

Cataractogenesis by Subconjunctival Gentamicin Inadvertently Injected into the Vitreous Cavity Following 23-Gauge Transconjunctival Sutureless Vitrectomy

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Abstract

A 35 year-old man underwent a 23-gauge 3-port sutureless vitrectomy for vitreous hemorrhage from Terson's syndrome in both eyes. A very small amount of gentamicin flowed into the vitreal cavity of only the right eye during intraoperative injection with subconjunctival gentamicin at the end of the surgery. Small cotton-wool patches were noted on the retina on day one after surgery, and minute stellate cortical opacities of the lens were noted one week after the surgery. The cortical opacities progressed to make the retina invisible, and phacoemulsification with intraocular lens insertion was conducted. Best-corrected visual acuity was 20/25 in the right eye and 20/28 in the left eye one week after the surgery. Fundus examination, visual field test, and electroretinogram demonstrated no differences between both eyes, with the exception of the aforementioned cotton-wool patches. Inadvertent intravitreal gentamicin injections can cause cataracts as well as retinal toxicities.

Keywords: Cataractogenesis; Gentamicin; Vitrectomy

Introduction

Clinical findings of retinal toxicity from gentamicin include early superficial and intraretinal hemorrhages, opaque and edematous retina, cotton-wool infarcts, arteriolar narrowing, and venous beading subsequent to retinal vascular nonperfusion, followed by chronic findings of rubeosis irides, neovascular glaucoma, retinal pigmentary degeneration, and optic atrophy [1]. Studies of the ocular toxicity of gentamicin have previously been focused on the retina, and its toxicity in other intraocular structures has yet to be reported.

Subconjunctival gentamicin is used extensively for endophthalmitis prophylaxis after intraocular surgery, although intravitreal gentamicin is no longer used for intraoperative prophylaxis [2,3]. In the case of sutureless vitrectomy, however, sclerotomy wounds can function as a channel for intravitreal access of subconjunctivally-injected gentamicin.

We report a case of cataract development with mild retinal toxicity from gentamicin inadvertently placed into the vitreal cavity through an unsutured 23-gauge sclerotomy.

Case Report

A 35 year-old man was referred to our facility complaining of reduced visual acuity in both eyes. He had abruptly lost his consciousness 1 month prior, and subarachnoid and intraventricular hemorrhages coupled with a ruptured cerebral aneurysm were detected

on the brain CT. The patient was managed in the intensive care unit after embolization of aneurysm with a Guglielmi detachable coil (Boston Scientific, Natick, MA, USA). His visual acuity and intraocular pressure were hand motion and 15 mmHg, respectively, in both eyes upon initial examination. No abnormalities were noted on the anterior segment. Posterior segment abnormalities other than vitreous hemorrhage were not noted on the ultrasonography, which was conducted in response to the finding of dense vitreous hemorrhaging on the fundus examination. He underwent a sutureless 23-gauge 3-port conventional vitrectomy in each eye, with the right eye first, one week apart under a diagnosis of Terson's syndrome. The mechanical induction of posterior vitreous detachment with an ocutome was conducted during the performance of the surgery. Intraoperative prophylaxis was achieved with 0.5 ml of subconjunctival gentamicin (concentration 80 mg/2 ml) at the end of each surgery. A very small amount of gentamicin, however, was observed to flow into the vitreal cavity of the patient's right eye through the unsutured sclerotomy wound. Vitreal cavity lavage was not conducted, considering the very small amount of gentamicin. Fundus examination conducted on postoperative day one showed three small cotton-wool patches only in the right eye (Figure 1).

The patient's uncorrected visual acuity was 20/200 in both eyes one week after the last surgery. The slit lamp examination revealed minute stellate cortical opacities in the lens of the right eye. No changes were noted on the fundus examination. He revisited our clinic complaining of leukocoria in his right eye six weeks after surgery. Numerous cortical

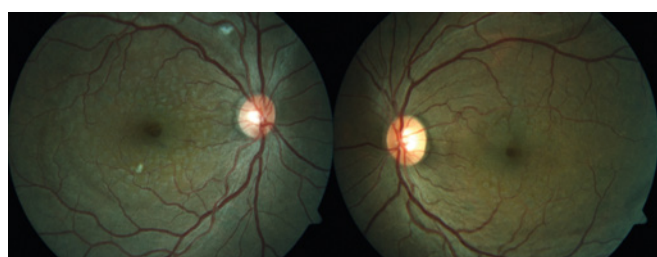


Figure 1: Fundus photograph showing small cotton-wool patches only in the right eye 6 weeks after the vitrectomies.

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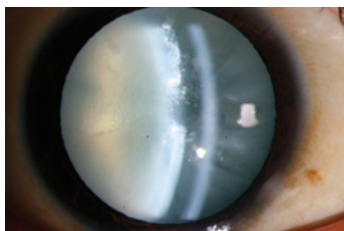


Figure 2: Cataract developed 6 weeks following intraoperative prophylaxis with subconjunctival gentamicin in a 23-gauge sutureless vitrectomy.

opacities merged to form a white cataract and the retina was not observable (Figure 2), and the other eye evidenced only a clear lens. Phacoemulsification with intraocular lens insertion was conducted. The best-corrected visual acuity was 20/25 in the right eye and 20/28 in the left eye one week after the cataract surgery, and the retina was similar. Ocular examinations of visual field test, and standard and multifocal electroretinogram demonstrated no difference between both eyes (data not shown).

Discussion

This case showed that subconjunctival gentamicin inadvertently injected into the vitreous cavity could cause toxicity in the lens as well as the retina.

Retinal toxicity was reported to be caused by as little as 0.1 mg of gentamicin [4]. The gentamicin in the vitreal cavity from the subconjunctival depot was quite small in our case, and caused only small cotton-wool patches without other devastating complications. Severe retinal toxicity, however, was reported in a case in which intravitreal gentamicin entered through an unsutured 25-gauge sclerotomy [5]. Lavage of the vitreal cavity should have been conducted, although we did not perform this procedure, considering the small amounts in our case [6,7].

The same procedures were conducted for vitreous hemorrhage from Terson's syndrome in both eyes. The only difference during the surgeries was the influx of the subconjunctival gentamicin into the vitreal cavity of the right eye. Thus, gentamicin was suspected as the cause of the cataractogenesis. The type and rate of cataract development

was different from that previously reported after vitrectomy [8]. Stellate small opacities were distributed throughout the anterior and posterior cortex and perceived as of two weeks after the surgery. The opacity progressed rapidly, making a cataract surgery inevitable just six weeks after the vitrectomy. To the best of our knowledge, there have been no reports of cataractogenesis from intravitreal gentamicin except in one *in vitro* experiment, in which opacity appeared in the cultured rat lenses after 60 minutes of treatment with 5.0 mg/ml of gentamicin [9].

Conclusion

Subconjunctival gentamicin inadvertently injected into the vitreous cavity can induce cataract and retinal toxicity. Caution should be exercised in intraoperative prophylaxis with subconjunctival gentamicin after sutureless vitrectomy. The injection of gentamicin subconjunctivally, far from the scleral wound, may be the most appropriate protocol. Vigorous lavage of the vitreal cavity should be carried out in cases of intravitreal access of any quantity of gentamicin.

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