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The Epidemiological Evaluation of Ocular Penetrating or Blunt Trauma Cases Applied to Emergency Room of an Eye Hospital

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Abstract

Purpose: Our purpose was to evaluate the etiological and clinical features of the patients with ocular blunt trauma or open globe injuries who applied to emergency room of our hospital in six months period.

Methods: Our prospective study consisted of 268 eyes of 260 cases who had been applied to the emergency room of our hospital. In addition to detailed ophthalmological examination, the age and sex of the cases, the affected eye, the type and the etiology of the trauma were recorded. X-ray and ultrasonic examinations were performed in necessity.

Results:The mean age of 206 male (79.2%) and 54 female (20.8%) cases was 31.7±2.04. Seventy-nine cases (30.4%) were younger than 16-year-old, 93 cases (35.8%) were between 17 and 40 year-old and 88 cases (33.8%) were older than 40 year-old. The most frequent trauma etiologies were injuries with wood (18.7%),metallic objects (direct injury or metal-on-metal mechanism, 17.5%), crush injuries (traffic accidents etc.13.6%) and injuries by fist (assault injuries) (12.1%).

Conclusion: According to our study, ocular blunt trauma or penetrating injuries mostly affect male cases than females. Most of the etiological factors were found to be preventable factors and this shows the importance of the protective measures.

Key words: Ocular trauma, blunt trauma, penetrating injury, emergency room.

Introduction

Ocular trauma is a serious public health problem and many people lose their vision because of it every year.(1,2) As significant number of ocular injuries are potentially preventable, this fact raises the importance of protective measures. (1,2) Also ocular trauma is one of the most frequent reasons of unilateral blindness and the incidence of serious injury that causes visual morbidity vary from 8.8 / 100000 to 15.2 / 100000 per year according to some different studies.(3-8)

According to previous epidemiological studies, young adults and children are affected mostly from ocular trauma and this fact also causes a workforce and productivity losses as a social health problem.(7) The etiology and type of ocular trauma can differ in every country according to the social specialties. Open globe injuries are generally accepted to be more serious and to have poorer visual prognosis than closed injuries. (7-11) Visual acuity and other clinical features are very important for visual prognosis and there are some models like ocular trauma score (OTS) those predict the visual prognosis.(12)

In our study, our aim was to evaluate the epidemiological

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and etiological factors and clinical features of the ocular blunt trauma or penetrating injury cases who applied to emergency room of our hospital, which has the most number of ocular emergency cases in Ankara, in six months period.

Patients and methods

Two hundred and sixty-eight of 260 cases who had applied to emergency room of our hospital between January 2014 and June 2014 because of blunt trauma or open globe injury were included in to our prospective study. Our study was approved by Ethics Committee of Ankara Numune Training Hospital and written consents were taken from our adult cases or the parents of the child cases.

All the cases had detailed ophthalmologic examinations including best-corrected visual acuities (BCVA) with Snellen-charts,anterior and posterior segment examinations and intraocular pressure (IOP) measurements with pneumotonometer (closed globe injury cases) at the emergency room. Orbital and Waters X-ray examinations were performed for all cases and ultrasonic examination was performed in necessity. The cases were divided into groups according to their ages as the cases younger than 17-year-old, the cases between 17 and 40-year-old and the cases older than 40-year-old.

The cases with other types of trauma like corneal or conjunctival foreign body, corneal epithelial defect caused by minor trauma or chemical injuries were not included in to the study. Before ophthalmological examinations, the previous ocular and systemic medical histories of the cases, some epidemiological information about the cases like sex and age, the type of trauma, the etiological factor of trauma, the affected eye andthe exact time of the trauma were recorded. Also, tetanus prophylaxis was performed in injuries with metallic objects at the emergency room in necessity.

Statistical analysis of the data was performed with SPSS 18 programme: Descriptive statistics are presented as frequency and percentage distributions.

Table 1: The demographic characteristics of the cases.

Age: mean±SD (range)	31.7±2.04 (1-86 years)
Sex: Female: n (%)	54 (20.8%)
Male: n (%)	206 (79.2%)
Age: <18-year-old n (%)	79 (30.4%)
Age: 18-40 -year-old n (%)	93 (35.8%)
Age: >40-year-old n (%)	88 (33.8%)

Table 2: The type of the trauma and the diagnosis of the cases

Type of trauma: n (%)	
Penetrating trauma:	85 (32.7%)
Blunt trauma:	175 (67.3%)
Diagnosis of cases: n (%)	
Conjunctival hemorrhage:	49 (18.8%)
Corneal penetrating trauma:	45 (17.3%)
Hyphema:	38 (14.6%)
Periorbital ecchymosis and edema:	28 (10.8%)
Conjunctival laceration:	25 (9.6%)
Corneal abrasion:	16 (6.2%)
Scleral penetrating trauma:	15 (5.8%)
Others*:	44 (16.9%)

*Others: Eyelid laceration, iridodialysis, intravitreal hemorrhage, commotio retinae, intraocular foreign body, blowout trauma

Results

The age distributions of the cases are summarized in table 1. The mean age of 206 male (79.2%) and 54 female (20.8%) cases was 31.7±2.04 (1-86 years). Seventy-nine cases (30.4%) were younger than 16-year-old, 93 cases (35.8%) were between 17 and 40 year-old and 88 cases (33.8%) were older than 40 year-old (Table 1). In 136 cases (52.3%) the right eyes, in 120 cases (46.2%) the left eyes and in the remaining 4 cases both left and the right eyes were affected.

The type of the trauma and the diagnosis of the cases are summarized in table 2. Eighty-five cases (32.7%) had penetrating and 175 cases (67.3%) blunt ocular trauma. The most frequent clinical features were conjunctival hemorrhage (18.8%), corneal penetrating trauma (17.3%) and hyphema (14.6%) (Table 2).

The etiologies of ocular trauma of our male and female cases are summarized in table 3. The most frequent causes were injuries with wood (18.5%), injuries with metallic objects (direct injury or metal-on-metal mechanism, 17.7%), crush injuries (traffic accidents etc. 13.5%) and assault injuries (fist etc) (11.9%) (Table 3).

The BCVA was measured except 15 cases who were younger than 5-year-old. In 4 eyes had no light perception,13 eyes had only light perception, 49 eyes feet only hand motion, 83 eyes had BCVA values between 0.1 and 0.7 and 111 eyes had BCVA values between 0.8 and 1.0.

Surgical treatments were performed for corneal and scleral

Etiological factor:	Female:	Male:	Total:
Injuries by wood: (n/%)	8 (14.8%)	40 (19,7%)	48 (18,7%)
Injuries by metallic objects:	4 (7,4%)	41 (20.2%)	45 (17.5%)
Crush injuries (traffic accidents etc)	13 (24.1%)	22 (10.8%)	35 (13.6%)
Injuries by fist (beating injuries)	12 (22.2%)	19 (9.4%)	31 (12.1%)
Injuries by game balls	2 (3.7%)	19 (9.4%)	21 (8.2%)
Injuries by stone	4 (7.4%)	10 (4.9%)	14 (5.4%)
Injuries by pressurised bottled drinks	1 (1.9%)	6 (3.0%)	7 (2.7%)
Injuries by horn of the animals	2 (3.7%)	3 (1.5%)	5 (1.9%)
Injuries by rubber band	1 (1.9%)	4 (2.0%)	5 (1.9%)
Injuries by plastic pipe	1 (1.9%)	6 (3.0%)	7 (2.7%)
Injuries by glass	3 (5.6%)	7 (3.4%)	10 (3.9%)
Injuries by pencil	0 (0%)	6 (3.0%)	6 (2.3%)
Injuries by spade	0 (0%)	1 (0.5%)	1 (0.4%)
Injuries by garden hose	0 (0%)	4 (2.0%)	4 (1.6%)
Injuries by knife	2 (3,7%)	2 (1,0%)	4 (1,6%)
Injuries by snow ball	0 (0%)	1 (0.5%)	1 (0.4%)
Injuries by nail	1 (1.9%)	8 (3.9%)	9 (3.5%)
Injuries by thorn	0 (0%)	3 (1.5%)	3 (1.2%)
Injuries by needle	0 (0%)	1 (0.5%)	1 (0.4%)
Total:	**54 (100%)**	**206 (100%)**	**260(100%)**

Table 3: The ocular trauma etiologies of our male and female cases

penetrating injuries, eyelid and conjunctival lacerations at the same days. Medical treatments (± hospitalization) were offered for the other cases according to their diagnosis and severity of their conditions.

Discussion

Ocular trauma is a very serious social health problem since it is seen mostly in children and young persons who have strong workforce and productivity potential.(7) Many factors like the social specialties of the countries, the epidemiological characteristics of the cases and even the geographical and seasonal changes can affect the etiology and type of ocular trauma.(7) Here in this study we evaluated the epidemiological and etiological factors and the clinical features of our cases with ocular blunt trauma or penetrating injuries who applied to emergency room of our hospital in six months period.

The type of the trauma is very important for the visual prognosis. Lin et al. investigated the type, severity, and mechanisms of ocular trauma in the emergency room in their study with 519 cases of ocular trauma in all ages.(13) Contusions associated with blunt trauma was found to be the most common type, followed by penetrating lacerations and ruptures.(13) In their study, Khatry et al. evaluated 525 cases with ocular injuries in rural Nepal in all ages also and defined lacerating and blunt traumas as the most common types of injuries.(14) Kadappu et al. investigated the childhood open and closed globe eye injuries in their study.(8) They stated that closed globe injuries had more favorable visual outcome than open globe injuries and globe ruptures, zone 3 injuries, poor initial visual acuity, wound length >10 mm and lens trauma were found to be associated with poor visual outcome.(8) In our study, we observed blunt ocular trauma in more than 60% of our cases like

Lin et al. study.

Age and sex are very important epidemiological factors ocular trauma. Cheung et al investigated the epidemiology, treatment modalities and the visual outcomes of hospital-based ocular emergencies in their study.(15) They observed 1027 patients with ocular emergencies and stated that the rate was highest in middle-aged men. Northey et al. also observed male predominance in their study and the mean age was 35.5.(16) The distribution of the age may differ in male and female cases. Teixeira et al. reviewed 180 cases who underwent surgical repair of for open-globe injury retrospectively in their study.(17) The mean age of male cases was found to be as 46.4 in their study while it was 70.9 in female cases. Brophy et al. investigated serious ocular trauma cases and observed thatmore than 40% of these cases were observed in cases younger than 20-year-old. (18) Abbott et al. investigated the epidemiology and etiology in pediatric ocular trauma in their review. (19) They mentioned male predominance in also childhood traumas and stated that this was related with the differences of many factors like characteristics, activities, hobbies and kinds of games between male and female children.(19) The incidence of ocular injuries was found to be rarest in children younger than 2-year-old while it was most frequent in children between 12 and 17 year-old. Although male predominance is clear according to many reports, some opposite results were also reported. Sheng et al. reported a 10-year review of open-globe trauma in elderly patients with a mean age of 80-year-old and stated that 71% of their cases were female.(20) Old women may be more prone to fall injuries and accidents than old men, which were the most frequent etiological factors, according to the study. (20) In our study 79.2% of our cases were male and male predominance was seen in all age groups. The age distribution was also compatible with the previous studies and the ages of most of our cases were between 18 and 40-year-old like in previous studies.

The etiological factors of ocular trauma depend on many things including the age and sex of the cases, the environmental factors and also the social characteristics of the country. In childhood compressed air powered guns, thrown objects like stones, eggs or metal projectiles, sports-related injuries with game ball, dart etc, domestic-related injuries, airbag, seatbelt and fall injuries are the most frequent etiological factors of trauma.(19) In young and middle-aged men work accidents and ocular injuries caused mainly by motor vehicle accidents are most frequently seen.(15,17) But elder cases are more vulnerable to fall injuries. (20) Sex is also as important as the age for the etiology of the trauma. In women domestic and fall injuries are known to be the most frequent etiological factors. (17) According to our study injuries by wood, metallic objects and crush injuries are the most frequent three factors of trauma in male cases. Wood was found to be the most frequentetiological factor and the main reason for this was thought to be related with winter season. As our study consisted of winter seasons, male cases should have cut wood for household heating. In rural areas of our country wood is still the most frequent tool for household heating. Also 80% of our cases were male and 65% of our cases were younger than 40-year-old and most of them were in working-age population, therefore the injuries by metallic objects were also thought to be frequent in our study. But in women crush injuries,injuries by fist (beating injuries) and injuries by wood were the most frequent etiological factors. The preponderance of beating injuries in women was miserable and thought provoking. Violence to women is a very big social problem in all of the world as in our country. As conclusion ocular trauma is known to be the one of the most frequent reasons of unilateral blindness in all ages. As most of the etiological factors were found to be preventable factors, the importance of the protective measures becomes the main topic of conversation. Easterbrook stated that 90% of eye injuries can be prevented with better education, supervision, and proper certified safety eye protectors.(21) Also violence to women can be prevented with better education and high quality of life. These facts should have been kept in mind in the prevention of ocular trauma which is one of the most important social problem in our country.

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