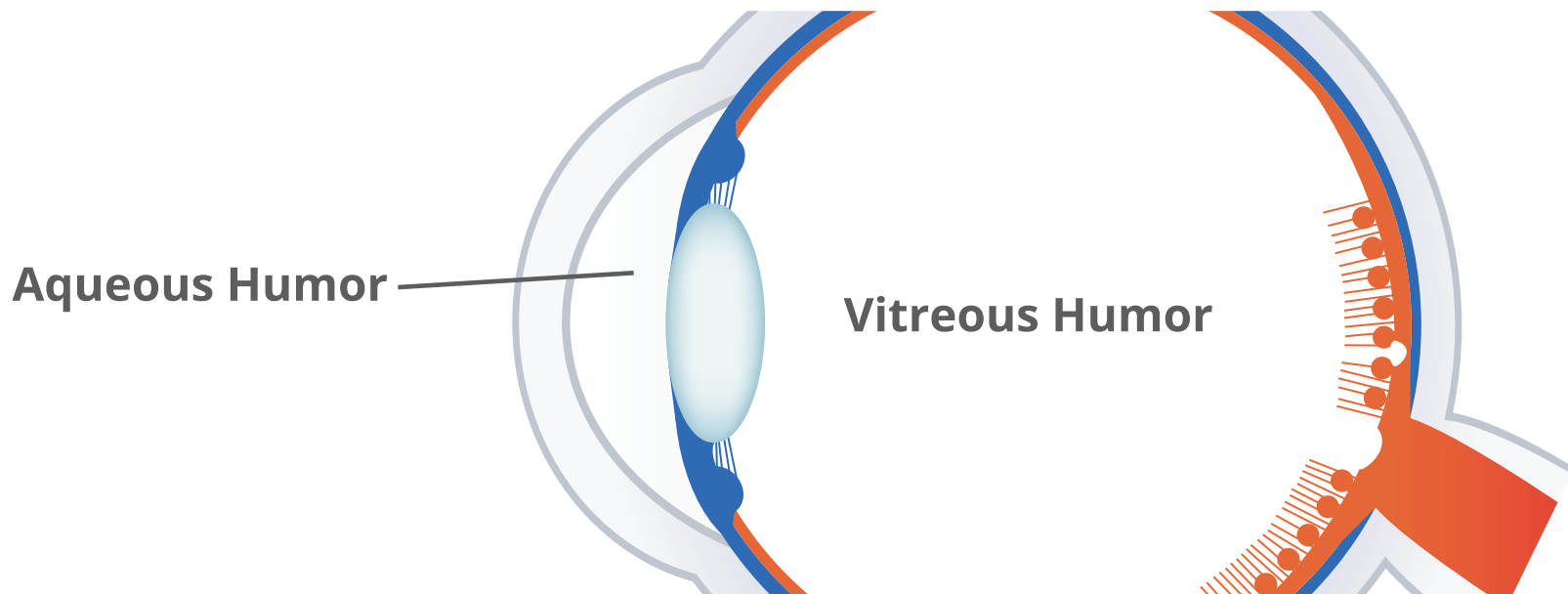




WHEN AQUEOUS HUMOR IS NO LAUGHING MATTER



A patient presented with aqueous misdirection syndrome, a rare but challenging postoperative complication.

BY GURKIRAT CHANA, OD; NATALIE COREY-TANGEN, OD; AND OSAMA SAID, OD

Aqueous misdirection syndrome, also known as malignant glaucoma, was first described by von Graefe in 1869.^{1,2} It is a rare but challenging postoperative complication characterized by increased IOP despite iridotomy and a shallow anterior chamber without pupillary block, primarily following glaucoma or cataract surgery. Management often requires both medical and surgical intervention.

Here, we discuss the case of a patient who developed aqueous misdirection syndrome following incisional surgery. We detail the

clinical course, management strategies, and surgical interventions, in addition to a brief review of relevant literature.

THE CASE

A 63-year-old female presented with blurred vision and ocular irritation, OD > OS, in September 2023. In April 2022, her IOP was 50 mm Hg, necessitating a treatment regimen of steroid drops (prednisolone acetate 1%) and brimonidine tartrate 0.2%/timolol maleate ophthalmic solution 0.5% (Combigan, Allergan). Her VA at this visit was light perception OD, and her IOP was 15 mm Hg OU.

The patient's history included acute angle-closure glaucoma in the right eye, for which multiple laser iridotomies were performed, followed by Kelman phacoemulsification.³ However, her IOP remained elevated, and her anterior chamber was shallow, necessitating a pars plana vitrectomy (PPV).

The patient's extraocular muscles were full and smooth bilaterally. Her pupils were equal, round, and reactive to light. Confrontation fields were full OU. Slit-lamp examination showed 3+ microcystic edema with bullae and sutures at the 9:00 and 2:00 clock positions OD and horizontal

AQUEOUS MISDIRECTION SYNDROME PRESENTS SIGNIFICANT DIAGNOSTIC AND THERAPEUTIC CHALLENGES. TIMELY INTERVENTION IS CRITICAL TO PREVENT IRREVERSIBLE DAMAGE. THIS CASE UNDERSCORES THE IMPORTANCE OF EARLY RECOGNITION AND THE POTENTIAL ROLE OF VITRECTOMY IN REFRACTORY CASES.

band haze from the 9:00 to 3:00 clock positions OS. Refraction yielded -0.50 -3.50 x 120, with a VA of 20/60 OS.

OCT was unreliable due to artifacts, but showed thin retinal nerve fiber layers and a central macular thickness of 178 μ m OS. Pentacam (Oculus) tomography indicated a flat anterior chamber with unreliable keratometry values due to blinking. B-scan ultrasound confirmed retinal attachment and stable IOP, ruling out choroidal effusion as a differential diagnosis. This left us with differential diagnoses of acute angle-closure glaucoma, which is often associated with iris bombe and pupillary block, and aqueous misdirection syndrome, central and peripheral shallowing of the anterior chamber without pupillary block.

DIAGNOSIS

The patient was ultimately diagnosed with aqueous misdirection syndrome based on clinical findings, lack of choroidal effusion, and failure of typical glaucoma therapies. The

forward movement of the iris-lens diaphragm and high IOP despite iridotomy (a week after she presented in September 2023, her IOP had skyrocketed to 80 mm Hg) supported this diagnosis.

Initial management included topical steroids, atropine, and IOP-lowering medications (timolol). The patient's IOP remained stable following PPV to restore normal aqueous flow by disrupting the anterior hyaloid face. Postoperatively, the patient was maintained on long-term steroid therapy to manage inflammation and prevent phthisis.

DISCUSSION

Aqueous misdirection syndrome is characterized by the misdirection of aqueous humor into the vitreous cavity, leading to forward displacement of the iris-lens diaphragm. The etiology remains unclear, but may involve poor permeability of the anterior vitreous face, which traps aqueous humor. It is crucial to distinguish this condition

from other causes of increased IOP, such as choroidal effusion or malignant glaucoma.

Aqueous misdirection occurs most frequently after incisional surgery, particularly in eyes with preexisting angle closure. It is more common in Asian populations due to the shorter axial lengths of their eyes and narrower anterior chamber angles.

Management involves medical and surgical interventions. Topical cycloplegics and IOP-lowering agents are first-line therapies. In refractory cases, laser disruption of the anterior hyaloid face or PPV is indicated.^{4,5}

TAKEAWAYS

Aqueous misdirection syndrome presents significant diagnostic and therapeutic challenges. Timely intervention is critical to prevent irreversible damage. This case underscores the importance of early recognition and the potential role of vitrectomy in refractory cases. ■

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