

## ORIGINAL ARTICLE

## A clinical evaluation of Glaucoma following blunt trauma in G.G.G. Hospital, Jamnagar.

Bharg kariya<sup>1\*</sup>, Mayank Acahrya<sup>2</sup>, Anwar Sipai<sup>3</sup>, Komal Vala<sup>4</sup>, Radhakrishan Khatri<sup>5</sup><sup>1,4,5</sup> Third year resident, Ophthalmology, <sup>2</sup>M.S. Ophthalmology, Additional Professor, <sup>3</sup>M.S. Ophthalmology, Assistant Professor, Shri M.P. Shah Govt Medical College, Jamnagar.

## ABSTRACT

**BACKGROUND:** to study the occurrence of glaucoma in blunt trauma in patients presenting to the eye dept, G.G.G. hospital Jamnagar. **OBJECTIVE:** to study the clinical profile, age, sex, occupation, mode of injury, intra-ocular pressure and gonioscopic grading of the patients with blunt trauma. **Settings:** various patients presenting to the eye dept, G.G.G. hospital Jamnagar with blunt trauma. **MATERIALS AND METHODS:** a total of 50 patients (50 eyes) will be evaluated for blunt trauma by detailed history taking followed by measuring visual acuity, intra-ocular pressure, anterior segment examination on slit lamp, gonioscopy and gonioscopic grading of the angle of anterior chamber. **RESULTS:** Glaucoma due to blunt trauma is a substantial yet neglected cause of vision loss especially in young patients. Detailed history taking is very important while evaluating these patients. There is profound increase in the intra ocular pressure after blunt trauma and the gonioscopic evaluation and grading of the anterior chamber angle helps in diagnosis of these patients. **CONCLUSIONS:** young male patients were more commonly affected. Left eye was more commonly affected than right eye. Labourers and farmers are more commonly affected. The most common mode of injury was by stone and wooden stick. Angle recession on gonioscopy is a significant risk factor for the development of glaucoma.

**Keywords:** 1 blunt trauma, 2 angle recession, 3 glaucoma, 4 gonioscopy

## INTRODUCTION

Blunt injury is associated with antero-posterior compression of the globe and simultaneous equatorial globe expansion which induces stress on the angle structures. As any object strikes the eye, the force of the blow transmits hydraulic forces through the aqueous. Consequently, most of the transmitted force is directed along the iris towards the trabecular meshwork, ciliary body, and zonules. It can lead to hyphema, iridocyclitis, iris sphincter tears, iridodialysis, cyclodialysis, lens subluxation, angle recession, retinal tear or dialysis, retinal detachment, vitreous hemorrhage or choroidal rupture. The most common type of glaucoma associated with blunt trauma is angle recession glaucoma. It is a Secondary Open Angle Glaucoma<sup>1</sup>. Angle recession after traumatic hyphema occurs in 71-

100% of cases<sup>2,3,4</sup>. Several publications have demonstrated that the greater the number of clock hours of angle recession, the greater the likelihood of developing elevated pressures and glaucoma. Authors have reported varying amounts ranging from 180 to 240 degrees as "at high risk," but most studies confirm that greater than 180 degrees of recession makes glaucoma more likely. Interestingly, one study reported 50% of ARG patients will go on to develop open angle glaucoma in the contralateral eye. This has led to the hypothesis that angle recession does not directly cause elevated IOP, but may accelerate the process in an already at risk eye. The key exam finding in angle recession is widening of the ciliary body band which is seen on gonioscopy. This exam finding, in the presence of elevated pressure and nerve damage, leads to the diagnosis of angle recession glaucoma. Slit Lamp Exam Other evidence of ocular trauma should clue the clinician to look for angle recession. Such findings might include sphincter tears, corneal scars, Vossius ring, iridodialysis, iridodonesis, phacodonesis and hyphema.

*\*Corresponding Author:*

Dr. Bharg Kariya  
 "Tulsi", Plot no 70 B,  
 8- Kotecha Nagar,  
 Rajkot 360001.  
 Contact No: 9723643900  
 Email: bhargkariya@gmail.com

**AIMS AND OBJECTIVES**

- To study the cases of blunt ocular trauma patients visiting the department of Ophthalmology , Guru Gobind Singh Hospital, Jamnagar , with the following aims :
- To study the clinical profile of patients presenting with blunt ocular trauma.
- To compare the findings with the contralateral eye
- To study the age, sex and occupation related variations in the patients presenting with blunt ocular trauma.
- To study the angle of the anterior chamber with Posner’s 4-mirror gonioscope and classify them according to the Scheie’s, Schaffer’s, Spaeth’s and RPC systems.
- To study the variations in the angle like iris processes, peripheral anterior synechiae, angle recession, foreign body, tumors, blood in Schlemm’s canal (if visualized).

**MATERIALS AND METHODS**

A detailed history will be taken. The visual acuity testing will be done with the help of Snellen’s chart and if V/A <6/60 , then it will be tested with fingercounting, hand movements, perception to light and projection of rays.

Intra ocular pressure will be measured by Schiotz tonometer with 5.5g and 10g weight after instillation of 2% proparacaine eye drops as a local anesthetic ,with proper cleaning of the instrument and detailed explanation to the patient about the procedure to be done.

Then a gross anterior segment evaluation will be done under torch light examination and the same will be corroborated on the slit lamp findings.

Posterior segment evaluation , if possible, will be done in detail with direct and indirect ophthalmoscopy for general fundus, optic nerve head, blood vessels and macula. On further follow-up examination , changes of glaucoma will be specifically looked for in the fundus examination.

Gonioscopy will be performed after thorough explanation of the procedure to the patient , on the slit lamp, using a Posner’s 4 mirror goniolens after

instillation of 2% proparacaine eye drops as a local anesthetic.

The grading of the angle will be done according to Schaffer’s, Schies’s , Spaeth’s and RPC grading systems. Findings such as peripheral anterior synechiae, hyphaema, pigmentations, exfoliative materials, and especially angle recession will be looked for.

**DISCUSSION**

Out of the 50 patients examined, raised intra ocular pressure i.e >21mmhg was found in 23 patients at the time of presentation, which is 46% of the patients. In the study carried out by Dr. Purvi Bhagat *et al.*, the intra ocular pressure was >21mmhg in 50.66% of the cases. Scheie HG et al reported intra ocular pressure increases to more than 24 mm hg in about 32% of ocular trauma patients.

**Table 1: Percentage of patients presenting with raised intra ocular pressure after blunt trauma**

Present study	46%
Purvi Bhagat et al	50.66%
Scheie et al	32%

Incidence of glaucoma due to blunt trauma, based on raised intra ocular pressure and gonioscopic findings, in patients presenting to eye department of G.G.G. hospital was 16%. In the study carried out by Dr. Gordon Bowler *et al* the incidence rate was 7%. Girkin, et al. used the United States eye injury registry to demonstrate that 3.39% of people go on to develop angle recession glaucoma at 6 months following blunt ocular trauma. A 10 year prospective study of 31 eyes by Kaufmin and Tolpin reported that 6% patients with angle recession will go on to develop glaucoma. According to Dr. Kirti Singh et al, the incidence of glaucoma after trauma ranges from 0%-20%.

**Table 2: Incidence of glaucoma after blunt trauma**

Present study	16%
Dr Gordon Bowler et al	7%
Girkin et al	3.39%
Dr Kirti Singh et al	0-20%

The male preponderance as compared to the females in blunt ocular trauma was evident from the male:female ratio of 2.8:1. This might be due to the fact that males are more likely to suffer trauma due to increased frequency of outdoor

activities as compared to females. In the study carried out by Penpe Gul Firat et al, the male:female ratio was 2.42:1. In a study carried out by Tielsch et al<sup>[6]</sup>, the ratio of male:female was 2.57:1. The male female ratio was 2.2 in the study done by Gadia R. et al<sup>7</sup>

**Table 3: Male:Female ratio for blunt trauma :**

Present Study	2.8:1
Penpe Gul Firat et al	2.42:1
Tielsch et al	2.57:1
Gadia R et al	2.2:1

Left eye was affected more than right eye by a ratio of 1.5:1. This corroborates with the findings by Dr Purvi Bhagat *et al* in whose study left eye to right eye ratio was 1.4:1.

**Table 4: Preponderance for left eye vs right eye for blunt trauma**

Present Study	1.5:1
Dr Purvi Bhagat et al	1.4:1

The percentage of people affected in the age group of 16-25 years was 18%, 26 -35 years was 30%, 36-45 years was 14%, 46-55 years was 16%, 56-65 years was 18% and >65 Years was 4%. This clearly demonstrates that the risk of trauma was far more in the young i.e. 16-35 years about 48% as compared to the other age groups. According to the study carried out by Dr. Purvi Bhagat *et al* 43% of the patients affected were of the age less than 35years. In a study conducted by Y. M. Canavan et al, three-quarters (77%) were less than 30 years old and nearly half (47%) were under 16 years of age.

**Table 5: Percentage of patients affected with age <35 years**

Present study	48%
Dr Purvi Bhagat et al	43%

Labourers (42%) and farmers (20%) were most commonly affected (62%). This might be because of increased work outdoors and their work exposes them to risk of blunt trauma. Moreover, they do not take any proper safety measures while working. A study by Thylefors B. et al. reported that lower socioeconomic classes are more associated with ocular trauma. Nirmalan PK, et al conducted a population-based cross-sectional study of 5150 persons 40 years or older in a randomly chosen rural population of 3 districts of southern India. The most

common setting where the ocular trauma occurred was during agricultural labor (46.9%). Incidence of trauma was higher for laborers and lower for literates.

In the study by Y. M. Canavan et al, most injuries followed sporting or domestic accidents (58.5%) and predominantly affected children (39.5%). Industrial accidents (9%) and assault (7%) accounted for a relatively small percentage of the total injuries.

The most common mode of injury was by stone (26%), wooden stick (18%), fist (14%), cow's horn (14%), ball (10%), utensil (6%), cooker (4%), door (4%), comb (2% and pen (2%). Injuries by stone and wooden sticks were more commonly seen in farmers and labourers. Injuries by ball were more commonly seen in students, whereas injuries by household items such as utensil, cookers and combs were commonly seen in housewives and retired persons. In the study carried out by Dr. Purvi Bhagat et al, 54.66% of the injuries were caused by stone, wooden stick or ball.

Angle recession >180 degrees on gonioscopy was seen in (6%) of the study group. This is a significant risk factor for the development of glaucoma in the future. Such patients should be monitored routinely for intra-ocular pressure measurement and other glaucoma investigations. It was more commonly seen in younger age group patients.

The presence of peripheral anterior synechiae was seen in (16%) of the patients. This is also a risk factor for the development of glaucoma in the future. Such patients require routine monitoring and regular follow up.

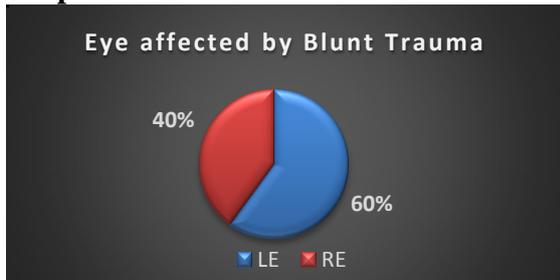
**CONCLUSION**

- Incidence of glaucoma due to blunt trauma, based on raised intra ocular pressure and gonioscopic findings, in patients presenting to eye department of g.g.g. hospital was 16%.
- There was significant male preponderance as compared to female. Male:female ratio was 2.85:1.
- Left eye was more commonly affected than the right eye. Left eye was affected

## A clinical evaluation of Glaucoma following blunt trauma

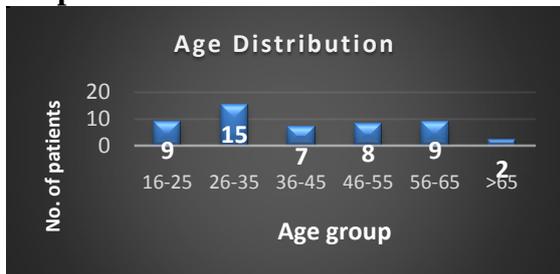
in 60% of the patients, whereas right eye was affected in 40% patients.

**Graph 1**



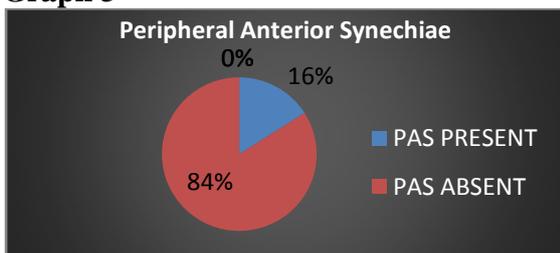
- Age group of 26-35 years was most commonly affected (30%), followed by age group of 16-25 years was 18%, age group 56-65 years was 18%, age group 46-55 years was 16%, age group 36-45 years was 14% and >65 years was 4%.

**Graph 2**



- Labourers and farmers contribute a majority of the occupations affected (62%).
- The presence of angle recession and peripheral anterior synechiae on gonioscopy significantly increases the risk of glaucoma due to blunt trauma. angle recession (>180 degrees) was seen in 6% of the patients.

**Graph 3**



- There is a lack of protective eye wear worn by occupations that are more likely to be affected by blunt trauma.
- The most common mode of injury was by stone (26%), wooden stick (18%), fist (14%), cow's horn (14%), ball (10%), utensil (6%), cooker (4%), door (4%), comb (2%) and pen (2%).

### REFERENCES

1. Shields MB, ed. Glaucomas associated with ocular trauma. Textbook of Glaucoma. 4th ed. Baltimore: Lippincott Williams & Williams; 1988. 339-44.
2. Ozer PA, Yalvac IS, Satana B, Eksioglu U, Duman S. Incidence and risk factors in secondary glaucomas after blunt and penetrating ocular trauma. J Glaucoma. 2007 Dec. 16(8):685-90.
3. Mowatt L, Chambers C. Ocular morbidity of traumatic hyphema in a Jamaican hospital. Eur J Ophthalmol. 2010 May-Jun. 20(3):584-9.
4. Wolff SM, Zimmerman LE. Chronic secondary glaucoma. Association with retrodisplacement of iris root and deepening of the anterior chamber angle secondary to contusion. Am J Ophthalmol. 1962. 84:547-63.
5. Tielsch JM, Parver L, Shankar B. Time trends in the incidence of hospitalized ocular trauma; Arch Ophthalmol 1989; 107: 519-523
6. Gadia R, Sihota R, Dada T, Gupta V. Current profile of secondary glaucomas; Indian J Ophthalmol. 2008 Jul-Aug; 56(4):285-9.