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Clinical profile of patients with forearm and hand injuries at tertiary care institute of Bhuj, Kutch

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Abstract

Background and Aim: 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. 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.

Material and Methods: The study was conducted in the Department of Surgery, Gujarat Adani Institute of Medical Science, Bhuj, Kutch, Gujarat, over the period of 12 months. Total 150 Subjects were recruited from patients presenting in emergency/surgery OPD, with a primary diagnosis of soft tissue injuries in the forearm and the hand. 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, detailed clinical examination in the form of general examination and systemic examination. Local examination which included details like the limb involved, examination of the wound including its dimensions, neurovascular status, involvement of the tendons, any fracture of the underlying bones and involvement of joint.

Results: Out of 150 subjects 128 (85.3%) were males while 22 (14.6%) were females. Maximum cases were of crush injuries accounting for 50% of the subjects (75 subjects). Lacerated wounds made up for 27.3% subjects (41 subjects). Associated involvement of the joint was seen in 55 subjects (36.6%), whereas 95 subjects (63.3%) did not have any involvement of the joints. Neurovascular injury was seen in only 29 subjects (19.3%).

Conclusion: Among all those attended, the male gender had a higher prevalence. 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.

Keywords: Forearm, hand, joint, lacerated wounds

Introduction

Sir Abraham Colles ^[1], an Ireland surgeon, classically described the fracture in the Edinburgh Medical Surgical journal in 1814. He classically described the 'dinner fork deformity' and the six displacements: dorsal displacement, dorsal angulation, lateral displacement, lateral angulation, impaction and supination. He also described the management of the fracture by closed reduction and cast application. The first description of this fracture has been attributed to Pouteau ^[2], the French surgeon. He described the fracture in 1783.

Acute traumas involving upper limb in the emergency room are common, however, they are little understood from an epidemiological perspective ^[3]. The injuries that affect the distal extremity of the upper limb are considered a major social and public health problem both due to the physical and mental impact, as well as to high costs of initial treatment of it.

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 ^[4]. 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 ^[5, 6].

Hand and forearm injuries, however small or large they may be do have a significant impact on

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the society in terms of cost of treatment and hospital stay and costs of lost production [7]. 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 [8].

Methods

The study was conducted in the Department of Surgery, Gujarat Adani Institute of Medical Science, Bhuj, Kutch, Gujarat, over the period of 12 months. Total 150 Subjects were recruited from patients presenting in emergency/surgery OPD, 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.

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 150 patients in this study. Patients with healed and chronic injuries including post burn contractures and patients who did not give consent were excluded from the study. 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, detailed clinical examination in the form of general examination and systemic examination.

Local examination which included details like the limb involved, examination of the wound 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.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

A total of 150 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 29.30±14.25 years. In this study, out of 150 subjects, the highest incidence was in the age group of 20-40 years.

Majority of the subjects were males. Out of 150 subjects 128 (85.3%) were males while 22 (14.6%) were females. It was observed that maximum hand and forearm soft tissue injuries occurred due to workplace and industrial injuries. This contributed to 34.6% (52 subjects) of overall injuries. Out of the other injuries, 26% (39 subjects) were agricultural injuries and 22.6% (34 subjects) were due to burns and domestic injuries each. While 12% (18 subjects) were due to RTA, 4 subjects (2.6%) were of stab injuries and 2 patients (1.3%) were of animal bite.

In the present study it was observed that the maximum cases were of crush injuries accounting for 50% of the subjects (75 subjects). Lacerated wounds made up for 27.3% subjects (41 subjects). This was followed by burn injuries amounting to 15.3% cases (23 subjects) followed by avulsion injuries which were seen in 5.3% subjects (8 subjects). Other injuries were seen

in 2.7% subjects (s subjects) (Table 1). Associated involvement of the joint was seen in 55 subjects (36.6%), whereas 95 subjects (63.3%) did not have any involvement of the joints (Table 2). Neurovascular injury was seen in only 29 subjects (19.3%). Rest of the 121 subjects (80.6%) had no neurovascular involvement (Table 3). Out of total 150 subjects, tendon injury was present in 32 subjects and rest 118 had no tendon injury.

Table 1: Distribution of patients based on type of wound

Type of wound	Number	Percentage (%)
Crush injection	75	50
Laceration	41	27.3
Burn	23	15.3
Avulsion	8	5.3
Others	3	2
Total	150	100

Table 2: Distribution of patients based on bone and joint involvement

Joint involvement	No of cases	Percentage (%)
Present	55	36.6
Absent	95	63.3
Total	150	100

Table 3: Distribution of patients based on neurovascular status

Neurovascular status	No. of subjects	Percentage (%)
Intact	121	80.6
Compromised	29	19.3
Total	150	100

Discussion

In a study carried out in a university hospital in Ribeirão Preto, an analysis of the demand for emergency care was made in 2000, in which 27.6% corresponded to traumatic injuries involving the hands [9]. Comparing the data obtained in this study with the literature, a strong predominance of the male gender was observed. The data of this work presented results similar to those of Santos *et al.*, [10] Lopes [11] and Batista and Filgueira.¹² The results found are in accordance with clinical experience, since men are more exposed to the risk of accidents, men in this way were responsible for more severe trauma records, such as amputation, short-blunt injury, fracture / dislocation and infection. 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 The present study showed that injuries have been reported to occur most commonly 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%) [13]. Similarly, Ravikumar *et al* also found that the commonest age group for these injuries was (21-50) years (71.82%).¹⁴ Prasad *et al* also saw that a majority of the patients were in the age group of (16-25) years (54%) [15]. 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. Out of the other injuries, 26% (39 subjects)

were agricultural injuries and 22.6% (34 subjects) were due to burns and domestic injuries each. While 12% (18 subjects) were due to RTA, 4 subjects (2.6%) were of stab injuries and 2 patients (1.3%) were of animal bite. In a study by Ravikumar G *et al* agricultural injuries were seen in 11.25% of the patients [14]. In the present study it was observed that the maximum cases were of crush injuries accounting for 50% of the subjects (75 subjects). Lacerated wounds made up for 27.3% subjects (41 subjects). This was followed by burn injuries amounting to 15.3% cases (23 subjects) followed by avulsion injuries which were seen in 5.3% subjects (8 subjects). Other injuries were seen in 2.7% subjects. Associated involvement of the joint was seen in 55 subjects (36.6%), whereas 95 subjects (63.3%) did not have any involvement of the joints. Neurovascular injury was seen in only 29 subjects (19.3%). Rest of the 121 subjects (80.6%) had no neurovascular involvement. Out of total 150 subjects, tendon injury was present in 32 subjects and rest 118 had no tendon injury. A similar result was seen in a study by Hung *et al* where crush injuries were seen in 37.8% of the patients [16]. 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% [17]. 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 [18].

Conclusion

Among all those attended, the male gender had a higher prevalence. 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.

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