Aggravation of polypoidal choroidal vasculopathy after cataract surgery

Dear Editor,

Polypoidal choroidal vasculopathy (PCV) is considered to be variant of choroidal neovascularisation. We report a case where PCV was aggravated shortly after cataract surgery and accompanied by submacular hemorrhage in an asymptomatic PCV patient.

A 68-year-old woman complained of decreased visual acuity (VA) of the left eye. The best-corrected VA was 20/25 in the right eye and 20/40 in the left eye. The intraocular pressure (IOP) was 16 mmHg in both eyes. A slit-lamp examination showed mild nuclear sclerosis of both lenses. The fundus examination of the left eye revealed what looked like pigment epithelial detachment (PED); therefore, fluorescein angiogram (FA) and indocyanine green angiogram (ICGA) were performed. ICGA showed a branching vascular network (BVN) terminating in polypoidal swelling and serous PED [Fig. 1a]. Since the VA was not affected significantly and no additional finding such as metamorphopsia was made, it was decided to conduct follow-up observations. Three years later, the VA of left eye decreased to 20/200, and fundus could not be evaluated precisely. Patient wanted cataract surgery to be performed. The cataract surgery was performed without complication. The VA improved to 20/25 one day after cataract surgery, but the patient continuously complained of dim vision. The VA showed an abrupt drop to 20/50 one week after the surgery and she complained of metamorphopsia. The fundus examination showed submacular hemorrhage [Fig. 1b]. Photodynamic therapy was performed and intravitreal bevacizumab (1.25 mg) was given three times every six weeks [Fig. 2]. Submacular hemorrhage disappeared but irregular PED was still found on optical coherence tomography (OCT). The BVN and polypoidal lesion also remained. [Fig. 1c]; however, the VA improved to 20/30 and the metamorphopsia of the patient disappeared.

But the reason why the lesion that had remained asymptomatic for a few years got aggravated in a short time following cataract surgery can be found in terms of the hemodynamics in the choroid in this case. As for the relationship between IOP and blood flow to the eye, Zhao et al., measured IOP during cataract surgery for humans by breaking down the procedure into three phases (A: Cortical cleanup, B: Nuclear disassembly and C: Anterior capsular polishing). They reported on a big fluctuation in IOP ranging from 13±4.7 mmHg preoperatively to 96±6.2 mmHg at the maximum. Normal retinal vessels have a sufficient autoregulative capacity so that the blood flow to the retina can be maintained at a constant level even if there is some change in IOP; however, choroidal vessels have a limited capacity which leads to a diminished blood flow to the choroid even when IOP increases or the arterial pressure decreases slightly. An abrupt fall in the IOP can cause an increase in the blood flow to the choroid and the blood vessels of the elderly patients are so vulnerable that vascular rupture and hemorrhage can occur [Fig. 3].

In summary, we reported a case where an asymptomatic...
PCV patient showed submacular hemorrhage derived from PCV in a short period of time following cataract surgery.

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Figure 1: (a) Prior to cataract surgery, the fundus was hazy secondary to cataract, polypoidal lesion (yellow arrow) and serous pigment epithelial detachment (PED) (arrowhead) were found on indocyanine green angiogram (ICGA). (b) One week after cataract surgery, submacular hemorrhage was seen in the fundus, and a new polypoidal lesion (red arrow) was observed on ICGA. (c) Three months after one photodynamic therapy and three intravitreal bevacizumab injections, submacular hemorrhage disappeared but polypoidal lesion and branching vascular network remained on ICGA, and irregular PED was still found on optical coherence tomography.

Figure 2: The treatment course of submacular hemorrhage. Fundus photograph showing nearly completely resolved blood under the macula. (PDT: photodynamic therapy, IVB: intravitreal bevacizumab injection)

Figure 3: Possible mechanism of subretinal or sub-RPE hemorrhage in asymptomatic PCV following cataract surgery. (a) When IOP increases during cataract surgery, choroidal blood flow decreases. (b) When IOP decreases, choroidal blood flow increases. (c) Fragile site of polypoidal lesion can rupture when fluctuation of choroidal blood flow exists, and this can cause bleeding. (RPE: retinal pigment epithelium, PCV: polypoidal choroidal vasculopathy, IOP: intraocular pressure)