

Immediately sequential bilateral cataract surgery importance during the COVID-19 pandemic

Jorge L. Alió^{1,2}, Ali Nowrouzi³

Access this article online
Quick Response Code:

Website: www.saudijophthalmol.org
DOI: 10.4103/sjopt.sjopt_44_21

Abstract:

Cataract surgery is one of the most frequently performed types of surgery in the world. Most patients suffer from bilateral cataract and while cataract surgery of only one eye is effective in restoring functional vision, second eye surgery leads to further improvements in health-related quality of life, and is cost effective. At present, most patients undergo cataract surgery in both eyes on separate days, referred to as delayed sequential bilateral cataract surgery (DSBCS). An alternative procedure involves operating both eyes on the same day, but as separate procedures, known as immediately sequential bilateral cataract surgery (ISBCS). The aim of this study is to evaluate the effectiveness and costs of ISBCS compared to DSBCS. ISBCS is an important topic in ophthalmology, especially during the recent COVID-19 pandemic as it is necessary to decrease the hospital visits in order to prevent the contagious risk of this disease. There are well-documented advantages in terms of reduced costs for patients and health-care systems as well as more rapid visual rehabilitation and neuroadaptation. Based on recent studies, the risk of bilateral simultaneous complications is now recognized to be rare with the advent of intracameral antibiotics and strict protocols in this surgical approach. With the use of more sophisticated optical biometry and the 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 adhere in order to prevent any further complications and obtaining better outcomes.

Keywords:

COVID-19, immediately sequential bilateral cataract surgery, simultaneous bilateral cataract surgery

INTRODUCTION

The number of cataract surgery has increased rapidly over the years. Cataract surgery is one of the most frequently performed types of surgery in the world. Due to numerous cases of cataract surgery, small efficiency gains in cataract care delivery may lead to substantial cost savings on a macro level in all healthcare systems.

The majority of patients, mostly elderly, suffer from bilateral cataract. A previous study showed that 71% of patients with cataract had an indication for bilateral surgery. While cataract surgery of only one eye is effective in restoring functional vision, studies have shown that cataract surgery of the second eye leads to further improvements in health-related quality of life and is cost-effective.^[1-3]

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

At present, most patients undergo cataract surgery in both eyes on separate days, with a delay of at least 1–2 weeks to 1 month (delayed sequential bilateral cataract surgery [DSBCS]). However, over the past years, some have argued that the procedure is now safe enough to perform in both eyes on the same day during a single operating session (immediately sequential bilateral cataract surgery [ISBCS]).

The two primary reasons for delaying second-eye surgery are the risk of bilateral endophthalmitis and the risk of refractive surprise and the possibility of adjustment of the second eye, intraocular lens (IOL) power based on early refraction of the first eye. Acute endophthalmitis is most likely to occur within the first 2 weeks after surgery. When this happens, cataract surgeons may decide to abstain from second-eye surgery. However, unilateral endophthalmitis is a rare complication, especially since the introduction of intracameral antibiotic prophylaxis. Several

How to cite this article: Alió JL, Nowrouzi A. Immediately sequential bilateral cataract surgery importance during the COVID-19 pandemic. Saudi J Ophthalmol 2022;36:124-8.

¹Department of Research and Development, and Refractive Surgery, VISSUM, VISSUM Instituto Oftalmológico de Alicante, Grupo Miranza,

²Department of Ophthalmology, Universidad Miguel Hernández, Alicante, ³Department of Ophthalmology, Hospital Quironsalud, Marbella, Spain

Address for correspondence:

Prof. Jorge L. Alió,
Street Cabañal1, Alicante
03016, Spain.
E-mail: jlalio@vissum.com

Submitted: 25-Feb-2021

Revised: 17-Aug-2021

Accepted: 18-Nov-2021

Published: 29-Aug-2022

epidemiologic studies have reported that the administration of intracameral antibiotics significantly reduces the risk for developing endophthalmitis compared to other prophylactic measures such as topical antibiotics.^[4,5] More recent studies on incidences of endophthalmitis after administration of intracameral antibiotics show endophthalmitis rates of 0.039% (Spain)^[6] and 0.029% (Sweden).^[7] In addition, the study on Swedish national data reports a significant decrease in endophthalmitis rates compared to previous years.^[7] So far, the few cases of bilateral endophthalmitis after ISBCS that have been described could be attributed to faults in aseptic procedures.^[8] Three randomized controlled trials (RCTs)^[9-11] and several noncomparative studies^[12-19] found no significant differences in (severe) complication rates. With regard to refractive outcomes, delaying second-eye surgery enables cataract surgeons to evaluate the outcomes of the first eye at very early postoperative time and, if necessary, adjust their plans for second-eye surgery.^[20] In some countries, the standard for success that is used in cataract surgery is a postoperative refraction within 1.0 diopter of the target refraction^[21] although the better result defines as postoperative refraction within 0.50 diopter of the target refraction. Only two previous studies, one randomized study and one nonrandomized comparative study,^[9,22] report data on refractive outcomes for ISBCS compared to DSBCS. These studies showed similar refractive outcomes for ISBCS compared to DSBCS, indicating that by careful patient selection refractive surprises may be prevented.^[9,19,23,24] However, the number of patients in these two studies was limited, and the overall quality of the evidence of the RCT was graded low to moderate.^[21]

Furthermore, available studies on cost analyses showed that ISBCS resulted in fewer costs and important cost savings to third-party payers, patients, and society compared to DSBCS.^[25-29] However, to date, only one (model-based) cost-utility analysis has been performed.

ISBCS is different from DSBCS;^[30] it 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, 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 and the Cochrane Central database search were performed from year 2000 to the end of December of 2021, using the following keywords: bilateral cataract surgery, simultaneous bilateral cataract surgery, sequential bilateral cataract surgery, same-day cataract surgery, bilateral cataract extraction, and ISBCS.

Sixty articles were found, of which 38 were finally analyzed. Four articles were classified as randomized clinical trials with the level of evidence 1 and the other 34 articles classified as nonrandomized clinical trials with evidence level of 2. 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.

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.^[14,31-33] 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.^[32] 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.^[34]

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.^[30]

DISCUSSION

Serious allegations against the ISBCS is the risk of potential bilateral vision loss as a result of bilateral complications^[35] 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 hemorrhage, corneal decompensation, and retinal detachment.^[36-38] Some authors divide late complications into "catastrophic" and "noncatastrophic." The first one includes endophthalmitis and epithelial ingrowth, whereas noncatastrophic complications include CME and corneal decompensation,^[39,40] uveitis, hiphema, ocular hypertension (HTO), capsular bag distension syndrome, striate keratopathy, incisional leakage, ciliary block, glaucoma, endothelial cell decompensation, and IOL decentration.^[15,41]

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 four 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.^[42-45]

One more complication that is sometimes mentioned is 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.^[20,46] The use of prepared intracameral antibiotics should help to reduce this risk by minimizing errors in mixing and diluting antibiotics in the perioperative period.^[47] In our knowledge, of all previous studies, there are no reported cases of bilateral TASS.

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.^[19] 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. Three RCTs^[9-11] and several non-comparative studies^[12-19] found no significant differences in (severe) complication rates such as endophthalmitis, and there is not any reported case of bilateral endophthalmitis in these studies.

It is important to consider another type of endophthalmitis which is delayed-onset postoperative endophthalmitis. The onset of this kind of endophthalmitis has been defined as greater than 6 weeks after the surgery, and in some studies, the mean time between surgery and the diagnosis of endophthalmitis was 9 days (range: 1 to 39).^[48] As the separation time between two eyes in DSBCS approach is between 7 days and 30 days, it is not a rational conclusion to prefer DSBCS approach as a safer surgery for this late-onset of endophthalmitis. Although late-onset endophthalmitis is not reported in any cases in previous RCTs^[9-11] and other noncomparative studies studies.^[12-19]

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 notably 38 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.^[39] On the other hand, none of the randomized controlled clinical trials could provide evidence about the prevalence of postoperative

anisometropia in patients undergoing ISBCS 32 as it is also recently confirmed by Spekrijse in BICAT-NL study.^[41]

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. According to advances in optical biometry and the development of the fourth-generation formulas such as Barret II, the adjustment coefficient has improved to 0.3 diopters considering the refractive error of ± 1 postoperative diopter. This result contrast with the formulas of the third generation that presented an adjustment coefficient of 0.5 diopters.^[49]

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, especially 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.^[50]

Advantages

The undoubted and greatest medical advantage of ISBCS is the faster complete visual rehabilitation of the patient.^[23] 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.^[31,51]

Serrano *et al.* confirmed this faster complete visual rehabilitation by Self-perceived changes in visual function assessed with the VF-14 questionnaire. Differences between groups were observed 1 month after surgery ($P < 0.001$): Patients in the ISBCS group had significantly better self-perceived visual function scores than those in the DSBCS group after the first eye was treated ($P < 0.001$). After the second eye was treated, visual acuity scores in the DSBCS group improved ($P = 0.001$), and at the 1-year follow-up, the differences between groups disappeared ($P = 0.07$).^[10]

Lundström *et al.* similarly reported that ISCS patients had more rapid rehabilitation than DSBCS patients with respect to binocular visual acuity and binocular contrast sensitivity.^[22]

Nasiri *et al.* also utilized VF-14 questionnaire and found it to be the only outcome measure that remained significantly higher postoperatively in the ISCS group compared to the DSBCS group, not only 2 months, but also 4 months after the first operation.^[23]

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.^[52] 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.^[47,53,54]

A second major advantage of ISBCS is economic: there are lower hospital costs and more efficient use of operating room time.^[25,27,28,41,55] 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.^[39,56,57]

As an example, we can illustrate the potential cost savings in 1 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.^[58]

CONCLUSION

Immediate sequential bilateral cataract surgery offer some advantages in terms of saving of health resources and faster optical rehabilitation.

The risk for postoperative bilateral complications such as 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.

The ISBCS surgical approach is considered to be a safe procedure without any further risk of complications compared to the DSCBS approach.

The operation prevents also other significant problems occurring after unilateral surgery such as anisometropia and neuroadaptation problems.

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.

ISBCS may be beneficial to patients under certain circumstances. Patients who must travel great distances for surgery, those who require general anesthesia, and those with very limited social support systems are among those where risks may be outstripped by potential gain. Recent release of an optically adjustable IOL presents another potential avenue for ISBCS.

Because the optical correction of the IOL is adjustable postoperatively, and patients require several weeks waiting time while wearing special goggles between surgery and adjustment, it would be logical to offer surgery for both eyes in the same setting. Although the risk of refractive surprise in this surgical approach is not a major issue, by means of this new technology we can do any further postoperative adjustments in order to provide better vision based on patient's demands as well as establishing the concepts of monovision, micro-monovision.

With these achievements we gain the courage to cross new boundaries, and one of them is the adoption of ISBCS. With careful patient selection, and strict adherence to protocol, this is a method with better visual outcomes. 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 DSCBS. We believe that soon it could become a standard in many clinics.

Financial support and sponsorship

This study has been financed in part by Network for cooperative research in Health "OFTARED", Nodo Dioptrio Ocular, Biobanco Iberia (Reference: RD16/0008/0012.) Funded by institute de salud Carlos III and co-funded by European Regional Development fund (EDRF), project "A way to make Europe.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Frampton G, Harris P, Cooper K, Lotery A, Shepherd J. The clinical effectiveness and cost-effectiveness of second-eye cataract surgery: A systematic review and economic evaluation. *Health Technol Assess* 2014;18:1-205, v-vi.
2. Chew M, Chiang PP, Zheng Y, Lavanya R, Wu R, Saw SM, *et al*. The impact of cataract, cataract types, and cataract grades on vision-specific functioning using Rasch analysis. *Am J Ophthalmol* 2012;154:29-38.e2.
3. Shekhawat NS, Stock MV, Baze EF, Daly MK, Vollman DE, Lawrence MG, *et al*. Impact of first eye versus second eye cataract surgery on visual function and quality of life. *Ophthalmology* 2017;124:1496-503.
4. Barry P, Seal DV, Gettinby G, Lees F, Peterson M, Revie CW, *et al*. 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;32:407-10.
5. Grzybowski A, Brona P, Zeman L, Stewart MW. Commonly used intracameral antibiotics for endophthalmitis prophylaxis: A literature review. *Surv Ophthalmol* 2021;66:98-108.
6. Rodríguez-Caravaca G, García-Sáenz MC, Villar-Del-Campo MC, Andrés-Alba Y, Arias-Puente A. Incidence of endophthalmitis and impact of prophylaxis with cefuroxime on cataract surgery. *J Cataract Refract Surg* 2013;39:1399-403.
7. Friling E, Lundström M, Stenevi U, Montan P. Six-year incidence of endophthalmitis after cataract surgery: Swedish national study. *J Cataract Refract Surg* 2013;39:15-21.
8. Arshinoff SA, Odorcic S. Same-day sequential cataract surgery. *Curr Opin Ophthalmol* 2009;20:3-12.
9. 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;37:992-1002.
10. Serrano-Aguilar P, Ramallo-Fariña Y, Cabrera-Hernández JM, Perez-Silguero D, Perez-Silguero MA, Henríquez-de la Fe F, *et al.* Immediately sequential versus delayed sequential bilateral cataract surgery: Safety and effectiveness. J Cataract Refract Surg 2012;38:1734-42.
 11. Lundström M, Albrecht S, Nilsson M, Aström B. Benefit to patients of bilateral same-day cataract extraction: Randomized clinical study. J Cataract Refract Surg 2006;32:826-30.
 12. Sarikkola AU, Kontkanen M, Kivelä T, Laatikainen L. Simultaneous bilateral cataract surgery: A retrospective survey. J Cataract Refract Surg 2004;30:1335-41.
 13. Johansson B. Resulting refraction after same-day bilateral phacoemulsification. J Cataract Refract Surg 2004;30:1326-34.
 14. Johansson BA, Lundh BL. Bilateral same day phacoemulsification: 220 cases retrospectively reviewed. Br J Ophthalmol 2003;87:285-90.
 15. Arshinoff SA, Strube YN, Yagev R. Simultaneous bilateral cataract surgery. J Cataract Refract Surg 2003;29:1281-91.
 16. Wertheim M, Burton R. Immediately sequential phacoemulsification performed under topical anaesthesia as day case procedures. Br J Ophthalmol 2002;86:1356-8.
 17. Ganesh S, Brar S, Sreenath R. Immediate sequential bilateral cataract surgery: A 5-year retrospective analysis of 2470 eyes from a tertiary care eye center in South India. Indian J Ophthalmol 2017;65:358-64.
 18. 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;124:1126-35.
 19. Arshinoff SA, Bastianelli PA. Incidence of postoperative endophthalmitis after immediate sequential bilateral cataract surgery. J Cataract Refract Surg 2011;37:2105-14.
 20. Olsen T. Use of fellow eye data in the calculation of intraocular lens power for the second eye. Ophthalmology 2011;118:1710-5.
 21. Lundström M, Dickman M, Henry Y, Manning S, Rosen P, Tassignon MJ, *et al.* Risk factors for refractive error after cataract surgery: Analysis of 282811 cataract extractions reported to the European registry of quality outcomes for cataract and refractive surgery. J Cataract Refract Surg 2018;44:447-52.
 22. Chung JK, Park SH, Lee WJ, Lee SJ. Bilateral cataract surgery: A controlled clinical trial. Jpn J Ophthalmol 2009;53:107-13.
 23. Nassiri N, Nassiri N, Sadeghi Yarandi SH, Rahnavardi M. Immediate vs. delayed sequential cataract surgery: A comparative study. Eye (Lond) 2009;23:89-95.
 24. 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.
 25. 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.
 26. Lundström M, Albrecht S, Roos P. Immediate versus delayed sequential bilateral cataract surgery: An analysis of costs and patient value. Acta Ophthalmol 2009;87:33-8.
 27. O'Brien JJ, Gonder J, Botz C, Chow KY, Arshinoff SA. Immediately sequential bilateral cataract surgery versus delayed sequential bilateral cataract surgery: Potential hospital cost savings. Can J Ophthalmol 2010;45:596-601.
 28. Rush SW, Gerald AE, Smith JC, Rush JA, Rush RB. 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.
 29. Malvankar-Mehta MS, Filek R, Iqbal M, Shakir A, Mao A, Si F, *et al.* Immediately sequential bilateral cataract surgery: A cost-effective procedure. Can J Ophthalmol 2013;48:482-8.
 30. Ainsworth G. Bilateral endophthalmitis after simultaneous bilateral cataract surgery. J Cataract Refract Surg 2006;32:708-9.
 31. Arshinoff SA. Immediately sequential bilateral cataract surgery-A global perspective. US Ophthalmic Rev 2015;8:14-8.
 31. Arshinoff SA. Need for strict aseptic separation of the 2 procedures in simultaneous bilateral cataract surgery. J Cataract Refract Surg 2006;32:376-7.
 33. Arshinoff SA. Immediately sequential bilateral cataract surgery: Why & how. Ocular Times 2010;1:15-20.
 34. Arshinoff S. Simultaneous bilateral cataract surgery. J Cataract Refract Surg 1998;24:1015-6.
 35. Khokhar S, Pangtey MS, Soni A. Misgivings about simultaneous bilateral cataract extraction. J Cataract Refract Surg 2002;28:3.
 36. Obuchowska I, Mariak Z. Simultaneous bilateral cataract surgery – Advantages and disadvantages. Klin Oczna 2006;108:353-6.
 37. Henderson BA, Schneider J. Same-day cataract surgery should not be the standard of care for patients with bilateral visually significant cataract. Surv Ophthalmol 2012;57:580-3.
 38. Ramsay AL, Diaper CJ, Saba SN, Beirouty ZA, Fawzi HH. Simultaneous bilateral cataract extraction. J Cataract Refract Surg 1999;25:753-62.
 39. Smith GT, Liu CS. Is it time for a new attitude to “simultaneous” bilateral cataract surgery? Br J Ophthalmol 2001;85:1489-96.
 40. Tyagi AK, McDonnell PJ. Visual impairment due to bilateral corneal endothelial failure following simultaneous bilateral cataract surgery. Br J Ophthalmol 1998;82:1341-2.
 41. Spekrijse LS, Simons RW, Winkens B, van den Biggelaar FJ, Dirksen CD, Nuijts RM. 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;20:257.
 42. Benezra D, Chirambo MC. Bilateral versus unilateral cataract extraction: Advantages and complications. Br J Ophthalmol 1978;62:770-3.
 43. Ozdek SC, Onaran Z, Gürelik G, Konuk O, Tekinşen A, Hasanreisioğlu B. Bilateral endophthalmitis after simultaneous bilateral cataract surgery. J Cataract Refract Surg 2005;31:1261-2.
 44. Kashkouli MB, Salimi S, Aghaee H, Naseripour M. Bilateral *Pseudomonas aeruginosa* endophthalmitis following bilateral simultaneous cataract surgery. Indian J Ophthalmol 2007;55:374-5.
 45. Puvanachandra N, Humphry RC. Bilateral endophthalmitis after bilateral sequential phacoemulsification. J Cataract Refract Surg 2008;34:1036-7.
 46. Arshinoff SA. Same-day cataract surgery should be the standard of care for patients with bilateral visually significant cataract. Surv Ophthalmol 2012;57:574-9.
 47. Li O, Kapetanakis V, Claoué C. Simultaneous bilateral endophthalmitis after immediate sequential bilateral cataract surgery: What's the risk of functional blindness? Am J Ophthalmol 2014;157:749-51.e1.
 48. Shirodkar AR, Pathengay A, Flynn HW Jr., Albin TA, Berrocal AM, Davis JL, *et al.* Delayed- versus acute-onset endophthalmitis after cataract surgery. Am J Ophthalmol 2012;153:391-8.e2.
 49. Turnbull AM, Barrett GD. Using the first-eye prediction error in cataract surgery to refine the refractive outcome of the second eye. J Cataract Refract Surg 2019;45:1239-45.
 50. Chang DF. Disruptive innovation and refractive IOLs: How the game will change with adjustable IOLs. Asia Pac J Ophthalmol (Phila) 2019;8:432-5.
 51. Keskinbora HK. Simultaneous bilateral cataract surgery. J Cataract Refract Surg 1999;25:304-5.
 52. Kontkanen M, Kaipainen S. Simultaneous bilateral cataract extraction: A positive view. J Cataract Refract Surg 2002;28:2060-1.
 53. Huang TE, Kuo HK, Lin SA, Fang PC, Wu PC, Chen YH, *et al.* Simultaneous bilateral cataract surgery in general anesthesia patients. Chang Gung Med J 2007;30:151-60.
 54. Schachat AP. Simultaneous bilateral endophthalmitis after immediate sequential bilateral cataract surgery: What's the risk of functional blindness? Am J Ophthalmol 2014;158:410-1.
 55. 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;132:1282-8.
 56. Chang DF. Simultaneous bilateral cataract surgery. Br J Ophthalmol 2003;87:253-4.
 57. Sharma TK, Worstmann T. Simultaneous bilateral cataract extraction. J Cataract Refract Surg 2001;27:741-4.
 58. Chandra A, Claoué C. Simultaneous bilateral cataract surgery: A further advantage. Eye (Lond) 2010;24:1113-4.