

Ocular Trauma Induced Malignant Glaucoma: A Case Report

Anuradha Raj^{1*}, Pratibha Sahu² and Vandana Sharma³

¹Additional Professor, Department of Ophthalmology, All India Institute of Medical Sciences, Bathinda, Punjab, India

²Junior Resident, Department of Ophthalmology, All India Institute of Medical Sciences, Bathinda, Punjab, India

³Assistant Professor, Department of Ophthalmology, All India Institute of Medical Sciences, Bathinda, Punjab, India

***Corresponding Author:** Anuradha Raj, Additional Professor, Department of Ophthalmology, All India Institute of Medical Sciences, Bathinda, Punjab, India.

Received: December 01, 2023; **Published:** February 23, 2024

Abstract

Malignant glaucoma is characterized by increased intraocular pressure (IOP) and shallowing of the central anterior chamber (AC) in association with the normal posterior segment. It occurs specifically after filtration surgery, peripheral iridotomy, iridectomy or cataract surgery. Alterations in the anatomy of the lens, ciliary body and anterior hyaloid push the iris-lens diaphragm forward impeding the anterior flow of aqueous humor leading to increased IOP. To the best of our knowledge, malignant glaucoma has been reported after blunt trauma only once in the literature. We, therefore report a rare case of malignant glaucoma secondary to blunt trauma which was managed successfully with vitreous aspiration and air injection in AC.

Keywords: Malignant Glaucoma; Vitreous Aspiration; Anterior Chamber; Intraocular Pressure

Introduction

Malignant glaucoma also known as cilio-vitreo-lenticular block and aqueous misdirection is a serious but uncommon etiology of secondary angle closure glaucoma [1]. This occurs following incisional ocular surgeries such as cataract surgery, trabeculectomy or iridectomy. Raised intraocular pressure (IOP), central and peripheral shallow anterior chamber (AC) and patent peripheral iridectomy/iridotomy without posterior segment pathology hint towards malignant glaucoma [2]. Pupillary block glaucoma, choroidal detachment and delayed suprachoroidal hemorrhage are excluded before diagnosing malignant glaucoma [3]. Surgical management like hyaloidotomy, hyaloidectomy, and vitreous aspiration are the mainstay of treatment [4]. We present a rare case of malignant glaucoma secondary to blunt ocular trauma.

Case Presentation

A 50-year-old male presented with heaviness and pain in the left eye along with a diminution of vision for two weeks which was gradually progressive and insidious in onset, associated with photophobia and colored halos. He sustained trauma to his left eye with a cricket ball two months ago. There was no previous history of any ocular laser or surgeries.

The best corrected visual acuity (BCVA) was 20/20 and 20/80 in the right and left eye, respectively with -0.5 Dioptre (D) sphere and -1.5 D sphere. On applanation tonometry, IOPs were 14 mmHg and 46 mmHg in the right and left eye respectively.

Slit lamp examination was unremarkable for the right eye but revealed a diffusely shallow AC in the left eye. The pupil was larger in size about 3 mm and sluggishly reacting to light. The cornea was edematous with mild conjunctival congestion (Figure 1) and minimal iridodonesis and phacodonesis. There was no evidence of iris bombe or pupil block or lens subluxation.



Figure 1: Diffusely shallow anterior chamber with corneal haze.

On gonioscopy, occludable angles were found since none of the angle structures were visible. Anterior segment optical coherence tomography (AS-OCT) showed mid-peripheral iridocorneal touch which resolved after starting treatment (Figure 2a and 2b). The medical treatment with Inj. Mannitol 20% 1g/kg body weight, oral acetazolamide, topical Timolol 0.5%, Brimonidine 0.2%, and Brinzolamide 1% lowered his IOP to 38 mmHg. After making an initial diagnosis of acute angle closure glaucoma (ACG) of the left eye, laser peripheral iridotomy (PI) was performed on the fourth day after bringing the IOP down to the tune of 30 mmHg with maximum medical management.

Despite a patent PI, IOP increased to 52 mmHg, raising the suspicion of malignant glaucoma. Furthermore, on Brightness (B-Scan), fluid pockets were noted in the anterior hyaloid without any evidence of choroidal effusions. All these shreds of evidence revised our diagnosis of malignant glaucoma in the left eye. Topical Atropine sulfate 1% was added to the ongoing antiglaucoma medications (AGMs).

On the fifth day, vitreous aspiration through pars plana with reformation of AC with air bubble was done. The patient was kept supine for three hours and IOP dropped to 9 mmHg. AC was well-formed on AS-OCT with air bubbles and few cells (Figure 2c). Prophylactic PI was done in the other eye. Topical AGMs and oral acetazolamide were stopped, but topical atropine sulfate was continued in addition to topical prednisolone acetate 1%. On one month follow-up, the cornea was clear with deep AC (Figure 3). The BCVA was achieved as 20/20 with a -0.5 D Sphere in the left eye.

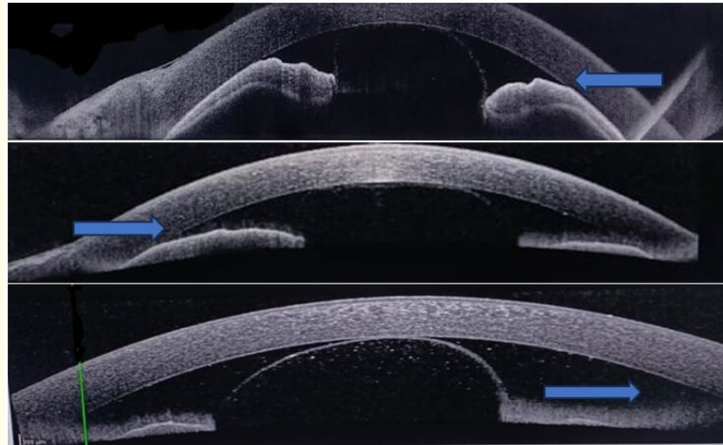


Figure 2: a. Mid peripheral iridocorneal touch on anterior segment optical coherence tomogram. b. Straightening of the Iris after starting the antiglaucoma medication. c. Opening of the angles with air bubble and deep anterior chamber after surgical management.

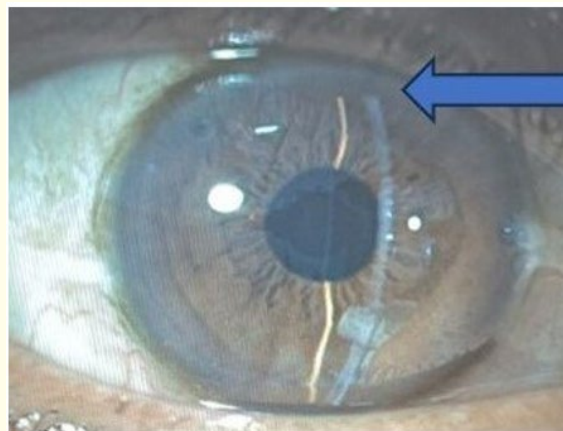


Figure 3: Clear cornea with deep anterior chamber after treatment.

Discussion

Malignant glaucoma is an aggressive form of secondary glaucoma that can cause irreversible blindness if not diagnosed and treated well in time. Different theories postulated in its causation include posterior pooling of aqueous, ciliolenticular block, anterior hyaloid obstruction and slackness of lens zonules [5]. The alterations in the anatomic relationship between the lens, ciliary body, anterior hyaloid face and vitreous push iris-lens diaphragm forward impede the anterior flow of aqueous humor. Despite being secondary to ocular surgical or laser procedures, it can rarely occur after blunt ocular trauma [6].

In the current case, malignant glaucoma occurred due to blunt trauma which may have resulted in slackness or laxity of zonules leading to iridodonesis, phacodonesis, and vitreous strand in AC which eventually shifted the iris lens diaphragm forward.

The final diagnosis of malignant glaucoma was made after excluding pupillary block where iris bombe formation occurs with peripheral shallow AC and moderately deep central AC, but in our case, AC was diffusely shallow. Choroidal detachment and suprachoroidal hemorrhage were ruled out on B Scan, furthermore, it showed few aqueous pockets in the anterior vitreous suggestive of malignant glaucoma.

The standard medical regimen includes topical atropine and phenylephrine. These drugs tighten the lens zonules by relaxing the ciliary muscle and pulling the lens backward. This regimen can abort the attack within 4 - 5 days in 50% of cases [7].

Hyperosmotic agents like intravenous mannitol or oral glycerol decrease vitreous volume and make the AC deep [8]. Oral or topical carbonic anhydrase inhibitors, topical alpha agonists, and beta-blockers decrease aqueous production.

Surgical treatment includes Argon laser cyclophotocoagulation, neodymium-doped yttrium aluminium garnet (Nd: YAG) laser disruption of the anterior hyaloid face and transscleral diode laser cyclophotocoagulation [9]. Posterior sclerotomy, air Injection, and lens extraction combined with incision of the anterior hyaloid and vitreous aspiration are other surgical modalities.

In the present case, the patient didn't respond to medical treatment, so vitreous aspiration was done. Prophylactic laser iridotomy in the fellow eye was done according to standard guidelines [10].

Conclusion

Malignant glaucoma occurs secondary to ocular surgical procedures but blunt ocular trauma should be ruled out which is very rare. In refractory cases of medical treatment, vitreous aspiration from the pars plana can be an effective modality.

Financial Support and Sponsorship

Nil.

Conflicts of Interest

There are no conflicts of interest.

Bibliography

1. Wilde C., *et al.* "Spontaneous onset pseudophakic malignant glaucoma secondary to zonular weakness and cilio-lenticular block". *Oman Journal of Ophthalmology* 11.2 (2018): 178-180.
2. Moinul P., *et al.* "Aqueous misdirection syndrome: an interesting case presentation". *Clinical Ophthalmology* 9 (2015): 183-186.
3. Dave P., *et al.* "Treatment outcomes in malignant glaucoma". *Ophthalmology* 120.5 (2013): 984-990.
4. Chew RP., *et al.* "Successful management of malignant glaucoma with irido-zonulo-hyaloidotomy and complete pars plana vitrectomy". *Cureus* 14.1 (2022): e21679.
5. Grzybowski A., *et al.* "Acute and chronic fluid misdirection syndrome: pathophysiology and treatment". *Graefe's Archive for Clinical and Experimental Ophthalmology* 256.1 (2018): 135-154.
6. Theelen T., *et al.* "Malignes Glaukom nach stumpfem Bulbustrauuma [Malignant glaucoma following blunt trauma of the eye]". *Ophthalmology* 102 (2005): 77-81.

7. Chandler PA, *et al.* "Mydriatic-cycloplegic treatment in malignant glaucoma". *Archives of Ophthalmology* (1962): 353-359.
8. Debrouwere V, *et al.* "Outcomes of different management options for malignant glaucoma: a retrospective study". *Graefe's Archive for Clinical and Experimental Ophthalmology* 250.1 (2012): 131-141.
9. Stumpf TH, *et al.* "Transscleral cyclo-diode laser photocoagulation in the treatment of aqueous misdirection syndrome". *Ophthalmology* 115.11 (2008): 2058-2061.
10. Quigley HA, *et al.* "Possible mechanisms of primary angle closure and malignant glaucoma". *Journal of Glaucoma* 12.2 (2003): 167-180.

Volume 15 Issue 3 March 2024

©All rights reserved by Anuradha Raj, *et al.*