

# Severe Fibrin Block Angle Closure Secondary to Retinal Detachment Surgery

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## Abstract

Secondary glaucoma is a well-known complication post vitreoretinal surgery that is often difficult to manage. We report an unusual case of compressive angle crowding and fibrin induced pupillary block secondary to anterior segment ischemia following combined scleral buckle and vitrectomy surgery. Surgical removal of the fibrin membrane proved effective in reducing intraocular pressure and preventing glaucomatous damage to the optic disc.

**Keywords:** Encircling band; Angle closure; Anterior segment ischaemia

## Background

Secondary glaucoma post vitreoretinal surgery is often difficult to treat. Mechanisms of secondary glaucoma that have been described after vitreoretinal surgery include anterior segment ischemia and angle closure glaucoma from shallow detachment of the ciliary body, scleral indentation and compression of the vortex veins [1]. Mild cases may respond to topical antiglaucoma medications, however, in severe cases, releasing the buckle may be necessary. Glaucoma surgery with trabeculectomy or tube shunts is challenging due to significant conjunctival scarring.

We illustrate unusual case of compressive angle crowding and fibrin induced pupil block secondary to anterior segment ischemia following combined scleral buckle and vitrectomy surgery. Our case is the first report of successful reduction of intraocular pressure after surgical removal of fibrin membrane without the need of topical antiglaucoma eye drops.

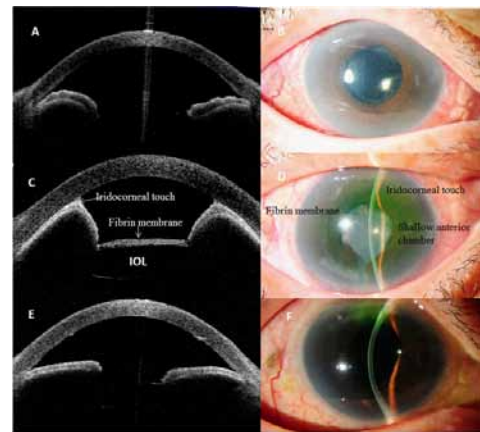
## Case Report

A 66 year-old Chinese female with past medical history of type II diabetes mellitus and hypertension, presented with sudden loss of her right superior visual field of 2 days duration.

Her left Snellen visual acuity (VA) was 6/7.5 but right eye could only count fingers (CF). The right anterior chamber (AC) was shallow with moderate cataract. Fundus examination revealed a right macula-involving subtotal inferotemporal retinal detachment. The patient underwent right phacoemulsification, posterior chamber intraocular lens implantation, and scleral buckle (240 encircling band) with pars plana vitrectomy, endolaser and octafluoropropane (C3F8) under general anaesthesia.

At 2 weeks post operatively, the IOP which was raised ever since the surgery, peaked at 45mmHg despite maximal medical treatment. Gonioscopy revealed closed angles in four quadrants and anterior segment optical coherence tomography (ASOCT) confirmed secondary angle closure (Figure 1a,1b,1c) without obvious ciliary effusions. As a temporising measure, a right transcleral cyclophotocoagulation (TCP) was performed and lowered her IOP to 15mmHg with topical latanoprost and timolol.

Four months following TCP, a thick fibrin membrane had developed across the pupil margin causing iris bombe (Figure 1d).



**Figure 1:** (A) ASOCT showing closed angles. (B) A shallow anterior chamber. (C) ASOCT showing iridocorneal touch with high peripheral anterior synechiae. A fibrin membrane is seen adhering to the IOL. There is posterior synechiae causing pupil block. (D) A thick fibrin membrane is noted across the pupil. There is further anterior chamber shallowing and pronounced iridocorneal touch, 5 months after retinal detachment surgery. (E) ASOCT demonstrating that after surgical removal of the fibrin membrane, stripping of PAS and surgical peripheral iridectomy, the anterior chamber has deepened considerably. There is residual peripheral anterior synechiae. (F) Photograph showing a deepened anterior chamber after surgical removal of the fibrin membrane.

Extensive iridocorneal touch with peripheral anterior synechiae (PAS) over 270 degrees (Figure 1e,1f) resulted in her IOP creeping up to 32mmHg. Fundal examination revealed an epiretinal membrane and early grade A proliferative vitreoretinopathy.

## As a neodymium

Yttrium Aluminium Garnet (Nd:YAG) laser failed to disrupt the

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membrane, surgical removal of the fibrin membrane, stripping of the PAS and a peripheral surgical iridectomy was performed. The IOP fell to 20 mmHg. The option of removal or loosening of the scleral buckle was offered to alleviate the anterior segment ischemia and compressive angle crowding but our patient declined further surgery.

One year after removal of the fibrin membrane, the anterior chamber remained deep with no recurrence of fibrin formation. The VA remained at CF with an attached retina. Despite residual scattered PAS, the IOP stabilized at 13 mmHg without ocular hypotensive medications and the optic disc displayed no appreciable glaucomatous damage.

## Discussion

Secondary glaucoma is a well-known complication post vitreoretinal surgery. This article describes an unusual case of compressive angle crowding and fibrin induced pupil block secondary to anterior segment ischemia following combined scleral buckle and vitrectomy surgery that is well illustrated by ASOCT.

Angle narrowing has been detected in 50% of the cases of non-vitreotomized eyes with scleral buckle in the first post op week [1] and 1-4% eventually develops angle closure glaucoma [2]. Several mechanisms can explain this phenomenon; compression of the vortex veins can cause ciliary body and choroidal congestion and force the lens iris diaphragm anteriorly. In addition, shallow detachment of the ciliary body and a high deep buckle may also be responsible for compressive angle crowding. Gonioscopy and ASOCT were crucial in determining the mechanism of elevated IOP in our vitrectomised patient at post op week 2.

The prevalence of a fibrinous reaction post vitrectomy has been reported in 12 to 14.5% [3,4] though only 3.2% develop fibrin-induced pupillary block [5]. However, such severe fibrin pupil block and iris bombe at 5 months post operatively is less likely solely attributable to a post vitrectomy or post TCP fibrinous reaction alone but also to an element of anterior segment ischemia.

Anterior segment ischemia has been previously reported following surgical procedures such as scleral buckling, disinsertion of the ocular muscles and diathermy or cryotherapy to the long posterior ciliary vessels [6]. Blood flow rates in major temporal retinal arteries following uncomplicated scleral buckling are on average 50% lower than the unoperated contralateral eye [7]. Therefore, simply loosening the scleral buckle may address the underlying anterior segment ischemia and relieve secondary angle closure; however, the presence of an epiretinal membrane and early suggestion of proliferative vitreoretinopathy would entail an increased risk of redetachment in our patient. Our case is peculiar in that even though anterior segment ischemia and commonly causes hypotony, our patient had elevated IOP. This is due to the dual mechanisms of compressive secondary angle crowding initially and later fibrin block obstructing aqueous outflow.

Treatment modalities to relieve fibrin related pupillary block include mydriatics, Nd:YAG laser [8], intracameral recombinant tissue plasminogen activator [9] and surgical removal of the membrane. Success with mydriatics is unpredictable and intracameral rTPA, would have been prohibitively expensive for our patient. Hence, a straightforward surgical approach was utilized to control her IOP and aid visual recovery.

In summary, we describe a unique case of secondary compressive angle crowding and fibrin induced pupillary block post retinal

detachment surgery well illustrated by ASOCT. Removal of the fibrin membrane, stripping of PAS and surgical iridectomy proved effective in normalizing her IOP and preventing recurrence.

## Financial Disclosures

Dr Perera has received honoraria from Carl Zeiss Meditec. We have adhered to the Tenets of the declaration of Helsinki for this study.

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