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DESCRIPTIVE STUDY OF HAND INJURY ATTENDED AT TERTIARY CARE HOSPITAL WITH SPECIAL REFERENCE TO ASSESS SEVERITY OF HAND INJURY WITH HISS SCORE

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Abstract

Background: We conducted this study to establish the predictability of HISS system to hand strength in patients with traumatic hand injury.

Methods: This retrospective study was conducted on 30 hospitalized patients for surgery in in Jaipur due to traumatic hand injury. All of them received rehabilitation occupational therapy in the same trauma center with established protocols and were supervised by the same group of therapists within one month after surgery. Passive/active range of motion exercise, hand grip strength training, proprioception/functional training were included in this standardized protocol.

Results: The mean age of patients was 41.36±13.69 Yrs. Among them, 23 patients were male and 7 patients were female. 63.33% were dominant hand injured. The mean value of total HISS score is 53.21 ± 36.35. A positive correlation exists between the differences of the strength of two hands, and the severity shown by HISS system.

Conclusion: In conclusion, initial anatomical injury severity assessed by HISS system may predict hand strength in traumatic hand injured patients after an adequate recovery period. Poor hand strength could be expected with initial high total HISS score.

Keywords: HISS, Hand injury, Palmer pinch.

Introduction

Injuries to hand bring huge impact on function, interfering activities of daily living. It is also detrimental to potential productivity from injured person. In the United States, 18 million acute upper extremity injuries resulted in 32 million days of restricted activity and 10 million lost working days over a period of 1 year. Thus, strategies to predict severe injured patient, promoting early intervention and rehabilitation become mandatory to those with hand injury.[1] The hand is a structure of delicate. Its perfect performance counts on intact sensory and motor system, including skeletal system and neuromuscular system. Many studies have tried to reveal the effects of individual structures.[2-6] Campbell and Kay described the injury-involving anatomic components and get comprehensive evaluation with the hand injury severity scoring (HISS) system developed in 1996.[7] This scoring system evaluated the following four subsystems, including integument (skin and nail), skeletal (bones, joints and ligaments), motor (tendons and intrinsic muscles) and neural (median, ulnar and digital nerves) components. On the one hand, HISS has been proposed to be used as a guide to predict outcomes, such as return-to-work, [8] and subsequent impairment and disability. [9] However, on the other hand, most of the hand injury patients are blue collar class, employed in machinery trade/operation or structural work.[10] For these jobs' strength-required nature, hand strength could be as important as manual dexterity as returning to original work. To our knowledge, there is no literature specifically discussing the correlations between HISS system and post-injured hand strength, trying to elucidate outcome risk from initial anatomical assessment. We conducted this study to establish the predictability of HISS system to hand strength in patients with traumatic hand injury.

Materials and Methods

This retrospective study was conducted on 30 hospitalized patients for surgery in in Jaipur due to traumatic hand injury. All of them received rehabilitation occupational therapy in the same trauma center with established protocols and were supervised by the same group of therapists within one month after surgery. Passive/active range of motion exercise, hand grip strength training, proprioception/functional training were included in this standardized protocol.

The inclusion Criteria:

Persons aged 15–60 at the time of injury, there were at least 6 months elapsed between the injury and the clinically stable condition, and no splinting devices were needed.

Exclusion Criteria:

Subjects who had previously known neurological or rheumatological diseases, were unable to answer the questionnaires to, foreign workers, hand injuries beyond distal to carpal bone, bilateral hand injuries, and subjects with any prior histories of severe hand injuries.

30 subjects met our study criteria and each had HISS scores successfully assessed by a hand surgeon. Demographic data of these participants were obtained by interview.

Results

Table 1: General characteristics

Mean age	**41.36±13.69 Yrs**
Male : Female	23 : 7
Dominate hand injury	19 (63.33%)
HISS score	53.21 ± 16.35

The mean age of patients was 41.36±13.69 Yrs. Among them, 23 patients were male and 7 patients were female. 63.33% were dominant hand injured. The mean value of total HISS score is 53.21 ± 36.35.

Table 2: ORs for the relationship between hand strength tests (difference between two hands) and HISS severity

HISS severity	**Palmer pinch**	**Lateral pinch**	**Cylindrical grip**
Moderate	3.82	1.25	0.59
Severe	2.26	1.31	4.26
Major	3.90	1.23	8.28
p-value	<0.05	>0.05	<0.05

A positive correlation exists between the differences of the strength of two hands, and the severity shown by HISS system.

Discussion

We found that the bigger differences between two hands, the higher severity could be shown by HISS system, namely, the more severe hand injury, the poorer hand strength could be revealed.

HISS is a descriptive severity scoring system for injuries to the hand and a useful instrument to predict the functional outcome. It comprehensively records the injury anatomy. In our study, the HISS scores recorded were ranging from 2 to 245, just located within the lower fifth of the entire range (0–1064). The most severity group was the minor severity, and the least severity group was the major one. Compared to previous studies,[9-11] the distribution was still reasonable although the major group was lower in percentage. It has been speculated that body posture affects measured hand strength.[12] Grip span should also be considered as measuring hand grip strength.[13] As designing the way, we conduct the study, standard measurement procedures were executed under well-defined test postures in order to minimize possible interfering effects. In this study, we calculated differences between two hands (values of injury hand minus the intact one) and grouped subjects into better and poorer hand strength by median of difference.

We put them into the logistic regression model to compare the relative risk of different HISS scores to be in poorer one and further, verify the predictability of HISS system. Most people live with right dominant and left non-dominant hand, the strength and dexterity in two hands differ in nature. A long known but controversial "10% rules" has been proposed. We adjusted this variant from setting in logistic regression model to lessen the effects resulting from differences between dominant and non-dominant hand.

Conclusions

In conclusion, initial anatomical injury severity assessed by HISS system may predict hand strength in traumatic hand injured patients after an adequate recovery period. Poor hand strength could be expected with initial high total HISS score.

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