

MANAGEMENT OF HAND TRAUMA

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ABSTRACT

Objective To assess the outcome of the management of patients with hand trauma.

Study design Descriptive study.

Place & Duration of study This study was carried out from June 2005 to June 2008 in a private setup in Rawalpindi.

Patients and Methods All adult patients of hand trauma were included. Patients with acute/sub-acute/chronic wounds, those with postburn contractures or congenital deformities were excluded. Patients with associated closed fracture/dislocations, tendon injuries of hand were also excluded. The wounds were washed with antiseptic solution (povidone-iodine) and normal saline. The dressings were changed on daily basis. Other wounds were managed by skin grafting and flap coverage. Any complication occurring during the treatment was recorded.

Results One hundred fifteen patients were managed in a three year period. The mean age of male patients was 31.6 years and 30.8 years in females. Majority of male patients had road traffic accident (33.3%) followed by workplace accidents (22.2%). Most of the female patients had domestic accidents (17.5%) followed by road traffic accidents (12.7%). Majority of the patients underwent skin grafting (53.9%) followed by flap coverage (33.3%). Only 12.8% patients were managed conservatively. Cross-finger flap was carried out in 11.3% of the patients, 3.5% patients had groin flap and 2.6% thenar flap. Partial graft loss was seen in 4.35% of the patients. There was one case of complete graft loss and 2.61% patients had wound infection.

Conclusions Any wound on the hand should be evaluated and aggressively managed in order to reduce the morbidity and to improve the remaining function.

Key words Hand trauma, Skin graft, Skin flap.

INTRODUCTION:

The human hand serves a unique function and separates man from the rest of the animal kingdom. A hand can be strong and powerful, yet delicate and precise.¹

The physical characteristics of the hand often adapt to an individual's patterns of function or occupation. The thick, calloused hands of a manual laborer have hypertrophied muscles that are adapted for functions involving power and grasp. The hands of a concert pianist or an artist are supple and have increased mobility. A blind patient requires a two-point discrimination of 2mm to read Braille.

The use of hand clearly influences the level of function.¹ Injuries to the hand are very common and may have severe

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consequences.² Severe injury resulting from machines such as a power saw represents greater complexity from severe contamination, disruption of vital structures, crush and often thermal or chemical injury as well.³ This leads to substantial morbidity for the patient and invariably necessitates prolonged rehabilitation.⁴

The reconstruction of normal hand function and appearance after a severe injury is one of the most challenging endeavors in reconstructive surgery. A spectrum of reconstructive efforts may be required to reach a successful conclusion. Adequate skin and soft tissue coverage of hand is important to ensure the protection and function of the underlying structures. The patient's occupation, overall health, and personal goals must be carefully weighed and discussed with the patient, to arrive at most appropriate surgical approach for each situation. In this article, the experience of the patterns of hand trauma presenting in a private setup are discussed.

PATIENTS AND METHODS:

This study was carried out from June 2005 to June 2008 in a private setup. All the patients presenting with the history of hand trauma, acute/sub-acute/chronic wounds were included. Patients less than 12 years and those with post-burn contractures or congenital deformities, associated closed fracture/dislocations, tendon injuries or burns were excluded. All the patients were evaluated thoroughly. The condition of the wound was noted. The wounds were thoroughly washed with antiseptic solution (povidine-iodine) and normal saline. The dressings were changed on daily basis. The other wounds were managed by different surgical modalities like secondary healing, skin grafting and flap coverage. Any complication occurring during the treatment was recorded.

RESULTS:

A total of 115 patients were included in the study with female to male ratio of 1:1.4. The mean age of male patients was 31.6 years and 30.8 years in females. Majority of male patients had road traffic accident (21- 33.3%) followed by workplace accidents (14- 22.2%). Most of the female patients had domestic accidents (11 - 17.5%) followed by road traffic accidents (8 - 12.7%). Majority of the patients underwent skin grafting (53.9%) followed by flap coverage (33.3%). Only 12.8% patients were managed conservatively (table-1).

Cross-finger flap was carried out in 11.3% of the patients (Fig-1). 3.5% of the patients had groin flap and 2.6% had thenar flap. Partial graft loss was seen in 5 (4.35%) patients. There was one case of complete graft loss. Three (2.61%) patients had infection. Two patients had partial flap necrosis.

DISCUSSION:

Injuries to the hand are extremity important. The single most fundamental principle of management of injuries of the hand is that primary treatment determines a high degree of the

Table 1: Procedures performed

Procedure		Patients	%
Secondary healing		8	12.7
Skin grafting		26	41.3
Primary closure/stump formation		7	11.1
Flap coverage	Cross-finger flap	15	23.8
	Volar V-Y flap	1	1.6
	Groin flap	2	3.2
	Radial forearm flap	1	1.6
	Littler flap	1	1.6
	Thenar flap	1	1.6
	First dorsal metacarpal artery flap	1	1.6



ultimate recovery. Adequate skin coverage in a traumatized hand is important in promoting early wound healing, preventing postoperative wound infection and facilitating rehabilitation for early return of hand function. Adequate soft tissue coverage in hand is particularly important because of the complexity of form and function of the hand. Skin graft is a safe and reliable method of achieving the skin coverage. It is mostly used in superficial wounds or when there is a healthy bed underneath. When underlying structures like bone, joint, tendon and nerves are exposed, grafts cannot be used. It then necessitates the use of a flap. Various types of flaps can be used depending on the location, nature and size of the defect. Musculocutaneous flap cannot be used in hand because they are bulky therefore the local fasciocutaneous flaps are the best choice.

Fingertip injuries constitute the major part of the hand trauma.⁵ Small wounds of the finger tip can be skin grafted provided there is no bone exposed. Even these smaller wounds can be left for secondary healing if the tissue loss is limited to the soft tissue. This result in no loss of functional length of the finger. More deeper wounds need an adequate skin coverage. The local flaps provide the best available tissue. We used cross-finger flap in 19% of the patients presenting with finger tip injuries. The cross finger flap was classically designed on the dorsum of adjacent non-traumatized finger. The donor site defect was closed with a full-thickness skin graft. Although these flaps are insensate but sensate flap can also be used.^{6,7}

Similarly the volar V-Y advancement flap (Atasouy) was also used in one case. The small defect can also be covered by the thenar flap which was also used in one case. Cross finger flap was also used to cover the thumb injuries in 4.8% of the patients. One patient underwent Littler flap and one had first dorsal metacarpal artery flap to cover the thumb wound. Cross finger flap was used in 23.8% of the patients in the present study. A larger series by Koch et al demonstrated that there was no donor site morbidity in cross-finger flaps.⁸ Morbidity included the cosmetic impairment and intolerance to cold in few cases.

Thumb equals more than half of the function of hand.⁹ Various options for thumb reconstruction include the use of grafts, local and distant flaps. Cross-finger flap was used in 4.8% of the cases in the present series alongwith Littler flap in one case and first dorsal metacarpal artery flap in one case. Majority of the wounds on dorsum were covered with skin graft (22.2%). Groin flap was used in two cases and pedicled radial artery forearm flap was used in one case. Only 11.1% cases were left for stump formation, 12.7% were left for secondary healing. Skin grafting was performed in 41.3% whereas 34.9% of the patients had flap coverage.

There were only a few complications in the present series. Graft loss was seen in only one case with wound on the dorsum. The graft became infected on 5th day and was regrafted later. Partial graft loss was seen in five cases, one of which was the donor site for cross-finger flap. Partial flap loss was seen in two cases of cross-finger flap. In long term, hypertrophic scarring was seen in two cases. In the study by Khan et al infection occurred in 22.6% of the patients admitted with occupational hand trauma.⁹ Surprisingly, 10% patients had amputations of digits but none had amputation in the present series. In another study, 88% of the patients resumed their previous job after 8-9 weeks.¹⁰ Various flaps have been used for coverage of the wounds in upper limbs. In the study by Manzoor et al, Littler flap was used in wound coverage in eleven hands and Foucher flap in 4 patients.^{11,12}

In a 2 years study conducted by Serinken et al, in occupational injuries, 32.7% of the total patients had isolated injury to wrist, hand and fingers.¹³ They observed hand trauma in

87.2% of the patients whereas it was 58.5% in the present study. A higher rate of injury was due to the males working predominantly in industries. In a study by Woon et al, majority of the patients (70.1%) had wound less than 5cm on hand and 16% had wound larger than 10cm.¹⁴ They used flaps with 100% flap survival similar to the results of the present study.

The hand trauma, if not treated promptly and efficiently, may result in varying degrees of the disability which also has a major financial aspect. In a recent study by Alderman et al, financial impact of hand trauma was studied.¹⁵ In that study only 4.2% of the patients were un-insured. The health insurance policy is not developed in our country.

CONCLUSION:

Any wound on the hand should be evaluated and aggressively managed in order to lessen the morbidity and improve the remaining function.

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