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Original Article

A Series of Civilian Ocular Injuries from the Civil War in Syria

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Abstract

Objectives: This study aimed to evaluate the demographic and clinical features of eye injury cases in the Syrian Civil War.

Methods: A total of 224 eyes of 212 Syrian patients who were referred urgently to Hatay Mustafa Kemal University Faculty of Medicine Department of Ophthalmology between January 2011 and December 2018 were evaluated retrospectively. Types of trauma and clinical findings were analyzed.

Results: Patients were predominantly male (n=194, 91.5%). The mean age was 29.50±10.76 (range 1–74) years. A total of 30 (14.15%) patients were <18 years old. Most eye traumas (n=177, 79.0%) were open globe injuries, and the remaining 21.0% (n=47) were closed globe injuries. Intraocular foreign body was detected in 106 (47.32%) eyes. Primary repair was performed in 74.10% (n=166) of the cases, and evisceration was performed in 4.46% (n=10).

Conclusion: Our study indicated that war conditions can cause serious eye injuries in civilians. These conditions often cause vision and eye loss in adults and children. In addition, all units carrying and treating patient should be strongly coordinated to minimize vision, time, and economic losses.

Keywords: Intraocular foreign body, ocular trauma, Syrian civil war.

Introduction

Eye traumas can lead to serious conditions, from loss of vision to loss of globes (1). The mechanisms of these traumas determine the patient's final vision and loss of globe. A smooth and clean corneal injury can heal almost without sequelae, while an uneven or infected injury can have very serious consequences. Also the location of the eye injury is important prognostic factor. (Zon 1=cornea, Zone 2= from

limbus to posterior 5mm scleral area and Zone 3= The area behind the border of Zone 2). While firearm injuries of the eye are relatively rare in civilians, they occur dramatically in armed conflicts or wars. Although many factors affect the severity of trauma, the presence of intraocular foreign body (IOFB) and localization of the eye injury are prominent factors in determining the prognosis of trauma (2).

In the present century, the incidence of penetrating eye injuries in wars has increased significantly compared with the total number of combat injuries. Patients are usually unable to access health services without delay due to the war environment. Following the Syrian Civil War, there has been a growing interest on the effects of war, violent conflict, and refuge on the development and physical health of refugees in Syria. In this study, we aimed to share our knowledge and experience about the magnitude of civilian injuries and ocular traumas encountered during the Syrian Civil War.

Methods

This consecutive retrospective case series included 224 eyes of 212 patients. During the period between June 2011 and October 2018, wounded Syrian patients who urgently referred to our hospital were examined. Electronic data of these patients

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were retrospectively analyzed, and demographic data, clinical features, and trauma parameters were assessed. Patients with missing or unreadable data were excluded. The study was approved by the ethics committee of Hatay Mustafa Kemal University, Faculty of Medicine, Hatay, Turkey (11.04.2019/06).

Statistical Analysis

Sample characteristics were expressed as frequency distribution and mean±standard deviation. Descriptive statistics for discrete outcome variables were presented as frequencies and proportions (n, %). All statistical analyses were performed with the Statistical Program for Social Sciences software version 21 (IBM Corp. Armonk, NY, USA).

Results

Of the 212 patients, 182 (85.85%) had a good general status (Glasgow 14–15), 20 (9.43%) had moderate status (Glasgow 8–13), and 10 (4.72%) had a poor general condition (Glasgow 3–8). The mean duration of hospital stay was 6.12±11.71 days. Clinical and demographic findings of trauma are summarized in Table 1.

Table 1. Demographic and clinical characteristics

Total number of patients, n	212
Patients under 18 years of age, n (%)	30 (14.15)
Number of eyes evaluated, n	224
Mean age (years)	29.5±10.76
Range (years)	1-74
Gender, n (%)	
Male	194 (91.5)
Female	18 (8.5)
Trauma lateralization (patient eye), n (%)	
Only right	116 (54.72)
Only left	84 (39.62)
Bilateral	12 (5.66)
Globe injury type, n (%)	
Open	177 (79.0)
Closed	47 (21.0)
Localization of open globe injury, n (%)	
Corneal (zone I)	137 (77.4)
Corneoscleral (zone II)	20 (11.3)
Isolated scleral (zone III)	20 (11.3)
Initial visual acuity (eye), n (%)	
≤ Hand motion	136 (60.71)
Counting fingers	53 (23.66)
Light perception	29 (12.94)
No light perception	6 (2.67)

Vitreous hemorrhage was detected in 34 (15.17%) eyes of patients with trauma. Of these injuries, 32 were open injuries, two were closed injuries, and 12 had foreign bodies. Retinal detachment was detected in six (2.83%) patients, and two of them had IOFB, and when foreign bodies were examined, one eye had stone and the other had stone and shrapnel. Moreover, 27 (12.73%) patients had orbital fractures, 26 of which were open injuries and one was a closed injury. Hyphema was observed in 7 (3.12%) eyes. Perforation of the anterior capsule and cataract was observed in 25 (10.68%) eyes. Endophthalmitis was seen in three cases, and all were open trauma. IOFB was detected in two eyes, one of them had only stone and the other had shrapnel and stone. The number of cases is shown in Figure 1.

Foreign bodies were detected in 106 (47.32%) eyes. As regards the localization of foreign bodies, the distribution was as follows: orbital cavity (n=50), conjunctiva (n=1), cornea (n=4), anterior chamber (n=1), lens (n=2), vitreous (n=44), retina (n=2), and optic nerve (n=2) (Fig. 2). IOFBs were shrapnel in most of the cases, which were organic in five eyes and a glass material in one eye. Evisceration was performed in 10 (4.46%) eyes, and primary repair was performed in 166 (74.10%) eyes. In one patient, contact lens was implanted due to small leakage. In addition to ocular

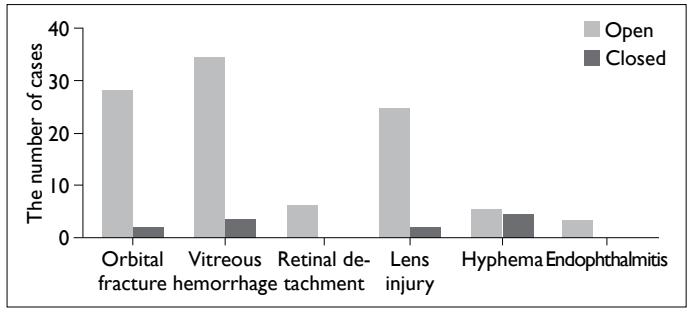

Figure 1. Patient condition upon hospital admission.

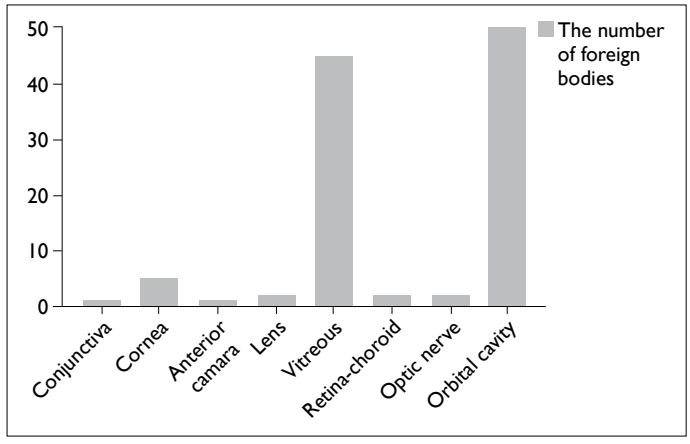

Figure 2. The distribution of foreign bodies according to the type of globe injury.

trauma, 17 (8.01%) patients had facial injuries, and eyelid, eyebrow, and nose injuries were most commonly observed. In addition, six patients had extremity and thoracic injuries.

Discussion

This study investigated the incidence of demographic and clinical features of eye injury cases referred to our hospital during the Syrian Civil War. We demonstrated that penetrating ocular injuries due to internal armed conflicts are considerable causes of permanent severe visual impairment. Although these eye injuries predominantly affect young men, women and children are incurred severe injuries. Wearing special glasses and imposing an international arms embargo are proposed to decrease eye injuries and vision loss as consequences of potential wars. During this civil war, organization of patients with trauma is very important, because poor coordination of units carrying and treating the patient causes time loss and economic loss.

In this century, wars and armed conflicts are among the avoidable causes of injuries, which adversely affect human life and result in life-threatening conditions and disabilities. Ocular trauma is one of these disabilities. Eye injury is also one of the most common causes of monocular morbidity and unilateral blindness (3). In case of war or civil unrest, the incidence of combat eye injuries increases even more (4,5).

The Syrian Civil Uprising/War has started since the early spring of 2011. The World Health Organization has determined that at least 57% of public hospitals have been damaged and 37% of them have been out of service, while at least 50% of the medical staff have left the country since the war started (6). Thus, injured civilians have serious difficulties accessing treatment, and most of them were being treated in neighboring countries, such as Turkey, Lebanon, or Jordan. Thach et al. investigated the outcomes of IOFB injuries during the Operation Iraqi Freedom (7). In their study, only two patients (3.6%) were female, and there was no patient aged <18 years. Moreover, Colyer et al. explored perforating globe injuries throughout the Operation Iraqi Freedom, and they did not detect women or children in their study population (8). In a previous study conducted by Gurler et al., although young male adults mostly incurred IOFB injuries, children (6/78) and women (10/78) were also affected (9). Barak et al. analyzed ocular injuries in the Second Lebanon War between Israeli soldiers and civilians (10), and they also recorded women and children who sustained ocular injuries. In the present study, 18 (8.5%) patients were female, while 30 (14.15%) were children aged <18 years. These results showed that women and children are also negatively affected and injured in the civil war and armed conflict environment. Feghhi et al. also investigated the outcomes of IOFB injuries (11), and they mentioned generally good anatomic and visual outcomes of vitreoretinal surgery. The appropriate route of removal may be determined by the type, size, and site of the IOFB.

Çelikel et al. published postmortem examination and autopsy reports of 186 deaths during the Syrian Civil War (12). In their study, the mean age was 30.6 years, and there were more male (91.4%) than female (8.6%) patients. Moreover, 21.5% of the patients were <20 years old. Our demographic data were similar to those of Çelikel et al. In the Syrian Civil War, young men were mostly injured, but women and children were also affected.

Gurler et al. reported that the sites of most eye injuries are found in zone 1, zone 3, and zone 2 (in this order) (9). Similarly, Ozal et al. reported the zone of trauma as zone 1, zone 3, and zone 2 (in this order) (13). In our study population, 177 (79.0%) of the eye injuries were open globe injuries, while 47 (21.0%) were closed globe injuries. In open globe injuries, the perforation sites were zone 1 in 137 (77.40%) eyes, zone 2 in 20 (11.30%) eyes, and zone 3 in 20 (11.30%) eyes. Although the anterior and temporal regions of the eye has the highest risk for trauma, the frequency of injury in zone 3 increases in destructive environments such as in a civil war.

Generally, endophthalmitis occurs after open globe injury in approximately 1 of 100 cases (14,15). However, Thach et al. and Colyer et al. did not find any cases of endophthalmitis in their studies from the Operation Iraqi Freedom (6,7). In accordance with these two studies, the rate of endophthalmitis was as low as 1.12% (n=2) in our study. We speculated that the high temperature produced by an explosion might cause sterilization of small IOFBs before entering the eye; thus, no cases of endophthalmitis were recorded.

In our study population, 27 (12.73%) patients had orbital fractures. Of these injuries, 26 were open injuries and one was a closed injury. This result suggests that eyes with orbital fractures should be examined more carefully for perforation. In the clinical follow-up, 166 (74.10%) eyes underwent primary repair, and 10 (4.46%) eyes underwent evisceration because the eye status was very poor to repair.

A civil war also brings material burden to the conflicting countries. Karakus et al. reported a positive correlation between cost and length of hospital stay in the Syrian Civil War (16).

This study has some limitations. First, our study was a retrospective analysis of medical records, so we could not obtain all the required data. Second, our sample size was not large enough to allow accurate statistical analyses (i.e., logistic regression) for investigating factors associated with the outcomes.

In conclusion, wars and internal armed conflicts as preventable causes of morbidities adversely affect human life. These internal armed conflicts can lead not only to death

but also to serious morbidities such as eye and vision loss, because these patients often sustain multiple traumas. Treatment of patients with multiple traumas should be carried out in a unit with all relevant disciplines. In addition, we recommend that all units carrying and treating the patient should be strongly coordinated to minimize vision, time, and economic losses. By following precautionary measures, these negative outcomes and treatment costs can be reduced.

Disclosures

Ethics Committee Approval: The study was approved by the ethics committee of Hatay Mustafa Kemal University, Faculty of Medicine, Hatay, Turkey (11.04.2019 / 06).

Peer-review: Externally peer-reviewed.

Conflict of Interest: Declared.

Authorship Contributions: Involved in design and conduct of the study (AE); preparation and review of the study (AE, BEK); data collection (AE); and statistical analysis (AE, BEK).

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