Case Report

Management of Malignant Glaucoma in a Pseudophakic Silicon Oil-Filled Eye: A Case Report

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ABSTRACT

This case report describes malignant glaucoma following Ahmed glaucoma valve implantation in a pseudophakic silicone oil-filled eye. A 44-year-old woman with Behcet's disease and congenital cataract underwent pars plana vitrectomy and silicone oil injection for pseudophakic rhegmatogenous retinal detachment. Despite maximum tolerated anti-glaucoma medications, uncontrolled intraocular pressure (IOP) prompted Ahmed glaucoma drainage device implantation. Early postoperative findings revealed diffuse shall owing of the anterior chamber, peripheral iridocorneal touch, and an elevated, diffusely spread bleb with corneal contact. Diagnosis of over-filtration was established after excluding posterior segment pathologies. Initial interventions included anterior chamber reformation with cohesive viscoelastic and subsequent interventions due to recurrent shallowing. Silicone oil removal and localized zonulectomy during a follow-up visit successfully restored and maintained the anterior chamber for five months. This case underscores the efficacy of tailored surgical approaches in managing recurrent malignant glaucoma in complex scenarios.

Key words: Malignant Glaucoma, Silicone Oil, Ahmed Glaucoma Valve, Hyaloido- zonulectomy, Irido-zonulo-hyaloidotomy.

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INTRODUCTION

Malignant glaucoma, also known as ciliary block glaucoma or aqueous misdirection, was first described in 1986 and is a rare condition characterized by elevated intraocular pressure (IOP)and a flattening of the anterior chamber in the presence of patent iridotomy.[1] The exact cause of malignant glaucoma is not yet fully understood, but a proposed mechanism is posterior misdirection of aqueous humor into or behind the vitreous, resulting in a pressure differential across the lens-iris diaphragm, anterior chamber shall owing or flattening, and secondary angle closure glaucoma.[2] There are several proposed medical, laser based, and surgical treatment strategies for the management of malignant glaucoma. The first line management is medical therapy including topical cycloplegics, topical and systemic aqueous suppressants, topical steroids, and hyperosmotic agents which is effective in 50 percent of patients.[3] Other treatment options are neodymium-doped yttrium aluminum garnet (Nd:YAG) laser capsulohyaloidotomy or other surgeries that disrupt the anterior hyaloid face. Pars plana vitrectomy (PPV) with or without lensectomy or diode laser cyclophotocoagulation is reserved for refractory cases.[4] In this case report, we present an unusual case of recurrent malignant glaucoma in a pseudophakic,

silicon oil-filled eye after Ahmed glaucoma valve (AGV) implantation, who was successfully treated with zonulectomy.

CASE PRESENTATION

The institutional review board of the Shiraz University of Medical Sciences approved the study (IR.SUMS.MED.REC.1402.327)and the tenets of the declaration of Helsinki and its later amendments were followed. The patient signed the informed consent form.

A 44-year-old female diagnosed with Behcet disease and a candidate for silicone oil (SO)removal, was referred to glaucoma service due to shallow anterior chamber following AGV implantation in the right eye. She had a history of uneventful phacoemulsification and posterior chamber intraocular lens (PCIOL) implantation in the right eye (RE) for a neglected congenital cataract at the age of 14 years. She presented with sudden onset of vision loss in the RE due to retinal detachment 3 months before this visit. At the initial examination, her visual acuity in the RE was hand motion, and the intraocular pressure (IOP) with Goldmann applanation tonometry was 10 mm Hg. She underwent 23-gauge pars plana vitrectomy and SO (Silicone oil 1000 centistokes) tamponade for retinal detachment which was uneventful. Betamethasone 0.1% every 2 hours, Homatropine 2% every 8 hours and Ciprofloxacin 0.3% every 4 hours were prescribed and gradually tapered over the 1st post-operative month. After the procedure, her IOP was 10 mmHg, visual acuity was 50cm finger count, and the retina was attached in the RE. Fifty-two days after the 23-gauge pars plana vitrectomy and SO tamponade, the patient presented with ocular pain and redness in her RE. IOP was 50mmHg and her vision was hand motion. She was managed with intravenous infusion of 250ml of Mannitol 20%, oral Acetazolamide 250mg, topical Timolol 0.5%, topical Brimonidine 0.2%, and topical Dorzolamide 2% but no response was seen. Three days later, an Ahmed glaucoma valve was implanted in the supero-temporal quadrant of the globe. On the 1st post-operative day, IOP was 3 mmHg, and the AC was uniformly shallow with peripheral iridocorneal touch, and the central AC depth was equal to half of the central corneal thickness (CCT). There was a diffuse and elevated bleb, the tube was partially occluded by iris and was in touch with cornea, there was no silicone oil in the anterior chamber and the inferotemporal iridotomy was patent. After excluding posterior segment pathologies, over-filtration was diagnosed, and the AC was reformed by cohesive viscoelastic agent. After 12 hours, the AC was shallow again. The patient underwent AC reformation and partial tube ligation with Vicryl 8/0 through a clear corneal incision over the tube. On day 1, after surgery, IOP was 14mmHg, AC was formed and the visual acuity of the RE was 0.5-meter finger count (LogMAR).The patient was prescribed topical antibiotic every 6 hours and topical steroid for every 4 hours. The antibiotic was discontinued after 10 days and the steroid was planned to be slowly tapered over 4 weeks. The patient missed follow-up and did not come for one month after the shunt surgery. At this visit, Slit-lamp examination showed that the peripheral and central AC depth was uniformly decreased, almost equivalent to one CCT,IOP was 12 mmHg and a

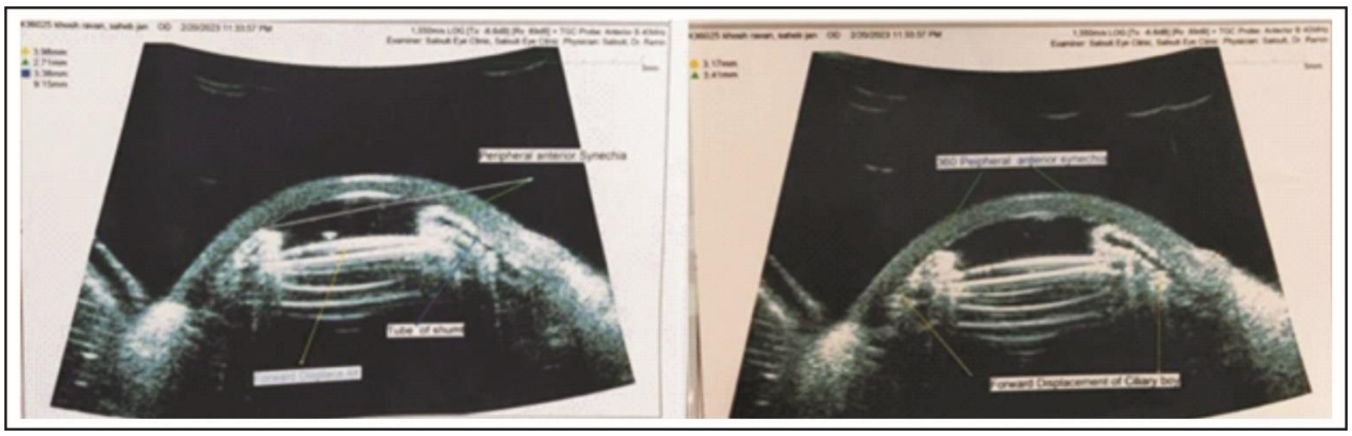

Figure 1: Ultrasound biomicroscopy showing reduced central and peripheral anterior chamber depth and anterior rotation of ciliary body and anterior displacement of the iris -lens diaphragm.

circumscribed elevated bleb. The inferotemporal iridotomy was patent and her vision was hand movements. After excluding the posterior segment pathologies, Ultrasound Bio-microscopy (UBM) (Ellex Eye cubed) revealed anterior rotation of ciliary body with subsequent anterior displacement of the iris-lens diaphragm and AC shallowing (Figure 1).

The patient was diagnosed with Malignant glaucoma. She underwent silicon oil removal and localized zonulectomy through the inferotemopral surgical iridectomy. On postoperative day 1, the IOP was 12 mmHg, cornea was clear, the anterior chamber was formed, visual acuity was 1-meter finger counting and the retina was attached (Figure 2).

Figure 2: Anterior segment slit-lamp Bio-microscopy after 3 months of inferior localized zonulectomy and silicone oil removal.

The patient was kept on Atropine 1% eye drops once a day and she is still stable on the 6th post-operative month.

DISCUSSION

The exact pathophysiology of malignant glaucoma is not clearly defined, however, it is described to be a multifactorial condition leading to an alteration in the anatomic relationship of the lens, ciliary body, anterior hyaloid face, and vitreous, resulting in anterior displacement of the iris-lens diaphragm.[5] The principle in the management of malignant glaucoma is to provide a direct communication between AC and vitreous cavity or to break the block between the ciliary body and the antessrior hyaloid face.[6] Current treatment strategies include medical therapy with cycloplegics, aqueous suppressant, osmotic agents and anti-inflammatory medications which could be effective in half of the patients in a 5-day period. Laser therapy by aiming to disrupt the anterior hyaloid face or altering the vitreo-ciliary relationship through the posterior rotation of ciliary process is usually effective. Surgical therapy is mandatory in cases who are refractory to medical or laser therapy.[5] PPV is reserved for resistant forms of s glaucoma.

It is usually not expected to find aqueous misdirection in an eye that had undergone PPV for any reasons.[6] However, there are several studies reporting the recurrence of malignant glaucoma following PPV, called malignant glaucoma-like syndrome.[7] It is mainly due to the obstruction of the anteroposterior space between the vitreous cavity and the AC by fibrin membranes, residual anterior hyaloid face, capsular remnant, zonular fibers and IOL haptic.[8] The incidence of malignant glaucoma following PPV is greater in phakic eyes compared to the pseudo-phakic patients due to the difficulty to remove the anterior hyaloid face completely in the presence of crystalline lens.[9] Aqueous misdirection can also occur after glaucoma surgeries especially when AC flattening occurs. However, in our case, ciliary block happened about one month after glaucoma drainage device implantation. There is no report of occurrence of malignant glaucoma in a pseudophakic silicone oil filled eye but Ghoraba et al, reported a series of seven phakic patients who had malignant glaucoma following PPV and silicone oil injection and they all responded to phacoemulsification and PCIOL implantation and posterior capsulotomy.[10] Our case responded successfully to a localized zonulectomy during silicone oil removal.

CONCLUSION

PPV is a surgical option in cases with refractory malignant glaucoma, but aqueous misdirection can also happen in vitrectomized eyes. In our case the zonules were precluding free passage of aqueous from the vitreous cavity to the anterior chamber and by performing a limited zonulectomy the AC was reformed.

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Patient's Consent: Researchers followed the guidelines set forth in the Declaration of Helsinki.

Conflict of Interest: Authors declared no conflict of interest.

Availability of Data and Materials

The datasets used and/or analyzed during the present study are available from the corresponding author on reasonable request.

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Authors Designation and Contribution

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Aidin Meshksar; *Assistant Professor: Literature search, Data acquisition, Manuscript editing, Manuscript review.*

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