

A 50-year-old woman presented with severe reduction of vision and recurrent pain in right eye following cataract surgery

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Presentation of Case

Dr. Abir Bin Sajj (MS Resident): A 50-year-old female, hailing from Patuakhali, was admitted at the Department of Ophthalmology for the management of severe reduction of vision and pain at the right eye for the last 7 months following cataract surgery at a government hospital. Her cataract surgery (small incision cataract surgery with PC-IOL implantation) of the right eye was performed on October 28, 2018. On the first post-operative day, she developed pain, redness and severe reduction of vision in the right eye. The following day, she was discharged with the advice of some medications like moxifloxacin, dexamethasone, bromfenac eye drops and oral acetazolamide and potassium. She was under weekly follow-up for the next 2 months but her vision did not improve and her pain also did not subside. After 4 months of surgery, she went to a local hospital where she was again prescribed oral acetazolamide and potassium with some anti-glaucoma eye drops. With this medication, her pain slightly decreased but did not subside and there was no improvement in her vision. Later, she was referred to Dhaka for better management.

There was no history of any trauma, fever, cough, joint pain, weight loss or any irregular bowel movement. There was no previous history of any redness of eye before surgery. She

was non-diabetic and normotensive.

On general examination she was ill-looking, blood pressure was 110/70 mmHg and other vital parameters were within normal limit. All systemic examination revealed normal findings except ophthalmic examination.

On ocular examination, her best-corrected visual acuity on the right eye was reduced to hand movement with the presence of projection of rays from all 4 quadrants and on the left eye was 6/18. Her pupillary light reaction was absent on the right eye and was pharmacologically dilated. Her ocular motility was full on all gazes on both eyes.

Dr. Md. Abdul Khaleque (Associate Professor): On slit lamp ((Topcon, Japan) examination of the right eye, eyelashes were matted. The conjunctiva was congested. The cornea edematous with ground glass appearance with multiple iris pigments on the endothelium, especially inferiorly and a suture was found placed at 8 O'clock position; shallow anterior chamber; new vessels present along the pupillary margin from 12 to 9 O'clock position with new vessels running in irregular direction (Figure 1A). The intraocular lens in the sulcus with iris pigments over the optics and posterior capsular tear (Figure 1B). On left eye, the findings were normal except the presence of lental opacity.

Her intraocular pressure was initially 40 mmHg

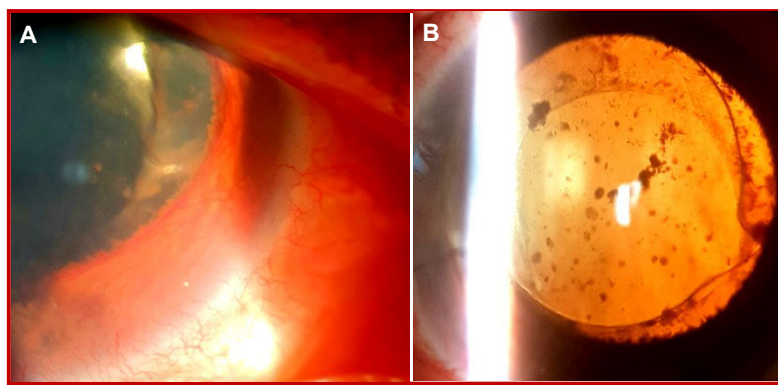


Figure 1: Diffuse illumination of the iris (A) and retroillumination of the right eye (B) using slit lamp biomicroscope



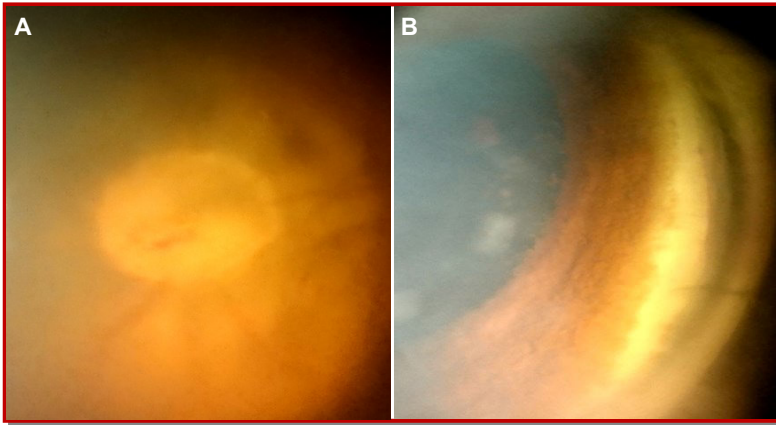


Figure 2: Showing optic disc by 90D condensing lens (Volk, USA) (A) and angle of the anterior chamber by 4 mirror gonioscope (Opticlear, India) (B)

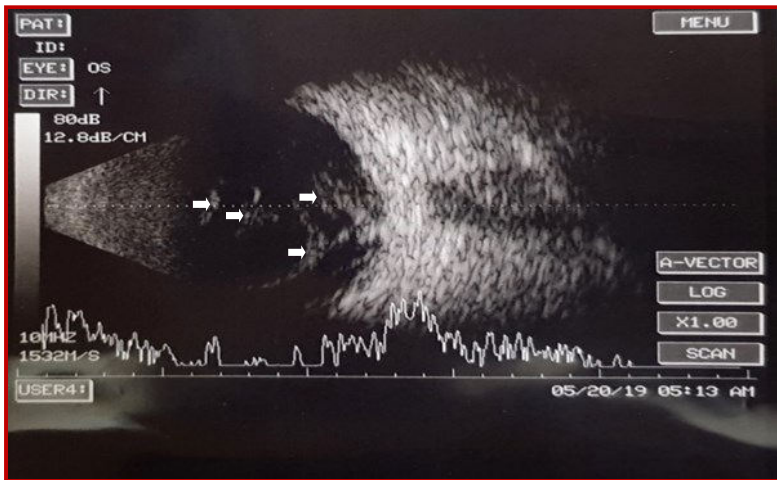


Figure 3: Some echogenic shadows in the vitreous cavity seen using B-scan of the right eye

on the right eye before admission. Then, it was reduced to 16 mmHg after getting antiglaucoma medications (Tablet acetazolamide and timolol eye drop) and again raised to 43 mmHg during admission. The intraocular pressure was measured by Goldmann applanation tonometer (Inami, Japan).

Dr. Mohammad Afzal Mahfuzullah (Assistant Professor): On fundoscopic examination of the right eye, the media was hazy. The color of the disc was pale. The disc margin was well-defined. The cup disc ratio was 0.9:1. The neuroretinal rim was almost obliterated in all the four quadrants (Figure 2A). Multiple dots and blot hemorrhages were present in all the four quadrants and the foveal reflex was absent. Her left eye fundus was normal.

Dr. Khaleque: On gonioscopic examination of the right eye, there was peripheral anterior synechiae present superiorly, nasally and inferiorly (Figure 2B). The new vessels were seen in the nasal, inferior and temporal angle over the trabecular meshwork. Her left eye findings were normal.

Dr. Suproakash Sarkar (MS Resident): Laboratory data showed, slightly raised ESR, normal leukocyte count but slightly high lymphocyte count (Table I). Anti-HSV I showed positive titer for IgG (ISR 2.91) and IgM (ISR 2.22). Her lipid profile showed slightly elevated triglyceride level with normal other cholesterol levels. Her random blood glucose and HbA1C levels were normal.

Dr. Mahfuzullah: Her B-scan (Veatech Ophthalmic Instrument, USA) of the right eye showed some echogenic shadows in the vitreous cavity which was suggestive of vitreous hemorrhage (Figure 3). Her MRI of the brain showed normal findings.

Provisional Diagnosis

Neovascular glaucoma due to central retinal vein occlusion (right eye)

Differential Diagnosis

Inflammatory glaucoma

Dr. Khaleque: Glaucoma is seen in about 20% of patients with uveitis.¹ Many types of inflammatory uveitis including herpetic uveitis can cause secondary glaucoma. One study shows patients with herpes simplex keratouveitis, 28% had intra-ocular elevation and 10% had glaucomatous damage.² As this patient showed positive titer for IgG and IgM against herpes simplex virus-1, so there is a chance of having inflammatory glaucoma.

Pseudophakic glaucoma

Dr. Khaleque: Secondary glaucoma may develop in a pseudophakic eye due to various reasons. In a study, ocular hypertension was noted in 9% of pseudophakic eyes. Out of them, only 3% had permanent ocular hypertension resulting in chronic pseudophakic glaucoma.³

Dr. Abdul Khaleque's Diagnosis

Neovascular glaucoma due to central retinal vein occlusion (right eye)

Discussion

Dr. Khaleque: This morbid condition was post-operative. Hence, the angle-closure glaucoma might be subjected but this could be secondary angle-closure glaucoma. The treating physician prescribed antiglaucoma medication along with antibiotics and steroid as post-operative treatment. Naturally question comes what was the underlying cause of secondary glaucoma? She was not properly

Table I

Investigation reports of the patient		
Parameters	Findings	References
Random blood sugar (mmol/L)	5.9	<11.1
HbA1C (%)	5.9	<6
Erythrocyte sedimentation rate (mm in first hour)	30	<20
Total white blood cell count (/mm ³)	9,000	4000-11,000
<i>Differential count</i>		
Neutrophil (%)	45	40-75
Lymphocyte (%)	52	20-50
Monocyte (%)	2	2-10
Eosinophil (%)	1	1-6
Serum cholesterol (mg/dL)	180	<200
High density lipoprotein (mg/dL)	35	>35
Low density lipoprotein (mg/dL)	48	<100
Triglyceride (mg/dL)	165	<150
C-Reactive protein (mg/L)	1.9	<3

evaluated for her ailment as no records were available. She was discharged on 2nd post-operative day.

Seven months elapsed before admission into the Bangabandhu Sheikh Mujib Medical University Eye Unit ocular examination reveals that there was peripheral anterior synchia along with new vessels in the angle.

Prof. Md. Shafiqul Islam: The most common cause of iris neovascularization is the ischemic retinopathy. There are different groups of disease-causing neovascularization. The groups are a) systemic vascular disease, b) ocular vascular disease, c) other ocular diseases, d) intraocular tumor, e) ocular therapy and f) trauma. Among the diseases, the most common causes are the carotid occlusive disease, diabetic retinopathy and central retinal vein occlusion.⁴ Clinical evaluation of this patient excludes carotid occlusive disease and diabetic retinopathy. Hence, central retinal vein occlusion could be the underlying cause of neovascularization in this patient.

Iris neovascularization and neovascular glaucoma may occur in 45-85% of the eyes affected by ischemic central retinal vein occlusion and only in 5% of nonischemic eyes.

There is the formation of a fibrovascular membrane on the surface of the iris and trabecular meshwork of anterior chamber angle. Initially, the membrane covers the anterior chamber angle structure but subsequently it causes peripheral anterior synechia due to contraction.⁵

Dr. Shish Rahman (Assistant Professor): What are the

points in favor of central retinal vein occlusion?

Dr. Mahfuzullah: On indirect ophthalmoscopy, though media is hazy, there are dots and blot hemorrhages in all the four quadrants, which is suggestive of central retinal vein occlusion. It is the third most common blinding retinal disorder after diabetic retinopathy and branch retinal vein occlusion.⁶

Dr. Shish Rahman: Is there any risk factors present for the central retinal vein occlusion?

Dr. Abir: In this patient, no risk factor is present. The patient is non-diabetic, non-hypertensive and lipid profile is normal.

Dr. Khaleque: The pathogenesis of central retinal vein occlusion is not yet well understood. It is thought to be a compartment syndrome, where central retinal artery, central retinal vein and optic nerve coexist in a 1.5 mm diameter area. The possible systemic factor can precipitate thrombus formation in addition to changes in compartmental structures. Thrombus, thus, forms in the lamina cribrosa in most or all the cases.^{7,8} Though there was no well-known risk factor for central retinal vein occlusion in this case, it could still happen before surgery. The patient may be unaware of unocular visual loss. Intraocular surgery such as cataract extraction increases the risk for anterior segment neovascularization as the vascular endothelial growth factor is thought to move easier into the anterior chamber.

Prof. Md. Sharfuddin Ahmed: What were the complications occur during the initial surgery?

Dr. Abir: From the wound, it looks like that the surgeon could have planned phacoemulsification. Due to per-operative complication like posterior capsular rent and vitreous prolapse, the surgery was converted to small incision cataract surgery. The stitch at 8 O'clock position probably was due to wound closure of small incision cataract surgery.

Prof. Ahmed: Do you think trabeculectomy is necessary as if the intraocular pressure has been controlled with medication?

Dr. Khaleque: Trabeculectomy with mitomycin C could be a better option for this patient.⁹ Trabeculectomy with mitomycin C combined with direct cauterization of the peripheral iris is an alternative option for the management of neovascular glaucoma.¹⁰

Dr. Afzal: Current treatment options for ischemic central retinal vein occlusion include anti-vascular endothelial growth factor drugs, steroids, anti-coagulants, laser treatments and a range of surgical interventions to minimize or delay the onset of complications associated with central retinal vein occlusion including macular edema and neovas-

cularization.^{11, 12} Panretinal photocoagulation is effective in preventing neovascular glaucoma following ischemic central retinal vein occlusion.¹³

Dr. Khaleque: Intra-vitreous^{14, 15} as well as intracameral¹⁶ injection of bevacizumab (intracameral half dose) can be given. If the media becomes clear then panretinal photocoagulation LASER can be done.¹⁷ If the media remains hazy, then pars plana vitrectomy with endolaser can be done.¹⁸

Prof. S. A. Wadud: If we don't treat neovascularization what could be the complications?

Dr. Abir: Repeated hyphema or ocular pain can occur.

Dr. Khaleque: Pre-operative assessment is very crucial for cataract surgery. Detailed anterior segment examination with normal and dilated pupil by slit lamp, dilated fundus examination by slit lamp with 90/78 D lens or indirect ophthalmoscope is mandatory. Intraocular pressure must be measured. Correlation of visual impairment and the extent of cataract are important. If the visual loss is greater than the extent of cataract. A further detailed evaluation is mandatory.

In this case, the surgeon, who did the initial surgery, probably missed the background pathology. If they could have been able to detect the central retinal vein occlusion and rubiosis iridis, then they would have to advise the initial intravitreal and intra-cameral anti-vascular endothelial growth factor. If possible, one session of panretinal photocoagulation prior to the surgery could be done. As panretinal photocoagulation remains the mainstay in controlling the neovascular drive and should be considered in all cases of neovascular glaucoma when retinal ischemia is present.^{19, 20} In that case, the suffering of this patient could have been reduced.

Final Diagnosis

Pseudophakia with neovascular glaucoma due to central retinal vein occlusion (right eye)

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