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Pattern of mechanical ocular injuries in patients visiting a rural referral centre

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Received: 2016-09-06 Accepted: 2017-09-12

印度某医疗中心机械性眼外伤患者受伤情况分析

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摘要

目的:研究农村转诊中心到访以病人机械性眼损伤模式。

方法:本研究在 Dr. Rajendra Prasad Government Medical College(RPGMC), Kangra (Himachal Pradesh) 眼科进行。研究从 2013-01-01/2013-12-31,周期 12mo,包括数据收集、整理、描述、分析和解释,然后进行为期 1mo 的随访。前瞻性研究,包括 200 例机械性眼损伤的患者,所有患者都接受了问卷调查,并进行详细的眼部检查。根据国际眼损伤类型分为开放性眼球损伤和闭合性眼部损伤。受损的眼睑、泪腺以及颅神经麻痹视为独立存在,通过 MS Excel 2007 表格使用 Epi info7 软件进行数据分析。

结果:在研究期间,共接收门诊患者 21710 例,其中 200 例为机械性眼损伤,占门诊总人数的 0.921%。患者年龄为 1~80(平均 33.12±20.48)岁。151(75.5%)例男性,49(24.5%)例女性患者,男女比例为 3:1。200 例受试者中,眼部损伤情况分别为:家中(100 眼)、运动场所(29 眼)、职业损伤(29 眼)、道路交通事故(38 眼)、暴力冲突(10 眼)、学校(3 眼)、宗教场所踩踏事故(1 眼)。就诊时视力达到 6/12 的有 47%,<6/12~6/36 有 13.5%,<6/36~1/60 有 6%,<1/60~光感有 22%,无光感的 4%。7.5% 患者视力无法通过国际标准视力表评估。大多数患者为闭合性眼部损伤(54.5%),涉及眼睑、泪腺(23%),开放性眼部损伤为 19.5%,3% 累及颅神经。

结论:眼部机械性损伤是造成单眼失明的常见病因,具有可预防性。

关键词:眼部损伤;眼睑和泪腺;穿孔;撕裂

引用:Chauhan N, Tuli R, Sharma RK, Kumar D. 印度某医疗中心机械性眼外伤患者受伤情况分析. 国际眼科杂志 2017;17(12):2207-2211

Abstract

• AIM: To study the pattern of mechanical ocular injuries in patients visiting a rural referral center.

• METHODS: The study was conducted in the department of Ophthalmology, Dr. Rajendra Prasad Government Medical College (RPGMC), Kangra (Himachal Pradesh) for a period of 12mo from 1st Jan 2013-31st Dec 2013 which included data collection, data organization, presentation, data analysis and data interpretation followed by a period of follow up extending to a period of 1mo. A total of 200 patients were studied which included all patients of mechanical ocular injuries that visited our department either directly or were referred from other public or private institutions during the study period. It was a prospective study in which all the patients were interviewed with the aid of a questionnaire and underwent a detailed ocular examination. The injuries were classified according to the international ocular trauma classification into open globe and closed globe injuries. The injuries of the lid and adnexa and the cranial nerve palsies were considered as separate entities and data analysis was done with MS Excel 2007 worksheet using the Epi info7 software.

• RESULTS: A total of 21,710 patients attended the out-patient department (OPD) during the study period out of which 200 patients were of mechanical ocular trauma which formed 0.921% of the total OPD attendance. The patients ranged in age from 1-80y with a mean age and standard deviation of 33.12±20.48y. In those patients 151 patients (75.5%) were males and 49 (24.5%) were females. The male to female ratio was 3:1. Out of the 200 patients studied, 100 were injured at home, 19 in the playground, 29 had occupational injuries, 38 were injured in road side accidents, 10 were injured due to assault, 3 at school and 1 patient was injured during a stampede that occurred in a religious camp. The visual acuity at presentation was upto 6/12 in 47%, <6/12 to 6/36 in 13.5%, <6/36-1/60 in 6%, <1/60 to PL (perceive light) positive in 22% and PL negative in 4 % patients. In 7.5 % patients the visual acuity could not be assessed on the Snellen's chart. Most of the patients had closed globe injuries (54.5%) followed by involvement of the lid and

adnexa (23%). And 19.5% had open globe injuries and 3% had involvement of the cranial nerves.

• CONCLUSION: Ocular injuries are common and preventable causes of monocular blindness.

• KEYWORDS: ocular trauma; adnexa; perforation; laceration

DOI:10.3980/j.issn.1672-5123.2017.12.05

Citation: Chauhan N, Tuli R, Sharma RK, Kumar D. Pattern of mechanical ocular injuries in patients visiting a ural referral centre. *Guoji Yanke Zazhi* (*Int Eye Sci*) 2017;17(12):2207-2211

INTRODUCTION

Ocular trauma, once described as a neglected disorder has recently been highlighted as a major cause of visual morbidity. Worldwide, there are approximately 1.6 million people blinded from eye injuries, 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss, this being the commonest cause of ocular unilateral blindness today. Therefore, we aim to study the pattern of mechanical ocular injuries and determine their types, extent and preventive factors.

SUBJECTS AND METHODS

The study was conducted in the Department of Ophthalmology, Dr. RPGMC, Kangra (Himachal Pradesh) for a period of 12mo from 1st Jan 2013-31st Dec 2013 which included data collection, data organization, presentation, data analysis and data interpretation followed by a period of follow up extending to a period of 1mo. The study was conducted under the guidance and after taking permission from the institutional ethical review committee.

All males and females who presented with mechanical ocular injuries either directly to the hospital or were referred from other public or private hospitals were included.

Exclusion criteria patient or family member not giving an informed consent, chemical injuries. Patients with any ocular disease in the affected eye, pateints with non embedded superficial foreign bodies. It was a prospective study in which all the patients were interviewed with the aid of a questionnaire. The distant visual acuity was tested with the help of Snellen's chart. Intraocular pressure was measured (wherever possible) with the help of Applanation tonometer mounted on Haag Streit BM-900 slit lamp. Assessment of extraocular movements and careful examination was done to see for diplopia in any gaze. Pupils size, shape, symmetry was seen and pupillary reactions were assessed. Examination of the lid and adnexa was done to see for any periorbital swelling, discolouration, ptosis or lid laceration. Complete evaluation was done to note any injury to the punctum or the canaliculi. A detailed slit lamp examination was done with the Haag Streit BM 900 slit lamp and details of findings were noted down. Direct and indirect ophthalmoscopy was done to diagnose involvement of the vitreous, optic nerve head, retina and choroid. B-Scan Ultrasonography was done in patients where media haze did not allow visualization of the posterior segment by ophthalmoscopy. Radiological investigations like X ray orbit (to localize foreign bodies), CT scan (in cases of orbital fractures or to know the exact location of radioluscent foreign bodies) and MRI (for optic nerve laceration/avulsion, posterior fossa and wooden foreign bodies) were ordered wherever necessary. The injuries were classified according to the International Ocular Trauma Classification into open globe and closed globe injuries. The injuries of the lid and adnexa and the cranial nerve palsies were considered as separate entities. Statistical analysis was done with MS Excel 2007 worksheet using the Epi info 7 software.

Table 1 Age wise distribution of patients $n=200$

Age group (a)	Number of patients	Percentage(%)
0-10	33	16.5
11-20	28	14
21-30	40	20
31-40	31	15.5
41-50	24	12
51-60	23	11.5
>60	22	11

Table 2 Occupation of the patients

Occupation	Patients (%)
Unemployed	5
Labourer	11
Business	6.5
Independent profession	16.5
Cultivation	14
Service	10
Student	28.5
Housewife	8.5
Total	100

Table 3 Monthly income (in rupees)

Monthly income (in rupees)	Number of patients	Percentage(%)
Up to 5000	75	37.5
>5000-10,000	71	35.5
>10,000- 15,000	13	6.5
>15,000-20,000	17	8.5
>20,000	24	12
Total	200	100

Table 4 Circumstances of injury

Circumstances of injury	Patients (%)
Home	50
Playground	9.5
Occupational	14.5
Road side accident	19
Assault	5
School	1.5
Others	0.5
Total	100

Table 5 Mode of injuries in patients injured at home $n=100$

Mode of injury	Number of patients
Household objects/hand/finger nail	14
Vegetative matter(wooden stick/thorn)/bull horn	54
Firecrackers	14
Fall	18
Total	100

Table 6 Mode of injuries in patients up to 15y of age $n=45$

Mode of injury	Number of children	Percentage(%)
Sewing needle	1	2.22
Ball/racquet	6	13.34
Fire cracker	10	22.22
Wooden stick	8	17.78
Metallic object	2	4.44
Finger/ hand	5	11.11
Road side accident	3	6.67
Stone	1	2.22
Fall	8	17.78
Plastic pipe	1	2.22
Total	45	100

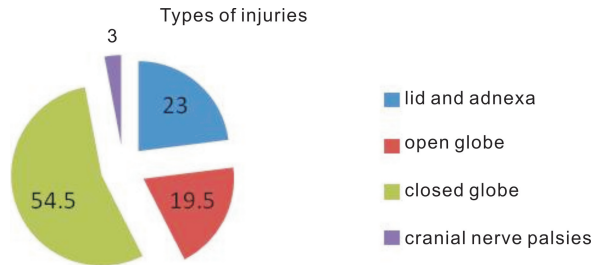

Figure 1 Types of injuries.

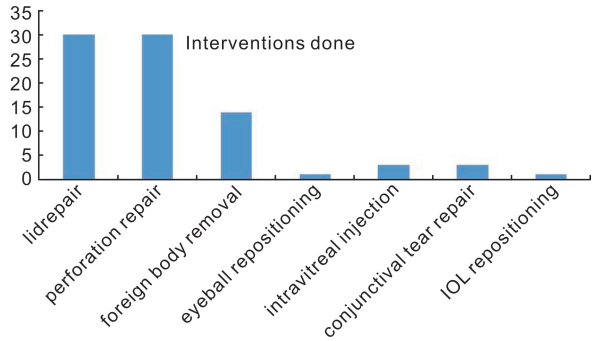

Figure 2 Interventions done.

RESULTS

A total of 21710 patients attended the OPD during the study period out of which 200 patients were of mechanical ocular trauma which formed 0.921% of the total OPD attendance. These patients were subjected to meticulous history taking and a detailed ocular examination was done.

The following observations were made: The patients ranged in age from 1y-80y with a mean age and standard deviation of 33.12±20.48y. Out of these 75.5% were males and the rest were females. There was 46% had involvement of the right eye, 44% left eye; and the remaining 10% had involvement of both the eyes. As far as the educational status was concerned, it was seen that 19.5% were uneducated, 21.5% had attained primary education (till 5th grade), 30.5% secondary education (till 10th grade), 15.5% till 12th grade, 10% were graduates and 3% post graduates.

And 62% patients reached our centre within 24h, 29.5% reached within 1wk, 6.5% within 1mo and 2% reached after 1mo. The visual acuity at presentation was upto 6/12 in 47% patients, <6/12-6/36 in 13.5%, <6/36-1/60 in 6%, <1/60-PL positive in 22%, PL negative in 4% and acuity could not be assessed in 7.5% patients.

DISCUSSION

Traumatic eye injuries have been found to be a common phenomenon in developing countries like ours[1]. They are important causes of utilization of ophthalmic service resources. There were about three times more males than females in our study; males being 75.5% and females 24.5% of the total patients studied. This finding is in line with previous reports stating that there was a higher involvement in trauma among the male gender because the males are more active and engage in a lot more outdoor and risk-laden activities than their female counterparts. Kinderan *et al*[2] in their study conducted in the western region of Nepal showed that out of eleven hundred eyes of 1069 patients (31 bilateral injuries), 69.3% were males and 30.7% were females. In addition, Hossain *et al*[3] in their study on the pattern of ocular trauma showed that 76% patients were males and the female patients were 24%.

In our study, more than half of the patients were aged between 20-60y. These are mostly people in the active and economically productive age which is similar to the findings by some other authors like Addisu Z[4] and CJN Imoru *et al*[5]. This highlights the socioeconomic impact and the burden of ocular injuries on the society.

In our study 30.5% individuals had completed secondary education, 10% were graduates and 3% were post graduates, showing that ocular trauma is not just confined to the less educated lower socioeconomic strata of society.

There was 28.5% of those injured in our study were students, 14% were involved in farming and 11% were labourers, 16.5% patients were involved in independent profession (plumber, carpenter, chef, *etc.*) (the classification was done as per the udaipareek socioeconomic status scale). The increased occurrence of ocular injuries among students highlights the need of parental or elderly supervision at play, adequate awareness of traffic rules and driving skills should be judged before giving a driving license.

In our study 50% of all injuries occurred at home, 19% occurred due to road traffic accidents, 14.5% were occupational (workplace), 9.5% occurred on the playground, 5% due to assault, 1.5% at school and 1 patient (0.5%) was injured due to stampede in a religious camp. Desai *et al*[6] also reported that home was the commonest place of sustaining ocular injuries seen in 30.2% patients followed

by work place in 19.6%. The reason why home was the most common place of injury in our study could be because most patients came from a rural background and were involved in household activities like collecting wooden sticks for lighting chulhas for cooking, collecting fodder and feeding cattle. Also fire crackers were an important cause of ocular injuries at home which were seen to occur mostly during the Diwali season in the month of October. Oluyemi F[7] in his study done in Nigeria also showed that ocular trauma occurred in a domestic setting in 47.4% cases. This was in contrast to the study done by Levent *et al*[8] to evaluate the etiological characteristics of open globe injuries in geriatric patients, where 63.3% were injured in the farm. Also in a study done on occupational open globe injuries in 2001 by Vasu *et al*[9], of the 129 consecutive patients of open globe injuries reviewed, 33.3% were occupation related, 95.35% patients were males and 4.65% were females, 79.06% patients were between 16 and 45y of age.

In our study, closed globe injuries (54.5%) were encountered more than open globe injuries (19.5%). Also the study conducted in Jimma university showed that closed globe injuries (45.4%) were more common than open globe injuries (22.7%) and cornea was most commonly affected part of the eye (63.2%)[10]. This may be due to the anatomical position of the cornea being most anterior. This was in contrast to Cao *et al*[11], who in their study done on hospitalized patients in China showed that the incidence of open-globe injuries was 55.1% and was higher than closed-globe injuries which was 43.4%, 18.6% patients had ocular adnexal injuries. Omolase *et al*[12] in their study done in 2011 concluded that 84.1% patients sustained blunt eye injury while 12.1% had penetrating eye injury. A considerable proportion of patients, that was 37.9%, presented within 24h of injury. Vegetative materials were the most common offending agent seen in 42.4% patients, 22% patients were admitted and none of the patients had used eye protection at the time of injury. In a study by Kanoff *et al*[13] there was a higher incidence of IOFBs and penetrating injuries in patients injured at work. Both the preoperative and final best corrected visual acuity was better in the work-related group. The final visual acuity was better than 20/200 in 74.1% of cases of work-related open globe injuries.

Out of the 39 patients of open globe injuries in our study, 6 (15.38%) had visual acuity better than or equal to 6/12, 14 (35.89%) had acuity from less than 1/60 to PL positive and 5 (12.82%) were PL negative on follow up after 1mo whereas in patients of closed globe injuries, the visual acuity on follow up after 1mo was ≥6/12 in 76.15% patients. This showed that the visual outcome was better in closed globe injuries than in open globe injuries. Also it was seen in the study that the patients of open globe injuries having involvement of the lens (traumatic cataract, subluxation, phacocele) had poor visual outcome on follow up after 1mo than those in which there is no lens injury. It was seen that there is no significant relation between the time interval between trauma and surgery and the final visual outcome. The study done in Singapore by Aggarwal *et al*[14] also identified associated traumatic cataract as one of the factors contributing to poor post operative visual outcome in open globe injuries.

Most of the patients of open globe injuries in our study had type B open globe injury and Zone I (upto the corneosclerallimbus) was the most commonly involved. In a study done to assess the epidemiology of ocular trauma in adult patients admitted to the University Hospital of the West Indies (UHWI), Jamaica, between January 2000 and December 2005, the most common place of injury was home in 30.2% patients followed by street in 28.2%, 2% injuries occurred during recreational activities. The most common cause of ocular injury was motor vehicle accident in 18.6%. The second most common cause was from nail hammering seen in 14.3%, of which 97.2% were males[5]. In a study aimed to review the epidemiology and visual outcome of patients with open globe injuries in the Northwest part of Turkey, 95 eyes of 95 patients aged between 3 and 79 years were reviewed. The types of open globe injuries seen were laceration in 80% and rupture in 20%[15]. This is comparable to the study done by El-Sebaity *et al*[16] to study pediatric ocular injuries in Upper Egypt, in which the most common cause of injury in children aged 16 years or younger was fall on the ground, followed by wood and stones.

In our study, 15% patients needed repair of lid laceration, corneoscleral perforation repair was needed in 15%. In 7% patients, foreign body removal was done which included conjunctival, deep embedded corneal foreign bodies, foreign bodies in the anterior chamber and in the bony orbit (in 1 patient). Intravitreal injections were given in 3 patients and manual repositioning of the globe was done in 1 patient who had prolapse of the eyeball.

Significant complications on subsequent follow ups for 1mo were seen in a total of 34 (17%) patients which included traumatic cataract in 20 (10%), endophthalmitis in 3 (1.5%), angle recession in 2, optic atrophy in 2 and phthisis bulbi in 1 patient.

This was in contrast to the study done by Asaminew *et al*[10] in Jimma University where endophthalmitis was seen in 4.9% cases and traumatic cataract in 3.3%.

On follow up after 1mo 66% patients had visual acuity upto 6/12, 8.5% had acuity from less than 1/60 till PL positive and 4.5 % were PL negative.

This was similar to the result of the study done by Maurya *et al*[17] on Indian University students where the final visual acuity in patients with ocular injuries was reported to be 6/18 or better in 60.24% patients.

Most of the patients in our study had a good visual outcome due to a number of reasons: 47% patients had visual acuity upto 6/12 at the time of presentation, 62% patients reached

our centre within 24h and therefore early medical management could be started. In patients of open globe injuries, Zone I was commonly involved which has a favourable prognosis as compared to patients with Zone II and Zone III. Closed globe injuries which have a better prognosis were more common than the open globe which have a poor visual outcome. Ayanniyi *et al*[18] in their cross sectional study on 1393 pupils from 10 randomly selected schools in Nigeria showed that unilateral phthisis bulbi occurred in 0.14% (2 out of 1393) patients, couching in 0.07% (1 out of 1393) and retinal detachment in 0.07% (1 out of 1393) patients, all leading to blindness in the affected eyes. A retrospective review of 135 patients of penetrating ocular injuries over a 10 year period done by Oluyemi F[7] showed that the presenting visual acuity was better than 6/18 in only 3.0% patients, whereas 63.0% patients had acuity less than 3/60 and 16.3% patients had no light perception at presentation. At the last follow-up visit, the overall best corrected visual acuity (BCVA) was 6/18 or better in 14.8% patients; 59.3% patients had 3/60 or less BCVA; 25.2% patients had no light perception. All patients with visual acuity <3/60 had corneal opacities, and 70% patients had phthisical eye.

Ocular injuries are still a common and preventable cause of monocular blindness. From our study it can be inferred that ocular injuries are not only confined to the less educated lower socioeconomic strata of society but extend to all the classes of society. Community education is an essential part in prevention which should, therefore also include people belonging to the higher socioeconomic status and the well educated class. Efforts to prevent ocular injuries should particularly be directed towards improving established domestic habits and taking care during farming and harvesting activities. Adult supervision is an important factor in the prevention of eye injury in the pediatric group. Dangerous fire crackers should be completely banned, these being the most common cause of ocular injuries in children in our study. As students were seen to be affected very commonly, efforts should also be directed in particular towards them. Adult supervision at home and school and appropriate education regarding traffic rules on road can help combat the problem.

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