

# Simultaneous Bilateral Cataract Surgery in Outreach Surgical Camps

Kagmeni Giles<sup>1,2,3</sup>, Ebana Steve Robert<sup>1,2</sup>, Ebana Mvogo Come<sup>2,4</sup> and Peter Wiedemann<sup>5</sup>

<sup>1</sup>University Teaching Hospital of Yaounde (UTHY), Yaoundé, Cameroon. <sup>2</sup>Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon. <sup>3</sup>Eye Department, University Yaoundé I, Yaoundé, Cameroon. <sup>4</sup>Central Hospital of Yaoundé, Yaoundé, Cameroon. <sup>5</sup>Eye Hospital, Leipzig University, Leipzig, Germany.

Ophthalmology and Eye Diseases  
Volume 9: 1–5  
© The Author(s) 2017  
Reprints and permissions:  
sagepub.co.uk/journalsPermissions.nav  
DOI: 10.1177/1179172117701738



## ABSTRACT:

**OBJECTIVES:** The aim of this study was to evaluate the safety and visual outcomes of simultaneous bilateral cataract surgery (SBCS) with intraocular lens implantation performed in outreach surgical eye camps.

**METHODS:** The medical records of 47 consecutive patients who underwent simultaneous bilateral small-incision cataract surgery between January 2010 and December 2015 in outreach surgical camps in rural Cameroon were reviewed. The measures included postoperative visual outcomes and intraoperative and postoperative complications.

**RESULTS:** Data from 94 eyes of 47 participants (30 men, 17 women; mean age: 60.93 ± 13.58 years, range: 45–80 years) were included in this study. The presented best visual acuity (VA) was less than 3/60 in 100% of the eyes. At the 4-week follow-up, 84.04% of the eyes showed increased VA of 1 line or more ( $P = .001$ ). Of these, 71 (75.53%) achieved good VA (greater than 6/18). Intraoperative or postoperative complications occurred in 19 (20.21%) eyes. The most serious intraoperative complication was a posterior capsule rupture and vitreous loss (2 patients, 2 eyes). The postoperative complications included a transient elevation in the intraocular pressure (6 eyes), chronic corneal oedema (5 eyes), iris capture (3 eyes), lens decentration (2 eyes), and hyphema (1 eye). No cases of postoperative endophthalmitis were recorded.

**CONCLUSIONS:** Under the strict observation of endophthalmitis prophylaxis, SBCS is an option to reduce the cataract blindness backlog in rural areas of developing countries.

**KEYWORDS:** Simultaneous bilateral cataract surgery, outreach surgery

**RECEIVED:** January 5, 2017. **ACCEPTED:** March 2, 2017.

**PEER REVIEW:** Five peer reviewers contributed to the peer review report. Reviewers' reports totalled 677 words, excluding any confidential comments to the academic editor.

**TYPE:** Original Research

**FUNDING:** The author(s) received no financial support for the research, authorship, and/or publication of this article.

**DECLARATION OF CONFLICTING INTERESTS:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**CORRESPONDING AUTHOR:** Kagmeni Giles, Eye Department, University Yaoundé I, BP 04 Yaoundé, Cameroon. Email: dr.kagmeni@gmx.net

## Introduction

Cataracts are the leading treatable cause of blindness in the world.<sup>1</sup> In sub-Saharan countries, many barriers contribute to low rates of cataract surgical coverage, including lack of financial resources, difficult access to eye care services, ignorance, and fear of surgery.<sup>2</sup> To overcome some of these barriers, we organized free eye camp surgery in rural areas in which simultaneous bilateral cataract surgery (SBCS) was performed in select patients. Simultaneous bilateral cataract surgery has become an increasingly debated issue, despite improvements in cataract surgical techniques. The primary issue is related to the risk of bilateral postoperative endophthalmitis.<sup>3</sup> However, most agree that SBCS should be used for bilateral paediatric cataracts to mitigate deprivation amblyopia and to prevent children from undergoing general anaesthesia more than once.<sup>4,5</sup> Performing a massive SBCS in locations other than hospitals remains a challenge. Therefore, the aim of this study was to assess the immediate visual outcomes and complications of patients undergoing SBCS in eye camps in Cameroon.

## Materials and Methods

### Patients

All patients who underwent SBCS in the outreach surgical camps in rural Cameroon between January 2010 and December 2015 were consecutively included in this study. Informed written consent was obtained from all participants before surgery, and the protocol was approved by the local ethics committee. The inclusion criteria were bilateral mature cataracts (Figure 1), a prompt pupillary reaction and compliance for local anaesthesia. The exclusion criteria were a high intraocular pressure (IOP; greater than 21 mmHg), pinkeye (increased risk of infection), active uveitis, corneal decompensation, uncontrolled hypertension, and diabetes. Moreover, those patients who did not have anyone to take care of them after the surgery were not eligible for SBCS. Preoperatively, the patients underwent complete ophthalmologic evaluations, including uncorrected visual acuity (UCVA) and pinhole visual acuity (PHVA) assessments using the Snellen vision chart at a distance of 6 m. In addition, the IOP was tested using a Schiøtz tonometer, slit





**Figure 1.** Bilateral mature cataract.

lamp examination (before and after pupillary dilatation), and pupillary reflex. A fundus examination was conducted using indirect ophthalmoscopy.

### Procedure

Each eye operation was performed as a separate and individual surgery, with separate sterilization cycles, routines, and instrument trays. Prior to the surgery, the patient's face was cleaned with 5% povidone-iodine for 3 minutes (Figure 2), and 5% povidone-iodine was dropped in the fornix. The second eye was cleaned again with 5% povidone-iodine before it was operated. Local anaesthesia consisted of a mixture of 3 mL bupivacaine and 3 mL xylocaine with paravulbar or retrobulbar injection. The operation technique was a modified small-incision cataract surgery (mSICS).<sup>6</sup> Polymethylmethacrylate intraocular lenses (IOLs) were implanted, and only standard IOLs (20 or 21 dioptres) were used. Sine biometry was not available. At the end of the procedure, 1 mg/0.1 mL of cefuroxime was injected in the anterior chamber, and a mixture of triamcinolone and gentamicin was given subconjunctivally. The postoperative medication consisted of a topical mixture of steroid/antibiotics drops that were used every hour with gradual tapering. Each patient was discharged with eye sheets on postoperative day 3 (Figure 3), and clear explanations were provided regarding the postoperative care and 4-week follow-up visit. The follow-up visit was conducted at the same campsite. The uncorrected UCVA and PHVA were tested and classified according to the World Health Organization (WHO) recommendations.<sup>7</sup> In addition, slit lamp and dilated fundus examinations were performed to identify the reasons for no amelioration in visual acuity (VA). The diagnosis of postoperative refractive error was made on the basis of a UCVA, which improved by at least 2 lines with a pinhole.

### Statistical analysis

The data were analysed using the Epi Info 3.5.1 software (US Centers for Disease Control and Prevention, Atlanta, GA, USA), and the quantitative variables were reported as mean  $\pm$  SD. The qualitative variables were presented in percentages. A Student paired *t* test was conducted to compare the



**Figure 2.** Face cleaning with 5% povidone-iodine.



**Figure 3.** Simultaneous bilateral cataract surgery patient at discharge.

postoperative and preoperative VAs. A *P* value of less than .05 was considered to be statistically significant.

### Results

Forty-seven patients (94 eyes) who met our inclusion criteria underwent bilateral surgery (30 men [78.72%], 17 women [21.28%]; mean age:  $60.93 \pm 13.58$  years, range: 45-80 years). The mean distance between each patient's home and the nearest eye clinic was 178 km, and each patient needed 1 or more caretakers. An mSICS and posterior IOL implantation were performed in all cases (100%). Preoperatively, 94 (100%) of the eyes were blind, presenting with VAs of less than 3/60. Table 1 summarizes the preoperative and postoperative VAs at the 4-week follow-up. There was a significant reduction in blindness among this population at the 4-week follow-up, and 84.04% of the eyes showed an increased VA of 1 line or more ( $P = .001$ ). Pinhole visual acuity was classified according to the

**Table 1.** Pre- and postoperative VAs.

VA RANGE	PREOPERATIVE PHVA, NO. (%)	POSTOPERATIVE DAY 3 UCVA, NO. (%)	POSTOPERATIVE 4-WK PHVA, NO. (%)
<3/60-PL	94 (100)	7 (7.44)	7 (7.44)
3/60-6/60		13 (13.82)	5 (5.31)
6/60-6/18		44 (46.80)	11 (11.70)
>6/18		30 (31.91)	71 (75.53)

Abbreviations: PHVA, pinhole visual acuity; PL, perception of light; UCVA, uncorrected visual acuity; VA, visual acuity.

**Table 2.** PHVA classification according to the WHO recommendations.

OUTCOME	PHVA	NO. (%)
Good	>6/18	71 (75.53)
Borderline	6/60-6/18	11 (11.70)
Poor	<6/60	12 (12.76)

Abbreviations: PHVA, pinhole visual acuity; WHO, World Health Organization.

WHO recommendations (Table 2). There was a significant increase in VA. Good VA scores of greater than 6/18 were achieved in 71 (75.53%) eyes ( $P = .001$ ). The causes of VAs of less than 3/60 (no amelioration with the pinhole) are recorded in Table 3. Of the 12 eyes with acuities of less than 6/60 at the 4-week follow-up, 7 (58.33%; 7.44% of all eyes) had pre-existing ocular pathologies. Five (41.67%; 5.31% of all eyes) had poor outcomes due to intraoperative complications.

In this study, 19 (20.21%) cases with complications were recorded (Table 4). Intraoperatively, the most serious adverse event was posterior capsule rupture and vitreous loss (2 eyes). The postoperative complications included transient IOP elevations (6 eyes), chronic corneal oedema (5 eyes), iris capture (3 eyes), lens decentration (2 eyes), and hyphema (1 eye). No cases of postoperative endophthalmitis and bilateral complications were recorded.

## Discussion

Surgical eye camps are one of the several strategies for increasing the number of cataract surgeries performed in developing countries. These camps provide inexpensive surgery in areas close to where most of the people live. Simultaneous bilateral cataract surgery remains controversial, and this procedure is rarely performed in adults in developed countries due to the potential risk of bilateral endophthalmitis. According to the guidelines for cataract surgery published by the Royal College of Ophthalmologists, SBCS should only be used in exceptional circumstances.<sup>8</sup> In addition, performing an SBCS negates the ability to adjust the surgery in the second eye according to the outcome of the first surgery.<sup>9,10</sup> The mean age of the patients was  $63.93 \pm 13.58$  years in this study, and the use of SBCS is justified in elderly people with severe visual impairment. There was no explanation for the sex difference in this study; the service was offered free of charge, which should have eliminated sex differences. However, Mganga et al<sup>11</sup> reported that in

**Table 3.** Causes of visual acuities of less than 3/60 (no amelioration with pinhole).

CAUSE	EFFECTIVE, NO. (%)
<b>Pre-existing eye pathologies</b>	
Optic atrophy	1 (8.33)
Vitreous opacity	1 (8.33)
Retinitis pigmentosa	2 (16.66)
Macular diseases	3 (25)
<b>Complications related to surgery</b>	
Corneal decompensation	5 (41.67)

**Table 4.** Intra- and postoperative complications among 94 eyes.

COMPLICATION TYPE	EFFECTIVE, NO. (%)
<b>Intraoperative</b>	
Posterior capsule rupture	2 (2.12)
<b>Postoperative</b>	
Transient IOP elevation	6 (6.38)
Chronic corneal oedema	5 (5.31)
Lens decentration	2 (2.12)
Iris capture	3 (3.19)
Hyphema	1 (1.06)
Endophthalmitis	0 (0.00)
Total	19 (20.21)

Abbreviation: IOP, intraocular pressure.

developing countries, 'females may have less access to money and the perceived need lower for improved vision due to their roles in the household and community'.

The presenting VA was less than 3/60 in 100% of the eyes. At the 4-week follow-up, 84.04% of the eyes showed an increased VA of 1 line or more; of these, 75.53% achieved a PHVA of 6/18 or better. However, our results are lower than the 82% reported by Beatty et al.<sup>12</sup> The significant difference between the UCVA and PHVA suggested that the postoperative refractive errors were the cause of the borderline VA. This

can be explained by using the available standard IOL in our series. A transient IOP elevation (greater than 21 mm Hg) was observed in 6.38% of the eyes. Beatty et al<sup>12</sup> reported 2 cases of bilateral transient IOP elevations after SBCS. The insufficient removal of viscoelastic substances from the anterior chamber at the end of the surgery was likely the cause of this event in our series. The greatest fear of SBCS has been due to possible simultaneous bilateral endophthalmitis, which is a major cause of blindness after cataract surgery. The incidence of postoperative endophthalmitis varies largely in the literature, ranging between 0.02% and 0.8%.<sup>13</sup> The absence of endophthalmitis in our series could be attributed to many factors. The patient selection criteria were rigorously respected, as were our operation technique and perioperative care. Preoperatively, all patients underwent periocular skin disinfection and conjunctival irrigation with 5% povidone-iodine for 3 minutes. This protocol of endophthalmitis prophylaxis is strongly supported in the literature.<sup>13,14</sup> In addition, 1 mg/0.1 mL of intracameral cefuroxime was given to all patients in our series. The use of intracameral antibiotics has been proven to reduce the incidence of postoperative endophthalmitis. In a large series, Arshinoff and Bastianelli<sup>15</sup> reported a significant reduction in the rate of postoperative endophthalmitis after SBCS (from 1 in 5759 to 1 in 14352 cases) with intracameral antibiotics.<sup>16</sup> However, a case of toxic anterior segment syndrome after uncomplicated cataract surgery possibly associated with intracameral use of cefuroxime has been reported.<sup>17</sup> Considering that all bacteria cannot be eliminated, Shimada et al<sup>18</sup> recommended the intraoperative irrigation of the surgical field with 0.25% povidone-iodine. Reports from the literature indicate that bilateral endophthalmitis following SBCS is a rare event. One case of bilateral vision loss due to bilateral endophthalmitis after SBCS was reported in a patient who underwent simultaneous bilateral intracapsular cataract surgery. The patient had septicaemia and dysentery, and the same surgical instruments were used for both eyes.<sup>19</sup> In our study, capsule rupture with vitreous loss was found in 2 (2.12%) cases, which was higher than the 0.9% reported in a series of 240 patients by Bhatta et al.<sup>20</sup> Ramsay et al<sup>21</sup> reported a case of bilateral vitreous loss among 453 cases of SBCS. Intraoperative complications, such as vitreous loss, should have automatically disqualified the second eye for the same-day surgery.<sup>22</sup> Fortunately, the 2 posterior capsule ruptures in our study occurred when operating on the second eye. Chronic corneal oedema was observed in 5 (5.31%) eyes in this series. This was attributed to corneal endothelial damages caused by instruments in the anterior chamber while extracting a hard lens through the small corneoscleral tunnel. A large tunnel should be considered if a hard lens is suspected.

This study revealed that pre-existing ocular pathologies of the posterior segment were responsible for 58.33% of the cases with poor visual outcomes (VA less than 6/60) at the 4-week follow-up. Despite our rigorous patient selection, we could not diagnose these pathologies preoperatively because of the density of the cataract.

Performing SBCSs in an outreach eye camp presents economic, social, and medical advantages in developing countries. For example, the surgery is performed within the community and near the patient's home; therefore, the transportation and accommodation fees (for the patient and at least 1 caretaker) required for a visit to the hospital were reduced. A great social benefit following SBCS is freedom for the patient's guide, who is usually a schoolboy and must miss school to accompany the patient. Leivo et al<sup>23</sup> conducted an economic analysis comparing simultaneous and sequential bilateral cataract surgeries in Finland and concluded that SBCS provided comparable clinical outcomes with substantial savings for health care and non-health care related costs.

The small sample size and short follow-up represent potential limitations to this study. Endophthalmitis following an SBCS is a rare event; thus, a large series is recommended in our setting to confirm and generalize our findings. Furthermore, although the visual outcome was good at the 4-week follow-up, we cannot make statements on later complications, such as posterior capsular opacity. In a previous study, this complication occurred in 2.9% of the eyes at 3 months after surgery.<sup>24</sup>

## Conclusions

The results of our study suggest that SBCS is a viable and safe option to reduce the prevalence of cataract blindness in rural areas in developing countries. Maximal perioperative endophthalmitis prophylaxis should be strictly observed, including periocular skin disinfection via 5% povidone-iodine for 3 minutes, conjunctival irrigation with 5% povidone-iodine, intraoperative irrigation of the surgical field with 0.25% povidone-iodine, and intracameral administration of broad-spectrum antibiotics.

## Acknowledgements

The authors sincerely thank all theatre and sterilization staff of the Yaoundé University Teaching Hospital.

## Author Contributions

This work was conducted in collaboration between all authors. KG and PW designed the study and wrote the protocol. KG, EMC, and ERS analysed the data and wrote the first draft of the manuscript. KG, ERS, and EMC contributed to writing the manuscript and were responsible for manuscript results and conclusions. KG, EMC, and PW made critical revisions and approved the final version.

## REFERENCES

1. Resnikoff S, Pascolini D, Etya'ale D, et al. Global data on visual impairment in the year 2002. *Bull World Health Organ.* 2004;82:844–851.
2. Gyasi M, Amoaku W, Asamany D. Barriers to cataract surgical uptake in the upper East region of Ghana. *Ghana Med J.* 2007;41:167–170.
3. Lansingh VC, Eckert KA, Strauss G. Benefits and risks of immediately sequential bilateral cataract surgery: a literature review. *Clin Exp Ophthalmol.* 2015;43:666–672.
4. Zwaan J. Simultaneous surgery for bilateral pediatric cataracts. *Ophthalmic Surg Lasers.* 1996;27:15–20.

5. Guo S, Nelson LB, Calhoun J, Levin A. Simultaneous surgery for bilateral congenital cataracts. *J Pediatr Ophthalmol Strabismus*. 1990;27:23–25; discussion 26–27.
6. Giles K, Domngang C, Nguetack-Tsague G, Come EM, Wiedemann P. Modified small incision cataract surgery and intraocular lens implantation in HIV patients. *Ophthalmol Eye Dis*. 2015;7:35–37.
7. World Health Organization (WHO). *Informal Consultation on Analysis of Blindness Prevention Outcomes*. Geneva, Switzerland: WHO; 1998.
8. The Royal College of Ophthalmologists. *Guidelines for Cataract Surgery*. London, England: RCO; 1995.
9. 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;57:580–583.
10. Sanmugasunderam S. Simultaneous bilateral cataract surgery. *Can J Ophthalmol*. 2010;45:575–576.
11. Mganga H, Lewallen S, Courtright P. Overcoming gender inequity in prevention of blindness and visual impairment in Africa. *Middle East Afr J Ophthalmol*. 2011;18:98–101.
12. Beatty S, Aggarwal RK, David DB, Guarro M, Jones H, Pearce JL. Simultaneous bilateral cataract extraction in the UK. *Br J Ophthalmol*. 1995;79:1111–1114.
13. Menikoff JA, Speaker MG, Marmor M, Raskin EM. A case-control study of risk factors for postoperative endophthalmitis. *Ophthalmology*. 1991;98:1761–1766.
14. Berkelman RL, Holland BW, Anderson RL. Increased bactericidal activity of dilute preparations of povidone-iodine solutions. *J Clin Microbiol*. 1982;15:635–663.
15. Arshinoff SA, Bastianelli PA. Incidence of postoperative endophthalmitis after immediate sequential bilateral cataract surgery. *J Cataract Refract Surg*. 2011;37:2105–2114.
16. Frilling 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.
17. Çakır B, Celik E, Aksoy NÖ, et al. Toxic anterior segment syndrome after uncomplicated cataract surgery possibly associated with intracameral use of cefuroxime. *Clin Ophthalmol*. 2015;9:493–497.
18. Shimada H, Arai S, Nakashizuka H, Hattori T, Yuzawa M. Reduction of anterior chamber contamination rate after cataract surgery by intraoperative surface irrigation with 0.25% povidone-iodine. *Am J Ophthalmol*. 2011;151:11–17.
19. Benezra D, Chirambo MC. Bilateral versus unilateral cataract extraction: advantages and complications. *Br J Ophthalmol*. 1978;62:770–773.
20. Bhatta RC, Krishnaiah S, Pant BP, Sapkota YD. Outcome of the manual small incision cataract surgery at the base hospital and improved surgical eye camps in Nepal: a prospective observational comparative study. *J Clin Experiment Ophthalmol*. 2011;2:186.
21. Ramsay AL, Diaper CJM, Saba SN, et al. Bilateral simultaneous cataract surgery. *J Cataract Refract Surg*. 1999;25:753–762.
22. Chang DF. Simultaneous bilateral cataract surgery. *Br J Ophthalmol*. 2003;87:253–254.
23. Leivo T, Sarikkola AU, Uusitola RJ, Hellstedt T, Ess SL, Kivela TJ. Simultaneous bilateral cataract surgery: economic analysis; Helsinki Simultaneous Bilateral Cataract Surgery Study Report 2. *J Cataract Refract Surg*. 2011;37:1003–1008.
24. Signes-Soler I, Javalov J, Montés-Mico R, Munoz G, Albrarran-Diego C. Efficacy and safety of mass cataract surgery campaign in a developing country. *Optom Vis Sci*. 2013;90:185–190.