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AN ASSESSMENT OF PATIENTS WITH HAND MUTILATION

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ABSTRACT:

Background: Hand mutilation due to burn injury has its own lifelong imprints. The resultant contracture needs meticulous and aggressive management by a team consisting of Plastic, Reconstructive, Hand, Orthopedic Surgeons and Physiotherapist. The objective of this study was to assess the frequency of hand mutilation secondary to burn injury and to evaluate the treatment options for its management.

Methodology: This prospective observational study was conducted at Department of Plastic Surgery and Department of Orthopedics and Traumatology, Liaquat University of Medical & Health Sciences, Jamshoro over the period of two years from January 2008 to December 2010. A total of forty patients were included in this study after obtaining informed consent.

Results: Male female ratio was 2.1:1. Age ranged from 1-40 years. Most of patients were children. Majority of patients belonged to rural areas and were uneducated, with lower socioeconomic status. Accidental flame thermal injury was most frequent. Most patients presented with mild to moderate type of contracture. Hand function improved better with full thickness skin graft. Major complications were local infection and graft failure.

Conclusion: Most of hand mutilations are preventable or could be reduced considerably in severity by proper initial post burn splitting, positioning, early surgery and rehabilitation of hand.

Keywords: hand injury, hand burns, hand mutilation

INTRODUCTION

Phylogenetically, the hand has evolved to prosper as an organ of immense importance for mankind most notably for its intricate functions in daily activities and its expressive role in non-verbal communication. The hand has been prompted as a symbol for peace, friendship, and authority, welcoming and power.

A contracture is a permanent tightening of muscle, tension, ligaments or skin that prevents normal movement of the associated body parts and that can cause permanent deformity. It develops when the normally elastic connective tissue are replaced by inelastic fibrous tissue. The affected area resistant to stretching and prevent normal movement. Contracture occurs primarily in the skin, underlying tissue, muscle, tendons and joint area. The most common causes are scarring and lack of use (due to immobilization or inactivity). Other common causes include injury (burn); reduce use (immobilization), degeneration of nerves and the inherited disorders such as muscular dystrophy.

Burn is a leading cause of adult deaths in Karachi. [1] The estimated adult mortality due to burn in Karachi was 10.2/100,000, 6.8/100,000 were men and 14.1/100,000 were women. Most common cause was flame (33/47). But stove burst caused the most severe injury; these patients were predominantly very young, uneducated, female house workers, who were injured during day light at home around a floor level stove, unaware of fire safety, who received no first aid. [1]

The hand is an organ of great sensitive and a system of exact machinery of great specialization "with the hand the laborer support a family, the parent loves and cares for a baby, the musician plays a guitar, the blind read and deaf talk". Contracture is categorized as a major injury by the American Burn Association. [2]

Aside from the initial injury itself, there are other contributing factors to post burn deformity including persistent edema, wound infection, poor positioning, prolonged immobilization and delayed or in adequate skin coverage. In appropriated burn can affect all tissue of the hand including the extensors or flexor apparatus, intrinsic muscle, skeleton and joints. A second degree burn that is immobilization for too long or with the hand in an appropriate position can developed stiffness of all small joints that results in a far greater problem than the burn wound itself, which can heal within three weeks.[3] The post healing therapy for the second degree burn may be minimal compared with the efforts needed to mobilize joints that have become compared with the efforts needed to mobilize joints that have become contracted from disused and poor positioning. Edema that is uncontrolled in a circumferentially burned hand may result in necrosis of the intrinsic muscles culture with significant stiffness and marked loss of a fine mobility that last long after skin wound itself is healed.[4] The aim of this study was to evaluate the frequency of hand mutilation by burn injury and outcome of its reconstruction options.

METHODOLOGY:

This prospective observation study was conducted at Department of Plastic Surgery and Department of Orthopedics and Traumatology, Liaquat University of Medical & Health Sciences, Jamshoro over the period of two years from January 2008 to December 2010. A total of forty patients were included in this study after obtaining informed consent. Patients of both genders with hand mutilation secondary to burn injury were included in this study, patients with comorbidities were excluded. All relevant information was collected on a predesigned proforma and was evaluated by IBM SPSS 19.

RESULTS:

During the study period, a total of 40 patients were included in this study, of these 27 were male and 13 were females, age of the patients ranged from 1-40 years. Majority belonged to age group of 1-5 years (55%). Males were 15 (27.5%) and females were 7 (17.5%). More details regarding age and sex distribution of the patients are presented in Table 1.

Majority of patients were uneducated as shown in table 2. Majority of patients presented with contractures within 5 years period of initial injury, Table 3. Flame injury was reported as most frequent cause 18(45%) of contractures, Table 4. As far as mode of the burn is concerened it was accidental in most of patients followed by ocuupation burn, contact and flamed burn injury respectively. Hand and wrists were involved in most of the patients as far as associated burn is concerened. Most of patients did not received any type of treatemtn. In only 1 case general surgeon provided initial treatment. A general physician treated five patients and others treated 6 patients. Out of these 6 patients, 2 had undergone splintage and 4 had combination treatment. None were operated. Ten patients had combined involvement of fingers. In 22 (55%) patients, right hand was involved. While in 5 patients both hands were involved, 31 (77.5%) patients had fibrotic band type of scar

Table 1
Age & Gender of Patients

Age (years)	Male Number	Female %	Total Number	%	Number	%
1-5	15	37.5	7	17.5	22	55
6-10	2	5	1	2.5	3	7.5
11-15	3	7.5	1	2.5	3	7.5
11-15	3	7.5	1	2.5	4	10
16-20	2	5	2	5	4	10
26-30	3	7.5	1	2.5	4	10
31-35	0	0	0	0	0	0
36-40	1	2.5	1	2.5	2	5
Total	27	67.5	13	32.5	40	100

Table 2
Educational status

Education	Number	Percentage (%)
No education	29	72.5
Others	6	15
Primary	5	12.5

Table 3
Time since hand injury

Presenting time (years)	Number	Percentage (%)
0-5	29	72.5
6-10	10	25
11-15	1	2.5

Table 4
Etiology of hand mutilation

Etiology	Number	Percentage (%)
Flame	18	45
Contact	11	27.6
Scald	4	10
Flash	3	7.5
Chemical	2	5
Electrical	2	5
Total	40	100

and only 9 (22.5%) had hypertrophic type of scar. In 37 patients, volar surface was involved as compared to 3 patients with dorsal surface. Four patients had PIP and 3 patients had DIP joint contracture respectively. In most of the cases contracture was limited to skin. In management, 21 patients were gone through contracture release and full thickness skin grafting done by Plastic Surgery team while 6 patients were released and operated by orthopedic team.

Ten patients had fully improved with contracture release and full thickness graft, 6 with plantar full thickness graft and 2 with Z plasty and primary closure respectively. Graft was fully rejected in 3 patients, while partially in 4 patients, aesthetic improvement was seen in 23 patients while 15 patients were fully satisfied post operatively. Good aesthetic results were seen with planter full thickness graft. Worst cosmetic appearance was seen with distant bulky flap. Infection rate was seen very high in 10 patients.

DISCUSSION

Burn injuries account for over 2 million cases in our country, with over 75% of patients sustaining injuries to the hands, post burn contractures of the fingers are very common conditions presenting for treatment. [3]

Burns and consequent contracture deformities continue to be one of the major problems threatening public health in both the developing, and developed nations. Because of the thick specialized nature of the palmer skin, full thickness injuries are rarely encounter burns of the hands. However contractures do develop when the burns are deep dermal.[4, 5, 6]

Although hand represented 5 % of the total body surface area. The contracture deformities of the hand may leave the individual totally non-functional, poor productive at work or even worse for self-care. Post burn finger contractures are commonly seen in children who have grasped hot objects and in adults most females with seizures disorders.

The development of post burn contracture in mainly related to the healing time taken by a burn wound. Although primary excision and skin grafting while some authors maintain that local flaps like z plasty and V Y advancement flap offer best management of these defects. [7] It is a common observation that time specific treatment of hand burn is delayed either because lack of availability of trained personnel or the compromised conditions of the patients of the extensive burn of the body. Accidental burns in children are a common cause of morbidity and mortality, common age is less than five years. [8]

Burns of hand in children requires special attention because of their very unique problems, yet very little had been written about these. The thinness of the skin of the upper extremity in children predisposes them to sustaining a deeper injury than adult's expose to a similar insult. A child's difficulty in understanding the severity of the problem and complying with treatment makes splinting, hand therapy and especially outpatient therapy programs extremely difficult and usually ineffective. The smallness of the affected parts and the decrease strength, leads to less ability to fight scar contracture. The mere in a child who does not want to cooperate, in our setup post burn finger contracture are seen frequent.

Although there is plethora of re-constructive procedures available from foreign literature the local literature is fairly deficient in this regard. So this study can provide many base line observations for further research in future. In this study the highest frequency of injury ranges belonged to age group of less than 5 years (36.66%). Accidental burn injury is more common in children. Increased education of parent and children, along with close supervision of infants and young children can prevent accidental burn injury. The causative agents had been mostly flame burns and majority of burn were accidental. Careless attitude, little understanding of combustibility and mishandling and mal functioning of the kerosene oil pressure stoves where the prominent features. This is also mention in other studies. [9-14]

The thermal burns are the most common type of burn examples of the thermal burns is exposure to cooking stoves, hot water, clothes iron or burns of roofers working with asphalt.[10]

This study also confirm that in adult females the burn accidents usually happens in domestic seating floor level cooking and lose garments are responsible for most accidents.[11,12] Floor level cooking is one of the cause of the burn this study shows high frequency of contact thermal injury. The thermal burns occur when the skin comes in contact with a hot surface. Contact thermal burns are also common types of burns and they result from exposure to or contact with steam, flames, flash and hot surface or hot liquids with a temperature above 115o F.

Schrader M [15] defined late consequences of the burns of the hands and he divided into 4 types depending on their extent and the involvement of the underlying tissue structure, from type 1 (only skin involvement) to type 4 (multi structure were involved like skin, tendon, ligament and joints). A classification system based on limitation of passive MCP flexion is defined by Grahan TJ. [16] According to him type 1 digits demonstrated greater than 30 degrees of MCP flexion with the wrist fully extended and scarring was generally limited to the dorsal skin. Type 2 digits demonstrated less than 30 degree of the MCP flexion with the wrist maximally extended and scarring typically involved skin dorsal apparatus and MCP capsule. Type 3 digits were flexed in greater than 30 degrees of MCP hyperextension and often demonstrated in congruity or dorsal sub luxation of the MCP joint.

Standard treatment for these deformities is by way for surgical release of the contractures than either defect can be closed by full thickness skin grafting or with local flaps. Most authors are of opinion that split thickness skin graft should be avoided. However some authors also maintain that split thickness skin graft from the non-weight bearing planter aspect of the foot give the best cosmetic result.[17] Though some author mentions the distraction of the contracture later on. There are no well documentary serial reporting the use of distraction for post burn contractures of finger.

CONCLUSION

Deformities corrected earlier shows better results in terms of functional restoration. Higher rate of recurrence is due to lack of proper postoperative care which includes physiotherapy and proper splint.

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