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Case report

Acute bacterial endophthalmitis after scleral buckling surgery with chandelier endoillumination

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ABSTRACT

Purpose: The non-contact wide-angle viewing system (WAVS) with chandelier endoillumination is being used more commonly during scleral buckling surgery for rhegmatogenous retinal detachments although its safety has not been established. We report our findings in a case of bacterial endophthalmitis that developed after scleral buckling surgery with WAVS and chandelier endoillumination.

Observations: A 42-year-old man underwent scleral buckling surgery for a rhegmatogenous retinal detachment in his right eye using a WAVS with chandelier endoillumination. Three days after the surgery, the patient noticed a marked decrease in his vision with ocular pain. Slit-lamp examination showed dense infiltration in the anterior chamber and vitreous body. Pars plana vitrectomy with antibiotic irrigation was done immediately, and *Staphylococcus epidermidis* was detected in the vitreous fluid. After vancomycin 6/day for 4 weeks, the inflammation gradually subsided, and the visual acuity recovered to 20/20 in 3 months.

Conclusions and importance: Acute bacterial endophthalmitis can develop after scleral buckling surgery performed with WAVS and chandelier endoillumination.

1. Introduction

Scleral buckling surgery with binocular indirect ophthalmoscopy has been a standard method to treat rhegmatogenous retinal detachments (RRDs) for many years. Recently, vitrectomy with smaller gauge surgical instrumentations has been used to treat retinal detachments due to its increased safety. However, there are still good indications for scleral buckling surgery without vitrectomy depending on the type and degree of retinal detachment. During conventional surgery with observation by binocular indirect ophthalmoscopy, the surgical field cannot be easily shared with the medical staff, and the access to high-quality intraocular images for the surgical assistant and the rest of the surgical team is limited.[1,2] Therefore, it is beneficial to have alternative buckling techniques that can overcome these limitations.

It has recently become more common to use a non-contact, wide-angle viewing system (WAVS) combined with endoillumination for vitrectomy which provides a panoramic and upright view of the surgical field.[3–5] Many recent studies have reported that the non-contact WAVS combined with endoillumination is an effective way to view the surgical field during scleral buckling surgery for RRDs.[6–19] Although its usefulness compared to an indirect ophthalmoscopy-guided surgery has been suggested, there has been only one report on the complications related to its use.[15] More specifically, the development of infectious endophthalmitis has not been reported in spite of the use of a chandelier endoilluminator that is inserted through the conjunctiva which is most septic site for infectious intraocular organisms.

We report a case of acute bacterial endophthalmitis that developed after scleral buckling surgery in which the WAVS was combined with chandelier endoillumination.

2. Case report

A 42-year-old man was referred to our hospital because of an acute visual field defect of his right eye. He had undergone successful vitrectomy with scleral buckling surgery for a RRD in his left eye one year earlier. He did not have any history of other ocular and systemic diseases. His visual acuities were 20/40 OD and 20/20 OS, and the intraocular pressures were 10 mmHg OD and 13 mmHg OS. Slit-lamp biomicrosopy showed that the anterior chamber and

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crystalline lens of the right eye were normal, but ophthalmoscopy showed a supra-nasal RRD with no macular detachment with three retinal breaks in the right eye. In the left eye, there was a scleral buckle and no remarkable changes.

Segmental scleral buckling surgery was planned for the right eye. Prior to the surgery, topical lovofloxacin was applied at 3 and 6 hours before the surgery, and the lids and conjunctiva were sterilized twice with 0.05% iodine polyvinyl alcohol ophthalmic solution (PA-Yodo, Nitten Phramacological Co, Tokyo, Japan).

The bulbar conjunctiva was incised at the limbus, and a 25-gauge valved cannula (Alcon Japan, Tokyo, Japan) was inserted through the sclera through a straight incision 4 mm from the limbus. A chandelier endoilluminator (disposable Eckard twinLight chandelier, DORC International, Zuidland, The Netherlands) was inserted through the cannula (Fig. 1). The ocular fundus was observed through the non-contact WAVS (Resight (500), Carl Zeiss Meditec, Germany) and a surgical microscope. After cryopexy, a circumferential segmental silicone tire (No. 287, MIRA, MIRA Inc., Waltham, MA) was sutured to the sclera and a silicone band (No. 240, MIRA, MIRA Inc., Waltham, MA) was placed circumferentially. The sclera and choroid were punctured by a 30-gauge needle, and the subretinal fluid was drained through the puncture. Then the sclerotomy site was covered with the silicone buckle without closing.

At the completion of surgery, the surgical field was rinsed with 0.05% polyvinyl alcohol-iodine (PAI) solution every 10 minutes. There was evidence of vitreous incarceration into the scleral port after the cannula was removed, so it was resected with scissors (Fig. 2). The sclera was washed with tobramycin solution, and the conjunctival wound was closed with 8-0 biodegradable sutures.

The next day, the retina was well attached and the visual acuity was 20/40. Lovofloxacin and betamethasone sodium phosphate eyedrops were applied 4/day, and no remarkable findings were noted. On day 3, a severe ocular pain developed which was associated with reduction of vision to hand motion vision. Slit-lamp biomicrosccopy revealed severe conjunctival injection and edema. Many cells were seen in the anterior chamber and the anterior vitreous (Fig. 3). Ophthalmoscopy showed severe vitreous haze, and multiple white retinal lesions with retinal hemorrhages (Fig. 4, Right). Dense hyperechoic shadows were noticed throughout the vitreous body (Fig. 4, Left). The eye was diagnosed with endophthalmitis.

Pars plana vitrectomy with lensectomy was immediately performed to treat the acute infectious endophthalmitis. The intraocular irrigating solution contained 0.01 g/ml of vancomycin (Nichi-Ikou, Toyama, Japan) and 0.02 g/ml of ceftazidime (Nichi-Ikou). Intraoperatively, no dense infectious material or specific pathological findings were observed within or outside the sclera where the cannula had been inserted or at the sclerotomy site that was used for subretinal fluid drainage. *Staphylococcus epidermidis* was detected in the vitreous sample, and the minimum inhibitory concentration was >4.0 (Resistant) for levofloxacin and 2.0 (Susceptible) for vancomycin. The patient was switched to vancomycin 6/day for 4 weeks. The inflammatory signs gradually subsided, and 3 months after the surgery, the corrected visual acuity had recovered to 20/20 with neither retinal detachment nor inflammation (Fig. 5).

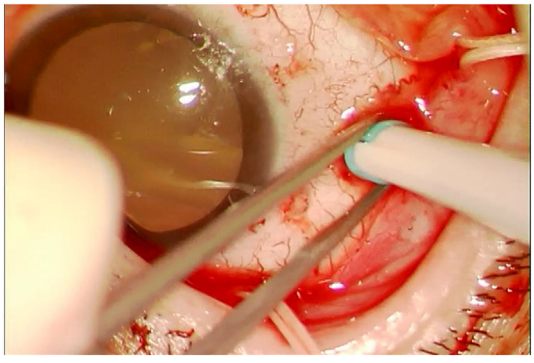

Fig. 1. External photograph showing the 25-gauge valved cannula on the sclera 4 mm from the limbus. The chandelier endoilluminator was passed through this cannula.

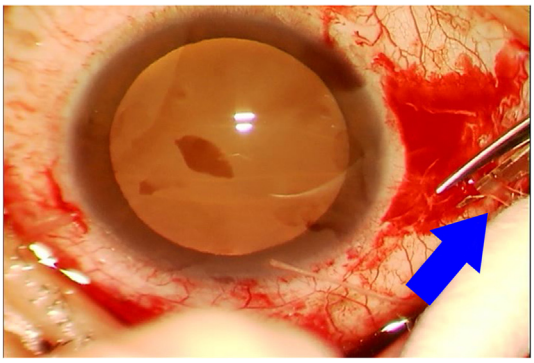

Fig. 2. Intraoperative photograph. The vitreous body possibly incarcerated in the scleral port for the endoilluminator was resected with scissors (arrow).

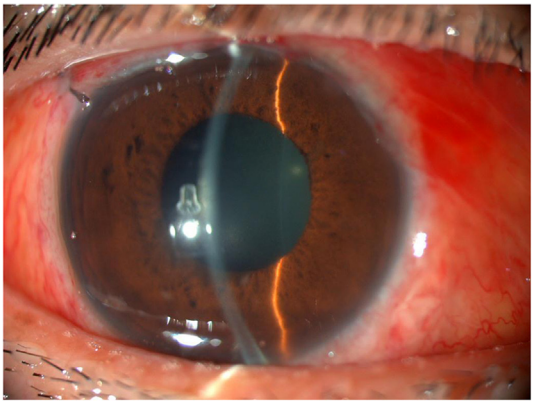

Fig. 3. Slit-lamp photograph of the anterior segment on day 3 after the surgery. Severe conjunctival injection and edema can be seen. Many cells can be seen in the anterior chamber.

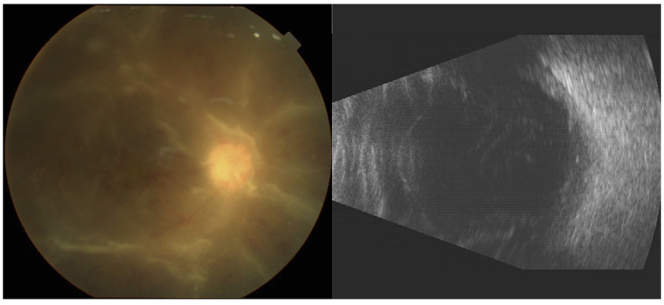

Fig. 4. Fundus photograph on day 3 after the surgery (Right). Severe vitreous haze and multiple white retinal lesions with retinal hemorrhages can be seen. Ocular echography showed dense hyperechoic shadows throughout the vitreous body (Left).

3. Discussion

There are several reasons why the WAVS is becoming more commonly used for scleral buckling surgery to treat RRDs.[6–19] In

Fig. 5. Fundus photograph 3 months after the surgery. The right visual acuity has recovered to 20/20 with neither retinal detachment nor inflammation.

general, the success rate with WAVS is almost equal to that with indirect ophthalmoscopy-guided buckling surgery. In some reports, the surgical duration was significantly shorter with WAVS than with conventional scleral buckling surgery.[13,14] The combination of WAVS with a surgical microscope can allow clear views of the fundus in pseudophakic eyes, and an improved view of the peripheral retina with oblique lighting to improve the detection of peripheral retinal breaks. In addition, this technique permits all team members to share the same surgical view, which can also educate trainees on these surgical techniques. Moreover, it can be helpful for surgeons suffering from neck strain or back pain.[20]

However, there are some reports on WAVS-related complications such as mild lens opacities caused by accidental contact of the chandelier endoilluminator and the lens or iatrogenic retinal detachments that occurred during the extraction of the endoilluminator.[15] Theoretically, surgical complications due to the scleral incision, the insertion of the chandelier endoilluminator, lens and peripheral retina damage, and endophthalmitis may occur during the surgery with WAVS and use of a chandelier endoilluminator. However, the development of acute infectious endophthalmitis has not been reported to the best of our knowledge.

The incidence of endophthalmitis was reported to be much lower after scleral buckling surgery than after cataract surgery.[21] Indeed, this is the first case of acute endophthalmitis after scleral buckling surgery at our institution after approximately 2500 consecutive cases of scleral buckling during the last 20 years.

The specific infectious route of the bacteria to the intraocular tissue was not definitively determined. The site of the scleral incision that was made for the drainage of subretinal fluid is probably not the site because the inflammatory infiltrates were more evident in the anterior than the posterior retina by echography, and a retinal detachment or subretinal abscess could not be found. It is well known that the vitreous that has herniated to the sclerotomy site can be a bridge for pathological organisms to enter the intraocular tissue.[22] During scleral buckling surgery, the changes of the intraocular pressure is substantial because of the scleral indentation so that vitreous herniation at the incision site can easily occur. To try to avoid the possibility of infection, we washed the surgical field with PAI solution several times intraoperatively, and the scleral sclerotomy was covered by the conjunctiva at the end of surgery. Povidone-iodine is widely used as a preoperative disinfectant in countries other than Japan. So, it is possible that the use of PAI might have played some role in the endophthalmitis. However, it is unlikely because PAI has been proven to be as effective as povidone-iodine as a preoperative disinfectant.[23] Additionally, the PAI solution is the only iodine solution approved for ophthalmic use in Japan. Nevertheless, acute infectious endophthalmitis did occur.

Acute infectious endophthalmitis is rare after scleral buckling, and one of the important symptom of infectious endophthalmitis is ocular pain. However, ocular pain is also common after scleral buckling surgery without infection, and thus infectious endophthalmitis after scleral buckling may be overlooked at the early stage. Clinicians should be aware that it can occur after scleral buckling surgery especially using the WAVS with chandelier endoillumination.

Patient consent

The consent has been obtained from the patient in writing. The IRB of Kagoshima University gave the permission to submit the present materials for scientific journals.

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Conflict of interest

The authors have no financial disclosures.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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