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ARAŞTIRMA/ RESEARCH

Analysis of ophthalmic emergencies

Göz acillerinin analizi

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Abstract

Purpose: The aim of this study was to determine the admission complaints, demographic characteristics, etiology, diagnosis, and outcome of patients who admitted to emergency department with eye-related complaints.

Material and Methods: All patients, over the age of 18, who admitted to emergency department with eye-related complaints between June 2011 and May 2012, were included prospectively in this study. Demographic characteristics, etiology, admission complaints, diagnosis, and outcome of the patients in the emergency department were evaluated with statistical analysis.

Results: At the time of the study, a total of 201427 adult patients admitted to our emergency department and 3256 (1.6%) were included in the study. 77.5% of the patients (2524) were males. The most frequent diagnosis was trauma (30.3%) in female gender, whereas it was superficial foreign bodies (46.2%) in male gender. The most common cause of trauma was home accidents (57.4%) in females, whereas it was work accidents (73%) in males. Of patients admitted due to vision loss (0.46%), it was identified that these patients were older and visual loss is more dependent on non-traumatic ophthalmic emergencies.

Conclusions: The majority of cases of ophthalmic emergencies are work accidents in young active workingmen patients group. The most common complaints of patients are trauma and superficial foreign bodies. Vision loss depends mostly on non-traumatic ophthalmic emergencies seen in the elderly.

Key words: Emergency, eye, vision loss

Öz

Amaç: Acil servise göz ile ilgili şikayetlerle başvuran hastalarda başvuru şikayetleri, demografik özellikler, etyoloji, tanı ve hastaların sonlanımlarının belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Haziran 2011 ve Mayıs 2012 tarihleri arasında acil servise göz ile ilgili şikayetlerle başvuran 18 yaş üstü tüm hastalar bu çalışmaya prospektif olarak dahil edildi. Demografik özellikler, etyoloji, başvuru şikayetleri, tanı ve hastaların sonlanımları istatiksel analizlerle hesaplandı.

Bulgular: Çalışmanın yapıldığı zamanda acil servise toplamda 201427 erişkin hasta kabul edildi ve 3256' sı (% 1.6) çalışmaya dahil edildi. Hastaların % 77.5' i (2524) erkekti. Kadın cinsiyette en sık görülen tanı travma (% 30.3), erkek cinsiyette ise yüzeyel yabancı cisim (%46.2) idi. Kadınlarda en sık travma nedeni ev kazaları (%57.4) iken, erkeklerde iş kazaları (%73) idi. Görme kaybı ile başvuran hastaların (% 0.46) daha yaşlı olduğu ve görme kaybının daha çok travma dışı göz acilleri ile ilgili olduğu tespit edildi.

Sonuç: Göz acillerinin en büyük kısmı, genç aktif çalışan hasta grubundaki iş kazalarıdır. En sık rastlanan hasta şikayeti travma ve yüzeyel yabancı cisimdir. Görme kaybı sıklıkla yaşlı hastalarda ve travmatik olmayan göz acilleri nedeniyle görülür.

Anahtar kelimeler: Acil, göz, görme kaybı

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INTRODUCTION

Ophthalmic emergencies, a major cause of visual impairment, account 1-6 % of emergency department visits all over the world. While trauma being the most common cause of emergency department admissions, it is followed by infection of eye and adnexal structures and chronic diseases of the eye[1,2]. Individuals exposed to motor vehicle accidents, game playing children, workers in industry and construction, and elderly individuals are often exposed to eye trauma. These traumas affect a person's visual acuity and quality of life. Besides, they lead to a decrease in productivity by causing loss of labor force, and serious treatment costs in economic terms[3,4].

According to estimates by World Health Organization, 55 million eye injuries occur every year all over the world causing loss of labor force more than one business day[5]. Approximately 1.3% of all patients are hospitalized and 0.9% will result in blindness. Patients usually admit to emergency department with complaints of trauma, acute episodes of chronic eye diseases such as glaucoma and complicated cataract, eye infections, sudden vision loss[5,6].

Informations about the frequency of emergency department admissions of eye related diseases and the role of emergency department care in eye related diseases are limited[7]. Most of the eye-related studies in emergency departments are focused on ocular injuries, clinical findings and applied treatment methods[8]. Studies regarding etiology of ophthalmic emergencies and demographic data of cases are insufficient[7]. Determination of the etiology of ophthalmic emergencies is important in terms of revealing people at risk and taking protective and preventive measures.

In this study, it was aimed to determine the admission complaints, demographic characteristics, etiology, diagnosis and outcome of patients who admitted to emergency department with complaints of eye-related symptoms.

MATERIALS AND METHODS

Study design and setting

All cases over 18 years from both genders who admitted to emergency department of our hospital between 1 June 2011 and 31 May 2012 with eye-related complaints were planned to be included prospectively in this study and the study was initiated following Adana Numune Training and Research Hospital Ethics Committee approval. Patients who do not consent to the study were excluded from the study. Despite the frequent eye injuries, the cases under 18 years have excluded from the study, because adult and child emergency departments are independent and separated from each other in our country.

Selection of participants and methods

Eye exams of patients who were included in the study were firstly conducted by emergency medicine residents, and then patients were consulted to experienced ophthalmologist in ophthalmology department of our hospital. During this examination, standard study data registration form was filled out by physician in charge of patient care. Patients were evaluated regarding age, gender, occupation (worker, artisan, farmer, housewife, civil servant, student, retired), admission complaints (redness, burning, stinging, discharge, swelling, trauma, vision loss, eye floaters, double vision, pain), side of problematic eye (right, left, both), time interval between onset of complaints and hospital admission, visual acuity on admission, diagnosis made in emergency room, type of trauma if the reason for admission was trauma (penetrating, blunt, superficial foreign body, chemical, thermal), trauma reason (game injury, work accident, home accident, traffic accident, farming accident, assault, firearm injury, sporting activities), trauma diagnosis (corneal perforation, corneal erosion, hyphema, lens injury, subconjunctival hemorrhage, eyelid edema and ecchymosis, conjunctival laceration).

Outcome status in emergency department (discharged, hospitalized, died, referred), place of hospitalization (department of ophthalmology or other), surgical status (presence or absence), whether there is organ loss or not, number of days of hospitalization and outcome status in hospitalized department (discharged, transferred, died) were investigated.

Statistical analysis

SPSS v.20 package program was used for statistical analysis of the obtained data. Comparison of groups with and without pathology in terms of continuous variables was performed with Student's t-test. Fisher's exact test was used to compare categorical

variables. Type 1 error in 95% confidence intervals (CI) at $p<0.05$ level was considered statistically significant in the evaluation of differences between the groups.

RESULTS

At the time of the study, a total of 201427 patients admitted to our emergency department and 3256 patients who admitted with an ophthalmic complaint (1.6%) were included in the study. 45 patients were excluded from this study because of incomplete data. Of the patients included in our study, 2524 (77.5%) were male and 732 (22.5%) were female. The average age of male patients was 35.63 ± 11.78 years, while the average age of female patients was 41.08 ± 17.09 years, and mean age of all patients was 36.85 ± 13 years.

When time of admission to emergency department and its relationship with trauma was evaluated, it was detected that 66.7% of trauma patients had admitted within the first 6 hours, and 30.6% of non-trauma patients within the first 6 hours and 45.7% in 6-24 hours range. It was determined that trauma patients had admitted to emergency department significantly earlier ($p < 0.0001$).

The most common admission complaint was redness (49.3%), pain (24.7%), trauma (19.9%), stinging sensation (18.9%), burning (16.9%) in women, whereas in men, stinging sensation (60%), redness (49.4%), burning (17.4%), pain (14.5%), trauma (13.9%), respectively. The most frequent diagnosis of female patients were trauma (30.3%), conjunctivitis (22.8%), corneal foreign bodies (8.5%), hordeolum/chalazion (5.1%) and subconjunctival hemorrhage (4.4%), respectively. The most frequent diagnoses of male patients were corneal foreign bodies (46.2%), trauma (28.5%), conjunctivitis (13.3%), corneal erosion (3.4%) and subconjunctival hemorrhage (1.5%), respectively. Diagnosis of the patients according to the gender are shown in Table 1. Traumatic injury was detected in 43.7% of female patients and 79.2% of male patients ($p<0.0001$). Likely to have traumatic injuries in men was 4.91 times higher than in women (odds ratio = 4.91). Statistically significant differences regarding admission complaints were detected in patients with traumatic eye disease compared to patients with non-traumatic eye disease. 45.7% of trauma patients and 58.5% of non-trauma patients had redness in the eyes ($p < 0.0001$). 59.1% of trauma patients and 30.2% of non-trauma patients had stinging sensation in the eyes ($p < 0.0001$). 12.3% of trauma patients and 27.9% of non-trauma patients had pain in the eyes ($p < 0.0001$).

The most common diagnoses of female patients due to trauma were corneal erosion (63.6%), eyelid edema and ecchymosis (15.33%), subconjunctival hemorrhage (8.81%) and conjunctival laceration (6.13%), respectively. Whereas the most common diagnoses of male patients due to trauma were corneal erosion (71.71%), eyelid edema and ecchymosis (9.24%), subconjunctival hemorrhage (5.9%) and hyphema (3.12%), respectively (Table 2).

There was statistically significantly difference between gender of trauma patients regarding type and cause of trauma ($p<0.0001$). In female patients, the most common type of trauma was blunt trauma (35.9%), whereas in males, it was superficial foreign body (58.4%). Diagnosis of trauma according to the gender of the patients are shown in Table 2. In female patients, the most common cause of trauma was home accidents (57.4%), whereas in males, it was work accidents (73%) ($p <0.0001$). Of the trauma patients, 70% had physically active working career such as workers, artisans, and farmers; whereas 63.7% of non-trauma patients consisted of housewives, retired or desk job workers ($p < 0.000$).

When patients' visual acuity were evaluated; 86.5% of women were counting fingers from 5 meters, 2.3% from 4 meters, 3.7% from 3 meters, 3% from 2 meters, 2.6% from 1 meter. Visual acuity of 0.4% of patients was at the level of light perception only and 1.5% could only see hand movements. On admission, there were no female patients with complete vision loss. 95.6% of male patients were counting fingers from 5 meters, 1.5% from 4 meters, 0.9% from 3 meters, 0.5% from 2 meters, 0.4% from 1 meter. Visual acuity of 0.3% of patients was at the level of light perception only. 0.5% of patients were able to see hand movements, while 0.46% of patients had complete vision loss (Table 3). Vision loss was identified in 15 (0.46%) of a total of 3256 cases. It was detected that 4.8% of females and 0.9% of males had admitted with the complaint of vision loss ($p < 0.0001$). Possibility of admission of females with complaints of visual loss was 5.71 times higher than males (odds ratio = 5.71).

Table 1. Diagnosis of the patients according to the gender.

Diagnosis	Female	Male	Total	p value
Corneal foreign body	62 (8.47%)	1167 (46.24%)	1229 (37.7%)	<0.0001
Trauma	222 (30.33%)	720 (28.53%)	942 (28.9%)	0.6655
Conjunctivitis	167 (22.81%)	336 (13.31%)	503 (15.4%)	0.0099
Corneal erosion	27 (3.69%)	85 (3.37%)	112 (3.4%)	0.5989
Subconjunctival hemorrhage	32 (4.37%)	37 (1.47%)	69 (2.1%)	0.9972
Hordeolum / Chalazion	37 (5.05%)	17 (0.67%)	54 (1.7%)	0.9873
Glaucoma	36 (4.92%)	17 (0.67%)	53 (1.6%)	0.9883
Keratitis / Chemosis	22 (3.01%)	29 (1.15%)	51 (1.6%)	0.5849
Cataract	24 (3.28%)	10 (0.40%)	34 (1.0%)	0.4685
Dry eye	10 (1.37%)	13 (0.52%)	23 (0.7%)	0.0429
Retinal diseases	8 (1.09%)	8 (0.32%)	16 (0.5%)	0.005
Blepharitis	3 (0.41%)	12 (0.48%)	15 (0.5%)	<0.0001
Pterygium / Pinguecula	9 (1.23%)	5 (0.20%)	14 (0.4%)	0.0048
Dakriosistitis	10 (1.37%)	3 (0.12%)	13 (0.4%)	0.0027
Complication of systemic diseases	10 (1.37%)	2 (0.08%)	12 (0.4%)	0.0005
Ocular pain	5 (0.68%)	6 (0.2%)	11 (0.3%)	<0.0001
Episcleritis	6 (0.82%)	4 (0.16%)	10 (0.3%)	<0.0001
Uveitis	1 (0.14%)	6 (0.24%)	7 (0.2%)	<0.0001
Sudden loss of vision	5 (0.68%)	0 (0.00%)	5 (0.2%)	n/a
Cellulite	3 (0.41%)	1 (0.04%)	4 (0.1%)	<0.0001
Peripheral facial paralysis	0 (0.00%)	4 (0.16%)	4 (0.1%)	n/a
Vitreal diseases	1 (0.14%)	1 (0.04%)	2 (0.1%)	<0.0001
Regular eye examination	16 (2.19%)	27 (1.07%)	43 (1.3%)	0.3124
Other	16 (2.19%)	14 (0.55%)	30 (0.9%)	0.2436

Table 2. Diagnosis of trauma according to the gender of the patients

Diagnosis of Trauma	Female	Male	Total	p value
Corneal perforation and laseration	4 (1.53%)	23 (2.56%)	27 (0.8%)	0.1004
Corneal erosion	166 (63.60%)	644 (71.71%)	810 (24.9%)	0.0525
Hyphema	3 (1.15%)	28 (3.12%)	31 (1%)	0.1076
Lens damage	4 (1.53%)	5 (0.56%)	9 (0.3%)	0.0012
Subconjunctival hemorrhage	23 (8.81%)	53 (5.90%)	76 (2.3%)	0.9737
Eyelid edema and ecchymosis	40 (15.33%)	83 (9.24%)	123 (3.7%)	0.4855
Conjunctival laceration	16 (6.13%)	21 (2.34%)	37 (1.1%)	0.7914
Other (orbital fractures, extra ocular muscle loss or injuries, vitreoretinal problems, etc.)	5 (1.92%)	41 (4.57%)	46 (1.5%)	0.3715

Table 3. Visual acuity assessment of patients according to their gender.

Gender	Visual acuity								
	CF 5 m	CF 4 m	CF 3 m	CF 2 m	CF 1 m	SHM	LP	CVL	Total
Female (n, %)	633 (86.5%)	17 (2.3%)	27 (3.7%)	22 (3.0%)	19 (2.6%)	11 (1.5%)	3 (0.4%)	0 (0.0%)	732 (100%)
Male (n, %))	2414 (95.6%)	38 (1.5%)	22 (0.9%)	12 (0.5%)	11 (0.4%)	12 (0.5%)	7 (0.3%)	8 (0.3%)	2524 (100%)

m: meter; CF: Counting fingers; SHM: Seeing only hand movements; LP: Light perception; CVL: Complete vision loss

When the relationship between vision loss and age was assessed, it was found that patients with complaint of vision loss (51.91 ± 19.43 years) were average 15.33 older than patients with no complaint of vision loss (36.59 ± 7.13 years) ($p<0.0001$). When the relationship between vision loss and trauma was assessed, it was found that there was vision loss in 0.4% of trauma patients and 5.1% of non-trauma patients ($p < 0.0001$).

It was found that 95.2% were discharged from the emergency department, 4% were hospitalized and 0.8% were referred when the outcome of all patients was examined. Surgical treatment was performed to 68 of 131 hospitalized patients. Of patients who underwent surgery, 26.4% (18) were female and 73.6% (50) were male. Surgery rate was 2 times more in trauma patients.

DISCUSSION

Ophthalmic emergencies are conditions that can affect the visual system and lead to permanent loss of visual function if left untreated. They should be detected by physicians and immediately treated and referred to an ophthalmologist if necessary[9].

Although eyeballs are quite well preserved anatomically and physiologically within the bone cavity supplemented with fat and connective tissue, the risk of eye injuries are quite common. Despite the eyes form only 0.52% of frontal surface of the body, eye trauma constitutes approximately 10% of all bodily injury. Despite the advances in methods of diagnosis and treatment, trauma and other ophthalmic emergencies may result decreased vision or even blindness. Even no vision loss develops; current problem may cause pain and discomfort, and can lead to loss of labor, care and treatment charges. Therefore, the determination of the etiology of ophthalmic emergencies is of great importance in terms of revealing people at risk, taking protective and preventive measures[1,5,10].

Eye-related complaints constitute 1-6% of all emergency room visits in the world[1]. In our study, in a similar manner, it was found that patients who presented with complaints related to the eye constitute 1.6% of all emergency department visits. The majority of patients were male (77.5%) similarly as in other conducted studies[1,2] this can be related to males working in more risky jobs, making more activities such as fighting and tough sports, being more active in social life and being more frequently exposed to trauma.

In our study, it was determined that the right eye was statistically more affected in both sexes. In the literature, this issue has been evaluated only in terms of the trauma and there is no study on which eye non-traumatic ophthalmic emergencies affect more. Joseph and colleagues also reported that the right eye is more frequently affected. Right eye being more injured is based on the idea that people work with more with the right hand and so that the right is more open to trauma[11].

The most common complaint was redness (49.3%) in females and stinging sensation in the eyes (60%) in males. The most common diagnose in male patients included in the study was trauma, whereas it was corneal foreign bodies in female patients. In other studies it has been reported that patients were most commonly diagnosed with traumatic ophthalmologic emergencies[3,12]. Whatever the severity, first admission department of ocular trauma is often emergency departments. Therefore, trauma is amongst the most common causes in both genders. When other common complaints are examined, non-urgent cases, such as superficial corneal foreign bodies and conjunctivitis, are found to admit to the emergency department instead of ophthalmology outpatient clinic.

In a study by Nash et al. in America, it was reported that patients admit to the emergency department most frequently with ocular injuries as ophthalmic emergencies[8]. In another study by Chipalle and his colleagues, it was found that nearly half of the patients admitted to the ophthalmology outpatient clinic was due to eye trauma[13]. In a similar manner, in 43.7% of women and 79.2% of men traumatic injury was detected in our study. Men having higher rates of trauma may be due to admissions being more related to work injuries and men working more at heavy works. The most common diagnosis of female patients admitted with complaints related eye trauma was corneal erosion, whereas it was corneal foreign bodies in male patients. In a study by Ozdemir and his colleagues on ocular trauma, most common diagnoses were corneal perforation (29.40 %) and corneal epithelial erosion (21.69 %)[14]. In our study, while corneal foreign bodies and corneal erosion were the most common trauma diagnoses, perforating eye injuries were seldom seen in both genders. It was detected that trauma patients had admitted to emergency department significantly earlier when time of admission to emergency

department and its relationship with trauma was evaluated. It was found that 66.7% of trauma patients had admitted to emergency department within the first 6 hours. Of patients without traumatic injuries, only 30.6% had admitted to emergency department within the first 6 hours after the start of complaints. In a study in Ghana, different from our study rates, it was observed that only 32.2% of cases admitted to hospital at an average of 24 hours after the trauma and 21% after a week[15]. As the study was conducted in a western, rural and poor Africa region, admission time being later compared to our data can be explained by our hospital being in the city center and the city's relatively greater sophistication.

We found that 70% of patients had physically active working career such as workers, artisans, and farmers when occupational groups of trauma cases were evaluated. It is thought that the majority of these patients have more often exposure to trauma due to not taking adequate protective measures (safety goggles, protective shield, mask) when working.

The most common cause of trauma in females was home accidents (57.4%), whereas it was work accidents (73%) in males. In developing countries, most injuries occur in the workplace[10,16]. Work-related eye injury[14] was found to be 38.9% in Taiwan[17], 32.8% in Greece[18], 19.6% in Scotland[19] and 14.3% in America[20]. Work accidents being most frequent cause of admission in males can be attributed to 70% of patients being a member of physically active working career such as workers, artisans, farmers and not taking adequately necessary safety measures for the employees' life despite our region being a developing region in terms of business, industry and agriculture.

The most common type of trauma in females was blunt trauma (35.9%), whereas it was superficial foreign body (58.4%) in males. There are falls, traffic accidents and assault in the etiology of blunt trauma in women. Superficial foreign bodies, one of the most common complaints of emergency visits are a common problem in young men. Foreign bodies especially consisting of small metal particles were the most common form of corneal foreign bodies. Patel and colleagues reported that 52% of intraocular foreign bodies that occur during hammering and chipping operations often at work have magnetic properties and that these cases constitute 26.7% of all penetrating eye injury cases[21]. It must be explained to every treated patient that it is necessary to use protective goggles, mask and shield in order to prevent eye injuries in the workplace and complications such as vision loss due to these bodies may develop in case these protective measures are not taken.

According to our study, 0.4% of female and 0.3% of male patients had visual acuity at the level of light perception only. In a study published by Ngo in Singapore on ocular traumas, it was found that 94 % of cases have a visual acuity over 6/12. It was reported that 4% portion with low level of visual acuity was composed of patients admitted with serious injuries such as penetrating laceration or intraocular foreign body[14]. In our study, trauma was found to be the leading cause for a decrease in visual acuity, besides effects of chronic systemic diseases (hypertension, diabetes mellitus, atherosclerotic vascular disease) on eye and eye diseases causing chronic visual loss (glaucoma, cataracts, retinal disease, keratitis, uveitis) were found to cause a decrease in visual acuity. In our study, complete vision loss was detected in 0.46% of patients. It was detected that 4.8% of female and 0.9% of male patients had admitted with the complaint of vision loss ($p < 0.0001$). Possibility of admission of females with complaints of visual loss was 5.71 times higher than males.

It was found that 95.2% were discharged from the emergency department and 4% were hospitalized when the outcome of all patients was examined. Surgical treatment was performed to 52% of hospitalized patients. Surgery rate was 2 times more in trauma patients. Similarly in the U.S., it has been reported that 3% of patients admitted with eye complaints require hospitalization[8].

Ophthalmic emergencies constitute 1.6% of all emergency admissions. Number of admitted male patients is about 3.4 times more than the number of female patients. In both genders, young, productive group of patients are most commonly affected. The most common causes for admission of patients are trauma and superficial foreign bodies. Vision loss is seen more in the elderly and due to non-traumatic ophthalmic emergencies.

As a large portion of the admitted cases is discharged, this shows that non-urgent cases cause an important workload by admitting to the emergency department. Society must be informed about ophthalmic emergencies that may cause vision

loss. Necessary and sufficient protective measures should be encouraged and checked regarding eye health of workers.

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