



## Original Research

# The Retrospective Analysis and the Demographics of Upper Extremity Injury Patients and Their Problems in the First 24 Hours After Operation

Şükran Öztürk, Kamuran Zeynep Sevim

Department of Plastic Reconstructive and Aesthetic Surgery, Sisli Hamidiye Etfal Training and Research Hospital, Istanbul, Turkey

### Abstract

**Objectives:** In this study, we analyzed patients with upper extremity injuries concerning patient demographics, injury type and etiological factors, and the most common problems encountered during the first 24 hours that were noted in the retrospective analysis.

**Methods:** In this study, a total of 82 patients who presented to the emergency plastic surgery clinic in Şişli Hamidiye Etfal Research and Training Hospital, postoperatively these patients were checked after surgery for first 24 hours concerning pain, nausea and vomiting, edema, agitation, arm immobilization arm and vascular patency.

**Results:** Among etiological factors, 54 patients were sharp-object trauma, 10 patients punched a hard object, 15 patients had work hazard, two patients had traffic accident, one patient from the fight. When these patients were postoperatively analyzed, in 45% patients pain, in 7% nausea and in 14 % bleeding were observed. Plaster was placed in 100% of the patients in order and their arms were elevated to reduce edema. During the first four hours, in 2% of the patients, edema was seen, 16% agitation, 8%vascular problems.

**Conclusion:** When the type of injury is subcategorized to injuries of several compartments (nerve, tendon, muscle, artery, vein), the early postoperative challenges are more easily and correctly handled.

**Keywords:** Pain; postoperative; musculoskeletal pain.

Please cite this article as "Öztürk Ş, Sevim KZ. The Retrospective Analysis and the Demographics of Upper Extremity Injury Patients and Their Problems in the First 24 Hours After Operation. Med Bull Sisli Etfal Hosp 2020;54(1):67-72".

Upper limb injuries are injuries that may cause serious dysfunction, limb loss or death.<sup>[1]</sup> Due to their functional importance, they are among the pathologies with high morbidity rate leading to long-term loss of workforce.<sup>[2]</sup> It is extremely important to collect data regarding the attempts made in this degree of labor loss and cost loss

injuries in the society, to determine the problems experienced in the postoperative period and to take necessary measures to eliminate these problems.

In this study, we aimed to investigate the demographic features and etiological factors of upper extremity injury cases treated in the Plastic Reconstructive and Aesthetic Surgery

**Address for correspondence:** Kamuran Zeynep Sevim, MD. Sisli Hamidiye Etfal Egitim ve Arastirma Hastanesi, Plastik Rekonstrüktif ve Estetik Cerrahi Klinigi, Istanbul, Turkey

**Phone:** +90 505 467 65 34 **E-mail:** kzeynep.sevim@gmail.com

**Submitted Date:** July 03, 2018 **Accepted Date:** November 09, 2018 **Available Online Date:** March 25, 2020

©Copyright 2020 by The Medical Bulletin of Sisli Etfal Hospital - Available online at [www.sislietfaltip.org](http://www.sislietfaltip.org)

**OPEN ACCESS** This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



Clinic and to identify the problems they experienced within 24 hours after surgery.

## Methods

This research was a descriptive trial. A total of 82 patients, aged between 14 and 65 years, who were admitted to the Şişli Hamidiye Etfal Training Research Hospital Plastic Reconstructive and Aesthetic Surgery Clinic between May 1, 2013 and July 31, 2013, were included in this study. The demographic characteristics, causes of injury, and medical diagnosis of the patients were retrieved from the archive files. The etiology was recorded based on the verbal statement made by the patient at the time of application. Patients in the sample group were investigated postoperatively concerning pain, nausea, vomiting, bleeding, edema, presence of agitation, upper extremity immobilization, upper extremity blood circulation problems at 0-4, 4-8 hours, 8-12, 12-16, 16-20, and 20-24 hour-intervals.

Patients under 14 years and over 65 years old, patients with mental retardation or foreign nationality due to lack of cooperation could not be included in the study.

Ethics committee approval of the study was obtained from Şişli Hamidiye Etfal Training and Research Hospital, and data were collected from patient archive files.

Statistical analysis was performed using SPSS (Windows version 15.0) program.

## Results

When the distribution of patients by gender and age was examined, male patients (n=58) are more than female patients (n=24) with a ratio of 71%, and the age range of patients was 14-24 years old (n=41) (Table 1).

When the educational status of the patients was examined, it was found that upper extremity injuries occur more frequently in primary school graduates or illiterate patients

**Table 1.** Distribution of the patients according to their ages, and genders

Gender	n	%
Male	58	71
Female	24	29
Total	82	100
Age (years)		
14-24	41	50
25-44	34	41
45-65	7	9
Total	82	100

**Table 2.** Distribution of the patients according to their educational status

Educational status	n	%
Primary veducation and illiteratee	46	57
Lycée and above	36	43
Total	82	100

(Table 2).

When etiologic factors were examined, cutting and piercing injuries were in the first place, with 54 (66%) injured patients. Although cutting and piercing injuries can be evaluated, a special case and frequently encountered "punching the glass" was considered as a separate factor. Punching the glass constituted the 2<sup>nd</sup> etiologic factor that accounted for 10 patients with upper extremity injury. In the third place, occupational accidents due to insufficient occupational safety measures occurred in 15 (18%), traffic accidents in two (2%), assaults in one (1%) patients, and these patients were evaluated within the scope of forensic cases (Table 3).

When the distribution of the patients according to their

**Table 3.** Distribution of the patients according to etiologic factors

Etiologic factor	n	%
Penetrating, and stab wound	54	66
Punching glass	10	13
Work accident	15	18
Traffic accident	2	2
Blow	1	1
Total	82	100

**Table 4.** Distribution of the patients according to their medical diagnoses

Medical diagnoses	n	%
Amputation	6	7
Vascular and nerve injuries	6	7
Vacular and tendon injuries	5	6
Vascular injury	3	3
Vascular, nerve, and tendon injuries	17	21
Nerve tendon, and muscular injuries	13	17
Nerve injury	11	15
Tendon injury	16	20
Nail bed laceration	2	2
Skin, subcutaneous tasarruf injury	2	2
Total	82	100

medical diagnoses was examined, it was determined that the joint injury of the vessel, nerve and tendon ranked on top (n=17: 21%), followed by isolated tendon injury (n=16: 20%) (Table 4).

The Numerical scale was used for pain scoring. Numerical scales start with the absence of pain (0) and reaches the level of unbearable pain (10). Scores four and above show the presence of pain (3) (Table 5).

When the first 24-hour follow-up periods of the patients treated for upper limb injuries were examined in 4-hour periods, the problems experienced by the patients after the operation were determined as problems related to pain, nausea, vomiting, bleeding, arm immobilization, edema, agitation and circulatory follow-up. Pain (45%), nausea, vomiting, (7%) and bleeding (14%) complaints were dominant during the first four hours of follow-up. In all patients included in this study, it was found that a patient was applied with plaster splint to provide upper limb immobilization (100%) and elevation was applied for the treatment of edema. Oral or intramuscular analgesics were preferred for the treatment of pain, and peripheral block was applied with the help of the anesthesia clinic. Medical treatment was administered for nausea and vomiting. In addition, the patients experienced problems related to edema in 2%, agitation in 16%, and circulation follow-up in 8% of the patients within the first four hours (Table 5).

## Discussion

Upper limb injuries are extremely frequent traumas that are always important due to severe morbidity rates.<sup>[2]</sup> Upper extremity injuries that arise from a wide variety of reasons, especially work and home accidents, have an important place among the injurious individuals who applied to the emergency department.<sup>[4, 5]</sup> Upper extremity injuries are detected in approximately 20% of patients who apply to the emergency department due to injury.<sup>[6]</sup> In the American National Trauma Surveillance System, it is reported that approximately 1.000.000 people apply to the emergency departments every year due to upper extremity injuries.<sup>[2]</sup>

Among patients treated with upper limb injuries, male patients are significantly and more frequently exposed to traumas, especially working adult and young adult age groups.<sup>[2]</sup> In a study evaluating 300 cases in Bolu and its surroundings, the average age of these patients was reported as 23.72 years. The authors also indicated that the upper extremity injuries occurred more frequently in men (73%) and that 60% of these injuries happened during industrial and agricultural work accidents.<sup>[7]</sup> They at-

tributed the results of the study to that men involved in work lifemore, especially in the works that required physical strength.<sup>[7]</sup>

In another study conducted abroad, work accidents were examined between 1990 and 2000, and it was observed that in 86.2% of these accidents, male individuals exposed to trauma.<sup>[8]</sup> Sorock et al. examined 1166 occupational hand injuries and reported that 891 cases were male.<sup>[9]</sup> In our study, the majority of patients hospitalized in our clinic due to upper extremity injuries were male. In support of the literature, these injuries were detected more frequently in the young adult population (Table 1). In addition, among the injured patients, the educational status of the patients was examined, and 57% of them were primary school graduates or illiterate (Table 2).

In our study, wounds created with cutting, and piercing tools took the first place in the etiology of upper extremity traumas.

Punching the glass by mostly alcoholic individuals took the second place (Table 3). Similar results were found in Şakrak et al.'s study. In this study, among 1205 hand injuries were examined, injuries that arose from cutting and piercing tools ranked first, followed by the injuries arose from punching the glass.<sup>[2]</sup> The reason why the penetrating and piercing injuries are in the first place in the etiology of upper extremity traumas has been linked to the use of cutting and piercing tools as crime tools in ordinary crimes, such as fighting, assault and robbery (Table 4). In our study, an upper limb injury was detected due to an occupational accident in 18% of the cases, and when medical history was taken in detail, the factor of insufficient job safety emerged. In two studies conducted abroad, the risks of occupational accidents were investigated, and the importance of education was emphasized as a conclusion of the study.<sup>[9, 10]</sup> In another study examining occupational traumatic upper extremity injuries and risk factors in Korea, it was underlined that risks would be prevented by safety education and managerial interventions.<sup>[11]</sup>

Upper extremity injuries occur in a wide range from simple soft tissue traumas to amputation.<sup>[12]</sup> In upper extremity injuries, artery injuries, nerve injuries and tendon injuries are common due to the anatomical features of the limb, and functional loss is difficult to prevent even if circulation is achieved in the extremity.<sup>[13]</sup> In our study, vascular, nerve and tendon injuries were detected in 21% of the cases in support of the literature (Table 4).

In our study, it was found that 45% of cases of upper extremity injuries had pain within the first four hours after the operation (Table 5). Surgical interventions are applied to millions of people around the world every year, and pa-

**Table 5.** Postoperative problems experienced by the patients

Time intervals (hrs)	Pain	Nausea, and vomiting	Bleeding	Immobilization of the upper extremity	Edema	Agitation	Circulatory problem
Amputation n=6							
0-4	4	1	4	6	2	-	-
4-8	2	-	1	6	2	1	-
8-12	-	-	-	6	2	-	-
12-16	3	-	-	6	2	-	-
16-20	-	-	-	6	2	-	-
20-24	2	-	-	6	2	-	-
Nerve and vascular injuries n=6							
0-4	6	3	4	6	-	3	4
4-8	-	-	3	6	-	-	4
8-12	5	-	-	6	-	-	3
12-16	-	-	-	6	-	-	-
16-20	-	-	-	6	-	-	-
20-24	5	-	-	6	-	-	-
Vascular and tendon injuries n= 5							
0-4	1	-	-	5	-	1	-
4-8	-	-	-	5	-	-	-
8-12	-	-	-	5	-	-	-
12-16	-	-	-	5	-	-	-
16-20	-	-	-	5	-	-	-
20-24	-	-	-	5	-	-	-
Vascular injury n= 3							
0-4	1	1	1	3	-	-	1
4-8	-	-	-	3	-	-	1
8-12	-	-	-	3	-	-	1
12-16	-	-	-	3	-	-	1
16-20	-	-	-	3	-	-	1
20-24	-	-	-	3	-	-	1
Vascular, nerve, and tendon injuries n=17							
0-4	15	3	8	17	-	8	5
4-8	10	-	1	17	-	-	2
8-12	-	-	-	17	-	-	1
12-16	-	-	-	17	-	-	1
16-20	-	-	-	17	-	-	1
20-24	-	-	-	17	-	-	1
Nerve, tendon, and muscular injuries n=13							
0-4	6	-	-	13	-	-	-
4-8	2	-	-	13	-	-	-
8-12	2	-	-	13	-	-	-
12-16	2	-	-	13	-	-	-
16-20	2	-	-	13	-	-	-
20-24	2	-	-	13	-	-	-
Nerve injury n=11							
0-4	10	-	-	11	-	5	-
4-8	8	-	-	11	-	5	-
8-12	-	-	-	11	-	-	-

**Table 5. CONT.**

Time intervals (hrs)	Pain	Nausea, and vomiting	Bleeding	Immobilization of the upper extremity	Edema	Agitation	Circulatory problem
12-16	-	-	-	11	-	-	-
16-20	-	-	-	11	--	-	-
20-24	8	-	-	11	-	-	-
Tendon injury n=16							
0-4	9	-	-	16	-	-	-
4-8	-	-	-	16	-	-	-
8-12	-	-	-	16	-	-	-
12-16	-	-	-	16	-	-	-
16-20	-	-	-	16	-	-	-
20-24	-	-	-	16	-	-	-
Nail bed repair n=2							
0-4	1	-	-	2	-	1	-
4-8	-	-	-	2	-	-	-
8-12	-	-	-	2	-	-	-
12-16	-	-	-	2	-	-	-
16-20	-	-	--	2	-	-	-
20-24	-	-	-	2	-	-	-
Skin, and subcutaneous tissue injury n= 3							
0-4	2	-	-	2	-	3	-
4-8	-	-	-	2	-	3	-
8-12	-	-	-	2	-	3	-
12-16	-	-	-	2	-	-	-
16-20	-	-	-	2	-	3	-
20-24	-	-	-	2	-	-	-

tients experience different degrees of pain during the post-operative period. Despite the great advances that have been realized in the last 20 years both in the understanding, evaluation, and treatment of chronic pain, postoperative pain still remains an unresolved problem. Postoperative pain is an acute pain that starts with surgical trauma, decreases gradually and ends with tissue healing.<sup>[15]</sup> In our study, it was determined that 45% of the patients with upper extremity injuries experienced postoperative pain in support of this result.

Plaster splint was applied to the arms of all patients included in our study, and arm elevation was performed to prevent edema. During this period, oral or intramuscular analgesics were mostly preferred to reduce the pain and agitation of patients. The peripheral block was performed with the help of an anesthesia clinic in only one patient who described an unbearable pain that persisted until the late postoperative period, which was compatible with reflex sympathetic dystrophy.

Early postoperative pain, plaster splint and immobilization

in patients who underwent surgical intervention disrupt the self-care of the individual for a while. The main goal in the treatment and care of the patients undergoing surgical intervention is to ensure that the patient can continue his normal life in a healthy way by reducing or preventing complications. For effective treatment and care to be provided for the patient undergoing surgical intervention, the patient should be thoroughly evaluated and his/her medical care should be planned regarding the potential risks of the surgery to be performed. A correct and careful evaluation increases the effectiveness of the care given to the patient.<sup>[14]</sup>

### Conclusion

When we divided the injuries of upper limb in groups as for affected vessels, nerves, tendons, muscles and only skin wounds, we think that this grouping guides the treatment approach, and evaluation of postoperative conditions experienced by the patients, such as pain, nausea and vomiting, bleeding, edema, upper extremity immobilization,

presence of agitation, and problems related to circulatory follow-up.

For alleviating pain, which is the most common problem experienced by the patients, the use of non-pharmacological or alternative or complementary methods in the management of postoperative pain has been supported by many research studies. Knowing the use of these methods by nurses and teaching patients is very important for patients to cope with postoperative pain.

In addition, it has been emphasized in many studies that preoperative information reduces the level of postoperative anxiety. Many factors play a role in postoperative nausea and vomiting. Although new anesthetic techniques and antiemetic agents have come into clinical use today, postoperative nausea and vomiting still remain a serious problem. Synthetic plasters that increase the comfort of the patient can be preferred instead of the plaster splint used in arm immobilization.

Upper extremity injuries occur due to many reasons, such as cutting and penetrating tool injuries, work accidents (industrial high energy accidents) and traffic accidents. In particular, we believe that cutting and penetrating injuries happen mostly in young male patients, and public spotlight and public training can be provided about the measures to be taken in this regard.

#### Disclosures

**Ethics Committee Approval:** Ethics committee approval of the study was obtained from Şişli Hamidiye Etfal Training and Research Hospital (971).

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship Contributions:** Concept – S.O.; Design – K.Z.S.; Supervision – S.O.; Data collection &/or processing – S.O.; Analysis and/or interpretation – K.Z.S.; Literature search – S.O.; Writing – S.O.; Critical review – K.Z.S.

#### References

1. Taşdemir K, Oğuzkaya F, Kahraman C, Ceyran H, Emiroğulları ÖN, Yasım A. Upper Extremity arterial injuries (in 106 cases). *GKD Medical Journal* 1997;5:218–22.
2. Şakrak T, Mangır S, Körmutlu A, Cemboluk Ö, Kıvanç Ö, Tekgöz A. 1205 A Retrospective analysis of a Hand Injury Case. *Turk Plast Surg* 2009;17:134-8.
3. Eti Aslan F. The Assessment Methods of Pain. *C.Ü. Hemşirelik Yüksekokulu Dergisi* 2002;6:9–16.
4. Keskin D, Seçkin Ü, Bodur H, Sevil A, Erdoğan B, Akyüz M. Clinical conditions of our tendon injured patients. *Türk Fiz Tıp Rehab Derg* 2005;51:94–7.
5. Aslan A, Aslan İ, Özmeriç A, Atay T, Çaloğlu A, Konya MN. Our experience about hand injury emergency. *TAF Preventive Medicine Bulletin* 2013;12:1–8. [\[CrossRef\]](#)
6. Gideroğlu K, Sağlam İ, Çakıcı H, Özturan KE, Güven M, Görgü M. Epidemiology of the hand injuries in Bolu region: a retrospective clinical study. *Abant Med J* 2012;1:13–5. [\[CrossRef\]](#)
7. Cantürk G, Eşiyok B, Yaşar H, Doğan B, Hancı H. Evaluation of Occupational Injury Cases in the Department of Forensic Medicine, Ankara University Medical Faculty Between 1993-2003. *Erciyes Med J* 2006;28:1–6.
8. Boufous S, Williamson A. Work-related injury in NSW hospitalisation and workers' compensation datasets: a comparative analysis. *Aust N Z J Public Health* 2003;27:352–7. [\[CrossRef\]](#)
9. Sorock GS, Lombardi DA, Hauser R, Eisen EA, Herrick RF, Mittleman MA. A case-crossover study of transient risk factors for occupational acute hand injury. *Occup Environ Med* 2004;61:305–11.
10. Chow CY, Lee H, Lau J, Yu IT. Transient risk factors for acute traumatic hand injuries: a case-crossover study in Hong Kong. *Occup Environ Med* 2007;64:47–52. [\[CrossRef\]](#)
11. Choi WJ, Cho SI, Han SH. A case-crossover study of transient risk factors for occupational traumatic hand injuries in Incheon, Korea. *J Occup Health* 2012;54:64–73. [\[CrossRef\]](#)
12. Tuncalı D, Toksoy K, Terzioğlu A, Aslan G. Upper extremity acute tendon injuries: an epidemiological evaluation. *Turk Plast Surg* 2005;13:114–8.
13. Topal AE, Özçelik C. The Characteristics of Upper Extremity Arterial Injuries. *Dicle Med J* 2004;31:55–7.
14. Dal Ü, Bulut H, Demir SG. The problems experienced by the patients at home after surgery. *Bakirkoy Medical Journal* 2012;8:34–40. [\[CrossRef\]](#)
15. Büyükyılmaz F, Aştı T. Nursing Care of Postoperative Pain. *Ataturk University School of Nursing Journal* 2009;12:84–93.