

# Modified Small Incision Cataract Surgery and Intraocular Lens Implantation in HIV Patients



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## ABSTRACT

**AIM:** To describe a surgical technique suitable for cataract surgery in regions with a high prevalence of HIV infection.

**METHODS:** We reviewed the medical records of 20 consecutive AIDS patients with cataract who underwent modified small-incision cataract surgery (mSICS) with posterior chamber lens implantation. Classic extracapsular cataract extraction (ECCE) was compared to mSICS. The number of potentially risky steps for contamination during surgery and duration of surgery were analyzed. A risky step was defined as any time when the surgeon had to use a sharp instrument. Student's paired *t*-test was carried out to compare continuous variables, and *P*-values <0.05 were considered statistically significant.

**RESULTS:** Twenty patients were included in the study, 13 males (65%) and seven females (35%). The mean age was 46.3 ± 13.6 years (range 22–70 years). The number of potentially risky steps for contamination was significantly higher in the classical ECCE than in mSICS (*P* < 0.001). The mean duration of cataract surgery with mSICS was significantly shorter as well (*P* < 0.001).

**CONCLUSION:** Conversion to mSICS is essential in order to reduce accidental injuries during cataract surgery in sub-Saharan countries. Sharp instruments should be passed through a neutral zone to ensure that the surgeon and nurse do not touch the same instrument at the same time.

**KEYWORDS:** small-incision cataract surgery (SICS), AIDS

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## Introduction

Cataract is the leading cause of blindness worldwide.<sup>1</sup> Surgery is the only solution to restore sight to cataract patients. In sub-Saharan countries, healthcare workers, especially surgeons, are at particular risk of acquiring HIV through needle pricks or cuts from other sharp instruments during operative procedures. Hospital-based studies revealed an HIV prevalence of 3% among patients presenting for ocular surgery at ESUT Teaching Hospital Enugu in Nigeria.<sup>2</sup> In Cameroon, Wilhelm et al obtained a positive HIV test result in 29 (5.5%) of the 525 patients who were scheduled for cataract surgery.<sup>3</sup> In the majority of cases, the seropositive status of the HIV positive patients was unsuspected.

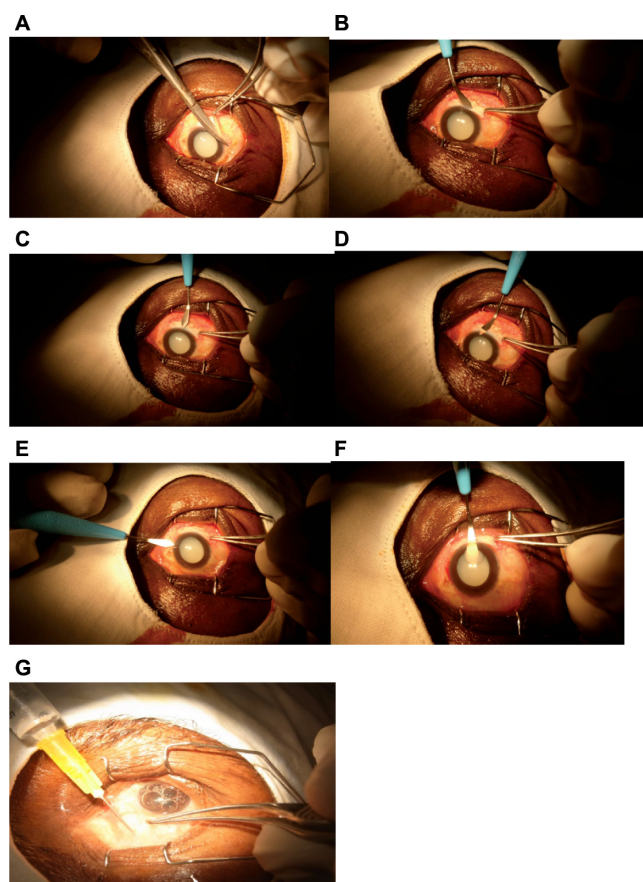
Rahmati et al reported that the total incidence of exposures was 66.3% of healthcare workers per year, and the highest percentage of percutaneous injuries occurred during surgical operations (22.8%).<sup>4</sup> To reduce this risk, it is essential for ophthalmologists in these areas to modify their technique in order to reduce accidental percutaneous injuries during cataract surgery. The objective of this study was to describe the

modified small-incision cataract surgery (mSICS) technique in HIV patients.

## Material and Methods

**Patients.** In this retrospective study, we reviewed operation protocols of 20 patients with AIDS and cataract who underwent mSICS at the Yaoundé University Teaching Hospital (YUTH) between January 2008 and December 2012. Written informed consent was obtained from all the patients. The research was exempted from the requirement for ethics committee approval because it was a retrospective study of anonymized medical records. The parameters analyzed included the number of sharp instruments used, the number of times that each sharp instrument was touched by the surgeon, and the duration of the procedure. Risky steps (Fig. 1) were defined as any time when the surgeon had to use a sharp instrument. Regarding these parameters, classical extracapsular cataract excision (ECCE) was compared to mSICS. The surgical steps of both techniques are summarized in Table 1.

**Statistical analysis.** Data were entered and analyzed using IBM-SPSS version 20 (IBM Corp.). Qualitative



**Figure 1.** Risky steps by mSICS: (A) limbal peritomy(scissors), (B) scleral incision (keratome), (C,D) sclerocorneal tunnel formation (keratome), (E) parasynthesis (keratome), (F) anterior chamber entry and anterior capsulotomy (keratome), and (G) subconjunctiva injection.

variables were presented as percentages (%), while continuous variables were presented as mean ± standard deviation. Student’s paired *t*-test (with unequal variance) was carried out to compare continuous variables after rejecting the null hypothesis of equality of variance with Hartley’s *F* test ( $P = 0.002$ ).  $P$ -values  $<0.05$  were considered statistically significant.

### Results

During a single cataract surgery using the ECCE technique, at least six different sharp instruments are needed (4.0 suture, 9.0 suture, scissors, needle 25G, blade, and cystotoma), and the surgeon touched them at least 20 times. With mSICS, only three sharp instruments (scissors, needle 25G, and keratome) are needed, and they were touched as few as three times (one time each,  $P < 0.001$ ). In the ECCE technique, scissors were the most frequently used sharp instruments (nine times), followed by suture needle (seven times), blade (twice) and cystotoma and needle (one time each). There was a statistically significant difference ( $P < 0.001$ ) in operation duration between ECCE ( $25 \pm 5$  minutes) and mSICS ( $8 \pm 2$  minutes).

**Table 1.** Surgical steps of the classical ECCE and mSICS and the instruments used.

SURGICAL STEPS	CLASSICAL ECCE	mSICS
Superior rectus fixation	4.0 suture	No fixation
Limbal peritomy	Colobri forceps Conjunctiva scissors	Colobri forceps Conjunctiva scissors
Scleral incision	Blade	Kt 2.5–3.0 mm bevel
Anterior chamber entry	Blade	Kt 2.5–3.0 mm bevel
Tunnel formation		Kt 2.5–3.0 mm bevel
Side port	Blade	Kt 2.5–3.0 mm bevel
Enlargement of sclera incision	Scissors right Scissors left	Kt 2.5–3.0 mm bevel
Anterior capsulotomy	Cystotoma	Kt 2.5–3.0 mm bevel
Hydrodissection	Rycroft cannula	Rycroft cannula
Lens extraction	Vectis	Vectis
Cortex removal	Simcoe cannula	Simcoe cannula
IOL implantation	Implantation forceps	Implantation forceps
Sclera suture	5 sutures 9.0 5 times suture cutting with vanas scissor	No suture
Conjunctiva closure	1 suture 9.0 1 time suture cutting with vanas scissors	Bipolar
Sub conjunctiva medication	Needle 25G	Needle 25G
Mean operation duration (min)	$25 \pm 5$	$8 \pm 2$
Total number of times that the surgeon touched sharp instruments for single procedure	<b>20</b>	<b>3</b>

**Abbreviations:** Kt, keratome; ECCE, extracapsular cataract extraction; mSICS, modified small-incision cataract surgery.

### Discussion

Cataract surgery is the most frequently performed surgery in the world. Ophthalmic surgeons in developing countries using ECCE run a higher risk of contracting a blood-borne infection because of frequent handling of sharp instruments and objects during operative procedures. Some methods have been proposed for reducing injuries during surgery, such as double-glove wearing during surgery and hands-free technique.<sup>5,6</sup> In this technique, instruments are indirectly transferred between surgeons and other personnel through the neutral zone within the surgical field or a container. Recently, Rahmati et al reported the effectiveness of using a magnetic needle in reducing the risk of sharp injuries in the operating room.<sup>4</sup> This



device has magnetic properties that attract the sharp pointed articles during surgery and preserve them in a protected space. In ECCE, six sharp instruments are used. The surgeon touches and changes them at least 20 times during a single procedure. In mSICS, only three sharp instruments (conjunctiva scissors, keratome, and 25G needle for subconjunctival depot) are needed. Each of them is used only once. With mSICS, a single use of the keratome replaces five sharp instruments used in ECCE for scleral incision, entry to anterior chamber, scleral incision enlargement, and anterior capsulotomy. The most frequently used sharp instrument in ECCE is the suture needle (seven times). Lopez et al reported that the suture needle was the cause in 91% of intraoperative sharp injury cases in their series.<sup>7</sup> Zhang et al also found that the suture needle was the most common cause of percutaneous injuries among health-care workers in a general hospital in China.<sup>5</sup> In the study by Mingoli et al, sharp needles were responsible for all injuries.<sup>8</sup> They also proved that blunt needles reduce sharp injuries and improve safety for surgeons. In the mSICS technique, a sharp needle is used only once while injecting the subconjunctival medication at the end of the procedure. The mSICS presented in this study differs from the classical ECCE and SICS, as concerns the number of sharp instruments used and the duration of the procedure. However, the clinical outcome is similar. The National Institute for Occupational Safety and Health at the Centers for Disease Control and Prevention has recommended that healthcare workers avoid the use of needles where safe and effective alternatives are available.<sup>9</sup>

## Conclusion

Awareness of the risks and factors associated with injuries during cataract surgery and adoption of safer intraoperative measures are important strategies for preventing potentially serious and life-threatening accidents. It is, therefore, imperative for ophthalmologists in the sub-Saharan region to convert to mSICS.

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## Author Contributions

This work was carried out in collaboration between all authors. Designed the study and wrote the protocol: KG, PW. Analyzed the data and wrote the first draft of the manuscript: KG, EMC, GN-T, CD. Contributed to the writing of the manuscript and were responsible for manuscript results and conclusions: KG, CD, EMC. All the authors reviewed and approved the final manuscript.

## REFERENCES

1. Resnikoff S, Pascoloni D, Etya'ale D, et al. Global data on visual impairment in year 2002. *Bull World Health Organ.* 2004;82:844–51.
2. Ezegwui IR, Akaraiwe NN, Onwasigwe EN. HIV seroprevalence in ophthalmic surgery patients at ESUT Teaching Hospital, Enugu. *Niger J Med.* 2012;21(2):194–5.
3. Wilhelm F, Herz E, McArthur C, Werschnik C. HIV seroprevalence in ophthalmologic patients of Cameroon. *Ophthalmologie.* 2004;101(9):941–4.
4. Rahmati H, Sharif F, Davarpanah MA. Surgeon's satisfaction on the use of invented needle magnet in reducing the risk of sharp injuries in the operating room. *Niger Med J.* 2014;55(3):220–3.
5. Zhang M, Wang H, Miao J, Du X, Li T, Wu Z. Occupational exposure to blood and body fluids among health care workers in a general hospital, China. *Am J Ind Med.* 2009;52:89–98.
6. Raahave D. Operative precautions in HIV and other blood borne virus diseases. *Infect Control Hosp Epidemiol.* 1996;17(8):529–31.
7. Lopez RA, Ravan GM, Monlux R. Hand injuries during hand surgery: a survey of intraoperative sharp injuries of the hand among hand surgeons. *J Hand Surg Eur Vol.* 2008;33(5):661–6.
8. Mingoli A, Sapienza P, Sgarzini G, et al. Influence of blunt needles on surgical glove perforation and safety for the surgeon. *Am J Surg.* 1996;172(5):512–6.
9. Infection Control Today. *NAPPSI Compiles List of Sharp-Safety Devices. 02.01.2003.* Available at: online: <http://www.infectioncontroltoday.com/articles/321feat3.html>. Accessed March 5, 2014.