

Original Article

Angle Recession in Patients with Closed Globe Injury

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ABSTRACT

Purpose: To determine the frequency of angle recession following closed globe injury in patients presenting to the department of ophthalmology of a tertiary care hospital of Pakistan.

Study Design: Descriptive observational study.

Place and Duration of Study: Study was conducted at Eye-A Unit, Hayatabad Medical Complex, Peshawar from 14th March 2017 to 14th Sept 2017.

Methods: One hundred and sixty three patients were selected for this study after applying WHO sample size calculation formula. Patients with history of closed globe injury were recruited through consecutive sampling technique. A detailed history regarding trauma, causative agent, duration of injury and site of impact was taken. Ocular examination including visual acuity and detailed examination of both anterior and posterior segment was carried out using slit lamp biomicroscope. Gonioscopy was performed to check the presence and extent of angle recession.

Results: Mean age was 33 ± 8.82 years. Seventy five percent patients were male and 25% female. Type of trauma included; 57 (35%) patients had road traffic accidents, 33 (20%) patients had stone injuries, 37 (23%) patients had sports injuries while 36 (22%) patients had eye trauma due to other types like fall, fight, glass injuries, chemical exposures etc. In 90 (55%) patients, right eye was affected while 73 (45%) patients had trauma in left eye. Duration of trauma was ≤ 2 days in 124 (76%) patients while mean duration was 1 day with $SD \pm 1.034$.

Conclusion: Frequency of angle recession was 28% following closed globe injury.

Key Words: Angle recession, closed globe injury, ocular trauma.

How to Cite this Article: Farhan M, Illyas O, Rehman M, Humayun J, Ahmad A. Angle Recession in Patients with Closed Globe Injury. Pak J Ophthalmol. 2022, **38 (1)**: 58-62.

Doi: 10.36351/pjo.v38i1.1248

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Received: March 31, 2021
Revised: July 28, 2021
Accepted: December 12, 2021

INTRODUCTION

Ocular trauma is one of the important causes of preventable blindness globally.¹ Eighteen million people worldwide have uniocular blindness from traumatic injury.² In the United States, there are approximately 2.5 million cases of eye trauma every year, resulting in approximately 50000 people who suffer from partial or complete loss of vision. In addition, the rates at which eye injuries require hospitalization are in the range of 4.9-89 per 10 million in developing countries.³

Blunt trauma forms a major part of ocular trauma. Squash balls, elastic luggage straps, falls and champagne corks are the most common causes of blunt ocular trauma.⁴ Blunt ocular trauma or ocular contusions cause an antero-posterior compression of the globe and elongation of the equatorial area. Both anterior and posterior segment structures may be influenced by this rapid deformation of ocular tissues. Cornea, iris, lens and zonules are the most affected tissues from trauma as they are vulnerable to acute deformation.⁵ Hyphema, glaucoma, angle recession, iris deformities, cataract, and lens luxation or subluxation are reported complications of ocular contusion.⁶

Angle recession is a common result of blunt trauma. As contact with the globe occurs, anterior-to-posterior compression forces the aqueous laterally, stressing the limbus. The longitudinal fibers of the ciliary muscle become separated from the circular fibers. This can also shear small vessels of the anterior ciliary arteries, leading to hyphema.⁷

The incidence of angle recession after eye trauma ranges from 20 to 94%.⁸ Patients with traumatic angle recession are prone to develop angle recession glaucoma. The possibility of developing glaucoma in an eye with angle recession appears to be related to the extent of angle recession. If more than 180° of the anterior chamber angle is involved, there is a greater chance of subsequent development of glaucoma.⁸

Anterior chamber angle recession has been reported to be the most common sign of previous blunt trauma to the eye.

A patient who has experienced blunt ocular trauma needs a comprehensive eye examination for the presence of angle recession and other abnormalities.⁹ As angle-recession glaucoma can occur even many years after trauma, patients should receive adequate counselling, and follow-up examinations should be performed regularly.

This study will give us a magnitude of angle recession following closed globe injury in our setup, which can help in early diagnosis of angle recession glaucoma in future.

METHODS

The total sample size was 163 by using WHO sample size calculator, based on 14.6% prevalence of angle

recession after blunt ocular trauma where confidence level = 95, absolute precision = 5% and population proportion (P) = 14.6%. Consecutive (non-probability) sampling technique was used for sample selection. All patients presenting with closed globe injury (diagnosed on clinical examination), with duration of less than 01 week and intensity mild to severe were selected. Age ranged from 18 to 60 years. Patients of either gender were included in the study. Non-cooperative patients, patients not willing to be part of the study and those having corneal opacity obscuring angle view (on the basis of clinical examination) were excluded from the study. Closed globe injury was defined as trauma to eyeball in which the corneo-scleral wall of the globe was intact. Closed globe injuries were further classified on the basis of visual acuity on initial examination as mild when initial visual acuity was equal to or greater than 6/12, moderate when initial visual acuity was greater than 3/60 but less than 6/12 and severe when the initial visual acuity was less than 3/60. Angle recession was considered as variable degree of cleavage between circular and longitudinal fibres of the ciliary muscle seen on gonioscopy. The purpose and benefits of the study was explained to the patients/attendants and written informed consent was obtained from each patient. A data collection proforma was filled for each patient having a detailed record of the disease including age, gender and laterality. A detailed history regarding trauma, causative agent, duration of injury and site of impact was noted. Ocular examination including visual acuity and detailed examination of both anterior and posterior segment was carried out using slit lamp. Gonioscopy was performed to check the presence and extent of angle recession. All the analysis was done in SPSS version 20.0. Frequencies and percentages were calculated for categorical variables like gender, type of trauma, laterality and angle recession. Mean \pm Standard Deviation was computed for numeric variable like age and duration of trauma. Angle recession was stratified among age, gender, laterality, type of trauma and duration of trauma to see effect modifications. Post stratification Chi Square test was applied keeping P-value <0.05 as significant. All the results were presented in the form of tables and charts.

RESULTS

In this study, mean age was 33 ± 8.821 years. Sixty five (40%) patients were 20-30 years of age, 54 (33%)

patients were in the age range of 31 – 40 years, 33 (20%) patients were between 41 – 50 years and 11 (7%) patients were 51 – 60 years. There were 122 (75%) males and 41 (25%) females. Ninety (55%) patients had trauma in right eye while 73 (45%) patients had trauma in left eye. Duration of trauma was ≤ 2 days in 124 (76%) patients and 39 (24%) patients had duration of trauma of > 2 days. Mean duration was 1 day with $SD \pm 1.034$. Road traffic accident was the cause of trauma in 57 (35%) patients, 33 (20%) patients had stone injuries, 37 (23%) patients had sports injuries while 36 (22%) patients had eye trauma due to other causes; e.g. fall, fight, glass injuries, chemical exposures etc. Forty six (28%) patients had angle recession while 117 (72%) patients did not have angle recession. Stratification of angle recession with age, type of trauma and duration of trauma is given in tables 1, 2 and 3.

Table 1: Stratification of Angle Recession with Respect to Age Distribution ($N = 163$).

Angle Recession	20 – 30 Years	31 – 40 years	41 – 50 Years	51 – 60 Years	Total
Yes	18	15	9	4	46
No	47	39	24	7	117
Total	65	54	33	11	163

Chi Square test was applied in which P value was 0.9425

Table 2: Stratification of Angle Recession with Respect to Duration of Trauma ($N = 163$).

Angle Recession	≤ 2 Days	> 2 Days	Total
Yes	35	11	46
No	89	28	117
Total	124	39	163

Chi Square test was applied in which P value was 0.9980

Table 3: Stratification of Angle Recession with Respect to Type of Trauma ($N = 163$).

Angle Recession	RTA Injuries	Stone Injuries	Sports Injuries	Other Injuries	Total
Yes	16	9	11	10	46
No	41	24	26	26	117
Total	57	33	37	36	163

Chi Square test was applied in which P value was 0.9961

DISCUSSION

Our study shows that the mean age was 33 years with $SD \pm 8.821$. The frequency of angle recession was

found to be 28% following closed globe injury. In a study done in central India, it was seen that out of a total of 220 cases of trauma, mean age was 8.74 ± 3.93 years, males were predominantly affected and open globe injuries outnumbered blunt injuries.¹⁰ Another researcher reported Cricket-related ocular injuries. His results showed that these injuries had poor prognosis with most cases being closed globe injuries with retinal detachment. Angle recession was seen in 18% cases in his series.¹¹ It has been reported that among patients who experience traumatic angle recession, 5% to 20% will develop glaucomatous optic neuropathy.¹² Literature shows that no difference was seen between the incidences of angle-recession glaucoma when comparing hyphema versus microhyphema.¹³ A study conducted by Kaur S, et al¹⁴ showed that the incidence of angle recession after eye trauma ranged from 20 to 94%.

According to one study, a total of 5 to 20% of patients with traumatic angle recession would go on to develop glaucoma.¹⁵ A very low incidence of only 7-9% is reported by other author, which is quite less than our results.¹⁶

The possibility of developing glaucoma in an eye with angle recession appears to be related to the extent of angle recession.¹⁷ On examination, if there is presence of increased pigmentation at the angle, raised IOP, blood in anterior chamber, subluxation of lens, and angle recession of more than 180 degrees, there are chances that it will lead to chronic glaucoma after closed globe injury. UBM findings include a wider angle and the absence of cyclodialysis cleft.¹⁸ If more than 180° of the anterior chamber angle is involved, there is a greater chance of subsequently developing glaucoma.¹⁹

Similar findings were observed in another study conducted by Salmon JF et al²⁰ in which anterior chamber angle recession had been reported to be the most common sign of previous blunt trauma to the eye. The prevalence of post-traumatic angle recession in that report was 14.6%.

Limitation of the study is that it lacks long term follow up which is a mandatory part of examination of a patient with blunt ocular trauma. Further longitudinal studies are required for this purpose.

CONCLUSION

Our study concludes that the frequency of angle recession was 28% following closed globe injury.

Patients with blunt trauma need long term follow up which should include Gonioscopy as a mandatory part of examination.

Ethical Approval

The study was approved by the Institutional review board/Ethical review board (227/HEC/B&PSC/2016).

Conflict of Interest

Authors declared no conflict of interest.

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Author's Designation and Contribution

Mohammad Farhan; Senior Registrar: *Concepts, Design, Data Acquisition, Data Analysis, Statistical Analysis, Manuscript Preparation, Manuscript Editing, Manuscript Review.*

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