

Annular pigment ring on the posterior lens capsule: a novel examination finding in blunt ocular trauma

The effects of blunt ocular trauma can impact a wide variety of ocular structures. Trauma may cause dislodgement of iris epithelial cells, which can create a ring of iris pigment on the anterior lens capsule, a finding known as the *Vossius ring*.¹ There has been one previously reported case of an annular pigment ring on the posterior lens capsule following blunt ocular trauma.²

Herein we report, to our knowledge, the second documented case of an annular pigment ring on the posterior lens capsule secondary to trauma and the third overall report of pigment on the posterior lens capsule following blunt trauma.

A 45-year-old man presented to the ophthalmology clinic following blunt trauma sustained to the right eye secondary to the patient driving into a tree branch while riding an all-terrain vehicle 8 hours prior. He initially noted ocular pain, but this subsided on its own after a few hours and at the time of presentation he complained of mild ocular discomfort and decreased visual acuity in the right eye.

On examination, his best-corrected visual acuities were 6/12 in the right eye and 6/6 in the left eye. Intraocular pressure was 17 mm Hg in the right eye and 14 mm Hg in the left eye. The pupils were bilaterally equal and reactive to light with no evidence of a relative afferent pupillary defect.

Examination of the right eye revealed a 2 mm hyphema accompanied by 4+ circulating red blood cells in the anterior chamber. There were no iris sphincter tears or transillumination defects. Dilated examination of the right eye revealed a ring of pigment on the posterior lens capsule. The anterior hyaloid and vitreous was free from any pigment. The optic nerve, macula, and retinal vessels were within normal limits. Superotemporal commotio retinae without retinal tear or dialysis was noted. Examination of the left eye was within normal limits. There was no evidence of any pigmentation on the posterior capsule in the

left eye. The patient was placed on 1% prednisolone acetate 4 times daily and 1% cyclopentolate 3 times daily in the right eye, advised to undertake minimal activity and maintain upright positioning, avoid the use of antiplatelet medications, and use an eye shield at bedtime.

Two weeks after the trauma, the hyphema resolved, but circulating 2+ red blood cells in the anterior chamber could still be seen, as well as a persisting unchanged annular pigment ring on the posterior lens capsule. The commotio retinae had resolved. Anterior-segment slit-lamp photographs and anterior-segment optical coherence tomography of the right eye were performed (Figs. 1 and 2). The anterior-segment optical coherence tomography demonstrated hyperreflectivity along the posterior aspect of the lens capsule corresponding to the annular ring seen clinically (Fig. 2).

Gonioscopy was performed at the final follow-up visit 5 weeks later. A regular iris configuration without angle recession or cyclodialysis cleft was noted. Pigmentation of the trabecular meshwork was graded as 2+ in both eyes. Anterior-segment examination showed continuing annular ring on the posterior lens capsule. Careful assessment demonstrated the absence of pigment on the corneal endothelium, transillumination defects of the iris, or iris pigment on the anterior surface of the lens capsule. At this visit the patient was given instructions to taper off the prednisolone acetate eye drops and was discharged from further follow-up.

To the best of our knowledge, there exists only one previous report by Anand et al.¹ of annular pigment ring formation on the posterior lens capsule following blunt ocular

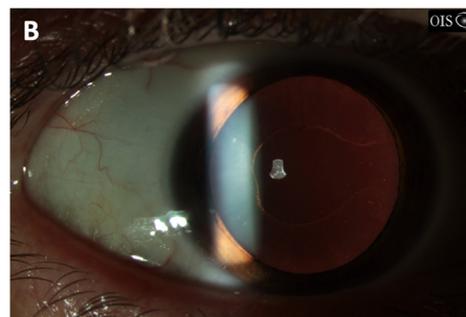
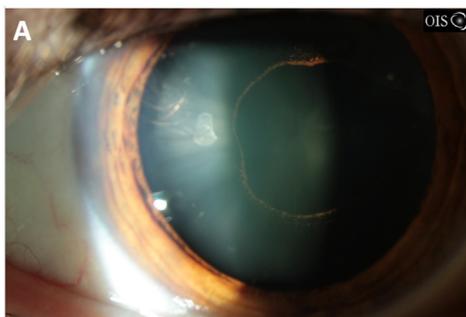


Fig. 1—(A) Annular ring of iris pigment visualized using tangential illumination on slit-lamp Biomicroscopy. (B) Annular ring of iris pigment visualized using retroillumination on slit-lamp biomicroscopy.

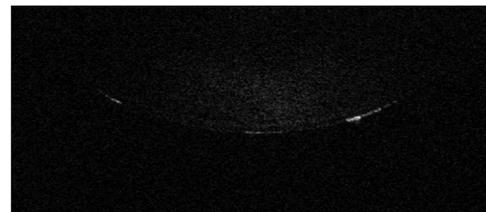


Fig. 2—Visante anterior-segment optical coherence tomography image of the posterior lens capsule. The hyperreflective material on the posterior lens capsule corresponds to the annular pigment ring observed clinically.

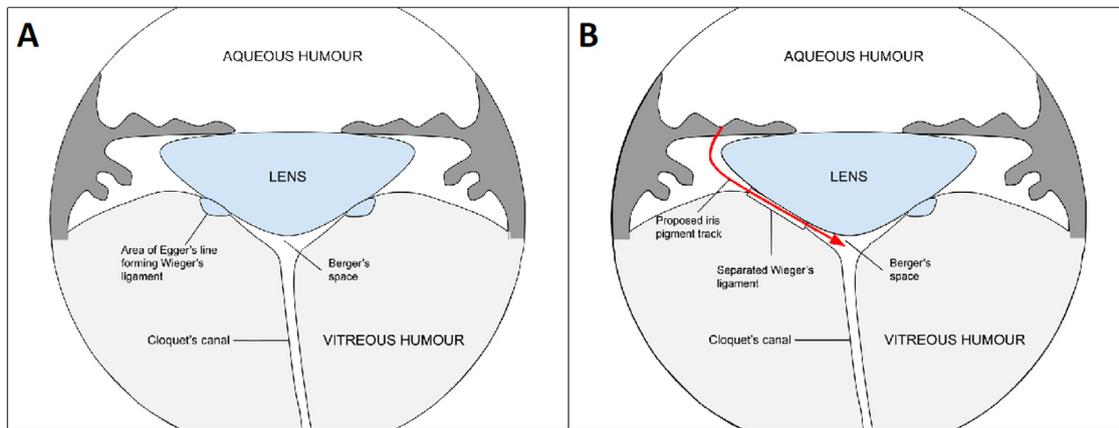


Fig. 3—Proposed pathway of pigment access to the posterior lens capsule: (A) baseline attachment of Wieger's ligament; (B) unilateral traumatic detachment of Wieger's ligament allows pigment access to Berger's space.

trauma. This previously reported case described the development of an annular pigment ring on the posterior capsule in association with traumatic iritis following blunt trauma, and the authors reporting this case postulated that pigment had been deposited in Berger's space and that the ring formation was owing to pigment deposition in areas of adherence of Wieger's ligament to the posterior lens capsule.² Another case has been reported by Al-Mezaine³ of dense posterior lens iris pigment deposition in a patient with pigment dispersion syndrome and a remote history of blunt ocular trauma. In this case, the pigment deposition was not in an annular formation, and the authors postulated that the remote trauma of the patient caused a separation of Wieger's ligament from the posterior lens capsule, thereby providing a pathway for pigment deposition in this area.

Our case appears to agree with the postulated mechanism by Al-Mezaine of traumatic Wieger's ligament separation being a pathway for pigment to access the posterior lens capsule.³ In Figure 1B it can be seen that the nasal-most aspect of the pigment deposition elongates in an open-C-shaped fashion. This area is likely a localized separation of Wieger's ligament through which pigment has transited into Berger's space. This situation is analogous to a bay, with pigment-containing aqueous flowing through the separation in Wieger's ligament only to stagnate within the wider Berger's space, trapping it there. The pigment then deposits on areas of intact Egger's line, creating the annular appearance. The potential pathway of the pigment resulting in the posterior capsule annular pigment ring is illustrated in Figure 3. Our case closely mirrors the case reported by Anand et al.,¹ suggesting that traumatic separation of the anterior hyaloid face from the posterior lens capsule with simultaneous iris pigment deposition into this newly accessible space can occur following blunt trauma.

It is possible that the source of the visualized pigment on the posterior lens capsule may have been from the ciliary body as opposed to the iris, and although no findings of angle recession or visible damage to the ciliary body were appreciated on gonioscopy, it is impossible to completely

exclude this possibility. It is also possible that the blunt trauma may create a defect within the zonules, thereby facilitating the passage of pigment, although we did not note any phacodonesis or lens displacement consistent with zonular damage to confirm this. Lastly, it is possible that in the initial assessments of the patient circulating iris pigment in the anterior chamber was not detected because of it being difficult to distinguish from circulating red blood cells. Confirmation of both the source of pigment and the proposed mechanism of disruption of Wieger's ligament as the route of posterior-capsule pigment deposition could be achieved in the future using cadaveric models, although this may be somewhat limited by the lack of aqueous humour flow in cadaveric eyes.

Pigmentation of the posterior lens also has been reported in pigment dispersion syndrome.^{4,5} We do not feel that this was a likely cause in our patient given the absence of other characteristic features in pigment dispersion syndrome.

In conclusion, this is the second reported case of an annular pigment ring on the posterior lens capsule following blunt ocular trauma and the third report overall of trauma resulting in pigment on the posterior capsule. This report confirms that pigment deposition on the posterior lens capsule can occur following blunt trauma and also confirms the previous report by Anand et al.¹ that such deposition can occur acutely in a unilateral annular formation.

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Footnotes and Disclosure

The authors have no proprietary or commercial interest in any materials discussed in this correspondence.