

Immediately Sequential Bilateral Cataract Surgery (ISBCS) Importance During Covid-19 Pandemic

Ali Nowrouzi^{1*}, Javier Benitez-del-Castillo¹, Mario Rodriguez-Calzadilla¹, Jorge L Alió², Ignacio Pereira-Gonzalez¹, Inmaculada Mota- Chozas¹

¹Ophthalmology Department of Hospital Universitario de Jerez de la Frontera, St. circunvalación, Hospital Universitario de Jerez de la Frontera, Cadiz, Spain

²Research and Development Department and Refractive surgery department, vissum, Vissum instituto Oftalmológico de Alicante, Alicante Spain and Ophthalmology department of Miguel Hernandez University

***Corresponding author:** Ali Nowrouzi, Ophthalmology Department of hospital Jerez de la Frontera, (address; St. circunvalación, Hospital Jerez de la Frontera, Jerez De La Frontera, Cádiz, Spain, postal code; 11407); Tel: 902505061; Email: alinoroozi_co@yahoo.com

Citation: Nowrouzi A, Benitez-del-Castillo J, Rodriguez-Calzadilla M, Alió JL, Pereira-Gonzalez I, et al. (2021) Immediately Sequential Bilateral Cataract Surgery (ISBCS) Importance During Covid-19 Pandemic. Annal Cas Rep Rev: ACRR-187.

Received Date: 04 January 2021; **Accepted Date:** 08 January 2021; **Published Date:** 15 January 2021

Abstract

Immediately sequential bilateral cataract surgery (ISBCS) is an important topic in ophthalmology especially during the recent Covid-19 pandemic as it is necessary to decrease the hospital visits for older aged patients in order to prevent the contagious risk of this disease. There are well-documented advantages in terms of better and more rapid visual rehabilitation and neuroadaptation as well as reduced costs for health care systems. Based on recent studies, the risk of bilateral simultaneous complications is now recognized to be rare with the advent of intracameral antibiotics. With the use of more sophisticated optical biometry and newest generation lens calculation refractive surprises are rare for normal eyes. A widely recognized protocol from the International Society of Bilateral Cataract Surgeons needs to be adhered for ISBCS in order to prevent any further complications and obtaining better outcomes.

Keywords: Immediately sequential bilateral cataract surgery, Simultaneous bilateral cataract surgery, Covid-19.

Introduction

Immediately sequential bilateral cataract surgery (ISBCS) is different from delayed sequential bilateral cataract surgery [DSBCS] [1] was a controversial topic in ophthalmology. However, after the Covid-19 pandemic, it has become an outstanding topic that requires more debate to decrease hospital visits by being utilized as a routine procedure. Although there are annually discussions and lectures about the benefits of this procedure, yet it still is not considered as routine despite the many positive studies on this subject. This review aims to clarify the advantages of ISBCS specially during the Covid-19 pandemic, illustrate the cost-effectiveness, and a present of the necessary inclusion protocols that should be taken into consideration for the best results and to prevent possible complications.

Methods

This is a review study. A PubMed platform search was performed, using the following keywords: bilateral cataract surgery, simultaneous bilateral cataract surgery, sequential bilateral cataract surgery, same-day cataract surgery,

bilateral cataract extraction, and ISBCS. 60 articles were found of which 38 were finally analyzed. English and Spanish languages were preferred, at least for abstracts.

Definition

What differentiates ISBCS from DSBCS is the timing of the second procedure. In other words, the treatment for ISBCS is performed on both eyes for one patient during the operating session. This is in contrast to DSBCS, where treatments for one eye and the other eye occur differently with a time interval in between, which may be several days, weeks or months. This means that the patient leaves the hospital after the first eye surgery and returns for the second eye operation which is considered to be a risk factor for Covid-19 due to increased hospital visits, especially for older aged patients during Covid-19 pandemic.

Qualification and protocol

A fundamental and overriding principle to prevent complications is to treat each eye surgery as independent procedure, as recommended by the International Society of

Bilateral Cataract Surgeons (www.isbcs.org). This applies primarily to the strict aseptic separation. Each eye requires an absolute change of covering, instruments and staff's gloves and gowns. [1, 2, 3, 4, 5] Many authors emphasize that the instruments should come from different sterilization sets and substances used during the procedure, such as viscoelastics or irrigation fluids, should be different. [3] If in some especial situation any significant surgical problem remains unresolved with the first eye, changing the ISBCS approach to DSBCS should be taken into consideration [6].

Another requirement of successful ISBCS is to prevent the development of infection. Intracameral antibiotic prophylaxis was shown to reduce the rate of endophthalmitis which is the most devastating complication and postoperative infections [7].

Objections

Serious allegations against the ISBCS are the risk of potential bilateral vision loss as a result of bilateral complications [8] such as Endophthalmitis, Toxic Anterior Segment Syndrome (TASS), and Cystoid Macular Edema (CME). The most severe of these is endophthalmitis; however, there are also theoretical risks of choroidal haemorrhage, corneal decompensation, and retinal detachment. [9, 10, 11] Some authors divide late complications into 'catastrophic' and 'non-catastrophic'. The first one include endophthalmitis and epithelial ingrowth; whereas non-catastrophic complications include cystoid macular edema and corneal decompensation [12, 13], uveitis, hiphema, ocular hypertension (HTO), capsular bag distension syndrome, striate keratopathy, incisional leakage, ciliary block, glaucoma, endothelial cell decompensation and IOL decentration [14, 15].

The greatest fear about ISBCS catastrophic complication is bilateral simultaneous endophthalmitis, despite bilateral endophthalmitis being well described in cases of DSBCS. There have been only 4 cases of simultaneous bilateral endophthalmitis reported in the world literature and none of the operations were done according to the essential protocol published by the International Society of Bilateral Cataract Surgeons regarding the aseptic rules [16, 17, 18, 19].

One more complication that is sometimes mentioned is toxic anterior segment syndrome (TASS), which is a sterile inflammatory reaction that usually occurs when something is changed in the surgical protocol, the source of balanced salt solution, brand of gloves used, instrument cleaning detergents, intracameral medications or methodology [20, 21]. The use of prepared intracameral antibiotics should help to reduce this risk by minimizing errors in mixing and diluting antibiotics in the perioperative period [22]. In our knowledge, of all previous studies there are no reported cases of bilateral TASS, i.e., Beathy et al. study (N=319), Ramsay et al. study (N=259), Sharma et al. study (N=143), Werthein et al. study (N=139), Johansson et al. study (N=220), Arshinof et al. study (N=1020) and recently published BICAT-NL study by Spekreijse (N=630).

In the ESCRS prophylactic intracameral cephalosporin studies, the incidence of postoperative endophthalmitis after unilateral cataract surgery weight averaged to 0.3% without prophylactic intracameral antibiotics and to 0.05% with prophylactic intracameral antibiotics, whereas studies in the United States using only topical antibiotics reported infection rates as low as 0.028%. No bilateral simultaneous endophthalmitis occurred in the 95,606 ISBCS cases collected. The overall rate of postoperative endophthalmitis after ISBCS was 1 in 5759. Infection rates were significantly reduced with intracameral antibiotics to 1 in 14,352 cases [23]. The risk for postoperative endophthalmitis in ISBCS appears to be at least as low as and possibly lower than published rates for unilateral surgery, particularly when recommended precautions are taken completely. Intracameral antibiotics significantly reduced the risk for postoperative endophthalmitis. As it is reported in Beathy et al. study (N=319), Ramsay et al. study (N=259), Sharma et al. study (N=143), Werthein et al. study (N=139), Johansson et al. study (N=220), Arshinof et al. study (N=1020) and recently published BICAT-NL study by Spekreijse (N=630), there is not any reported case of bilateral endophthalmitis in the total 2550 cases of all these studies.

Another disadvantage quoted by opponents of ISBCS is the possibility of refractive errors which means that there is no possibility to plan the operation of the second eye based on the results of the first operation [9] notably concerning the optical outcome. On one hand, we know that what increases the risk of inaccurate biometry is high myopia or axial length >26 mm, high hyperopia or axial length <21 mm, axial length difference between the eyes >1 mm, or previous refractive surgery [24]. On the other hand, none of the randomized controlled clinical trials could provide evidence about the prevalence of postoperative anisometropia in patients undergoing ISBCS [25] as it is also recently confirmed by Spekreijse in BICAT-NL study [15].

Undertaking certain eligibility criteria and careful patient selection may solve this problem. However, for "normal" eyes, optical biometry and the use of newest generation formula for IOL calculation is so predictable that this disadvantage is more theoretical than that of any real clinical relevance.

Recently light adjustable IOL(LAL) will allow patients to test and elect a different refractive target postoperatively. This paradigm shift will change how cataract patients choose their refractive objectives, and how ophthalmologists will be able to achieve them better, specially if there are any intolerable residual refractive errors in bilateral simultaneous cataract surgery approach. Performing both cataract surgeries simultaneously will make it easier for patients to test their pseudophakic refractive preferences, especially if some degree of anisometropia is intentionally chosen [26].

Advantages

The undoubted and greatest medical advantage of ISBCS is the faster complete visual rehabilitation of the patient [27]. Single eye surgery causes a reduction in our visual system from two receptors to one. Second eye surgery restores a normal balanced visual system for the patient, something that nature has validated for millions of years [3, 28].

The operation prevents also other significant problems occurring after unilateral surgery-anisometropia and neuroadaptation problems. Experience of the clinics which carried out thousands of such treatments shows that after simultaneous binocular surgery minor errors occur, and they are almost always symmetrical and do not cause problems such as anisometropia [29]. Even if there is a small lapse from a target refraction, the stereoscopic vision is immediately restored with better and faster neuroadaptation.

Furthermore, ISBCS is an ideal solution for patients who require general anesthesia, because it obviously lowers the risk of a second anesthetic with associated risks [22, 30, 31].

A second major advantage of ISBCS is economic: there are lower hospital costs and more efficient use of operating room time [15, 32, 33, 34, 35]. There are also financial advantages for the patient: faster return to work and fewer hospital visits, which is the one of the most important benefits of ISBCS during the Covid-19 pandemic situation [12, 36, 37].

As an example, we can illustrate the potential cost savings in one year in the Netherlands as it is published in BICAT-NL study by Spekrijse; 37 million euros for healthcare perspective and around 64 million euros and for social perspectives [15]. Surprisingly, calculation has been carried out that there is a potentially higher risk from death in a traffic accident by undergoing extra visits for unilateral sequential cataract surgery in those suitable for ISBCS [38].

Conclusion

With the development of surgical techniques, better measurement equipment and new generation formulas for IOL calculation, ophthalmic surgeries are faster, and have lower risk of complications, shorter hospitalization time and less visits, which is really important for older aged patients whom are more vulnerable during the Covid-19 pandemic situation. With these achievements we gain the courage to cross new boundaries, and one of them is the adoption of ISBCS. With careful patient selection [38], and strict adherence to protocol, this is a method with better visual outcomes [10]. However, what we need for full success is an experienced, skilled surgeon. All this adds up to the fact that the operational risk for ISBCS is the same or even smaller than DSBCS. We believe that soon it could become a standard in many clinics.

References

1. Ainsworth G. Bilateral endophthalmitis after simultaneous bilateral cataract surgery. *J Cataract Refract Surg.* 2006;32(5):708–709. [PubMed] [Google Scholar]
2. Johansson B. Simultaneous bilateral cataract surgery: pro. *Can J Ophthalmol.* 2010;45(6):572–574. [PubMed] [Google Scholar]
3. Arshinoff S.A. Immediately sequential bilateral cataract surgery—a global perspective. *US Ophthalmic Rev.* 2015;8(1):14–18. [Google Scholar]
4. Arshinoff S.A. Need for strict aseptic separation of the 2 procedures in simultaneous bilateral cataract surgery. *J Cataract Refract Surg.* 2006;32(3):376–377. [PubMed] [Google Scholar]
5. Arshinoff S.A. Immediately sequential bilateral cataract surgery: why & how. *Ocular Times.* 2010;1(1):15–20. [Google Scholar]
6. Arshinoff S. Simultaneous bilateral cataract surgery. *J Cataract Refract Surg.* 1998;24(8):1015–1016. [PubMed] [Google Scholar]
7. ESCRS Guidelines; 2013
8. Khokhar S., Pangtey M.S., Soni A. Misgivings about simultaneous bilateral cataract extraction. *J Cataract Refract Surg.* 2002;28(1):3. [PubMed] [Google Scholar]
9. Obuchowska I., Mariak Z. Simultaneous bilateral cataract surgery—advantages and disadvantages. *Klin Oczna.* 2006;108(7–9):353–356. [PubMed] [Google Scholar]
10. Henderson B.A., Schneider J. Same-day cataract surgery should not be the standard of care for patients with bilateral visually significant cataract. *Surv Ophthalmol.* 2012;57(6):580–583. [PubMed] [Google Scholar]
11. Ramsay A.L., Diaper C.J., Saba S.N., Beirouty Z.A., Fawzi H.H. Simultaneous bilateral cataract extraction. *J Cataract Refract Surg.* 1999;25(6):753–762. [PubMed] [Google Scholar]
12. Smith G.T., Liu C.S. Is it time for a new attitude to “simultaneous” bilateral cataract surgery? *Br J Ophthalmol.* 2001;85(12):1489–1496. [PMC free article] [PubMed] [Google Scholar]
13. Tyagi A.K., McDonnell P.J. Visual impairment due to bilateral corneal endothelial failure following simultaneous bilateral cataract surgery. *Br J Ophthalmol.* 1998;82(11):1341–1342. [PMC free article] [PubMed] [Google Scholar]
14. Arshinoff SA, Strube YN, Yagev R. Simultaneous bilateral cataract surgery. *J Cataract Refract Surg.* 2003 Jul;29(7):1281–91 [PMC free article] [PubMed] [Google Scholar]
15. Spekrijse, L.S., Simons, R.W.P., Winkens, B. *et al.* 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* 20, 257 (2020) [PMC free article] [PubMed] [Google Scholar]

16. Benezra D., Chirambo M.C. Bilateral versus unilateral cataract extraction: advantages and complications. *Br J Ophthalmol.* 1978;62(11):770–773. [PMC free article] [PubMed] [Google Scholar]
17. Ozdek S.C., Onaran Z., Gurelik G., Konuk O., Tekinsen A., Hasanreisoglu B. Bilateral endophthalmitis after simultaneous bilateral cataract surgery. *J Cataract Refract Surg.* 2005;31(6):1261–1262. [PubMed] [Google Scholar]
18. Kashkouli M.B., Salimi S., Aghaee H., Naseripour M. Bilateral *Pseudomonas aeruginosa* endophthalmitis following bilateral simultaneous cataract surgery. *Indian J Ophthalmol.* 2007;55(5):374–375. [PMC free article] [PubMed] [Google Scholar]
19. Puvanachandra N., Humphry R.C. Bilateral endophthalmitis after bilateral sequential phacoemulsification. *J Cataract Refract Surg.* 2008;34:1036–1037. [PubMed] [Google Scholar]
20. Arshinoff S.A. Same-day cataract surgery should be the standard of care for patients with bilateral visually significant cataract. *Surv Ophthalmol.* 2012;57(6):574–579. [PubMed] [Google Scholar]
21. Olson R.J. Thoughts on simultaneous bilateral cataract surgery. *Can J Ophthalmol.* 2010;45(6):569–571. [PubMed] [Google Scholar]
22. Li O., Kapetanakis V., Claoue C. Simultaneous bilateral endophthalmitis after immediate sequential bilateral cataract surgery: what's the risk of functional blindness? *Am J Ophthalmol.* 2014;157(4):749–751. [PubMed] [Google Scholar]
23. Arshinoff S.A., Bastianelli P.A. Incidence of postoperative endophthalmitis after immediate sequential bilateral cataract surgery. *J Cataract Refract Surg.* 2011;37(12):2105–2114. [PubMed] [Google Scholar]
24. Smith G.T., Liu C.S. Is it time for a new attitude to “simultaneous” bilateral cataract surgery? *Br J Ophthalmol.* 2001;85(12):1489–1496. [PMC free article] [PubMed] [Google Scholar]
25. 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;2015:912481. [PMC free article] [PubMed] [Google Scholar]
26. Chang DF. Disruptive Innovation and Refractive IOLs: How the Game Will Change with Adjustable IOLs. *Asia Pac J Ophthalmol (Phila).* 2019;8(6):432–435. doi:10.1097/APO.0000000000000266 [PMC free article] [PubMed] [Google Scholar]
27. Nassiri N., Nassiri N., Sadeghi Yarandi S.H., Rahnavardi M. Immediate vs delayed sequential cataract surgery: a comparative study. *Eye (Lond)* 2009;23(1):89–95. [PubMed] [Google Scholar]
28. Keskinbora H.K. Simultaneous bilateral cataract surgery. *J Cataract Refract Surg.* 1999;25(3):304–305. [PubMed] [Google Scholar]
29. Kontkanen M., Kaipainen S. Simultaneous bilateral cataract extraction: a positive view. *J Cataract Refract Surg.* 2002;28(11):2060–2061. [PubMed] [Google Scholar]
30. Huang T.E., Kuo H.K., Lin S.A., Fang P.C., Wu P.C., Chen Y.H., Chen Y.J. Simultaneous bilateral cataract surgery in general anesthesia patients. *Chang Gung Med J.* 2007;30(2):151–160. [PubMed] [Google Scholar]
31. Schachat A.P. Simultaneous bilateral endophthalmitis after immediate sequential bilateral cataract surgery: what's the risk of functional blindness? *Am J Ophthalmol.* 2014;158(2):410–411. [PubMed] [Google Scholar]
32. O'Brien J.J., Gonder J., Botz C., Chow K.Y., Arshinoff S.A. Immediately sequential bilateral cataract surgery versus delayed sequential bilateral cataract surgery: potential hospital cost savings. *Can J Ophthalmol.* 2010;45(6):596–601. [PubMed] [Google Scholar]
33. Leivo T., Sarikkola A.U., Uusitalo R.J., Hellstedt T., Ess S.L., Kivela T. Simultaneous bilateral cataract surgery: economic analysis; Helsinki Simultaneous Bilateral Cataract Surgery Study Report 2. *J Cataract Refract Surg.* 2011;37(6):1003–1008. [PubMed] [Google Scholar]
34. Rush S.W., Gerald A.E., Smith J.C., Rush J.A., Rush R.B. Prospective analysis of outcomes and economic factors of same-day bilateral cataract surgery in the United States. *J Cataract Refract Surg.* 2015;41(4):732–739. [PubMed] [Google Scholar]
35. Neel S.T. 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):1282–1288. [PubMed] [Google Scholar]
36. Chang D.F. Simultaneous bilateral cataract surgery. *Br J Ophthalmol.* 2003;87(3):253–254. [PMC free article] [PubMed] [Google Scholar]
37. Sharma T.K., Worstmann T. Simultaneous bilateral cataract extraction. *J Cataract Refract Surg.* 2001;27(5):741–744. [PubMed] [Google Scholar]
38. Chandra A., Claoue C. Simultaneous bilateral cataract surgery: a further advantage. *Eye (Lond)* 2010;24(6):1113–1114. [PubMed] [Google Scholar]