

Clinical & Refractive Optometry is pleased to present this continuing education (CE) article by Dr. Paul Harasymowycz et al entitled **An Unusual Case of Post-Vitreotomy Hypopyon**. In order to obtain a 1-hour Council of Optometric Practitioner Education (COPE) approved CE credit, please refer to page 108 for complete instructions.

An Unusual Case of Post-Vitreotomy Hypopyon

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ABSTRACT

A 57-year-old white male with severe diabetes presented with pain and decreased vision in his right eye 11 days post-vitreotomy, for non-clearing vitreous hemorrhage secondary to uncontrolled proliferative diabetic retinopathy. Clinically, a red and inflamed eye with elevated intraocular pressure (IOP) and a pinkish hypopyon were noted in the anterior chamber (AC). As the contralateral eye was amblyopic, the patient was treated as having endophthalmitis, although the clinical picture was consistent with a diagnosis of ghost cell glaucoma. Vitreous and AC aspirates were sent for analysis to both microbiology and pathology labs. The pathologic report confirmed the diagnosis of ghost cell glaucoma, and described degenerated spherical tan-colored red blood cells, with the characteristic peripherally-located hemoglobin clumps known as Heinz bodies.

INTRODUCTION

Ghost cell glaucoma is a clinical entity that was first described in 1976 by Campbell and colleagues in eyes with long-standing vitreous hemorrhage following vitrectomy.¹⁻³ It was later described by the same group in 1979 following cataract extraction and in 1981 following trauma. The disease was confirmed in 1985 in animal studies by Lambrou.⁴

Theoretically, the process involves morphologic changes and degradation of red blood cells (RBCs) present in the vitreous for a period of one to three weeks.⁵ Rigid spherical khaki-colored cells of 4 μ m to 7 μ m with

clumps of hemoglobin at their periphery called Heinz bodies are formed and then find their way through the anterior hyaloid. They become trapped in the 5 μ m millipores of the trabeculum and may lead to an obstruction of aqueous humor outflow, with secondary intraocular pressure (IOP) rise.

Clinically a doubled layered khaki-colored, or "candy-stripe" pseudo-hypopyon is a pathognomonic and often overlooked sign.

We report a case of ghost cell glaucoma in a phakic Caucasian man with a hypopyon post posterior vitrectomy, in which the final diagnosis was made after histopathologic evaluation of intraocular aspirates.

CASE REPORT

A 57-year-old white male presented to the ophthalmic emergency clinic complaining of pain and redness of his phakic right eye, which increased during the last 24 hours, accompanied by decreased visual acuity. Eleven days earlier the patient had undergone routine pars plana vitrectomy for a nonclearing vitreous hemorrhage of five months duration. He was using a topical antibiotic and corticosteroid drops four times daily in the right eye. He had a past medical history of microvascular diseases, hypertension, hypercholesterolemia, and complicated long-standing insulin-dependant diabetes. He was known by the retina service for proliferative diabetic retinopathy for which he had received panretinal photocoagulation OU. He was also amblyopic OS with count fingers vision.

Upon examination, visual acuity was light perception OD compared to hand motion immediately post-operatively, with vision stable at count fingers OS. Diffuse 3+ injection (Fig. 1), and an anterior chamber (AC) reaction graded 3+ cell and 1+ flare were noted. The pupil was unreactive OD and slightly peaked at 12 o'clock, with 2+ nuclear sclerosis (Fig. 2). Iris vessels were dilated and congested but no neovessels were seen on the iris surface nor in the angle on gonioscopy. Most notably, a 1.8-mm layered pinkish-white hypopyon was noted in the AC (Figs. 1-3). IOP was 26 mmHg OD and 21 mmHg OS. Massive vitreous hemorrhage prevented retinal evaluation but B-scan showed 360 degrees and absence of choroidal hemorrhage.

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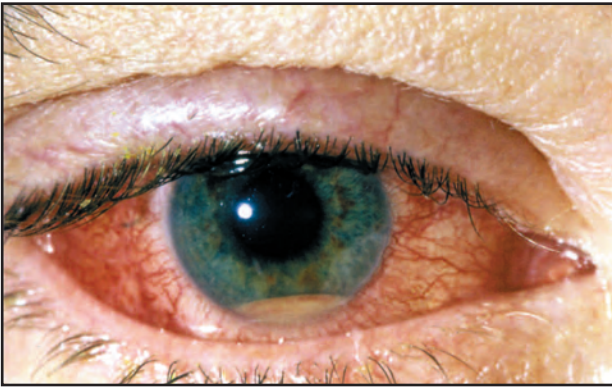


Fig. 1 Macroscopic view of the eye showing 3+ diffuse injection and deposit in the anterior chamber.



Fig. 2 Microscopic view of the anterior segment with dilated iris vessels, peaked pupil, and pinkish-white deposit

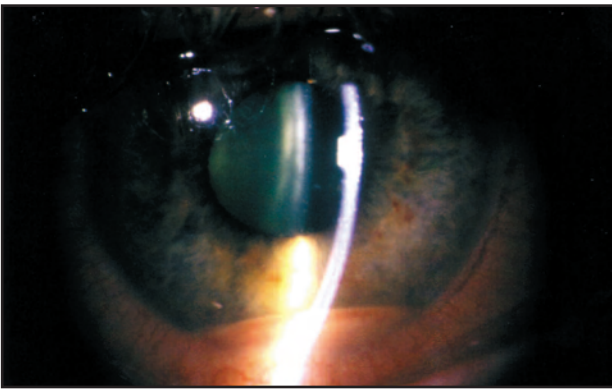


Fig. 3 Anterior chamber view with moderate inflammatory reaction

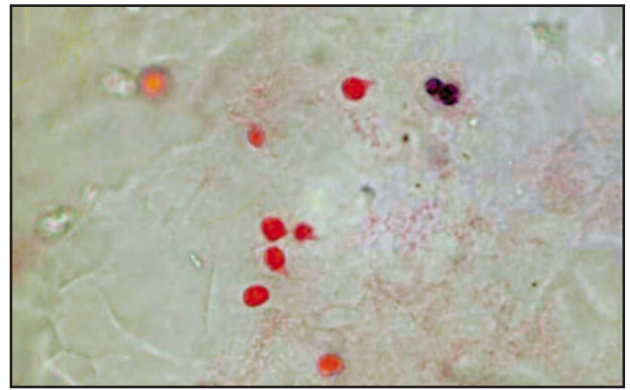


Fig. 4 Spherical RBCs and 1 neutrophile (original magnification x 100; Papanicolaou cytology preparation)

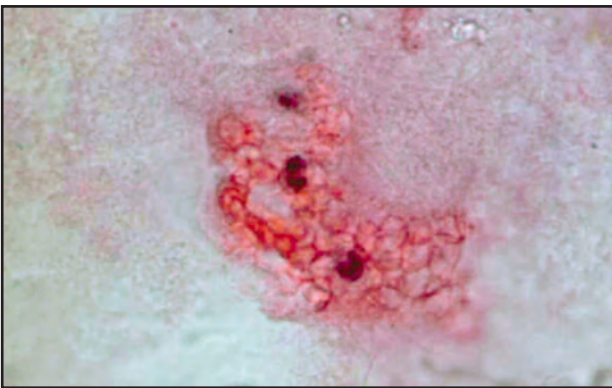


Fig. 5 More degenerated and coalescent RBCs (original magnification x 100; Papanicolaou cytology preparation)

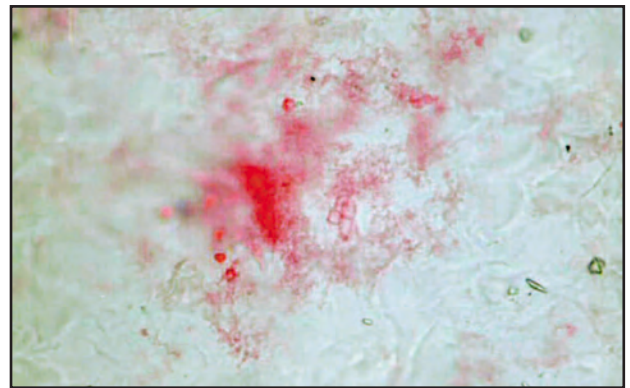


Fig. 6 Hemoglobin condensation on the periphery of RBCs compatible with Heinz bodies. (original magnification x 100; Papanicolaou cytology preparation)

Although the probability of post-vitreotomy endophthalmitis was considered low, given the patient's rubor et dolor disproportionate to IOP, and contralateral amblyopia, he was treated as having endophthalmitis until proven otherwise. AC and vitreous taps were performed and specimens were sent to microbiology and pathology

labs. Intravitreal and fortified hourly topical antibiotics were given, as well as alpha-agonists for the increased IOP.

On day 2, Gram stains were found to be negative. As a new white deposit was noted on top of the initial AC pseudo-hypopyon, hourly topical prednisolone was

added. After 4 days, injection and pain were decreasing and vision was subjectively improved. Cultures in the AC tap revealed only 1 colony of *Staphylococcus aureus* resistant to oxycyclin, and the possibility of contamination was raised. Fortified topical antibiotics were stopped at day 8 owing to the patient's continued improvement.

Finally, pathologic examination reports revealed spherical degenerated RBCs with thin walls and loss of intracellular hemosiderin (Fig. 4). Increased degeneration and coalescence was noted in regards to some other RBCs in which subtle peripheral deposits were also present (Fig. 5). Residual intracellular hemoglobin had more clearly coalesced and deposits in clumps on the inner surface of plasmatic membranes of other RBCs, compatible with more classical definition of Heinz bodies (Fig. 6).

The patient's IOP rise as well as intraocular inflammation resolved over time. He regained 6/120 (20/400) vision with clearing of the vitreous hemorrhage.

DISCUSSION

The exact incidence of ghost cell glaucoma following vitreous hemorrhage surgery has never been assessed. It is known to occur a few days after, and up to 4 years postoperatively. The precise mechanism by which degenerated RBCs gain access to the AC through the anterior hyaloid remains unknown, as cases have been described in phakic eyes with no history of trauma.⁶⁻⁸

Ghost cell glaucoma is a clinical diagnosis. Typically, the patient presents with pain and decreased vision in the presence of a mildly inflamed eye. On examination, perilimbal conjunctival injection is evident and the cornea may show a variable degree of edema. The AC is filled with khaki-colored cells that are out of proportion to the flare, and may be visualized with the green light on the slit lamp. No keratic precipitates are seen unless concomitant uveitis is present. When found, the classical candy-stripe double layer pseudo-hypopyon is pathognomonic. It is composed of a layer of fresh RBCs and a lighter khaki-colored degenerated RBCs on top. Tan-colored cells may also be seen on the corneal endothelium, in the trabeculum meshwork, and in the vitreous. IOP rise is variable and an open angle is found on gonioscopic examination.

When unclear, pathologic evaluation may be extremely helpful to confirm the diagnosis. Examination of wet preparations of aqueous and vitreous fluid by phase microscopy can be used to provide immediate confirmation of the clinical diagnosis.⁹ Paraffin sections of the specimen are later obtained and provide permanent documentation of the cytopathology.

The disease is most often self limited. Medical treatment of increased IOP is normally sufficient. Surgical options such as trabeculectomy or vitrectomy are the exceptions to the rule and AC irrigation is a good option to surgery.¹⁰

Some interesting questions remain unclear. For example, why does ghost cell glaucoma occur after vitreous hemorrhage and much less frequently following a long-standing hyphema? One can hypothesize that the difference in temperature between the vitreous and AC may be an important factor. Higher temperatures could be necessary for the degeneration of the RBCs. Also, in the AC macrophages can, in theory, remove RBCs and its debris faster.

On a more clinical basis, regardless of its low incidence (0.05%), post-vitrectomy endophthalmitis should never be overlooked.^{11,12} Nevertheless, in the presence of a multi-layered pseudo-hypopyon, the index of suspicion should be high for other clinical entities such as ghost cell glaucoma, especially in patients with a known history of long-standing vitreous hemorrhage preoperatively. □

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