

## —Report on Experiments and Clinical Cases—

Post-cataract Surgery Endophthalmitis Treated with  
Core Vitrectomy: A Case ReportToshihiko Shiwa<sup>1</sup>, Katsuya Umeno<sup>2</sup>, Yuji Hara<sup>3</sup> and Fumiaki Yoshitomi<sup>4</sup><sup>1</sup>Department of Ophthalmology, Nippon Medical School<sup>2</sup>Umeno Eye Clinic, <sup>3</sup>Hanami Eye Center<sup>4</sup>Dazaifu Yoshitomi Eye Center**Abstract**

Postoperative endophthalmitis is one of the most serious complications after cataract surgery though its frequency may be low. We report a case with post-cataract extraction bacterial endophthalmitis treated favorably by core vitrectomy through pars plana with anterior vitrectomy cutter (A-vit).

The patient, a 72-year-old woman, presented with blurred vision 7 days after phacoemulsification and aspiration (PEA) and intraocular lens (IOL) implantation. Her initial visual acuity was counting fingers. As hypopyon and corneal edema progressed in a few hours, we decided to perform vitrectomy. Firstly, we performed IOL explantation and anterior vitrectomy through the corneal stab incision with A-vit attached to the phaco machine. The inflammation, however, appeared to be severe. Secondly we performed core vitrectomy with the same cutter as we used in the first operation through pars plana as well as intravitreal injection of vancomycin on the following day. The inflammation was gradually subsided and her corrected visual acuity was recovered to 30/20 at 7 months after the vitrectomy.

The results suggest that for cataract surgeons in the facilities that are not equipped with 3-port vitrectomy machine, post-cataract extraction bacterial endophthalmitis of the emergency stage can be successfully treated by core vitrectomy through pars plana as well as intravitreal injection of antibiotics with neither vitreous shaving at the vitreous base nor artificial posterior vitreous detachment.

(J Nippon Med Sch 2004; 71: 340–344)

**Key words:** cataract surgery, endophthalmitis, core vitrectomy

**Introduction**

Post-cataract surgery endophthalmitis rarely occurs, although delay in treatment once it has developed may lead to blindness<sup>1,2</sup>. When endophthalmitis is suspected, establishing the diagnosis as early as possible and beginning

treatment are vital<sup>3</sup>. However, many ophthalmology clinics are not fully equipped with all of the surgical instruments needed to perform a vitrectomy. In addition, performing emergency surgery in instances where the patient is referred to a university hospital is often problematic, so early-stage treatment may not be possible. Thus, surgical techniques for post-cataract surgery endophthalmitis must be

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established. In the current case, symptoms developed on the 7<sup>th</sup> day after phacoemulsification and aspiration (PEA) with intraocular lens (IOL) implantation and abruptly worsened; hypopyon, corneal opacity, edema, and vitreous opacity manifested, so a vitrectomy was immediately performed using cataract surgical equipment equipped with an anterior vitrectomy cutter. We have reported our experience with a case of endophthalmitis in which visual function was restored.

### Case Report

A 72-year-old woman complaining of decreased vision was examined at Umeno Eye Clinic. The patient had undergone diet therapy 4 months earlier. Her HbA1c was 7.4%. Visual acuity was 0.5 ( $0.5x + 0.5D = \text{cyl} + 0.75D \text{ Ax } 180^\circ$ ) in the right eye and 0.4 ( $0.5x + 1.0D = \text{cyl} + 0.75D \text{ Ax } 180^\circ$ ) in the left eye; intra ocular pressure was 13 mmHg for the right eye and 14 mmHg for the left eye. There were no abnormalities in particular in the anterior ocular segment, and an Emery III cataract was noted in both eyes. There were no abnormalities in the ocular fundus. PEA and IOL implantation were performed for the right eye. The postoperative course was satisfactory and right visual acuity was 1.2 a month later. PEA and IOL implantation were then performed for the left eye. There were no complications during surgery and left visual acuity was 1.2 after one week. The patient sensed blurred vision in the left eye upon awakening on the 7<sup>th</sup> day after cataract surgery. Left visual acuity was decreased to counting fingers, and numerous cells and fibrin in the anterior chamber were noted (**Fig. 1**). Ocular pain, hypopyon, ciliary injection, and vitreous opacity were not noted, so the possibility of postoperative non-specific inflammation was considered and the course was observed conservatively, although corneal opacity/edema, hypopyon, and vitreous opacity manifested (**Fig. 2**) and symptoms worsened. Based on this course, the patient was diagnosed with endophthalmitis, and an imipenem drip (0.5 g/100 ml) and vitrectomy were immediately done. The vitrectomy was performed

using an anterior vitrectomy cutter, a device specifically for cataract surgery. The fibrin membrane on the IOL surface was removed and the IOL was extracted. An anterior vitrectomy cutter with a perfusion port was inserted into the eye from the corneal side port, and the central posterior capsule and anterior vitreous were removed/aspirated (**Fig. 3**). Imipenem (25 µg/ml) was added to the perfusate. When the surgery was complete, the cornea was relatively clear and the ocular fundus was clearly visible, so the patient returned home. Corneal edema, opacity, and Descemet's membrane folds had worsened upon the patient's return the following day; there was no hypopyon, although cells had increased (**Fig. 4**) and vitreous opacity had heightened, so the ocular fundus was not clearly visible. Endophthalmitis was determined to have progressed and vitrectomy was performed a second time. Perfusion was ensured by inserting a 23G needle through the side port of the cornea; the anterior vitrectomy cutter was inserted through the pars plana 3.5 mm from the limbus and vitreous was removed (**Fig. 5**). Because the cutter is specifically for cataract surgery and is not equipped with intraocular illumination, vitreous was removed/aspirated to a large extent down to the depth possible under the illumination of the operating microscope. Vancomycin 1 mg/0.1 ml was injected into the vitreous cavity and surgery was finished. The imipenem drip was determined to have been ineffective based on the previous course, and this was changed to a drip of vancomycin (0.5 g/100 ml). As of the following day, vancomycin (0.5 g/100 ml) and betamethazone (8 mg) drips, subconjunctival injection of betamethazone, and betamethazone and ofloxacin eye drops were administered. The course was satisfactory; as of the day following the second vitreous surgery, corneal edema, Descemet's membrane folds, and cells in the anterior chamber gradually decreased, visibility of the ocular fundus improved, and abnormalities were not noted in the ocular fundus 10 days after the second surgery. Left visual acuity improved to 0.4 (**Fig. 6**). Staphylococcus capitis (S. capitis) was detected in a microbial culture test of anterior chamber fluid. Sensitivity to vancomycin was noted, although the

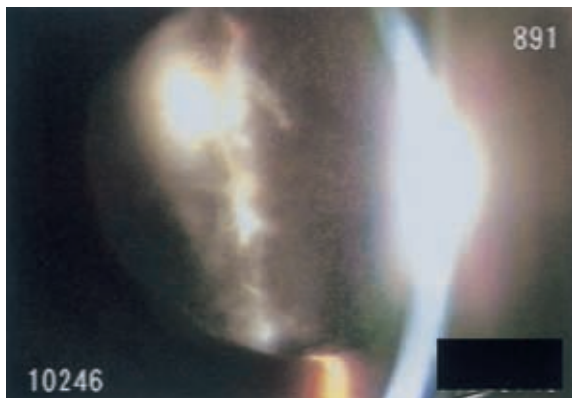


Fig. 1 Slit lamp microscopic findings at 80 minutes after onset. Numerous cells and fibrin in the anterior chamber was noted.

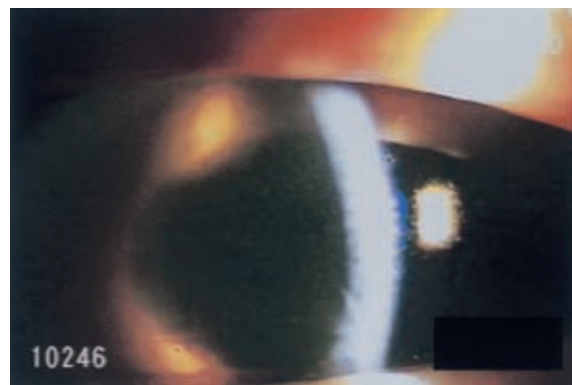


Fig. 4 Slit lamp microscopic findings at the following day of the first vitrectomy. Corneal edema, opacities, and Descemet's membrane folds had worsened.

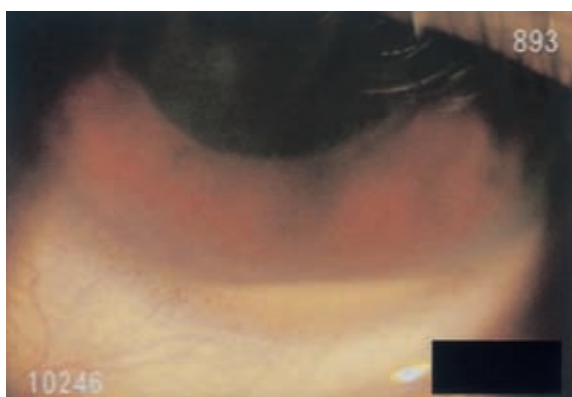


Fig. 2 Slit lamp microscopic findings at 3 hours after onset. Corneal opacities/edema, hypopyon, and vitreous opacities manifested.

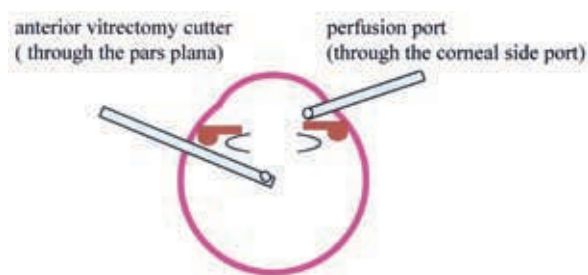


Fig. 5 Method of the vitrectomy (at the second operation)

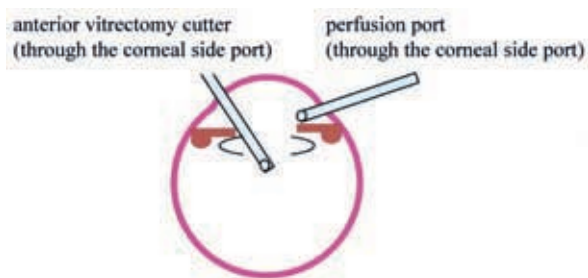


Fig. 3 Method of the vitrectomy (at the first operation)

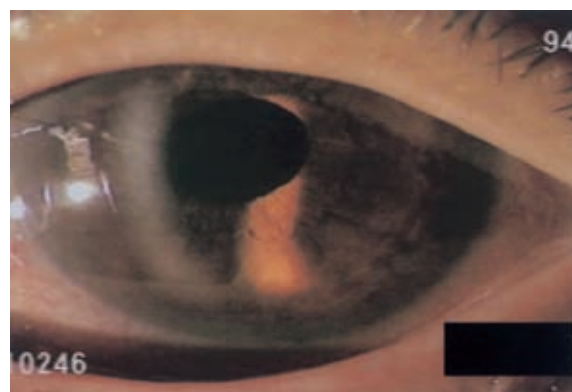


Fig. 6 Slit lamp microscopic findings at 10 days after from the second vitrectomy. Corneal edema, opacities, and Descemet's membrane folds decreased.

bacteria were resistant to numerous medications including methicillin and imipenem. IOL implantation was performed the in 5<sup>th</sup> month after the onset of endophthalmitis, and the IOL was fixed to the ciliary sulcus. Findings of inflammation in the eyes were

not noted on the 7<sup>th</sup> month after onset, and visual acuity had improved to 0.2 (1.5X - 0.75D = cyl - 1.25D Ax 110°).

## Discussion

Post-cataract-surgery bacterial endophthalmitis is said to occur at a rate of 1 case for every 500~1,700 cases of cataract surgery<sup>1</sup>. Legal cases involving post-cataract-surgery bacterial endophthalmitis have increased in recent years<sup>2</sup>. Even if legal precedents in which physicians have lost and blindness has resulted because the start of treatment was delayed are considered, handling of endophthalmitis allows no delay.

In the current case, visual acuity had decreased to counting fingers at the point when the patient sensed blurred vision and was examined, although ocular pain, ciliary injection, and hypopyon were not noted, so diagnosis of postoperative endophthalmitis was not possible and the policy adopted was conservative observation of the patient's course. However, corneal edema, hypopyon, and vitreous opacity manifested after two hours, and symptoms abruptly worsened. The course of endophthalmitis is extremely rapid, so repeating examination for several hours is vital in instances when the current ailment is suspected. In addition, edema and opacity were seen in the cornea, which was clear during onset, after two hours, and hypopyon also appeared. Immediately after the first vitrectomy, clarity was restored for the cornea, although edema, opacity and Descemet's membrane folds of the cornea had increased. Thus, paying attention to cornea findings in addition to the presence or absence of hypopyon as an indicator of the progress of endophthalmitis is vital.

The etiologic agent was *S. capitis*, a species of coagulase-negative staphylococci (CNS) that is said to have a good prognosis for visual acuity, and it was resistant to methicillin, imipenem, and the like<sup>4</sup>. CNS is most often prevalent as an etiologic agent for postoperative endophthalmitis, although reports of endophthalmitis due to *S. capitis* are extremely few in number<sup>5-7</sup>. David et al.<sup>5</sup> reported that the course of CNS endophthalmitis is delayed or chronic and diagnosis tends to be delayed because patients do not complain of ocular pain and that there are many cases with a satisfactory prognosis although the

ailment is characterized by numerous cases with a poor prognosis for visual acuity in instances of methicillin resistance. Characteristics of endophthalmitis due to *S. capitis* are that the course is slow, there is no ocular pain, and ciliary injection is also moderate; determining it to be postoperative non-specific inflammation is also problematic<sup>6,7</sup>, although sensitivity to most antibiotics is noted and it has a satisfactory prognosis. In the current case, the picture of the disease in the initial stages of onset was moderate as in the reports mentioned, although differences from past reports with regard to *S. capitis* infection were that inflammation abruptly worsened within several hours and that *S. capitis* was resistant to methicillin, imipenem, and the like.

With regard to treatment policies for post-cataract surgery endophthalmitis, the Endophthalmitis Vitrectomy Study Group (EVS) compared the prognosis for a group with antibiotic injection into the vitreous and a group receiving a vitrectomy<sup>8</sup>; they reported that vitrectomy is effective if visual acuity during diagnosis after the onset of endophthalmitis is on the order of light perception, although there were no significant differences in both groups in cases with visual acuity on the order of finger movement or worse. However, there are also reports that final visual acuity is not correlated to preoperative visual acuity and that satisfactory recovery of visual acuity can be expected if vitrectomy is performed as soon as possible<sup>3</sup>. In the current case, visual acuity during the onset of endophthalmitis was on the order of finger counting; if the policies of the EVS were followed, acceptable treatment would have been not to perform a vitrectomy and instead inject antibiotics into the vitreous and observe the patient's course. However, inflammation abruptly worsened several hours afterwards and hypopyon and vitreous opacity manifested, so the ailment was thought to be acute fulminant endophthalmitis due to *Enterococcus faecalis* or methicillin-resistant *Staphylococcus aureus* (MRSA), cases of which have increased in recent years, and a vitrectomy was performed with the goal of eliminating the etiologic agent.

With regard to techniques for vitrectomy with

respect to endophthalmitis, adequate results are not obtained with anterior vitrectomy alone and prognosis for visual acuity is poor, so some say that a vitrectomy must be performed through the pars plana using a 3-port system<sup>3</sup>. In the current case, this hospital was not equipped with a 3-port system and the patient could not be immediately referred to a vitreous specialist because onset occurred during a long holiday, so vitrectomy was performed using cataract surgical equipment equipped with an anterior vitrectomy cutter for both the first surgery and second surgery. The current author was under the impression that a substantial amount of vitreous had been removed during the first vitrectomy. A large amount of the vitreous remained directly below the posterior capsule as noted in perioperative findings during the second surgery, so the cause of inflammation not improving after the first vitrectomy was thought to be because the amount of vitreous removed in the anterior vitrectomy from the side port for the cornea was minimal. In addition, vancomycin administered in the vitreous during the second surgery cured the endophthalmitis because of its coincidental sensitivity.

Problems with the current technique are that surgeons with little vitrectomy experience approaching from the pars plana may cause tearing of the ora serrata and that it risks inducing the complication of retinal detachment because it is performed with poor visibility, so the ideal is to refer the case to a vitreous specialist. In addition, treatment should be begun within several hours in instances where diagnosis of endophthalmitis is made. In situations in which one cannot liaise quickly with a vitreous specialist and more so in instances in which emergency treatment is needed, there are cases requiring vitrectomy even if one is a cornea surgery specialist. Because of these factors, the current technique does not apply to all cases, but if 2-port core vitrectomy is performed together

with administration of antibiotics inside the vitreous cavity in the early stages where inflammation has not progressed to the retina as in the current case, endophthalmitis can be treated and may be cured in some instances without shaving of the vitreous base or artificial posterior vitreous detachment through 3-port vitrectomy. This technique can be chosen for emergency treatment until a patient can be transported to a vitreous specialist.

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(Received, June 9, 2004)

(Accepted, July 7, 2004)