Intravitreal Bevacizumab in the Treatment of Peripapillary Choroidal Neovascular Membrane Secondary to Idiopathic Intracranial Hypertension

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Abstract: A 14-year-old Caucasian boy with idiopathic intracranial hypertension (IIH) presented with blurred vision in his left eye. Visual acuity was 20/20, right eye, and 20/80, left eye, and funduscopy revealed bilateral papilledema. In addition, there was peripapillary choroidal neovascular membrane (PPCNVM) in the left eye. Oral acetazolamide improved the symptoms and signs of IIH, but seven weeks later, acuity remained 20/80, left eye, with an increase in subretinal hemorrhage. Two weeks following an intravitreal injection of bevacizumab, visual acuity on the left had improved to 20/30 with resolution of subretinal hemorrhage and fibrosis of PPCNVM. After an additional 2 weeks, visual acuity improved to 20/20, and there has been no sign of recurrence over 3.5 years of follow-up.

CASE REPORT

A 14-year-old healthy Caucasian boy presented with a history of blurred vision for 4 months and intermittent diplopia and headaches for several weeks. He had no significant medical or ophthalmological history.

Visual acuity was 20/20, right eye, and 20/80, left eye. There was a left relative afferent pupillary defect, and impaired color vision on the left eye. Extraocular movements were full. Automated perimetry revealed only an enlarged blind spot in the left eye. On ophthalmoscopy, there was bilateral optic disc edema and subretinal hemorrhage extending from the temporal aspect of the left disc toward the fovea (Fig. 1). Intravenous fluorescein angiography showed leakage from a PPCNVM (Fig. 2).

The patient’s blood pressure was 110/60 mm Hg, and hematologic screening for causes of optic disc edema was normal. Magnetic resonance imaging of the orbits and brain and magnetic resonance venography were unremarkable. Lumbar puncture revealed an opening pressure greater than 35 cm H2O with normal cerebrospinal fluid analysis. The patient was placed on oral acetazolamide (250 mg 4 times a day, which was decreased 7 days later to 250 mg twice a day).

Seven weeks later, despite an improvement in symptoms of intracranial hypertension and papilledema, visual acuity in the left eye remained 20/80 with an increase in the area of subretinal hemorrhage. The option of intravitreal anti-VEGF treatment was discussed with the patient’s family, and with parental consent, a single-dose intravitreal injection of 1.5 mg of bevacizumab (Avastin; Roche, Copenhagen, Denmark) was given under general anesthesia.

Two weeks later, left visual acuity was 20/30, and 4 weeks after treatment, it was 20/20. At 9 weeks, ophthalmoscopy revealed a flat and fibrosed PPCNVM with...
decreased subretinal hemorrhage (Fig. 3). The patient’s visual acuity has remained 20/20 over 3.5 years with no sign of recurrence of idiopathic intracranial hypertension (IIH) or PPCNVM.

**DISCUSSION**

Although a recognized complication of chronic papilledema, PPCNVM is rare (1,2). Juxtapapillary subretinal
neovascularization has been reported to complicate IIH in only 0.53% of cases (2).

In a retrospective review of 6 patients with IIH having PPCNVM, Wendel et al (2) noted that once the papilledema is treated adequately, these neovascular membranes are unlikely to cause severe visual loss provided that they do not enroach upon or cause hemorrhage into the fovea. They concluded that argon laser therapy may not improve visual outcome in more advanced cases and that photodynamic therapy may be a less destructive treatment option. Kaeser and Borruat (5) described a 14-year-old boy with IIH. At presentation, visual acuity was 20/20, right eye, and 20/200, left eye, with bilateral papilledema and PPCNVM in the left eye. Following treatment with acetazolamide, the patient’s vision returned to 20/30 in the left eye after 1 year, and the neovascular membrane resolved without treatment. However, Sathornsumetee et al (4) reported a case of IIH in which PPCNVM and reduced visual acuity persisted 9 months after a dramatic improvement in papilledema from optic nerve sheath fenestration.

The natural history of PPCNVM is unpredictable, as it may spontaneously involute, remain stable, or expand and lead to devastating visual loss. Management options for PPCNVMs include observation alone, surgery, laser photocoagulation, photodynamic therapy, or intravitreal anti-VEGF agents. Intravitreal bevacizumab has been reported as a successful management option for PPCNVM secondary to age-related macular degeneration (ARMD) (6) and peripapillary atrophy (7), but its use in cases of papilledema including IIH has not been described. The issue of using this agent in a pediatric patient was specifically discussed in the process of informed consent. Bevacizumab has been used in the treatment of retinopathy of prematurity, and there are no reports of local or systemic adverse events with follow-up of up to 10 months in this pediatric population (8).

The pathophysiology of PPCNVM associated with long-standing papilledema in IIH is uncertain, but it is thought to be different from ARMD (9–11). In ARMD, it has been proposed that the accumulation of drusen between retinal pigment epithelium (RPE) and Bruch membrane initiates a cascade of inflammatory and immune reactive processes, causing RPE dysfunction and breaks in Bruch membrane. Persistent RPE dysfunction results in chronic hypoxia, thus tipping the complex balance of pro- and antiangiogenic mechanism toward angiogenesis, leading to choroidal neovascularization (11,12). With papilledema, it has been postulated that discontinuity is formed in the peripapillary border of Bruch membrane from pressure exerted by the swollen disc. This discontinuity, in conjunction with focal hypoxia induced by axonal swelling, promotes angiogenesis and subsequent neovascular membrane formation (3).

REFERENCES