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The investigation of open hand injury patients presenting to emergency department

Acil servise başvuran açık el yaralanmalı hastaların araştırılması

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ABSTRACT

Introduction: Hand injuries are a common condition that causes serious loss of labor and skill function. İn Turkey, studies on the epidemiology and causes of hand injuries is limited. The purpose of this study was to determine the etiology, demographic characteristics, clinical findings and outcomes of patients who applied to emergency department with open hand injury and to obtain data that can be used as a preliminary model for future protective programs.

Material and Method: Between January 2010-December 2013, records of 1180 of patients who applied to emergency department for an isolated open hand injury were retrospectively reviewed. The records were examined for age, sex, date of application, occupation, cause of injury, localization or type of injury, medical treatments and outcome.

Results: 889 (75.3%) of the patients were male. The average age of the patients included in the study was 32.47 ± 18.51. When the days of injury were examined, injury was generally seen on Friday with 185 patients (15.7%). The main cause of the injuries were 699 (59.2%) home accidents. 103 cases (8.7%) were working in wooden work. The most commonly encountered injury was cuts on skin (50.5%), as observed in 596 cases. 488 (41.4%) of the cases were primary sutured and 788 (66.8%) of the cases were discharged.

Conclusion: Patients who are admitted to emergency department due to hand injuries, most of them are young male patients. It is possible to reduce labor and economic losses with early treatment of hand injuries and appropriate rehabilitation. We think that the training of employees in occupational health and the promotion of the use of protective clothes and the strict control mechanism to be created are the main measures.

Keywords: Hand injury, emergency department, occupational accidents

ÖZ

Giriş: El yaralanmaları ülkemizde sıklıkla görülen, ciddi iş gücü ve fonksiyon kaybına yol açan bir durumdur. Türkiye'de el yaralanmalarının oluş nedenleri ve epidemiyolojisi ile ilgili çalışmalar sınırlıdır. Biz bu çalışmada acil servisimize açık el yaralanması ile başvuran hastaların etiyolojilerini, demografik özelliklerini, klinik bulgularını ve sonuçlarını ortaya koyarak ileride uygulanması muhtemel bir önleyici program için ışık tutacak verilerin elde edilmesini amaçladık.

Gereç ve Yöntem: Ocak 2010 – Aralık 2013 tarihleri arasında acil servise izole açık el yaralanması nedeniyle başvuran 1180 hastanın kayıtları retrospektif olarak incelendi. Kayıtlardan yaş, cinsiyet, başvuru günü, meslek, yaralanma nedeni, yaranın lokalizasyonu, yaranın türü, yapılan medikal tedaviler ve sonuçları incelenmiştir.

Bulgular: Çalışmaya alınan hastaların 889'unu (%75,3) erkekler oluşturmuştur. Yaş ortalaması 32 (0-86)'dir. El travmalarının meydana geldiği günler incelendiğinde en fazla travmanın 185 hasta (%15,7) ile cuma gününde olduğu görülmüştür. Çalışmaya alınan hastaların 699'u (%59,2) ev kazasında yaralanmıştır. En sık yaralanan meslek grubunun 103 olgu (%8,7) ile kereste-ahşap işinde çalışanlar olduğu saptanmıştır. Çalışmaya alınan hastaların 596'sında (%50,5) yüzeyel yaralanma saptanmıştır. Olguların 488'i (%41,4) primer sütüre edilmiş ve 788'i (%66,8) de taburcu edilmiştir.

Sonuç: El yaralanmasıyla acil servise başvuran hastaların büyük bir kısmını çalışan genç erkek hastalar oluşturmaktadır. El yaralanmalarının erken tedavisi ve uygun rehabilitasyonu iş gücü kayıpları ve ekonomik giderleri azaltmak için önemlidir. Burada asıl üstünde durulması gereken nokta el yaralanmalarının önüne geçebilecek önleyici tedbirlerin alınması olduğu düşünülmektedir.

Anahtar Kelimeler: El yaralanması, acil servis, iş kazaları

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INTRODUCTION

Hand injuries are a common condition that causes serious loss of labor and skill function. These injuries are responsible for 10-30% of emergency department (ED) applications (1,2). Even if hand injuries are not life-threatening, cause limitations in daily activities and loss of financial and emotional (3,4). The purpose of this study was to determine the etiology, demographic characteristics, clinical findings and outcomes of patients who applied to ED with open hand injury and to obtain data that can be used as a preliminary model for future protective programs.

MATERIAL AND METHOD

In this study the tenets of the Declaration of Helsinki were followed. Between January 2010- December 2013, records of 1180 of 1292 patients who applied to our ED for an isolated open hand injury were retrospectively reviewed. 112 patients were excluded due to lack of records. Patients with extra-organ injuries and major traumas were excluded from the study. The records were examined for age, sex, date of application, occupation, cause of injury, localization or type of injury, medical treatments and outcome.

Statistical analysis: The data was analyzed by using the Statistical Package for the Social Sciences for Windows, version 16.0 (SPSS Inc, Chicago, IL, USA). Shapiro-Wilk test was showed whether the distributions of continuous variables were normal or not. Descriptive qualitative data were presented as numbers and percentage values, while descriptive quantitative data were presented as mean scores, standard deviations, ranges and medians. The comparison between groups regarding qualitative data were done by using the Chisquare test, while comparison between two groups with quantitative data and parametric distribution was done by using independent t-test and the nonparametric distribution was done by using the Mann–Whitney U test. In addition, comparison between more than two groups regarding quantitative data with parametric distribution was done by using one-way Anova test and that with nonparametric distribution was done by using the Kruskal–Wallis test. Statistical significance level was <0.05.

RESULTS

Male predominated in the patient group studied (75.3%). The average age of the patients included in the study was 32 (0-86). The mean age distribution was not statistically significant in terms of gender ($p = 0.724$). 185 of the patients (15.7%) were admitted on Friday. The distribution of the patients according to the application days did not show statistically significant difference ($p=0.784$). It was found that the main cause of the injuries were 699 (59.2%) home accidents and 306 (25.9%) occupational accidents (Table1). When the age distribution of injury patterns was examined statistically significant ($p<0.001$). Self-harm and sports injuries are seen in an earlier age; firearm injuries are seen in older ages. 103 (8.7%) of the patients included in the study were working in wooden workers and 64 (5.4%) in construction workers (Table 2).

The injury was seen in the left hand 607 (51.4%), right hand 565 (47.9%) and bilaterally in 8 (7%).

Table 1. The distribution of causes of injury

		The cause of injury								
		Occupational accidents	House Accident	Traffic accident	Hiding	Self-harm	Sports	Gunshot	Others	Total
Male	n; (%)	287(24.3)	472(40)	6(0.5)	9(0.8)	15(1.3)	6(0.5)	21(1.8)	73(6.2)	889(75.3)
Female	n; (%)	19(1.6)	227(19.2)	2(0.2)	2(0.2)	5(0.4)	1(0.1)	0(0)	35(3)	291(24.7)
Total	n; (%)	306(25.9)	699(59.2)	8(0.7)	11(0.9)	20(1.7)	7(0.6)	21(1.8)	108(9.2)	1180(100)

Table 2. The distribution of injury types

		The cause of injury								
		Occupational accidents	House Accident	Traffic accident	Hiding	Self-harm	Sports	Gunshot	Others	Total
Male	n; (%)	287(24.3)	472(40)	6(0.5)	9(0.8)	15(1.3)	6(0.5)	21(1.8)	73(6.2)	889(75.3)
Female	n; (%)	19(1.6)	227(19.2)	2(0.2)	2(0.2)	5(0.4)	1(0.1)	0(0)	35(3)	291(24.7)
Total	n; (%)	306(25.9)	699(59.2)	8(0.7)	11(0.9)	20(1.7)	7(0.6)	21(1.8)	108(9.2)	1180(100)

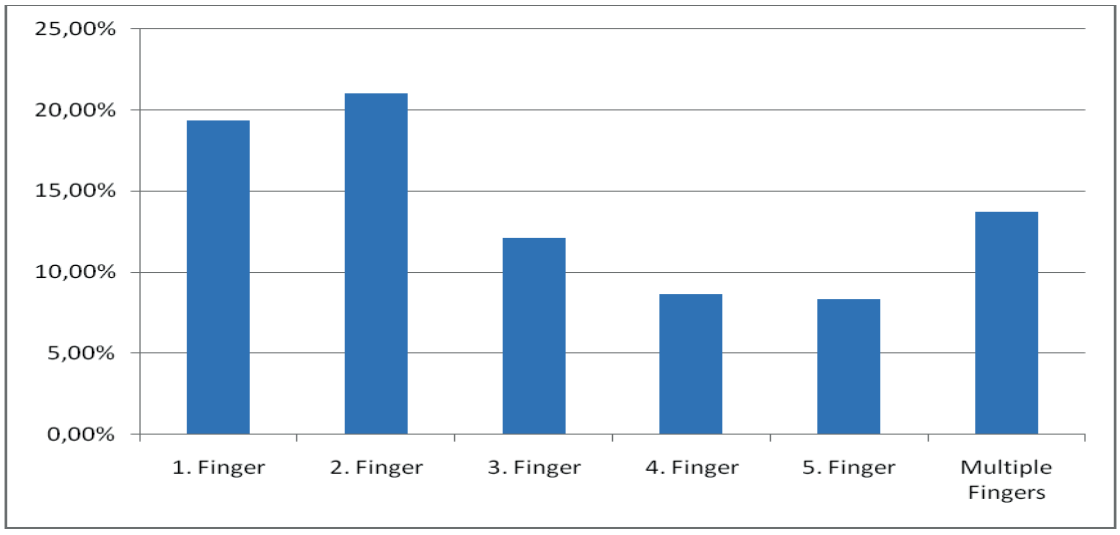

Figure 1. Frequency of finger injuries

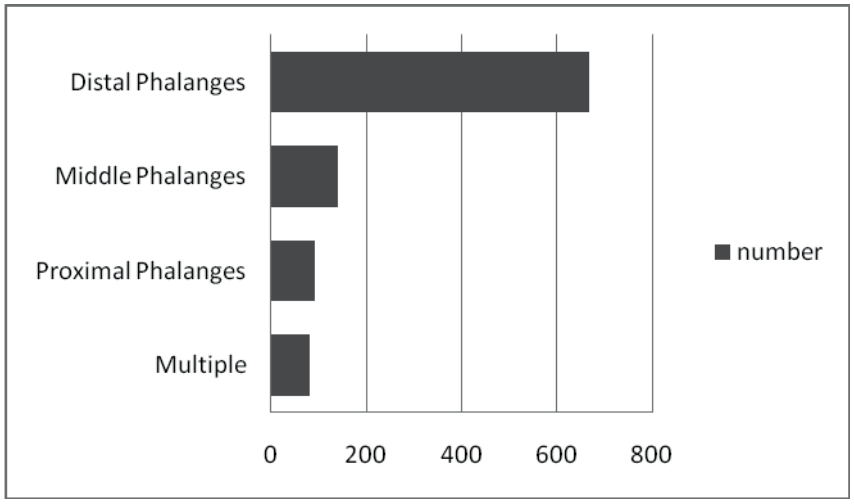

Figure 2. Parts of finger injuries

The injury was seen in dorsal surface in 448 (38.0%), palmar surface in 438 (37.1%), bilaterally in 294 (24.9%). The injuries were mostly seen on the fingers of the hands in 981(83.1%). Multiple finger injuries were observed in 162 cases. Injuries were most frequently observed in the second and first fingers (248/21 and 228/19, respectively) (Figure 1). Distal phalanges were injured most frequently, followed by middle and proximal phalanges (Figure 2). Finger amputation was reported in 188 cases. metacarpal injuries were detected in 239 patients (20.3%). The most commonly encountered injury was cuts on skin (50.5%), as observed in 596 cases. Tendon cuts were observed in 105 cases (8.8%), while bone fractures were found in 41 cases (3.4%).

Amputation and tendon injuries were statistically significant in male patients ($p < 0.001$). 429 of the male patients (36.3%) and 167 of the female patients (14.1%) were found to have skin cut injuries. Primary suturing (n=488), skin flap or skin graft repair (n=190) and stump closure (n=84) were the most preferred procedures among the treatments administered to the patients. Tetanus and antibiotic prophylaxis were given (respectively 822/69.6; 532/45.1). It was recorded that consultation was demanded for %59.7 of the patients, 66.8% of the patients were discharged from the emergency service, 31.2% of the patients were hospitalized and 1.8% of the patients refrained from the treatment.

DISCUSSION

About 26% of the patients who applied with ED injury were hand injuries (5-7). Ghiya et al. (8) have found that the mean age of the patients studied was 27.41± 9.1 years, range from 16 to 65 years. In a study conducted by Trybus et al. (9) have declared that hand injuries ranged from 6.6% to 28.6% among all types of injuries and traumas on the mus-

culoskeletal system accounted for 28% of the injuries, which included 1199 patients. Eroglu et al. (10) have found that the mean age of the patients studied was 24.48±7.59 years, range from 9 to 46 years. In our study the mean age of the patients were 32.47 ± 18.51 (0-86 years). The distribution of age groups were 22.5% were in the age of 21-30, 17.3% in the age of 31-40, 15% in the age of 11-20 and it is compatible with the literature. In a study found that the rate of males was 80.6%. Ünlü et al. (3) were reported that the distribution of the patients were 70.16% male and 29.84% female. In our study was male dominant (75.3% male, 24.7% female) and similar to the literature. When the group of 0-20 age is examined, 72.2% of the patients were male and 27.8% were female. As a result, hand injuries are more likely to occur in male gender and we think that males are more likely to work in jobs that require the using of basic essential hand tools.

Karasoy et al. (11) were found hand injuries most commonly seen in the 15-35 age group. Keskin et al. (12) were declared that hand traumas were most frequently in the third decade. In our study was similar to previous studies, 53.7% of the patients were in the age range of 20-50 years. The injuries are particularly harmful to the individual economy and the domestic economies because they are seen at active working ages.

In a research, hand injuries days were listed as 16.24% on saturday, 11.16% on sunday, 16.04% on monday, 13.19% on tuesday, 13.80% on wednesday, 14.41% on thursday and 15.12% on friday (8). In our study, 13.8% on monday, 11.9% on tuesday, 14.7% on wednesday, 13.7% on thursday, 15.7% on friday, 15% on saturday, 15.3% on sunday of patients were admitted to ED. The reason for the increase in injury rate on fridays and saturdays, these days is the last working days of the week and there may be fatigue and attention loss when working towards. The rest periods frequency and times can be increased at the end of the week, so it can be prevent accidents.

In the study conducted by Karasoy et al. (11), with 1937 patients, work accidents were seen in 40%. According to the work done by Ünlü et al. (3), the distribution of crushing hand injuries were 44.11% for timber, 29.43% for agriculture, 11.76% for automotive, 9.80% for textile and 4.9% for machine. We found that the main cause of the injuries were 59.2% home accidents and 25.9% occupational accidents. It has been determined that most of them are working in wooden works. The cause of hand injuries from work accidents may be due to insufficient attention to adequate occupational safety and preventive measures. Taking safety precautions in industrial machines and the use of mechanical devices during the transport of heavy loads, the use of protective clothes can be reduce the frequency of occupational injuries. In our study, the distribution of the patients according to occupational groups; Wooden for 8.7%, construction for 5.4%, agriculture for 5.3%, automotive for 3.1%, food for 1,9% and the others for 75.6%. The reason why the others ratio is high is the lack of the type of industry can not be determined or the incomplete records.

According to study done by Smith et al. while 62% of the patients who applied to the ED with hand injuries were workers, 54% of these injuries were in the right hand, 44% in the left hand and 2% in the bilateral hand injury (13). Choyce et al. (14) were reported hand injuries about 83%. In the same study, it was found that the most frequently injured finger was the first finger at 27%, the fifth finger at 23% and the least injured finger was the second finger at 7%. In our study, the most frequently injured finger was the second finger with 25.2%, the least injured finger was the fourth finger with 9.9%. Generally, multiple finger injuries are not mentioned in the literature. In our study, multiple finger injuries were also assessed and it was determined as 13,7%. Of the finger injuries, 68.1% were distal phalanges and 14.2% were at the middle phalanges. When the fracture rates were evaluated in patients, it was determined as 32,1%. When all hand injuries are handled, it is obvious that injuries at the fingertips are significantly higher so it is important to encourage the use of protectors such as gloves to prevent hand injuries.

Ünlü et al. (3) was reported the fracture rate as 23.24% (3). Choyce et al.(14) was reported in the study of hand injuries due to spores,the fracture rate as 68%. In our study, we found that fractures and / or dislocations in 32.1% of hand injuries. Gustafsson et al. (15) have reported amputation in 29% of hand injuries, 16% of flexor tendon and digital nerve trauma, 13% of flexor tendon injuries, 11% of large soft tissue injuries + fractures and one or more anatomical tissue injuries, 10% of extensor tendon injuries and fractures and 3% of soft tissue injuries. Eroglu (16) was found that tendon damage occurred in 43.4% of cases, vascular damage in 9.7% nerve damage in 5.3% and bone fracture in 4.4%, while at least two of tendon, nerve, vein and bone damage were present in 11.5%. In the study of Karasoy et al. (11), 33% of cases were isolated skin cuts while isolated tendon injuries were in second place. Ünlü et al. (3) was reported the rate of amputation as 5.9%. In our study, the most commonly encountered injury was cuts on skin with 50.5%, amputations were second rank with 15.9%. The high rate of amputation is thought to be due to frequent complicated hand injuries from surrounding centers because our hospital is a tertiary hospital and because we are the only center in the city where microsurgery is being

done. When 388 cases (32.9%) were referred to ED from another health institution, 57% of these cases were referred without intervention. The most frequent procedure performed in ED hand injuries was primary suture with a rate of 41.4%. In our country where hand trauma is usually treated in tertiary care institutions, training of the personnel to apply triage is important. The fact that the primary suturation rate is high in our study means that many of these cases can be treated in secondary health care institutions. Thus, it is thought that both labor and economic loss may be less.

As a result, patients who are admitted to ED due to hand injuries, most of them are young male patients. It is possible to reduce labor and economic losses with early treatment of hand injuries and appropriate rehabilitation. We think that the training of employees in occupational health and the promotion of the use of protective clothes and the strict control mechanism to be created are the main measures.

MATERIAL SUPPORT AND RELATIONSHIP

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REFERENCES

1. Gideroğlu K, Sağlam İ, Çakıcı H, Özturan KE, Güven M, Görgü M. Bolu yöresi el yaralanmalarının epidemiyolijisi: retrospektif klinik çalışma. Abant Med J 2012; 1: 13-5.
2. Rinkevich Y, Maan ZN, Walmsley GG, Sen SK. Injuries to appendage extremities and digit tips: a clinical and cellular update. Dev Dyn 2015; 244: 641-50.
3. Ünlü RE, Abacı Ünlü E, Orbay H, Şensöz Ö, Ortak T. Ezici el yaralanmaları. Turk J Trauma & Emerg Surg TJTES 2005; 11: 324-8.
4. Sandvall BK, Keys KA, Friedrich JB. Severe hand injuries from fireworks: injury patterns, outcomes, and fireworks types. J Hand Surg 2017; 42: 385.
5. Bozkurt S, Savrun A, Okumus M, Bilal Ö, Baykan H, Kalender AM. Evaluation of patients applying to the emergency service with complaint of isolated hand injuries. Acad Emerg Med 2015; 14:54.
6. Chang HL, Jung JH, Kwak YH, et al. Quality improvement activity for improving pain management in acute extremity injuries in the emergency department. Clin Exp Emerg Med 2018; 5: 51.
7. Eisele A, Dereskewitz C, Kus S, et al. Factors affecting time off work in patients with traumatic hand injuries—A bio-psycho-social perspective. Injury 2018 (doi: 10.1016/j.injury.2018.07.012).
8. Ghiya MN, Murty S, Shetty N, D'Cunha R. A descriptive study of hand injuries presenting to the adult emergency department of a tertiary care center in urban India. J Emerg Trauma Shock 2017; 10: 19.
9. Trybus M, Lorkowski J, Brongel L, Hľadki W. Causes and consequences of hand injuries. Am J Surg 2006; 192: 52-7.
10. Eroğlu O, Koçak OM, Coşkun F, Deniz T. Cama yumruk atan hastaların demografik özellikleri ve hava koşulları ile ilişkisi. KU Tıp Fak Derg 2017; 19: 1-7.
11. Karasoy A, Sakinsel A, Gözü A, Kuran İ, Baş L. Acil el yaralanmalarinda deneyimlerimiz. Turk J Trauma & Emerg Surg TJTES 1998; 4: 265-9.
12. Keskin ED, Seçkin Ü, Bodur H, Sevil A, Erdoğan B, Akyüz M. Tendon yaralanmalı hastalarımızın klinik özellikleri. Turk J Phys Med Rehab's 2005;51:3.
13. Smith ME, Auchincloss J, Ali M. Causes and consequences of hand injury. J Hand Surg 1985; 10: 288-92.
14. Choyce M, Potts M, Maitra A. A profile of sports hand injuries in an accident and emergency department. J Emerg Med 1998; 15: 35-8.
15. Gustafsson M, Amilon A, Ahlström G. Trauma-related distress and mood disorders in the early stage of an acute traumatic hand injury. J Hand Surg 2003; 28: 332-8.
16. Eroğlu O. Demographic, anatomical, and clinical features of patients with glass-punching injuries. KU Tıp Fak Derg 2018; 20: 168-76.