



# Bilateral simultaneous endophthalmitis after immediately sequential bilateral cataract surgery

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## ABSTRACT

**Purpose:** Immediately sequential bilateral cataract surgery (ISBCS) has recently been considered effective due to faster visual rehabilitation and further improvements in quality of life. We report on the treatment course of a case of early postoperative endophthalmitis in both eyes after ISBCS.

**Observations:** The patient was a 75-year-old woman undergoing anticancer treatment for lung cancer, who had been receiving eye drops for bilateral uveitis and secondary glaucoma since 2019. She underwent ISBCS at another hospital in 2022. In that surgery, the same instruments were used for the surgery of both eyes, without resterilization between eyes. On the night of the following day, she became aware of vision loss in both eyes, and at the examination the next day, hypopyon and corneal edema were found and she was diagnosed with bilateral postoperative endophthalmitis, and referred to our hospital. On the same day, anterior chamber irrigation, posterior capsulotomy, and vitrectomy were performed on both eyes, and the intraocular lenses were preserved. There was no recurrence of postoperative inflammation, and visual acuity was 20/30 in both eyes 6 months after vitrectomy.

**Conclusion:** ISBCS is recommended to be performed with complete aseptic separation of the patient's two procedures. This important rule was not followed in this case. ISBCS should be performed in accordance with accepted protocols, such as those of the International Society of Bilateral Cataract Surgeons, the Royal College of Ophthalmologists, and the Canadian Ophthalmological Society.

## 1. Introduction

In recent years, immediate sequential bilateral cataract surgery (ISBCS) has been considered to result in faster visual rehabilitation, improved quality of life, and faster return to preoperative life activities overcoming the period of anisometropia that occurs in cases of delayed sequential bilateral cataract surgery (DSCBS).<sup>1-3</sup>

However, the worst scenario is the development of bilateral simultaneous postoperative endophthalmitis (BSPOE), which can lead to bilateral blindness.<sup>3-8</sup>

To avoid BSPOE, it is recommended that intracameral antibiotics be administered in therapeutic doses into the anterior chamber as the final step of surgery, and that the two eyes be treated as completely aseptically separate surgeries using different instruments, with nothing being shared in the two surgeries.

In this report, we describe our experience with a case of early

postoperative endophthalmitis with hypopyon in both eyes after ISBCS.

## 2. Case

The patient was a 75-year-old woman undergoing oral anticancer treatment for lung cancer (Tegafur Uracil 200mg/day for three months).

When she visited a local eye clinic in 2019, she was diagnosed with bilateral uveitis and secondary glaucoma based on the presence of posterior synechia and mild ocular hypertension in both eyes, bimatoprost 0.03% ophthalmic solution was administered daily, once a day, in both eyes.

She underwent ISBCS at another hospital in 2022. At that time, it is unknown whether consideration was given to the fact that she had a history of uveitis in both eyes and was undergoing anticancer treatment.

There were no intraoperative complications and the surgery was performed as an outpatient procedure. Intracameral moxifloxacin

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(500µg in 0.1 mL) injection was performed after IOL implantation and stromal hydration, but the same surgical instruments were used for both eyes, without reesterilization between procedures. After surgery, moxifloxacin hydrochloride 0.5% and betamethasone sodium phosphate 0.1% eye drops were started four times per day in both eyes. On the morning of the day after surgery, visual acuity was 20/50 in the right and 20/60 in the left, IOP was 19 in the right and 13 mmHg in the left, and no inflammatory findings were evident. On the evening of the same day, she became aware of vision loss in both eyes. On examination on the second day after surgery, conjunctival hyperemia and hypopyon were observed in both eyes, and the fundus could not be observed. Both visual acuities were reduced to light perception, and intraocular pressure was 40 mmHg on the right and 39 mmHg on the left. She was diagnosed as having postoperative endophthalmitis in both eyes and was recommended treatment in our hospital.

The same findings were seen at the time of examination at our hospital, which already showed hypopyon in both eyes, corneal edema, and fibrin precipitation on the anterior and posterior surfaces of the intraocular lenses, which were considered highly suspicious for postoperative endophthalmitis in both eyes (Fig. 1-a, 1-b).

Emergency surgery was performed under general anesthesia. Core vitrectomy was followed by peripheral vitrectomy with scleral indentation using four ports 25 gauge vitrectomy system of Constellation® Vision System (Alcon Inc, Geneva, Switzerland). Vitreous opacity was observed during vitrectomy, indicating that inflammation had spread to the vitreous cavity. Posterior lens capsulotomy and vitrectomy were performed in both eyes, and the intraocular lenses were preserved. The balanced salt solution (BSS) for anterior chamber rinsing and vitreous irrigation was mixed with vancomycin hydrochloride and ceftazidime hydrate and was used for intraocular irrigation during the surgery. At the start of surgery 10 mg vancomycin hydrochloride and 20 mg ceftazidime were added to the 500 mL BSS irrigating solution bottle.

Note that at the beginning of the surgery for both eyes, fibrin membrane adhering to the IOL, undiluted aqueous and vitreous humor were collected and submitted for bacteriological examination. Polymerase chain reaction (PCR) analysis of aqueous humor was not performed.

As post-operative treatment, 1% Vancomycin and 1.5% Levofloxacin eye drops 5 times a day and 0.1% Betamethazone eye drop 4 times a day were administered to both eyes. No oral steroid therapy was given.

Postoperatively, inflammation in both eyes gradually decreased and there was no recurrence of inflammation, although deposits were seen on the surface of the IOL (Fig. 2-a, 2-b).

Final postoperative visual acuity was 20/30 in both eyes. The results of bacterial culture tests of fibrin membrane, aqueous and vitreous humor were all negative.

### 3. Discussion

The incidence of early-onset endophthalmitis after cataract surgery is reported to be 0.02%–0.2%.<sup>9–12</sup> It is thought to be gradually decreasing as more care is taken to prevent endophthalmitis, including smaller incisions, proper eye washing with polyvinyl alcohol, chlorhexidine, or povidone iodine and intracameral antibiotics in some facilities. However, postoperative endophthalmitis is a serious condition that, if the timing of treatment is delayed, there may be cases in which vision cannot be salvaged even with intravitreal antibiotic injection or vitrectomy.<sup>5</sup>

In a study comparing the results of DSBCS and ISBCS, the incidence of postoperative endophthalmitis was 2 out of 38736 DSBCS eyes (0.005%) and 1 out of 10494 ISBCS eyes (0.01%),<sup>13</sup> with no significant difference between the two.

Guidelines for ISBCS have been issued by the International Society of Bilateral Cataract Surgeons (iSBSCS), the Royal College of Ophthalmologists and the Canadian Ophthalmological Society. The first eye to be operated on and the second eye to be operated on should be considered as two separate operations, and sterile surgical instruments should be used separately for each operation.<sup>15–17</sup>

Since both eyes are operated on, no eye patch should be used post-operatively, but strong antibiotic eye drops should be administered immediately and early after the operation. It is stated that it is effective, and if possible, intracameral antibiotic are also recommended. It also indicates that the selection of suitable patients for ISBCS is also an important point.<sup>16,17</sup>

Since 1970, nine cases of BSPOE after ISBCS have been reported as of 2022. These cases are considered cases of failure to follow the protocol recommended by the iSBSCS.<sup>14</sup> It is a critical mistake to use the same instruments for both eyes. Of the 9 BSPOE cases reported prior to this one, 5 had similar transgressions of “the rules”, while 2 of the remaining 4 were in immunosuppressed patients such as this one. The other 2: 1-autoclave likely not turned on, 1 due to illegal changes to OR ventilation.

It is difficult to state that immunosuppression is a definite contraindication to ISBCS, because these patients may only have 1 chance for surgery, if seriously ill. But extra caution should be taken, and the instruments must definitely be reesterilized between eyes.

We also discussed the possibility that this case is Toxic anterior segment syndrome (TASS). TASS is a severe inflammation of the anterior segment of the eye that occurs in the early postoperative period and is also referred to as noninfectious endophthalmitis.<sup>18,19</sup> Compared with infectious endophthalmitis, TASS has an earlier onset, less severe visual loss, and less fibrin precipitation, vitreous opacity, and hypopyon.<sup>20</sup>

Although TASS is considered a condition that improves with topical steroid treatment, in practice it is not easy to differentiate TASS from infectious endophthalmitis, and even if there is a possibility of TASS, in situations where infectious endophthalmitis cannot be ruled out even

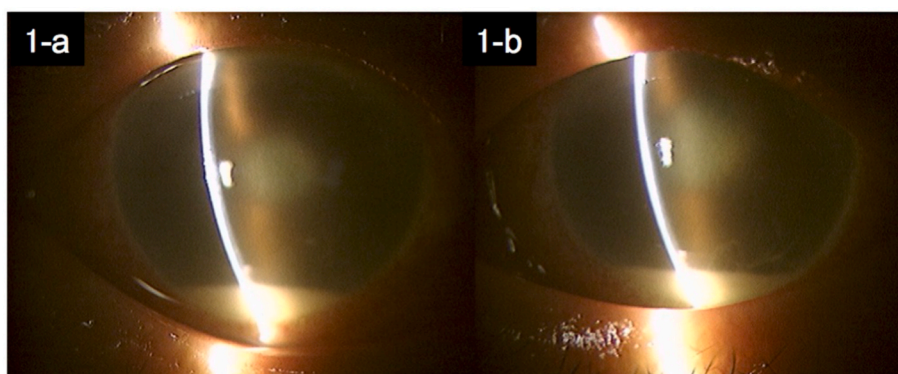
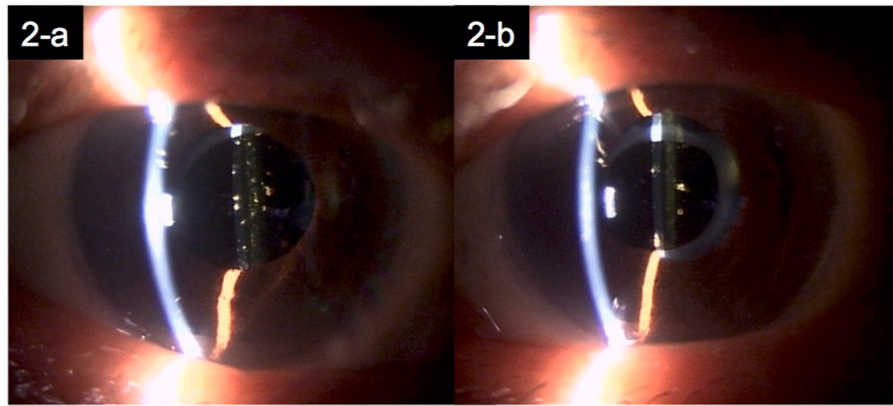


Fig. 1. 1-a, 1-b: Both eyes show corneal edema and hypopyon at initial examination. ( 1-a: right eye, 1-b: left eye ).



**Fig. 2.** 2-a, 2-b: Anterior segment photographs of both eyes 3 months after vitrectomy. Both show white deposits on anterior and posterior surfaces of the IOL, but no inflammatory is observed.

slightly, the only treatment would be as infectious endophthalmitis, which can cause blindness.

Other reported cases of bilateral hypopyon include uveitis due to Behçet's disease,<sup>21</sup> chronic myeloid leukemia,<sup>22</sup> acute anterior uveitis in a patient with rheumatoid arthritis after tocilizumab treatment was discontinued,<sup>23</sup> among others.

In this case, however, ISBCS was performed with no steroid eye drops or oral anti-inflammatory drug used until surgery. Postoperatively, the patient used betamethasone sodium ophthalmic drops (steroid eye drops) in both eyes four times a day. Therefore, it is unlikely that the bilateral hypopyon were an acute worsening of the uveitis. In addition, the patient was taking anticancer drugs for lung cancer, and her immune system was suppressed, which is a risk factor for infection.

Although we cannot definitely diagnose a bacterial infection since the results of bacterial culture from the intraocular contents were negative, we believe that this case was most likely caused by infectious bilateral endophthalmitis, possibly due to the use of common surgical instruments during ISBCS. Fortunately, this patient recovered excellent vision bilaterally after aggressive treatment of her bilateral simultaneous post-operative endophthalmitis (BSPOE).

#### Patient consent

Consent to publish this case report has been obtained from the patient in writing.

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#### Authorship

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

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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