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# Hyphema Due to Blunt Injury

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***Abstract***
***Purpose -*** *To study the causes, associated ocular findings and visual acuity on presentation, complications and visual outcome following treatment in patients of hyphema due to blunt injury.*
***Materials and Methods****- A retrospective study was performed in 100 patients with hyphema due to blunt injury admitted in Maharani Laxmi Bai Medical College, Jhansi between August 2019 to January 2020. The gender, age, race, cause of blunt injury resulting in hyphema, eye involved, vision at admission, other associated ophthalmological findings, complications and visual outcome were noted from the case records of patients. The data were analyzed using SPSS programme.*
***Results:*** *Males were more predominantly affected (80%). Two-thirds of patients were aged below 30 years. Sports related injury (40%) was the most common cause for hyphema. Hyphema disappeared within 5 days in 65% of patients. Iris injuries were very commonly associated in the form of mydriasis, iridodialysis. The best corrected vision of 6/18 or better was noted in 75% of patients at the last follow-up. The follow-up of these subjects was very poor and thus the incidence of secondary glaucoma could not be established. Moderate blood staining of cornea occurred in 0.8% of patients.*
***Conclusion****: Sports related injury is the most common cause of hyphema in Jhansi. Good visual recovery, without serious complications, is possible with appropriate and in-time treatment in hyphema patients due to blunt injury.*
***Keywords:*** blunt injury, hyphema, sports injury, blood staining of cornea.

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## I. Introduction

Injury to the eye is one of the most common causes of unilateral blindness worldwide. Hyphema and concomitant injuries to ocular structures following blunt trauma are not an infrequent cause of presentation to the emergency unit in many hospitals[1]-[5]. The causes of poor vision after blunt injury include black ball hyphema, secondary glaucoma, cataract, vitreous haemorrhage, commotio retinae and retinal detachment[6]. Recognition of factors related to poor visual outcome, appropriate medical therapy, surgical intervention when indicated and careful follow up will help in preserving vision in these patients. Posterior segment injuries[7], size of hyphema at presentation and retinal damage[8] have been reported to be significant predictors of poor visual outcome in these patients; while topical steroids and/or cycloplegic medication[8] and occurrence of secondary haemorrhage[7],[8] did not influence the final visual outcome.

This study was undertaken to determine the cause of blunt injury resulting in hyphema, visual acuity and other ocular findings on presentation, complications and visual outcome in these patients. This information may help in the development of appropriate preventive measures to reduce the morbidity in cases of blunt injuries of eye.

## II. Method and Material

**Subjects:**

This is a retrospective study of 100 patients with traumatic hyphaema due to blunt injury treated in the eye ward of Maharani Laxmi Bai Medical College, Jhansi over a period of 6 months. After taking history, visual acuity was tested on Snellen chart and the anterior segment was examined with slit-lamp biomicroscope. Intraocular pressure (IOP) was measured with applanation tonometer and fundus examination was done after dilating pupil with 2.5% phenylephrine eye drops using 90D lens and slit-lamp.

**Methods**

The age, gender, race, type of blunt injury, vision at admission, other ocular findings, grading of hyphema, treatment given, time taken for absorption of hyphema, follow-up period, complications and best corrected vision at last follow-up were noted from the patients' records. Based on the level of blood in the anterior chamber (AC) at slit-lamp examination, hyphema was graded as microscopic hyphema when no clot was present (circulating red blood cells only),

- Grade I - blood filling < 1/3 of AC,
- Grade II - blood filling < 1/2 of AC,
- Grade III - blood filling more than 1/2 of AC,
- Grade IV - total hyphema with red or black clots[1].

The standard protocol of management of hyphema was followed which included admission to the hospital, complete bed rest with restricted ambulation to bath room, elevation of head up to 45 degrees, patching the affected eye with rigid shield, using topical cycloplegics (homatropine 20g/L eye drops bd), corticosteroid (dexamethasone 1g/L eye drops qid), and Tab. Vitamin C 500 mg daily. Eyes with raised intraocular pressure were treated with timolol 5g/L eye drops bd, and Tab. Acetazolamide 250 mg tds. When the IOP was high (more than 30mmHg) inspite of glaucoma medications, IV mannitol was given. Surgical evacuation of the blood was performed in eyes with total hyphema and uncontrolled intraocular pressure with medication. Patients were monitored of blood level in the anterior chamber, visual acuity and intraocular pressure daily during their stay in the hospital. Secondary haemorrhage was diagnosed if the size of hyphema was increased or if fresh blood was present in the anterior chamber.

Gonioscopy was performed during the examination in first follow-up visit. The angle appearance was noted according to Shaffer classification from grade 0 to grade IV angle and abnormalities such as angle recession and peripheral anterior synechiae were also noted. In patients where gonioscopy was not done, it was listed as not done while noting down the findings from records. The above data were tabulated and analyzed using SPSS programme.

**Inclusion Criteria**:

1. Patients between 5 and 60 years of age.
2. Patient having history of trauma.

**Exclusion Criteria**:

1. Patients of age below 5 years or above 60 years.
2. Patients with postoperative hyphema, perforating injury with hyphema, and those who absconded from the ward within a day after admission were not included in this study.

**Statistical Analysis**

The data was entered regularly. Nominal data was presented as numbers & percentage. Data analysis & percentage calculation was done using Microsoft Office Excel.

## III. Results

Out of 100 patients, majority were males (80 cases, 80%).

**Table 1:** Age wise distribution

| Age | Number of patients | Percentage |
|---|---|---|
| 5-20 | 30 | 30% |
| 21-30 | 30 | 30% |
| 31-40 | 20 | 20% |
| 41-50 | 15 | 15% |
| 51-60 | 5 | 5% |

Hyphema was present in one eye only in all the patients in our study, and 60 eyes (60%) were in the right; 40 eyes (40%) were in the left. Sports injuries (n=40, 40%) were the most common cause of hyphema, the others being industrial (n=30, 30%), home (n=25, 25%) and motor vehicle accidents (n=5, 5%).

**Table 2:** Sport related injury

| Sport Injury | Number of patients | Percentage |
|---|---|---|
| Foot ball | 15 | 37.5% |
| Shuttlecock | 10 | 25% |
| Table tennis ball | 10 | 25% |
| Shuttle racquet | 5 | 12.5% |

**Table 2a:** Industrial/Work injury

| Industrial/Work injury | Number of patients | Percentage |
|---|---|---|
| Wood stick | 9 | 30% |
| Wire cable | 5 | 16.6% |
| Nail | 5 | 16.6% |
| Screw diver | 5 | 16.6% |
| Battery explosion | 5 | 16.6% |
| Metal piece | 1 | 3.3% |

**Table 2b:** Home Injury

| Home injury | Number of patients | Percentage |
|---|---|---|
| Fire cracker | 10 | 40% |
| Wooden stick | 10 | 40% |
| Broom stick | 5 | 20% |

**Table 3:** Visual acuity at the time of presentation

| Visual acuity | Number of patients | Percentage |
|---|---|---|
| 6/60 | 30 | 30% |
| 6/9 | 15 | 15% |
| PL | 10 | 10% |
| HM | 10 | 10% |
| 6/36 | 5 | 5% |
| 6/24 | 10 | 10% |
| 6/18 | 10 | 10% |
| Normal | 10 | 10% |

The IOP at admission ranged between 8 and 42 mmHg. The IOP of 20mmHg or below was seen in 80 (80%) patients; 10 (10%) had 21-30mmHg and 10 (10%) had 31mmHg. Echymosis/haematoma of patients, sub conjunctival haemorrhage seen in some patients. There was no fracture of orbital bones in any of the patients. The most common form of hyphema in our study was grade I, seen in 50 (50%) patients, Grade II in 25 (25%), Grade III in 15 (15%), Grade IV in 10 (10%).

**Table 4:** Hyphaema grading

| Grade | Number of patients | Percentage |
|---|---|---|
| I | 50 | 50% |
| II | 25 | 25% |
| III | 15 | 15% |
| IV | 10 | 10% |

Patients with grade III/IV hyphema had associated periorbital haematoma in 14 patients, iridodialysis in 3 patients, and traumatic mydriasis in 18 patients. All patients were treated as per the standard protocol as mentioned in the methods. Surgical intervention was needed only in 2 elderly patients of grade IV hyphema (vision only hand movements) in whom the IOP did not come down to normal level in spite of medical treatment. Paracentesis and evacuation of blood clot was done in both patients. The IOP was controlled with medical treatment. The best corrected vision improved to 6/18 in one patient. However, the other patient developed moderate blood staining of cornea and vision improved to only 6/60. This patient had cataract in the affected eye; following extracapsular cataract extraction and posterior chamber intraocular lens implantation, the best corrected vision improved to 6/24 only. The IOP on discharge was 20 mm Hg or below in 90 (90%) patients and between 21 and 30 mm Hg in 3 (3%) patients. The IOP came to normal reading with continued glaucoma medication in these 3 patients during the follow up examination after 3 weeks. The time taken for absorption of hyphema ranged between 2 and 20 days; (65%) hyphema was absorbed within 5 days. All these patients were discharged from the hospital only after complete absorption of hyphema.

## IV. Discussion

The higher frequency of hyphema in males in our study is because of more males working in different industries, their participation in sports and their involvement in assaults/accidents.

## V. Conclusion

In our study, sports/games related injuries were the most common cause for hyphema (40%), of which shuttle badminton game accounted for 64.4% (29 out of 45cases). The ocular injury in this game occurs commonly with round ended shuttle cock in the smash hit by opponent player in the single game, while the injury is due to long stick end of the racket of the partner player or with shuttle cock hit by the opponent player in the doubles game. Getting injury to the eye is an unacceptable price while playing this game. Wearing the protective glasses during play like in squash game can prevent ocular injuries.

The main treatment is bed rest and topical medical therapy to prevent iritis. Visual acuity and intraocular pressure are to be monitored daily during the hospitalization of the patient. Surgical evacuation of the blood has to be done when the IOP is 50 mm Hg for >5 days, or 30mmHg for >7 days inspite of maximal anti glaucoma medications; when there is no sign of absorption of blood within 3-4 days after injury in patients with total hyphema and when there is impending blood staining of cornea. The optimum duration of surgery is 5th to 7th day after injury for the following reasons: 1) if the IOP is normal, blood staining of cornea is unlikely to occur after 5th day of trauma; 2) too early attempts to remove the blood clot may in fact cause further bleeding because of manipulations in the anterior chamber, sudden lowering of IOP and dislodgement of clot; 3) surgery after 7 days of injury would be difficult due to firm adhesions and fibrosis; 4) new blood vessels and organization of clots occur within the first 5 days after trauma; 5). The best corrected vision of 6/18 or better in 75% of patients in our study indicates the beneficial effect of appropriate and in-time treatment in patients of hyphema due to blunt trauma. The causes of poor vision in the rest of patients were the effects of associated retinal findings such as commotion retinae, macular edema and scarring, macular hole and secondary glaucoma.Wearing protective glasses during shuttle badminton, squash games and at work places, supervision of children while playing, dissemination of preventive methods of eye injuries through media and in the schools/colleges will help to reduce the ocular morbidity in young patients.

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