

Combining bilateral phacoemulsification with unilateral vitrectomy: maximizing efficiency under the pressure of a pandemic

The COVID-19 pandemic has magnified a demand for efficiency in the ophthalmic operating theatre as hospitals restricted and delayed elective surgeries for fear of inpatient oversaturation. With each new wave of the virus, uncertainty looms for patients awaiting treatment for their visually debilitating cataracts.

One possible solution to the dilemma is to perform combined surgeries, such as immediately sequential bilateral cataract surgery (ISBCS) or phacoemulsification with pars plana vitrectomy (phacovitrectomy). It was proposed by one of the authors (A.K.) to combine these 2 surgeries into what has been called *immediately sequential bilateral cataract surgery with unilateral pars plana vitrectomy* (ISBCSUV). The main rationale was to further improve efficiency in the operating room given the restrained operating time during the COVID-19 pandemic.

This study was a retrospective case series of patients having undergone ISBCSUV at Hotel-Dieu hospital in Sherbrooke, Quebec, between January 2020 and March 2022. Patients were all operated on by 1 of the authors (A.K.). Before beginning the study, ethics committee approval was obtained. Inclusion and exclusion criteria for the study were largely based on those used to determine a patient's eligibility to undergo ISBCSUV at the time of consent for surgery. This included both an indication for ISBCS, as outlined by the Canadian Ophthalmological Society,¹ and any indication for elective or semiurgent phacovitrectomy. A lower threshold for cataract surgery was used for patients who were deemed at risk for symptomatic anisometropia, aniseikonia, and (or) loss of fusion. Patients with a follow-up of ≤ 6 weeks were excluded. Recorded data included patient demographics, rate of adverse events, duration of surgery, length of follow-up, and preoperative best-corrected visual acuity, postoperative uncorrected visual acuity at 6 weeks, and uncorrected visual acuity at the last visit. Visual acuities were converted to logMARs to facilitate statistical analysis.

Preoperative planning included careful patient selection and a detailed discussion with each patient regarding the risks and benefits of surgery. Informed consent was obtained. Surgical technique followed identical steps to those of traditional cataract phacoemulsification with intraocular lens implantation and 25-gauge pars plana vitrectomy. The eye undergoing phacovitrectomy was operated on first to allow an opportunity to postpone surgery on the phaco-only eye in the case of a major complication. After completing the surgery on the first eye, the procedure for preparation of the second eye strictly adhered to the guidelines outlined by the

International Society of Bilateral Cataract Surgeons, including changing instrumentation and regowning of the surgeons and nurses. Patients were typically seen on postoperative days 1, 7, and 42 and as needed. Bilateral Nd:YAG laser capsulotomy was systematically performed approximately 3 months after surgery to liberate the visual axis.

Forty-two patient files were obtained. Seven patients were excluded because of insufficient follow-up; therefore, 35 patients were included in the study. Demographic and clinical findings are listed in Table 1. Twelve eyes of 11 patients developed adverse events during the follow-up period. All events were minor except in 1 patient who developed a retinal detachment in the eye that underwent phacovitrectomy (Table 2). Urgent repeat pars plana vitrectomy was performed, and evolution was favourable at the last visit. There were no incidents of infectious complications or toxic anterior-segment syndrome (TASS).

Bilateral cataracts traditionally have been operated on in delayed succession, usually in an interval of weeks. This is called *delayed sequential bilateral cataract surgery* (DSBCS). However, ISBCS recently gained popularity worldwide during the COVID-19 pandemic. The modification brought several advantages, including reduced postoperative recovery time and less frequent transportation to and from the hospital for postoperative follow-up visits.² More precisely, recovery time was an average of 3.3 weeks for ISBCS versus 5.9 weeks for DSBCS, which translated to faster return to normal daily activities for patients.² The cost to treat a patient's cataracts also was reduced because of fewer outpatient visits, increased efficiency in the operating room, and a lowered need for anaesthetic and sedative use.¹ According to an American study, the transition from the delayed to the combined procedure could lead to savings of \$329–\$649 per patient.³ Similar advantages have been noted in studies evaluating combined phacovitrectomy.²

Over the past few years, the COVID-19 pandemic has placed an immense stress on health care systems around the world. Through it all, surgeons have elected to perform ISBCS more frequently than other procedures.⁴ This is explained by the inherent advantages of the procedure in the context of the pandemic. For one, many countries have been forced to delay or cancel elective procedures, including cataract surgeries, for fear of overwhelming hospitals with sick patients. Given the greater efficiency of ISBCS, surgeons were able to treat more patients over a fixed time schedule. Fewer postoperative follow-up appointments in ISBCS also meant less nosocomial exposure for vulnerable patients. Surgeons equally may be less likely of becoming infected because they treat a lower number of patients (though a higher quantity of eyes), resulting in fewer contacts.

Despite the recent increase in popularity of ISBCS, many have questioned the safety of the technique. The main

Table 1—Patient baseline characteristics and secondary outcomes (n = 35).

Mean age, y	72.1
Mean follow-up, days	170
Pars plana vitrectomy indications	
Epi-retinal membrane, n (%)	27 (77.1)
Symptomatic floating bodies, n (%)	2 (5.7)
Vitreous hemorrhage, n (%)	2 (5.7)
Other, n (%)	4 (11.4)
Mean preoperative BCVA, cataract-only eye, logMAR	0.20
Mean preoperative BCVA, phaco-PPV eye, logMAR	0.40
Postoperative outcomes	
Mean UCVA, cataract-only eye, 6 weeks, logMAR	0.14
Mean UCVA, cataract-only eye, last visit, logMAR	0.22
Mean 6-week UCVA, phaco-PPV eye, 6 weeks, logMAR	0.12
Mean 6-week UCVA, phaco-PPV eye, last visit, logMAR	0.18

BCVA, best-corrected visual acuity; UCVA, uncorrected visual acuity; PPV, pars plana vitrectomy

Table 2—Incidence of adverse events.

None, n (%)	25 (71.4)
Ocular hypertension, n (%)	3 (8.6)
Epi-retinal membrane recurrence, n (%)	2 (0.6)
Anterior uveitis, n (%)	2 (0.6)
Corneal abrasion, n (%)	1 (0.3)
Irvine Gass syndrome, n (%)	1 (0.3)
Retinal detachment, n (%)	1 (0.3)

concerns stem from the risk of bilateral complications such as infectious endophthalmitis and TASS. The incidence ratio for bilateral endophthalmitis was estimated in 2008 to be 1:1,000,000, considerably less than the risk of traffic mortality that patients take to travel to and from the hospital for the additional visits required for 2 unilateral cataract procedures.⁵ The risk of bilateral TASS is also exceptionally rare: given the use of new surgical equipment for the second eye, the risk of bilateral TASS in ISBCS is theoretically equivalent to the risk of TASS occurring in each eye in DSBCS. No case has yet been reported of bilateral TASS following ISBCS.¹

In summary, ISBCS and phacovitrectomy both provide significant benefits. To our knowledge, the combination of these procedures has never been reported in the literature. We believe that this procedure, termed *immediately sequential bilateral cataract surgery with unilateral vitrectomy* (ISBC-SUV), constitutes a further evolution in the improvement of surgical efficiency for vitreoretinal surgeons.

This study has important limitations, most notably the small sample size. Further studies into this technique will

require a much larger number of patients to provide adequate power for evaluation of the risks of rare but devastating complications including endophthalmitis and TASS. These studies are needed to conclude as to whether the new technique is equivalent to the current standard of care in terms of safety.

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Footnotes and Disclosure

The authors have no proprietary or commercial interest in any materials discussed in this correspondence.

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