

## Outcome of Corneal Scleral Laceration in Yazd

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### Abstract

The aim of this study is to define the epidemiologic characteristics and clinical profile and evaluation of final visual outcome of corneal scleral laceration. A prospective survey was conducted over a two year period from March 2000 to March 2002 on 79 consecutively admitted patients who underwent corneal scleral repairment at Yazd Eye Hospitals. This study included 79 eye injuries. Fifty nine of cases (74.7%) occurred in males and 20 cases (25.3%) in females. Mean age was 17.08 years. Left eye was more commonly involved (57%). Initial VA was an important predictor of final VA. Good initial VA > 20/200 leading to excellent final VA. 40.6% of traumas occurred in the first decade of life. Injuries less than 10 mm and related to zone I and II predicted a good visual outcome. In this study endophthalmitis (5.1%) was much less likely to develop in eyes with primary repairment within 24 hours from the injury (1.5%) than in eyes being repaired after 24 hours (21.4%) and the difference was significant (P=0.016).

Significant predictive factors for final VA after corneal scleral injury include: initial VA, wound length, wound and location, and the time of primary repair.

**Key words :** Corneal laceration, open globe injury.

### Introduction

About 2.4 million eye injuries occurs annually in USA<sup>1</sup>. Ocular trauma is one of the most important preventable causes of visual impairment.<sup>2</sup> Occupational injury is most common cause of ocular penetrating disorders. Sport events, fighting, and accidents also due to the firecracker and sharpness instruments causes eye injury.

Eye injury is the most common cause of monocular blindness in children. Approximately 75% of the population who have visual disorder due to trauma are blind in one eye. Among the people who are examined by Ophthalmologists, one out of 20 has an eye injury.<sup>3</sup> Open globe injuries are one of the commonest emergencies in ophthalmology, and requires immediate surgery.<sup>4</sup> Open globe injury appears as corneal scleral laceration and prolapse of intraocular Contents.<sup>5,6</sup>

Corneal and scleral wound treatment has been drastically changed due to microsurgical techniques during the past 50 years<sup>7</sup>, and its management requires careful evaluation and highly skilled surgical team in order to reduce the need for secondary procedure. Several societies and international data banks are established for recording the demography of eye injuries, such as National Eye Trauma System Registry (NE)<sup>8</sup> to provide optimal

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clinical care for severe ocular injuries, to foster research on eye injury, and to increase awareness of ocular trauma as a public health problem.

At present however only limited follow-up studies do exist in Iran, so it is necessary to collect datas of ocular traumas through these prospective studies. This study was conducted to determine the outcome of corneoscleral laceration repairment.

**Patients and Methods**

A prospective cross-sectional study was designed, for 79 patients with globe laceration who referred to Yazd eye hospital for emergency operation. History of patients including, demographic characteristic, type of injury, duration between accident and the initial repairment, initial and final visual acuity, were collected by interview and clinical examination. Location of injuries were categorized as zone 1) cornea and limbus, zone 2) limbus, up to 5mm to its posterior part, zone 3) from zone 2 to the equator. Length of injuries were divided into 3 groups (<5mm, 5-10 mm, >10mm). Some patients required secondary operation, including enucleation for complications of injuries. The patients were examined and followed-up each day during hospitalization, every week during first month of post-op, and every month until six months consequently. SPSS software was used for data analysis.

**TERMINOLOGY:**

Visual Acuity (VA): Excellent (20/60>), Good (20/200>), Poor (HM-LP-NLP), Enucleation. FC (Finger Count), HM(Hand Movement), LP(Light Perception) , NLP(No Light Perception)

**Results**

A total of 79 patients with corneoscleral rupture have been operated. Fifty nine cases (74,4%) were men and 20 cases (25.3%) were women. Right eye in 43% and left eye in 57% of the cases were involved. Mean age of patients was 17.08 years ranging

between 2 to 83. The frequency of different causes of traumas were as follow: penetrating in 62 patients (78.5%), blunt in 13 patients (16.4%) and missile in 4 cases. Distribution of open globe injuries according to type of trauma and sex is shown in Fig. 1.

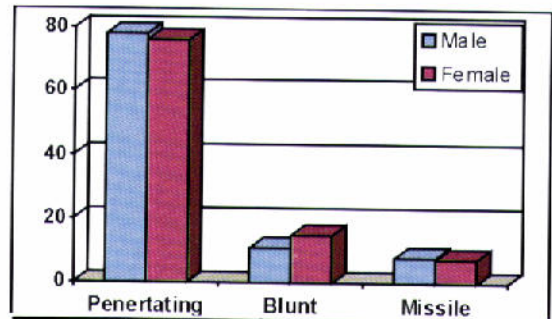


Figure 1: Distribution of Open Globe Injuries According to the Type of Trauma and Sex

Thirty two patients (40.5%) were less than 10 years old and most common type of trauma in this group was penetrating injuries. The percentage of penetrating trauma as a cause of injury was reduced in older patients while blunt and missile were increased, (Fig. 2). Visual acuity before and after surgery is shown in table 1.

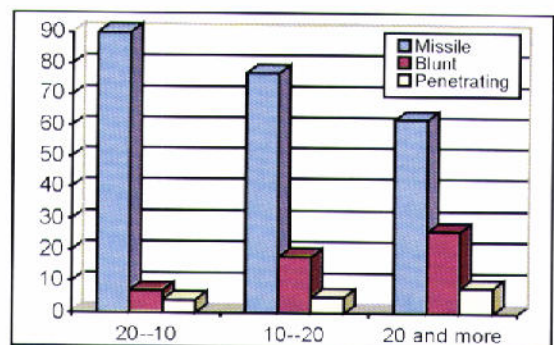


Figure 2: Distribution of Globe Injury According to the Age Grouping and Type of Trauma

VA	5/10-10/10	1/10-5/10	FC	LP ≤
Before operation	12 (15.2%)	7 (8.9%)	18 (22.8%)	42 (53.1%)
After operation	27 (37%)	20 (27.4%)	19 (26%)	7 (9.6%)



The final visual acuity was satisfactory (VA>20/200) in 64.5% of patients with penetrating trauma, and in 38.5% of patients with blunt injury.

This study showed that when initial vision is good, the final vision had better improvement, and is either good or excellent. Thus all patients with initial visual acuity more than 6/10 had final VA better than 6/10, but only 16.1% of patients with initial VA of FC or less earn final VA of 6/10 and better.

The relationship between the length of rupture and final visual acuity is shown in Table 2. When the length of rupture was less than 5mm, 68.7% of cases had a VA better than 6/10, in ruptures of 5-10mm (32.1%) and in rupture more than 10mm, 12.5% had VA more than 6/10. Six NLP cases belonged to patients with lacerations more than 10mm in length.

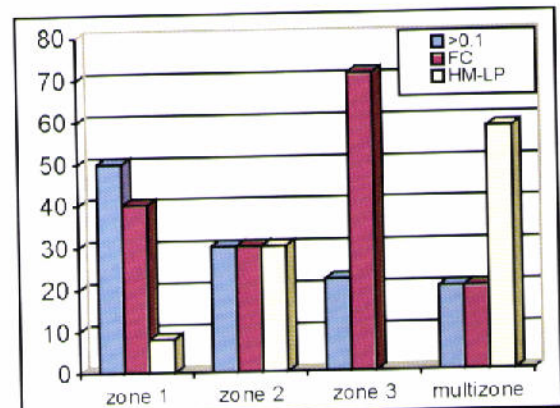
The interval between occurrence of injury and repairment surgery was as follows: 42.8% of patients before 12 hours, 40% between 12-24 and 17.7% after 24 hours.

**Table 2: Distribution of Trauma According to VA and the Length of Rupture**

VA	5/10-10/10	1/10-5/10	FC	Lp ≤
<5mm	24 (68.7)	7	3	1
5-10mm	9 (32.1)	6	12	1
>10mm	2 (12.5)	3	3	8

The role of period from the onset of injury to repairment and final visual acuity determined that when this period was shorter the predictive visual outcome was better and visa versa. When this period was less than 12 hours no cases of NLP, but all cases of NLP was found in repairment with more than 24 hours delay after 24 hours. There was a better predictability of VA in injuries on zone 1 and 2 in comparison with zone 3, as it is shown in Fig.3. When repairing is performed before than 24 hours 1.5% of patients and when in more than 24 hours 21.4% of patients, show endophthalmitis, (P=0.016). There were 4 cases of endophthalmitis (5.1%) and there was no significant difference between frequency of endophthalmitis in penetrating and blunt traumas. Enucleation was performed in six cases (7.50%) one for penetrating, four for blunt and one cases for missile trauma (7.6%). Only one of them was operated primarily, who had a wide rupture and a repairing time of 5 days after onset of damage,

while five eyes were enucleated in secondary operation. Logistic regression analysis showed that there was significant relation between variables of initial visual acuity, time of repairment, length of wound and final VA.



**Figure 3: Distribution of Open Globe Injury According to the VA and Location of Injury**

**Discussion**

This study indicates that primary visual acuity of LP and less, blunt trauma, posterior rupture, rupture with more than 10mm in length more than 24 hours delay in repairment has poor prognosis. Mean age of patients was 17.08 years old, ranging from 2 to 83 years. In 57% of cases left and 43% of cases right eye was involved. Male to female ratio was 74.4 to 25.3. Dannenberg et al.<sup>8</sup> found the mean age of 30.5 years, 51% involvement of left eye, and male to female ratio of 70 to 30. Pieramici<sup>10</sup> from Wilmer institute has reported 52% of left eye involvement and 48% of the right eye, with male to female ratio of 80 to 20, ranging between 1 to 89 years<sup>10</sup>. From 1985 to 1991, the NETS collected data of 2,939 cases of penetrating eye injuries at 48 collaborating eye trauma centers in 28 States. Eighty three percent of the cases were men; the median age of the patients was 27 years, ranging from 1 to 92 years. Seventy seven percent of the injuries were unintentional, 22% was caused by assault, and 1% was self-inflicted and it was compatible with our results. The mean age in this study was 17, 08 years. The reason for low mean age is probably due to more usage of sharp instruments by children. This study showed that penetrating, blunt and missile traumas are causes of corneal scleral lacerations in 79.4%, 15.1% and 5.5%



of the cases respectively. According to Werner<sup>6</sup> this rate was 48%, 30% and 17% respectively. In this study 40.6% of injuries was seen in the first decade of life and 90.7% of the cases was penetrating trauma. In a similar study by Nik-Eghbaly<sup>11</sup>, he found 92% of the causes due to penetrating and 8% of the causes due to blunt trauma, 24% of their patients had less than ten years old and 88% of the patients were men. In shoja's study<sup>12</sup> the male to female ratio was 4 to 1.

Findings of this study support the above mentioned studies. Higher rates of penetrating traumas in this study confirms that patients did not use eye protectors while working. In Boum's study<sup>9</sup> vision of 5/10 and more was found in 48% of penetrating traumas and 16% of blunt traumas. Thirty three percent of blunt traumas lead to enucleation. Our study showed that 35.6% of penetrating traumas and 23.1% of blunt traumas had a vision 6/10 and better, and 30.7% of patients with blunt trauma lead to enucleation. The difference between two studies may be due to differences in the number of patients. Wilmer's study showed that patients with an initial VA of 5/10 and better, had final VA of 6/10 and more. In a study performed by Esmaili<sup>13</sup>, patients with initial vision of 1/10 and better found a VA of  $\geq 3/10$ , with no cases resulting to enucleation.

Saxeua's study<sup>19</sup> found ruptures of less than 5mm with VA of 5/10 and more, in 62% of patients. Also in Gilbert<sup>14</sup> Detaum<sup>15</sup> and Starnberg<sup>16</sup> studies there was a significant relationship between length of rupture and final visual outcome.

The study showed that when repairing was done before and after 24 hours from injury, 1.5% and 21.4% endophthalmitis was seen, respectively. In Shoja study in Yazd,<sup>12</sup> six cases of endophthalmitis

was seen in repairment after 24 hours. Thompson<sup>18</sup> mentioned that delay in primary repairment (>24 hours) may raise the risk of infectious endophthalmitis to four fold. The enucleation rate in Behbahani's study<sup>20</sup> was 6%, and in this study it was 7.6% while in previous study in Yazd<sup>12</sup> it was 8.4%. Roper Hall<sup>17</sup> in 1955 has reported that nearly 45% of anterior segment damage lead to enucleation. The reduction in rate of enucleation at present time is mainly due to the development of microsurgery and vitreo-retinal operation during past two decades.

**Conclusion:** These findings suggest that more prospective studies should be performed in other ophthalmology centers, and it is necessary to establish a trauma and blindness prevention society in Iran. Public awareness on usage of safety eye protectors is necessary.

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