



Immediate Sequential Bilateral Cataract Surgery (ISBCS) in the Era of COVID-19

Alexander CD^{1,2,3} and Richard N^{4*}

¹Moorfields Eye Hospital, London, UK

²The NIHR Biomedical Research Centre, Moorfields Eye Hospital, NHS Foundation Trust, London, UK

³UCL Institute of Ophthalmology, London, UK

⁴Department of Science, University of Portsmouth, London, UK

Abstract

Background: Immediate Sequential Bilateral Cataract Surgery (ISBCS) is not widely performed; however, the COVID-19 pandemic has rapidly altered the risk benefit profile of this surgical procedure.

Methods: The literature search was undertaken on March 04th, 2021. The databases used included EMBASE, CINAHL, EMCARE, Medline and PubMed.

Findings: By operating on both eyes at one sitting, one outpatient visit and one surgical visit to the hospital is saved, reducing the potential exposure to COVID infection by 50%. As cataract surgery is the most common operation world-wide, this change could potentially save almost 10 million hospital visits per year. ISBCS is widely used internationally (Finland 40%, Sweden 40%) and privately in the UK. This is due to a number of reasons including clinical concern about the risk of bilateral endophthalmitis, postoperative refractive surprise, and there being no set national tariff for provider reimbursement.

Summary: The risk to benefit ratio's for ISBCS, has been shifted by COVID-19 pandemic. The development of one stop cataract surgery, may mean that in future the patient will only visit the hospital on one occasion for their surgery and their pre- and post-op care being delivered by telemedicine, delivering all the benefits of ISBCS while reducing the risk of COVID infection while lowering the carbon footprint cause by ophthalmology.

OPEN ACCESS

*Correspondence:

Richard Newsom, Department of Science, University of Portsmouth, St Michel's House, White Swan Lane, Portsmouth PO1 2UP, UK, Tel: 07977207402;

E-mail: richard.newsom@port.ac.uk

Received Date: 28 Dec 2022

Accepted Date: 09 Jan 2023

Published Date: 12 Jan 2023

Citation:

Alexander CD, Richard N. Immediate Sequential Bilateral Cataract Surgery (ISBCS) in the Era of COVID-19. *World J Surg Surgical Res.* 2023; 6: 1442.

Copyright © 2023 Richard N. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

The COVID-19 pandemic has rapidly altered cataract services. In March 2020 the Royal College of Ophthalmology (RCOphth) and the United Kingdom Cataract and Refractive Surgeons (UKISCRS) recommended immediate cessation to all cataract surgery [1] due to the risk of COVID infection.

This decision was subsequently justified as 30% to 40% of all COVID-19 was caught in hospital [2], with around 1% of healthcare workers having asymptomatic COVID-19 [3]. The risks to older patient's are high with 89% of all deaths in the >65 years group [4] and in older patients (>80 years) the infection to fatality ratio was 14.8% [5]. Patients attending for cataract surgery (average age 77.1 years [6]) fall into this highly vulnerable group. Due to the intimate nature of eye examinations, there is a considerable risk of COVID-19 transmission to patients [7]. Cataract surgery returned in the Autumn of 2020 and then was suspended again in early 2021.

As cataract surgery re-starts practices are evolving rapidly [8]. National bodies have recommended a reduction of contact time in hospital [9] and increasing the use of telemedicine [10].

For patients attending for cataract surgery, an effective way of reducing time in hospital is the use of Immediate Sequential Bilateral Cataract Surgery (ISBCS). By operating on both eyes at one sitting, one outpatient visits and one surgical visit to the hospital is saved, reducing the number of expected hospital attendances from 5 to 3, and so potential exposure episodes to COVID infection by 40%. As cataract surgery is the most common operation performed world-wide this change would save up to 10 million visits per year.

ISBCS is widely used internationally (Finland 40% [11], Sweden 40% [12]) and privately in the UK, but has not really taken off in other sectors [6]. The 2017 NICE Guidance (NG77), recommended ISBCS should be considered for 'people who are at low risk of ocular complications during and after surgery or people who need to have general anesthesia for cataract surgery but for whom general anesthesia carries an increased risk of complications or distress' [13].

There are significant surgical benefits for patients to undergo ISBCS, vision is restored to both eyes at the same time, allowing for a full visual recovery in a few days [14]. UK patients have to wait an average 3.7 months [6], (IQR 2.4 m to 6.6 m) for their second eye surgery. Waits for cataract surgery have been linked to an increase risk for trips and falls, lower confidence, lower activity, depression, anxiety and an increase in dependence on others [15].

The main reason for not undertaking ISBCS is the possibility of bilateral endophthalmitis and subsequent bilateral blindness [14]. Despite the technique being widely used there are only a few case reports of bilateral infections, of the four relevant cases, only two had significant visual loss, and all use contaminated instruments in the second eye.

Current recommendations from the international ISBCS society [16] preclude the re-use of gloves and surgical instruments in the second eye. Improvements in antibiotic treatments mean that the risk of endophthalmitis is now <0.6:1000 cases [17] and if this should occur early treatment with antibiotics and vitrectomy mean that vision is preserved in the majority of cases [18]. In a case series of 95,605 ISBCS surgeries, there were no cases of bilateral endophthalmitis [19].

Cataract surgical techniques have improved, so in routine cases the mean posterior capsule rupture rate is now 1.2% [20], in many of these cases a minor change to the surgical plan can lead to a successful outcome. If a major complication occurs on the first eye, the surgery for the second can be postponed until the patient is fully satisfied with the vision.

Another concern in regard to ISBCS, is the management of a refractive surprise. It is now clear that care in pre-surgery selection is key to this [21]. Theoretically if the first operation does not give the predicted outcome, then the second IOL can be adjusted by taking 50% of the refractive difference between the two eyes [22]. Dr. Shorstein's (Kaiser Permanente) looked at visual outcomes in 13,711 patients with Delayed Sequential Bilateral Cataract Surgery (DSBCS) and 3,561 undergoing ISBCS. They found no significant difference in postoperative BCVA or refractive error between the two groups, and no increase in the risk of complications, including endophthalmitis [23].

Since 2015 there has been a considerable improvement in biometry spherical equivalent predictive accuracy with the introduction of the Barrett formula [24], the Olsen raytracing PhacoOptics formula [25] and online machine learning calculators from Warren Hill [26] and IOL Solver from Damien Gatineau [27]. There has also been dramatic improvement in astigmatism management with per-operative angle alignment for toric implants and intrastromal arcuate cylinders for those with a femtosecond laser [28].

A key requirement is a robust process for rigorous checking of the lens implant for each eye. Involved staff members have to be engaged with checking and cross checking the IOL powers for sphere and if relevant cylinder as they do at present. There also has to be a check for

which lens is to be placed in the right and for the left eye.

There is a continued drive to put the patient choices at the heart of healthcare delivery. A recent survey found 58% would value being offered ISBCS, with over 80% of patients valuing having surgery on the same day as the clinic appointment (personal communication-RN). The patients were made aware of the advantages and disadvantages of the operation and decided clearly that they were in favor of ISBCS. As we put our patients at the center of all we do then this data needs to be put center stage as we consider our surgical pathway.

Informed consent is an iterative process with patients obtaining information once the diagnosis has been made and treatment options have been discussed. Patients have to be offered time to consider surgical and non-surgical options and for those who are happy to proceed without delay then rapid surgery is the choice and is an advantage for the patient.

The economics of ISBCS is clear [29,30], the main cost for cataract surgery is the turnaround time in the operating theatre. The surgical time per eye is under 10 min for an experienced surgeon, but the median number of patients on a four-hour list is seven [31]. A theatre utilization study by Roberts et al. found that the median increase in cataract surgery numbers with ISBCS was 3 eyes or a 32% increase in case numbers [32].

A recent survey of US surgeons found that 86% performed ISBCS, they quoted patient convenience and patient preference as their reasons for performing the procedure [20]. When Kessel et al. did a systematic review into ISBCS they found no difference in the risk of complications or visual outcome in patients randomized to ISBCS or surgery on two different dates. However, they only found three Randomized Controlled Trials (RCT) and overall graded the quality of evidence as low to very low [33]. The recently presented Dutch BICAT-NL study, a multicenter randomized controlled trial of ISBCS vs. standard delayed sequential cataract surgery (pending publication) found surprisingly minimal difference in operating time between the two groups. The study also found no difference in visual or refractive outcomes, or surgical complications. Day surgery admission costs were halved and clinic attendances reduced by a third [34]. Despite all the evidence for ISBCS, take up still remains poor as there is little financial incentive for hospitals to move to this model of health care delivery with, for example, reimbursement costs for ISBCS being little different to that for single eye cataract surgery in the UK.

ISBCS is not appropriate for all patients with bilateral cataracts, but as cataract surgery is the commonest operation in the UK, around 420,000 per year, even a small improvement in national efficiency would generate significant savings. In the BICAT-NL study, between 25% and 40% patients with bilateral cataracts were suitable for ISBCS [35], whilst another study reported almost 70% could be suitable for ISBCS [36].

Conclusion

The risk to benefit ratio's for ISBCS, has been shifted by COVID-19 pandemic. ISBCS is more efficient, less expensive and allows for faster visual recovery. The development of one stop cataract surgery, may mean that in future the patient will only visit the hospital on one occasion for their surgery and their pre- and post-op care being delivered by telemedicine, delivering all the benefits of ISBCS while reducing the risk of COVID infection while lowering the carbon footprint cause by ophthalmology.

References

- RCOphth: Management of ophthalmology services during the COVID pandemic. 2020.
- Up to 20% of hospital patients with COVID-19 caught it at hospital. The Guardian. May 17, 2020.
- Treibel TA, Manisty C, Burton M, McKnight A, Lambourne J, Augusto JB, et al. COVID-19: PCR screening of asymptomatic health-care workers at London hospital. *Lancet*. 2020;395(1023):1608-10.
- People, population and community. Births, deaths and marriages. Deaths involving COVID-19, England and Wales: Deaths occurring in April 2020. ONS April 2020.
- Verity R, Okell LC, Dorigatti I, Winskill P, Whittaker C, Imai N, et al. Estimates of the severity of coronavirus disease 2019: A model-based analysis. *Lancet Infect Dis*. 2020;20:669-77.
- Day AC, Donachie PHJ, Sparrow JM, Johnston RL. The Royal College of Ophthalmologists' National Ophthalmology Database study of cataract surgery: Report 1, visual outcomes and complications. *Eye*. 2015;29:552-60.
- Safadi K, Joshua MK, Chowder I, Solomon A, Amer R, Aweidah H, et al. Ophthalmology practice during the COVID-19 pandemic. *BMJ*. 2020;5:e000487.
- Recovery of surgical services during and after COVID-19. Royal College of Surgeons of England.
- COVID-19 Resources. Standards and Guidance. The Royal College of Ophthalmologists.
- Saleem SM, Pasquale LR, Sidoti PA, Tsai JC. Virtual Ophthalmology: Telemedicine in a COVID-19 Era. *Am J Ophthalmol*. 2020;216:237-42.
- Sarikkola AU, Uusitalo RJ, Hellstedt T, Ess SL, Leivo T, Kivelä T. Simultaneous bilateral versus sequential bilateral cataract surgery: Helsinki Simultaneous Bilateral Cataract Surgery Study Report 1. *J Cataract Refract Surg*. 2011;37(6):992-1002.
- Behndig A, Montan P, Stenevi U, Kugelberg M, Lundström M. One million cataract surgeries: Swedish National Cataract Register 1992-2009. *J Cataract Refract Surg*. 2011;37(8):1539-45.
- Cataracts in adults: Management. NG77. Guidance. 2017.
- Andrzej Grzybowski A, Wasinska-Borowiec W, Clauoué C. Pros and cons of Immediately Sequential Bilateral Cataract Surgery (ISBCS). *Saudi J Ophthalmol*. 2016;30(4):244-9.
- Hodge W, Horsley T, Albani D, Baryla J, Belliveau M, Buhmann R, et al. The consequences of waiting for cataract surgery: A systematic review. *CMAJ*. 2007;176(9):1285-90.
- ISBCS. International Society of Bilateral Cataract Surgeons.
- Barry P, Seal DV, Gettinby G, Lees F, Peterson M, Revie CW; ESCRS Endophthalmitis Study Group. ESCRS study of prophylaxis of postoperative endophthalmitis after cataract surgery: Preliminary report of principal results from a European multicenter study. *J Cataract Refract Surg*. 2006;32(3):407-10.
- Negretti GS, Chan W, Pavesio C. Vitrectomy for endophthalmitis: 5-year study of outcomes and complications. *BMJ Open Ophthalmol*. 2020;5:e000423.
- Arshinoff SA, Bastianelli PA. Incidence of postoperative endophthalmitis after immediate sequential bilateral cataract surgery. *J Cataract Refract Surg*. 2011;37:2105e2114.
- National Ophthalmology Database Audit. NOD Audit Annual Report 2019.
- Shalchi Z, Restoi M, Flanagan D, Watson M. Managing refractive surprise. Royal College of Ophthalmologist. Focus. 2018.
- Zhang J, Ning XN, Yan H. Adjustment of IOL power for the second eye based on refractive error of the first-operated eye. *Int J Ophthalmol*. 2019;12(8):1348-50.
- Herrinton LJ, Liu L, Alexeeff S, Carolan J, Shorstein NH. Immediate sequential vs. delayed sequential bilateral cataract surgery: Retrospective comparison of postoperative visual outcomes. *Ophthalmology*. 2017;124(8):1126-35.
- Kim SY, Lee SH, Kim NR, Chin HS, Jung JW. Accuracy of intraocular lens power calculation formulas using a swept-source optical biometer. *PLoS One*. 2020;15(1):e0227638.
- Phacoptics'. About us.
- RBF calculator. Hill-RBF Calculator Version 3.0.
- IOL solver.
- Day AC, Gore GM, Bunce C, Evans JR. Laser-assisted cataract surgery versus standard ultrasound phacoemulsification cataract surgery. *Cochrane Database Syst Rev*. 2016;7(7):CD010735.
- Leivo T, Sarikkola AU, Uusitalo RJ, Hellstedt T, Ess SL, Kivelä T. Simultaneous bilateral cataract surgery: economic analysis; Helsinki Simultaneous bilateral cataract surgery study report 2. *J Cataract Refract Surg*. 2011;37:1003-8.
- Rush SW, Gerald AE, Smith JC, Rush A, Rush R. Prospective analysis of outcomes and economic factors of same-day bilateral cataract surgery in the United States. *J Cataract Refract Surg*. 2015;41:732-9.
- Malvankar-Mehta MS, Chen YN, Patel S, Leung AP-K, Merchea MM, Hodge WG. Immediate versus delayed sequential bilateral cataract surgery: A systematic review and meta-analysis. *PLoS One*. 2015;10(6):e0131857.
- The Royal College of Ophthalmologists. The Way Forward. Cataract. 2021.
- Amsden LB, Shorstein NH, Fevrier H, Liu L, Carolan J, Herrinton LJ. Immediate sequential bilateral cataract surgery: Surgeon preferences and concerns. *Can J Ophthalmol*. 2018;53(4):337-41.
- Kessel L, Andresen J, Erngaard D, Flesner P, Tendal B, Hjortdal J. Immediate sequential bilateral cataract surgery: A systematic review and meta-analysis. *J Ophthalmol*. 2015;912481.
- Spekreijse LS, Simons RWP, Winkens B, van den Biggelaar FJHM, Dirksen CD, Nuijts RMMA. Cost-effectiveness of immediate versus delayed sequential bilateral cataract surgery in the Netherlands (the BICAT-NL study): Study design of a prospective multicenter randomised controlled trial. *BMC Ophthalmol*. 2020;20(1):257.
- Neel ST. A cost-minimization analysis comparing immediate sequential cataract surgery and delayed sequential cataract surgery from the payer, patient, and societal perspectives in the United States. *JAMA Ophthalmol*. 2014;132(11):1282-8.