerated injuries, 25.61% had associated fractures and of the cases with crush injuries, 57.14% had associated fractures.[8]

The present study noted that neurovascular injury was seen in 16 patients (14.1%). Rest of the 98 patients (85.9%) had no neurovascular involvement. Out of total 114 patients, tendon injury was present in 20 patients (17.5%) and rest 90 (82.5%) had no tendon injury. This is in stark contrast to the study by Gupta et al where tendon involvement was present in 60.66% of the case and associated neurovascular injury was seen in 39.34% of patients.[8]

CONCLUSION

Hand and forearm injuries are more common in males and in the age group of 20 to 40 years leading to loss of productive working days causing a significant financial burden on the society. Hand and forearm injuries range from isolated soft tissue injuries to those associated with bony and neurovascular involvement. Many of the subjects suffered from crush injuries of the hand which occurred either in the workplace or were of agricultural origin. This highlighted the need for better training of the workforce around heavy machinery and the need for stringent protective measures in these machines to prevent these injuries.

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