Purtscher-like Retinopathy an Unusual Complication of Retrobulbar Anesthesia after Cataract Surgery

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Abstract: Purtscher and Purtscher-like retinopathy are exceptionally rare conditions characterized by a distinctive pattern of ischemic retinal fundus findings, typically following traumatic or non-traumatic events, respectively, and resulting in sudden and severe visual impairment. We report the case of a 77-year-old male patient who experienced acute visual loss following retrobulbar anesthesia administered for routine cataract surgery. This case highlights a rare instance of Purtscher-like retinopathy as a complication of retrobulbar anesthesia which is a commonly used technique in ophthalmic surgery that provides effective akinesia and anesthesia. Although the peribulbar technique is often favored for its lower risk of optic nerve injury and intradural injection, it has also been associated with complications, including central retinal artery occlusion and Purtscher-like retinopathy.[1]

Keywords: Cataract surgery, Retrobulbar anaesthesia, Purtscher-like retinopathy

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Background

Purtscher retinopathy is a rare, vision-threatening microvascular occlusive disorder of the retina, first described by Otmar Purtscher in 1910 in a patient who sustained severe cranial trauma.[2] It is characterized by sudden visual loss accompanied by distinctive fundus findings, most notably Purtscher flecken, cotton wool spots, and intraretinal hemorrhages. When similar retinal findings occur in the absence of trauma, the condition is termed Purtscher-like retinopathy. This variant has been reported in association with various systemic conditions, including acute pancreatitis, renal failure, autoimmune diseases (such as systemic lupus erythematosus and dermatomyositis), amniotic fluid embolism, and hematologic malignancies.[3-6]

The exact pathogenesis of Purtscher and Purtscher-like retinopathy remains unclear. However, several hypotheses suggest that occlusion of precapillary arterioles by embolic or aggregated material may play a central role. These emboli may consist of fat, air, fibrin clots, leukocyte aggregates, or complement-activated complexes which particularly complement component C5a, which is known to mediate leukocyte aggregation and vascular injury.[7-9] The resulting ischemia primarily affects the inner retina, especially in the peripapillary and posterior pole regions, producing the characteristic fundus appearance.

Clinically, patients present with sudden, painless visual loss, which may be unilateral or bilateral and ranges in severity. Visual field testing may reveal central or paracentral scotomas, depending on the extent and location of ischemia. On fundus examination, Purtscher flecken (polygonal areas of retinal whitening situated between arterioles and venules) are considered pathognomonic. Additional findings include cotton wool spots, flame-shaped intraretinal hemorrhages, and, in some cases, optic disc edema. Macular edema may also be observed and can contribute to visual deterioration.[3-10]

Multimodal imaging plays a crucial role in diagnosis. Fluorescein angiography (FA) typically reveals areas of capillary nonperfusion, delayed arteriovenous transit, and leakage at the optic disc or macula.[11] Optical coherence tomography (OCT) demonstrates inner retinal

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thickening, hyperreflectivity, and occasionally cystoid macular edema. Optical coherence tomography angiography (OCTA) can further delineate areas of nonperfusion in the superficial and deep capillary plexuses.[12] Systemic evaluation is essential to identify any underlying or precipitating conditions. Investigations should be guided by clinical context and may include serum pancreatic enzymes, renal function tests, autoimmune screening, and hematologic evaluation. Neuroimaging (CT or MRI) may be indicated in cases involving trauma or suspected embolic sources.[6,13]

To date, only two cases of Purtscher-like retinopathy following retrobulbar anesthesia have been reported in the literature. In 1990 and 2001, both occurring after pterygium excision surgeries.[11,12] In 2016, Narendran et al.[13] documented the first case of Purtscher-like retinopathy following cataract surgery performed under peribulbar block anesthesia. However, the precise pathophysiology and optimal treatment remain unclear.

A review of surgical statistics from the ophthalmic operating room at Suddhavej Hospital, Faculty of Medicine, Mahasarakham University, which has performed cataract surgeries since 2017, revealed that in 2022, among 1,746 cataract procedures, a single case of Purtscher-like retinopathy occurred following retrobulbar block anesthesia which is marking the first such reported case at this institution.

A review of available literature indicates no previous reports in Thailand of Purtscher-like retinopathy associated with ocular procedures, including cataract surgery or retrobulbar anesthesia. The only known case of Purtscher retinopathy in Thailand was reported by Kanthar T. in 2019, which involved retinal findings following clavicle and scapula fractures sustained in a motorcycle accident.[14]

This case report aims to raise awareness of the potential severity of Purtscher-like retinopathy which is a rare but serious condition that can cause profound, often irreversible visual impairment. The rapid onset, limited treatment options, and potential for permanent blindness underscore the importance of early recognition and preventive measures.

Methods

The research methodology was qualitative research, depicted in a case report. The population size was one medical record of one patient who visited Ophthalmology clinic, Suddhavej hospital, Mahasarakham university during November 2022 - January 2023. All of the patient's data and graphic pictures were consented from the hospital director and institutional review board together with the ethics committee. The inclusion criteria were 1. The patient who underwent cataract surgery: Phacoemulsification with IOL implantation 2. Retrobulbar anaesthesia technique was applied 3. Subsequently post surgery, fundus photography and OCT showed Purtscher-like retinopathy. The exclusion criteria was Purtscher-like retinopathy from other specified causes.

Ethical Consideration

This case report was approved by the ethical committee of the Faculty of Medicine, Mahasarakham university. Reference number for ethics approval: 149-149/2567

Case Report

A 77-year-old man with a history of essential hypertension and asthma, and a prior uneventful cataract surgery in the right eye, presented for phacoemulsification with intraocular lens implantation in the left eye. He had no history of ocular trauma or previous surgery in the left eye. Preoperative fundus examination of both eyes was unremarkable. His best-corrected visual acuity (BCVA) was 20/30 in the right eye and 15/200–1 in the left eye, the latter due to nuclear sclerosis and a posterior subcapsular cataract. The patient received 5 mL of an anesthetic solution containing 0.75% bupivacaine, 2% lidocaine, and epinephrine 1:200,000. The injection was administered using a 25-gauge, 25 mm blunt retrobulbar needle through the inferotemporal eyelid. After needle withdrawal, light manual external compression was applied to the left eye. Cataract surgery was then performed by a third-year ophthalmology resident using the phacoemulsification technique, with an uneventful 40-minute operative course.

On the first postoperative day, the patient reported blurred vision in the left eye without pain, photophobia, or other ocular symptoms. BCVA remained 20/30 in the right eye, but had decreased to 10/200 in the left eye. A relative afferent pupillary defect (RAPD) was not present in either eye. Fundus examination of the left eye revealed multiple cotton wool spots and intraretinal hemorrhages arranged in a circular pattern around the optic nerve, along with areas of superficial retinal whitening and perivascular clearing consistent with Purtscher flecken (Figure 1). Fundus fluorescein angiography was not performed.

Spectral domain optical coherence tomography (SD-OCT) of the left eye demonstrated edematous changes in the foveal and parafoveal inner retinal layers, with hyperreflectivity of the nerve fiber layer corresponding to the area of retinal whitening (Figure 4). Based on these clinical findings, a diagnosis of Purtscher-like retinopathy was established.

A thorough evaluation was conducted to investigate potential systemic causes of Purtscher-like retinopathy. No underlying conditions such as pancreatitis, renal dysfunction, autoimmune disease, or hematologic malignancy were identified.

At follow-up visits at 4 and 8 weeks postoperatively, fundus examination revealed resolution of the intraretinal hemorrhages and gradual reduction of cotton wool spots (Figure 3). However, visual acuity in the left eye remained unchanged from the first postoperative day.

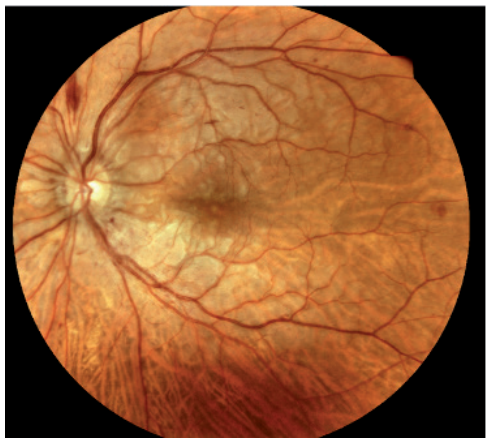

Figure 1: Fundus photography of the left eye (Postoperative day 1)

Figure 2: Compared to fundus photography fundoscopy of the right (unaffected) eye

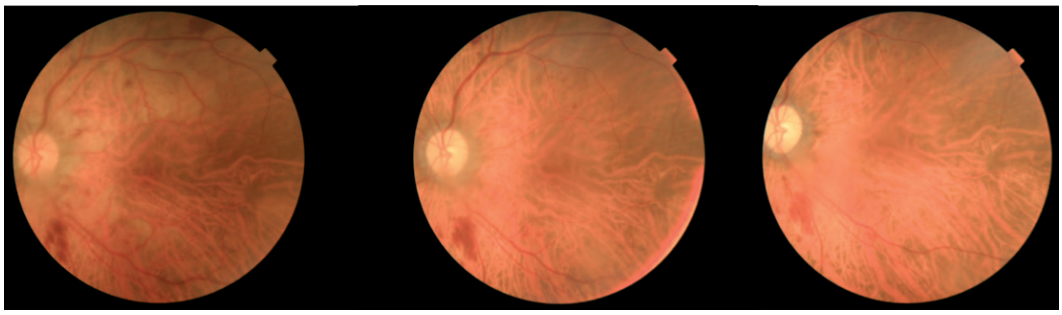

Figure 3: Fundus photography of the left eye (Postoperative day 1, 4 weeks, 8 weeks)

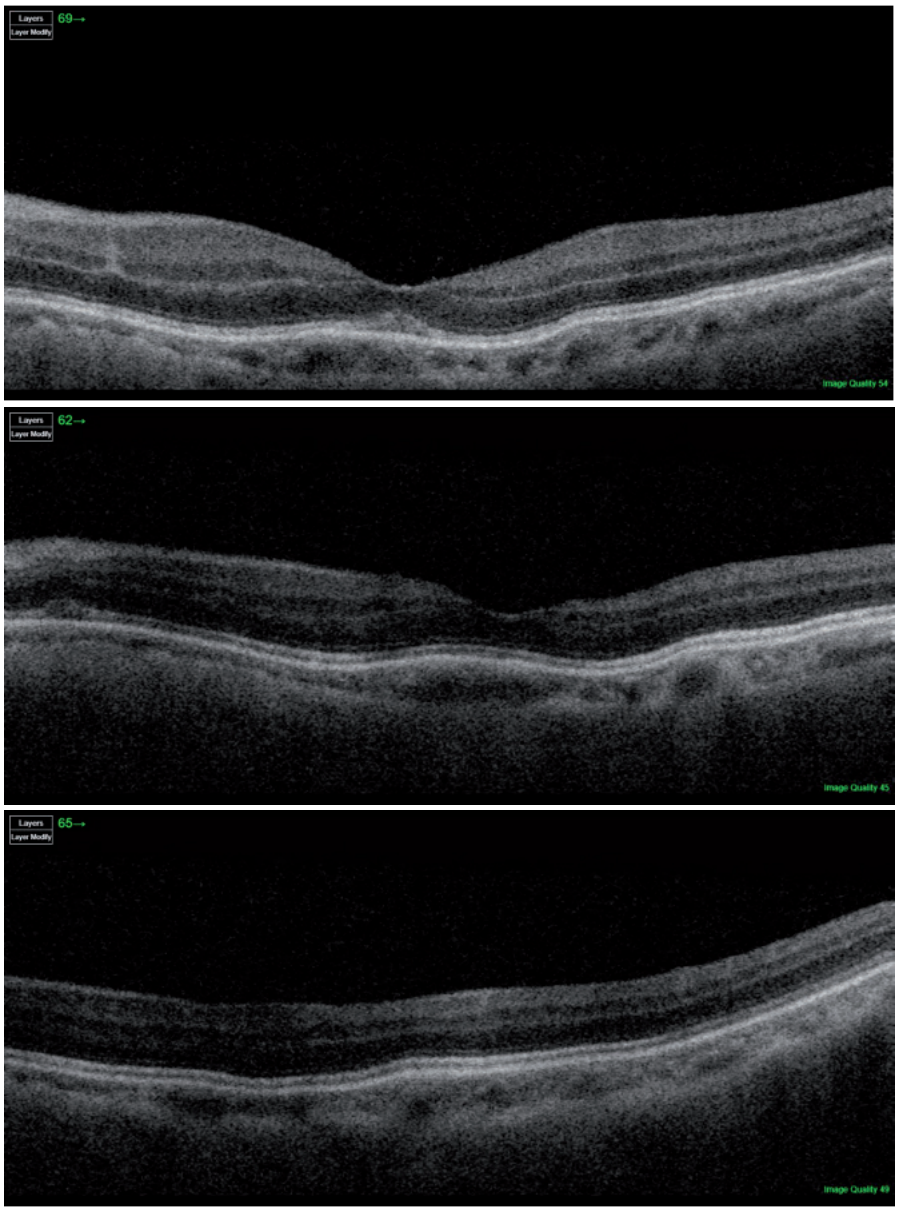

Figure 4: Optical coherence tomography of the left eye
(Postoperative day 1, 4 weeks, 8 weeks)

Discussion

Purtscher-like retinopathy is a rare, vision-threatening condition characterized by sudden visual loss associated with retinal whitening and hemorrhages, typically following trauma or systemic diseases. Its occurrence after retrobulbar anesthesia for cataract surgery is exceedingly uncommon, with only a few cases documented in the literature.

In 1990, Lemagne et al.[12] reported a case of Purtscher-like retinopathy following retrobulbar anesthesia, highlighting the potential for this complication even in routine procedures. Similarly, Blodi and Williams[15] described a patient who developed this retinopathy after an otherwise uncomplicated cataract extraction with retrobulbar anesthesia, experiencing severe vision loss followed by gradual improvement. More recently, Narendran et al.[14] reported a case in a healthy 64-year-old man who developed Purtscher-like retinopathy after a routine peribulbar anesthetic injection for cataract surgery, suggesting that even peribulbar anesthesia, considered safer than retrobulbar, can be associated with this rare complication.

Although the exact pathogenesis of this condition remains uncertain, it is believed to involve complement-activated immune processes leading to microvascular occlusion and subsequent retinal ischemia.[16] Since Purtscher-like retinopathy in this patient was symptomatic, closely monitoring for possible unexpected outcomes such as macular edema and follow-ups has been done without further treatment or intervention. Miguel et al. found no significant difference in visual acuity improvement between patients treated with high-dose corticosteroids and observation. The prognosis is variable. The fundus findings showed gradual resolution however the visual acuity revealed no improvement in this case. Our study had a limitation in that we could only follow the patient for 8 weeks postoperatively.

Given the scarcity of reported cases,[17] our case was considered as the first case in Thailand, we report to emphasize the possibility of such infrequent but serious complications as a cautionary example of potential indirect injury resulting in unfavourable visual outcome after cataract surgery.

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Nil.

Conflict of Interests

There are no conflict of interests.

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