



RESEARCH ARTICLE

A RETROSPECTIVE STUDY OF INCIDENCE OF HYPHEMAIN TERTIARY CARE TEACHING HOSPITAL, SOUTH KERALA

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ABSTRACT

Objective: In current this study, aims to assess hyphema involving of eye presented to Emergency medicine department and Ophthalmology outpatient department at PIMS&RC, tertiary care hospital in Thiruvalla, south Kerala State, India.689001. **Materials and Methods:** This study was conducted at the Department of Ophthalmology and Emergency Medicine Department retrospective study, over a period of two years from May 2022 and May 2024. The medical records of all patients who attended emergency department and outpatient department were retrospectively reviewed. All patients were seen by trained emergency duty doctors, ophthalmologists, resident's doctors. Patients with attending the Emergency department and the Ophthalmology department were included in the study after applying the inclusion and exclusion criteria. A detailed and comprehensive ophthalmic examination was performed and visual acuity was noted at the presentation and follow-ups. The data collected data from medical record department and electronic patient record (EPR). The descriptive and analytic statistics were carried out. **Purpose:** The study aims to assess the hyphema involving anterior segment of eye presented at emergency department and ophthalmology outpatient department at PIMS&RC, Thiruvalla, Kerala State, and India. **Materials and Methods:** Retrospective study was conducted at the Department of Ophthalmology and Emergency Medicine Department between May 2022 and May 2024. The records of 108 eyes of 194 patients with a diagnosis of hyphema were retrospectively reviewed from electronic patient record (EPR). The medical records of all patients who attended emergency department and outpatient department were retrospectively reviewed. All patients were seen by trained emergency duty doctors, ophthalmologists, resident's doctors. Patients with hyphema attending the Emergency department and the Ophthalmology department were included in this study after applying the inclusion and exclusion criteria. A detailed and comprehensive ophthalmic examination was performed and visual acuity was noted at the presentation and follow-ups. The data collected data from medical record department and electronic patient record (EPR). The descriptive and analytic statistics were carried out. **Results:** A total number of 194 patients were participated in this study. Out of 194 patients 108 eyes were involved 104(96.3%) eyes were unilateral involvement and 4(3.70%) eyes were bilateral involvement. 108 were male patients (55.7%) and 86 were (44.3%) female patients. Patients of all age groups were considered in this study. Most vulnerable age group was 20-40 years (59.2%) followed by 26-60 years (%). Most common mode of injuries were blunt injury eyes 54(50%) followed by neovascularization of iris(NVI) 24eyes (22.2%) , postoperative hyphema 18 eyeS (16.6)and patients underwent laser peripheral iridotomy12 eyes(11%) and 3 eyes with anterior chamber intra ocular lens(ACIOL)(2.7%). In our study maximum numbers of patients were farmers. Most common mode of injuries were blunt injury followed by systemic disorders like proliferative diabetic retinopathy PDR,) central vein occlusion(CRVO)and post-operative procedures.(Table 4).In our patients we saw grade 1 hyphema in 64 eyes (59.2%) followed by grade 2 hyphema seen in 26 eyes(24%). Management of hyphema includes medical management and surgical management. Most hyphema are self- limited resolve within 5-8days with bed rest, head end elevations more than 30 degrees, eye shields. Grade 1& 2 hyphemas without high IOP, treated with topical predforte 1% eye drops and homide eye drops.Eyes with high IOP treated with anti-glaucoma medication drugs. In our study no sickle cell disease patient. Out of 194 patients4 patients underwent phacoemulsification for traumatic cataract, 6 patients anterior chamber wash(AC WASH), and 8 patients underwent trabeculectomy with mitomycin(0.2% MMC).We discontinued anticoagulants, antiplatelets , non- steroidal anti-inflammatory drugs and aspirin.In our study we have not used antifibrinolytics such as tranexamic acid and aminocaproic acid also reduce the risk of secondary haemorrhage by promoting coagulation. Surgical management is indicated in grade 4 hyphema with IOP more than 50mmHg and corneal blood staining. **Conclusion:** In our study ocular trauma was more common cause for hyphema. Majority of patients were farmers. Despite our methodology, the inherent limitations of studies should be considered and conclusion drawn from our pooled results should be interpreted with caution. Future large-volume, well-designed with extensive follow-up is awaited to confirm and update the findings of this analysis.

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INTRODUCTION

Hyphema is defined as accumulation of red blood cells within the anterior chamber. A majority of patients present with a history that correlates to the aetiology. Despite the degree of aetiology, the management of a hyphema and its associated complications can be challenging for ophthalmologist. The pathophysiology, clinical signs and symptoms, complications, medical and surgical treatments, and prognosis of hyphema are subsequently discussed. Microhyphema is small amount of blood that is seen under slitlamp examination. A large hyphema can be noted with pen-light examination alone. The height and color of the hyphema should be documented under slitlamp. Height can be measured in millimeters from the inferior corneal limbus. Color can vary from red to black depending on the time frame of the hyphema. Blood that has clotted will appear darker in appearance (black). Patients with hyphema may complain of blurring of vision or complete loss of vision, pain and photophobia typically proportional to the amount of hyphema within the anterior chamber. Symptoms of eye pain may occur due to elevated increased intraocular pressure (IOP) due to blockage of the trabecular outflow by red blood cells and inflammatory debris is the most common complication of hyphema.

Diagnosis of hyphema is often confirmed by a slit lamp examination, and grading of hyphemas is crucial in guiding management and determining prognosis.

Hyphemas can be graded from I-IV in the following types¹.

Grade 0: No visible layering, but red blood cells within the anterior chamber (microhyphema).

Grade I: Layered blood occupying less than one third of the anterior chamber.

Grade II: Blood filling one third to one half of the anterior chamber.

Grade III: Layered blood filling one half to less than total of the anterior chamber.

Grade IV: Total filling of the anterior chamber with blood. If the anterior chamber is completely filled with bright red blood it is called a total hyphema.

Blood in the anterior chamber is filled with dark red-black blood it is called a blackball or 8-ball hyphema. The black color is suggestive of impaired aqueous circulation and decreased oxygen concentration. Eight ball hyphema is more likely to cause pupillary block and secondary angle closure glaucoma². In case of hyphema measurement of intraocular pressure (IOP) is important, it causes high IOP in Grade IV hyphema or eight ball hyphema. Case with rebleeding had a more than 50% chance of elevated IOP and grade 3 & 4 hyphemas.³ The aetiology of hyphema can occur after blunt injury or penetrating injury, spontaneously-eg; in cases like rubeosis iridis, juvenile xanthogranuloma, iris melanoma, myotonic dystrophy, keratouveitis (e.g., herpes zoster), leukemia, hemophilia, von-Willebrand disease, and on blood thinners like warfarin, aspirin.⁴ Compressive force to the globe can result in injury to the iris, ciliary body, trabecular meshwork, and their associated vasculature. The shearing forces from the injury can tear these vessels and result in the

accumulation of red blood cells within the anterior chamber. Iatrogenic in nature of hyphema can occur after intraoperative or postoperative hyphema is a well-known complication to any ocular surgery. Following anterior chamber implantation (ACIOL) known as uveitis-glaucoma-hyphema (UGH) syndrome.² Hyphema can occur after performing the Nd: YAG laser for a peripheral iridotomy. This type of hyphema is minimal and self-limited. Spontaneous hyphema, commonly caused secondary to neovascularization (eg, diabetes mellitus, ischemic central vein occlusion), ocular neoplasms (eg, retinoblastoma), uveitis, or vascular anomalies like juvenile xanthogranuloma, Herpes zoster.⁵ Sick cell anemia is an especially important factor to be considered. Red blood cells in this disease process can sickle in the anterior chamber causing them to become rigid and unable to easily escape through the trabecular meshwork this leads to a much greater likelihood of elevated intraocular pressure 24 mmHg for 24 hours (Thumb rule) ⁶. The intravascular sickled red blood cells can cause catastrophic vaso-occlusive events like central retinal artery occlusion and ischemic optic neuropathy even at mildly elevated intraocular pressure that would not otherwise be a threat to most eyes. Sick cell anemia is much more common in those of African descent, perhaps as high as 10%.⁶ The risk of these complications is significantly increased in patients who rebleed, which occurs in up to 38% of patients with hyphema, typically within the 3-5 days after the initial injury.

Management of hyphema includes medical to surgical and aims to eliminate any potential complications.⁷ Most of hyphema are self-limited and usually resolve within one week, bed rest, head end elevation more than 30 degrees, and eye shields may be sufficient. Wearing an eye shield is also encouraged to protect the eye. Restriction of activity or bed rest prevents the risk of rebleeding. Strict bed rest is encouraged in patients susceptible to rebleeds, such as those with sickle cell disease, coagulopathies, or severe grade IV hyphema. Elevation of the head of the bed enables blood to pool at the bottom of the chamber thereby improving vision and prevents obstruction of the trabecular outflow by cells. The following drugs anticoagulants, antiplatelets, and analgesic medications such as nonsteroidal anti-inflammatory drugs and aspirin should also be discontinued for the prevention of secondary hemorrhage. Medical management include the use of topical corticosteroids, cycloplegics, antifibrinolytics, and antiglaucoma drugs. Corticosteroids are useful in the prevention of inflammation and formation of peripheral anterior synechiae, as well as reduction of inflammation. Steroids do not significantly prevent the risk of secondary hemorrhage, cycloplegics such as homatropine 1% are commonly used to reduce the risk of posterior synechiae formation and to improve patient comfort by preventing spasms of ciliary muscles. Antifibrinolytics such as tranexamic acid and aminocaproic acid also reduce the risk of secondary hemorrhage by promoting coagulation.⁸ Carbonic anhydrase inhibitors (CAI) and Diamox tablets are contraindicated in sickle cell disease. Surgical management is indicated in cases refractory to medical treatment, persistent high-grade IV hyphemas, corneal blood staining, persistently elevated IOP more than 50 mmHg for 5 -7 days and uncontrolled glaucoma. Surgical management for sickle cell disease or trait with persistently elevated IOP for more than 24 hours. Surgical options include anterior chamber wash with irrigation and aspiration, using vitrectomy cutter, trabeculectomy, peripheral iridectomy, and anterior chamber paracentesis⁷. Most common complications are secondary

glaucoma, late angle recession glaucoma, peripheral anterior synechiae (PAS), posterior synechiae, optic atrophy and serious complication is corneal blood staining. Rebleeding can occur due to clot retraction and lyses. It usually occurs within first 5 days after the injury. Risk involved in rebleeding are hypotony, high IOP, aspirin and Black patients.

MATERIALS AND METHODS

Study design and enrolment: The ethical approval to perform the study was obtained from the Pushpagiri Medical College Hospital. This was a hospital-based retrospective study conducted at a tertiary care teaching hospital in south Kerala spanning a period of two years from May 2022 to May 2024. Patients with hyphema attending the emergency department and the Ophthalmology department were selected for the study based on the inclusion and exclusion criteria. All the patient's parents were provided informed consent. **Inclusion Criteria:** All types of hyphema attending Pushpagiri Medical College Hospital ophthalmology department and Emergency Department between May 2022 and May 2024. Day 1 to 3 days were included in this study. Age group between 0 to 70 years. Follow up period was 30 days. **Exclusion Criteria:** Patients with incomplete or missing clinical note. This retrospective study was conducted at the Department of Ophthalmology and Emergency Department between May 2022 and May 2024. 108 eyes of 194 patients with hyphema were enrolled in this study. The following data were collected from the electronic patient records. Date of consultation, type of injury, systemic disease like diabetes, hypertension, on warfarin, aspirin, sickle cell disease, history of any ocular surgery. The study and data collection protocols conformed to all local laws and complied with the principles of the hospital. On arrival to Emergency department or outpatient department, following history were noted from all patients such as gender, religion, caste, residential area, marital status, and occupation and education level of patients. Symptoms and signs (pain, redness, and decreased vision), treatment or intervention already given and level of consciousness were noted. Visual statuses before injury (previous history and surgery). All patients underwent basic eye examination including visual acuity, slit lamp examination, intraocular pressure measurement (IOP) if necessary dilated fundus examination and B-Scan performed.

Table 1. Patients Demographics.

| Gender | n=194 | Percentage (%) |
|--------|-------|----------------|
| Male | 108 | 55.7% |
| Female | 86 | 44.3% |

Table 1. Patients Profile.

| Age | n=194 patients | Percentage% |
|--------------|----------------|-------------|
| 0-20 Years | 28 | 14.4% |
| 20- 40 Years | 115 | 59.2% |
| 40-70 Years | 51 | 26.2% |

Table 3. Grading of Hyphema

| Grade | n= 108 eyes | Percentage (%) |
|---------|-------------|----------------|
| Grade 1 | 64 | 59.2% |
| Grade 2 | 26 | 24.0% |
| Grade 3 | 14 | 13% |
| Grade 4 | 4 | 3.7% |

Table 4. Causes of hyphema

| Mode of Injury | N=108 eyes | Percentage (%) |
|-----------------------------------|------------|----------------|
| Blunt trauma | 54 | 50% |
| Post – operative cases | 18 | 16.6% |
| Neo-vascularization of iris (NVI) | 24 | 22.2% |
| Post Nd: Yag laser iridotomy | 12 | 11.1% |
| AC IOL | 3 | 2.7% |

Table 5. Complications of Hyphema

| Complications | n=108 eyes | Percentage (%) |
|-------------------------------|------------|----------------|
| Secondary Glaucoma | 36 | 33.3% |
| Corneal Blood staining | 2 | 1.9% |
| Posterior synechiae | 24 | 22.2% |
| Peripheral Anterior Synechiae | 34 | 31.4% |
| Rebleeding | 8 | 7.4% |
| Traumatic Cataract | 4 | 3.7% |

Table 6. Mode of Management

| | N=108 eyes | Percentage (%) |
|---------------------------------------|------------|----------------|
| Medical Management | 90 | 50% |
| Phacoemulsification with foldable IOL | 4 | 16.6% |
| AC Wash | 6 | 22.2% |
| Trabeculectomy | 8 | 11.1% |

Main outcome and measure: To measure the various type of hyphema involving anterior segment and its complications. Treatment history, surgeries are included and follow-up were not included in this study. **Statistical analysis:** Data were analyzed using IBM SPSS statistics 22.0 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) Categorical variables were presented with frequency and percentage, continuous variables presented with mean and standard deviation.

RESULTS

A total of 108 eyes in 194 patients participated in this study. 108 were male patients (55.7%) and 86 were (44.3%) female patients (Table 1). Patients of all age groups were considered in this study. Most vulnerable age group was 20-40 years 115 (59.2%) followed by 40-70 years 51 (26.2%), (Table 2) 104 eyes (96.3%) had unilateral involvement and 4 eyes (3.7%) had bilateral involvement). In our study maximum numbers of patients were farmers. Most common mode of injuries were blunt injury followed by systemic disorders like PDR, CRVO and post-operative procedures. (Table 4). In our patients we saw grade 1 hyphema in 64 eyes (59.2%) followed by grade 2 hyphema seen in 26 eyes (24%). (Table 3). The most common complications is secondary glaucoma in 36 eyes (33.3%) and least is traumatic cataract in 4 eyes (3.7%) (Table 5). Management of hyphema in our study includes medical management and surgical management. Most hyphema are self-limited resolve within 8 days with bed rest, head end elevations more than 30 degrees, eye shields. Grade 1 & 2 hyphemas without high IOP, treated with topical predforte 1% eye drops and homide eye drops. Eyes with high IOP treated with anti-glaucoma medication drugs. No our study no sickle cell disease patient. Out of 194 patients, 4 patients underwent

phacoemulsification for traumatic cataract, 6 patients anterior chamber wash (AC WASH), and 8 patients underwent trabeculectomy with mitomycin (0.2% MMC). We discontinued anticoagulants, antiplatelets, non-steroidal anti-inflammatory drugs and aspirin. In our study we have not used antifibrinolytics such as tranexamic acid and aminocaproic acid also reduce the risk of secondary haemorrhage by promoting coagulation. Surgical management is indicated in grade 4 hyphema with IOP more than 50mmHg and corneal blood staining (Table 6)

DISCUSSION

This retrospective, hospital-based study provides data, hyphema in patients attended to a tertiary care teaching centre in the emergency and outpatient department of ophthalmology. A significant number of injuries were by farmers with blunt injuries followed by systemic disease. The most hyphemas are self-limiting, adequate monitoring of complications and visual acuity is crucial. Associated complications such as cataract, secondary glaucoma, rebleeding are common. Glaucomatous vision loss can be prevented with close monitoring and timely medical treatment. In the context of hyphema long-term follow-up with an ophthalmologist for continuous monitoring of complications is highly recommended.

CONCLUSION

Despite our methodology, the inherent limitations of studies should be considered and conclusion drawn from our pooled results should be interpreted with caution. Future large volume, well-designed with extensive follow-up is awaited to confirm and update the findings of this analysis.

Conflict of Interests: The authors of the paper do not have a direct financial relationship with the commercial entities mentioned in the paper that might lead to a conflict of interests.

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