

Retrospective study of the temporal approach in cataract surgery at Evangelical Church Winning All Hospital



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Background: According to the World Health Organization, cataracts are one of the leading causes of visual impairment. On a global scale, at least 2.2 billion people have near or distance vision impairment, with cataracts accounting for 94 million of these cases. This poses a significant health risk.

Aim: The purpose of this study was to determine the indications for temporal approach cataract surgery, as well as the effects of surgically induced astigmatism on the temporal approach in cataract surgeries performed at the Evangelical Church Winning All (ECWA) Eye Hospital in Kano, Nigeria.

Setting: Temporal approach in cataract surgery at Evangelical Church Winning All (ECWA) Kano: indications and surgically induced astigmatism.

Methods: A retrospective study of patients who underwent cataract surgery at ECWA Eye Hospital, Kano, a tertiary specialist eye care centre, between January 2019 and December 2020. The patients underwent standard manual small incision cataract surgery on the temporal side of the eye. Biodata, previous ocular surgery, type and time of last ocular surgery, pre-operative and postoperative astigmatism, indications for temporal approach, immediate surgical complications and postoperative visual acuity were extracted from the patients' clinical notes.

Results: There were 63 eyes from 44 patients who had temporal approach manual small incision cataract surgery. Thirty (68.2%) of the 44 patients were male, while 14 (31.8%) were female. Cataracts were most common between the ages of 61 and 70 years, and most of the patients ($n = 61$, 96.8%) required temporal surgery. Astigmatism caused by surgery was minimal. The visual outcome was good, with a postoperative visual acuity of 6/18 – 6/60.

Conclusion: Post-trabeculectomy cataract was the major indication for temporal approach cataract surgeries in the patients. The procedure was both safe and effective, resulting in improved visual outcomes.

Contribution: Temporal approach manual small incision cataract surgery (MSICS) was indicated mainly after trabeculectomy. The technique is safe, and patients had better visual outcomes.

Keywords: cataract surgery; temporal approach; astigmatism; visual acuity; ECWA hospital.

Introduction

A cataract is an opacification of the crystalline lens of the eye that causes vision loss. As the leading cause of blindness,¹ cataracts impose a public health burden on over 2 billion people worldwide.² They are a major cause of visual disability in Africa,^{3,4,5,6} creating a serious socio-economic problem.

The current method of cataract treatment is surgery.^{7,8} While phacoemulsification is the most advanced and technically superior method of cataract surgery, in developing countries, manual small incision cataract surgery (MSICS) is the most popular surgical management option for cataracts.^{9,10,11} Manual small incision cataract surgery is the method of choice at Evangelical Church Winning All (ECWA) Eye Hospital, Kano, a tertiary eye care centre, because of its affordability, shorter surgical time and comparable visual outcome to phacoemulsification.

The location, size and shape of incisions used in MSICS have been shown to influence postoperative surgically induced astigmatism (SIA).^{12,13} The superior approach produces a smaller SIA than the temporal approach.¹² To the best of the authors' knowledge, no retrospective review of temporal approach MSICS for cataract surgery has been performed at their centre since its inception. Following the standard temporal approach MSICS, the authors present their centre's experiences. This is a 2-year retrospective review (January 2019 – December 2020) to determine the indications of temporal approach MSICS, as well as SIA and visual outcome.

Methods

Procedures

This was a retrospective review. The surgical theatre register and clinical notes of patients who had temporal approach MSICS performed between January 2019 and December 2020 were obtained and reviewed. The patients underwent temporal approach MSICS from the temporal side of the eye in the following order: (1) a fornix-based conjunctival flap was raised and haemostasis was secured with bipolar wet-field cautery; (2) a straight corneo-scleral tunnel 2 mm from the limbus was constructed, and a side port was created on the nasal side; (3) capsulotomy or capsulorhexis was performed under viscoelastic material; (4) hydrodissection and nucleus prolapse into the anterior chamber and out through an enlarged tunnel were performed; and (5) cortical clean-up was performed via irrigation and aspiration, posterior chamber intraocular lens (PCIOL) implantation and anterior chamber wash. The conjunctival flap was secured with 10.0 nylon suture.

All patients underwent pre- and postoperative streak retinoscopy. Patients with equal to or greater than 0.50 dioptre cylinder (DC) were considered to have significant astigmatism. The data retrieved from the patients' clinical notes included biodata, previous ocular surgery, type and time of last ocular surgery, pre-operative and postoperative astigmatism, indications for temporal approach MSICS, immediate surgical complications and postoperative visual acuity.

Inclusion and exclusion criteria

The study included all patients who had temporal approach cataract surgery during the study period. Patients with temporal approach MSICS but no complete information were excluded.

Statistical analysis

The results were expressed as mean \pm standard error of mean. The data were descriptively analysed using the Statistical Package for the Social Sciences version 19.0 (SPSS; IBM Corporation, Armonk, New York, United States) at 95% confidence interval. The p -values < 0.05 were considered statistically significant.

Ethical considerations

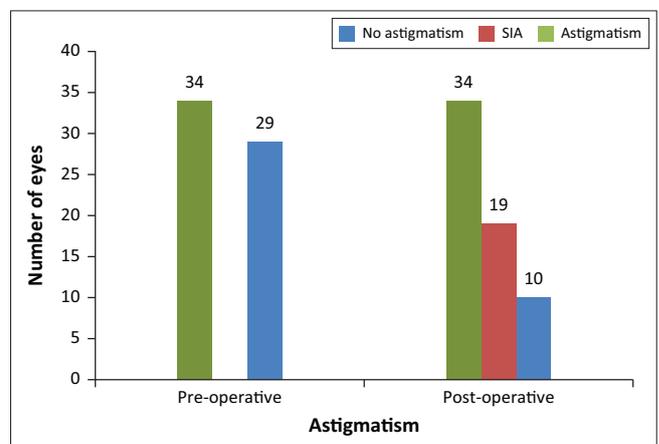
Ethical clearance to conduct this study was obtained from the chief medical director at ECWA Eye Hospital, Kano (ref. no. ECWA/EH/001/2018).

Results

There were 63 eyes from 44 patients who had temporal approach MSICS. Thirty (68.2%) of the patients were male, while 14 (31.8%) were female (Table 1). They ranged in age from 20 to 80 years, with a mean age of 62.32 ± 11.62 years. Previous glaucoma surgery was the reason for the temporal approach in 61 (96.8%) of the eyes. The remaining two (3.2%) had anterior staphyloma in the superior part of the eye. As shown in Table 1, cataract was more common in people aged between 61 and 80 years. The age group of 20 to 30 years had the fewest cataract cases (1.58%).

TABLE 1: Demographic variables of patients.

Age (years)	Gender				Frequency	
	Male		Female		N	%
	n	%	n	%		
20–30	1	-	0	-	1	2.3
31–40	3	-	0	-	3	6.8
41–50	1	-	3	-	4	9.1
51–60	2	-	2	-	4	9.1
61–70	14	-	8	-	22	50.0
71–80	9	-	1	-	10	22.7
Total	30	68.2	14	31.8	44	100.0



SIA, surgically induced astigmatism.

FIGURE 1: Pre-operative and postoperative astigmatism in 63 eyes.

TABLE 2: Intra-operative and postoperative complications.

Indices	Frequency (Eyes)	
	n	%
Intra-operative complication		
Hyphaema	1	1.6
Others	9	14.3
None	53	84.1
Total	63	100.0
Postoperative complication		
Uveitis	3	4.7
Others	10	15.9
None	50	79.4
Total	63	100.0

TABLE 3: Pre-operative and postoperative visual acuity of 63 eyes.

Indices	Pre-operative	Postoperative
6/6 – 6/18	2	2
< 6/18 – 6/60	34	52
< 6/60 – 3/60	27	9
Total	63	63

Figure 1 depicts pre- and postoperative astigmatism in the 63 eyes. Astigmatism was present in 34 of the eyes prior to surgery, while it was absent in 29. Astigmatism was present in 53 eyes after surgery, with only 10 having no astigmatism. Intra-operative hyphaema occurred in one eye, accounting for 1.6%, while uveitis occurred postoperatively in three eyes (4.7%), as shown in Table 2.

In Table 3, the majority of the eyes (54.0%, 34 eyes) had borderline visual impairment (< 6/18 – 6/60) prior to surgery. Furthermore, 27 eyes scored < 6/60 – 3/60, indicating a poor visual outcome. Postoperatively, 9 eyes had a poor visual outcome, while 52 eyes had a borderline visual outcome.

Discussion

The goal of this study was to determine the indications for temporal approach MSICS and the effects of surgically induced astigmatism on temporal approach in cataract surgeries at ECWA Eye Hospital Kano, through a retrospective review of cases. The goal of modern cataract surgery is to minimise postoperative corneal astigmatism for the best visual outcome.^{14,15} A temporal approach to cataract surgery has the potential to achieve this goal.^{15,16} Precision in the evaluation of corneal curvature before and after surgery is required to minimise postoperative corneal astigmatism, because incisions may induce a variable amount of corneal astigmatism.¹⁵

Cataracts were more prevalent in patients between the ages of 61 and 80 years (Table 1). This finding is consistent with Lou et al.'s report¹⁷ that old age is a risk factor for developing cataracts.

According to the astigmatism results shown in Figure 1, pre-operative astigmatism was present in 34 eyes (53.96%), while postoperative astigmatism occurred in 53 eyes (84.12%). Nikose et al.¹⁵ made a similar observation, reporting that 18.2% (25/138) of patients who underwent temporal cataract surgery had pre-operative astigmatism. Although the temporal approach has the potential to reduce postoperative corneal astigmatism when compared with superior corneal incision,¹⁵ it is not without the risk of SIA. This is evident in 30.15% ($n = 19$) of the eyes with postoperative astigmatism (Figure 1). These findings are consistent with those of other studies.^{15,18,19}

One of the difficulties that cataract surgeons face is cataract surgery in uveitic eyes,²⁰ which can result in intra-operative and postoperative complications. Uveitis

occurred postoperatively in three eyes (4.7%) in this study, as shown in Table 2. However, better and more efficient management of the complication resulted in a better outcome in terms of vision quality. Only one eye (1.6%) experienced intra-operative hyphaema as a complication.

In a parallel comparison of the visual acuity outcomes shown in Table 3, 34 eyes had borderline visual acuity of pre-operatively, while this increased to 52 eyes postoperatively. This indicated that the number of patients with improved vision had increased. Pre-operative visual acuity was poor in 27 eyes and postoperatively in 9 eyes (Table 3). Two of the operated eyes had good postoperative visual outcomes, with visual acuities of 6/18. According to a similar study by Zawar et al.,²¹ best-corrected visual acuity (BCVA) better than 6/18 was achieved in 1868 (93.4%) eyes, with 46 (2.3%) having BCVA < 6/60. The indication for temporal MSICS in the majority of the patients was previous glaucoma surgery; nonetheless, the majority of the operated eyes had moderate visual impairment postoperatively (Table 3). The findings of this study support previous reports in the literature that performing cataract surgery using a temporal approach improves vision quality and reduces postoperative astigmatism.^{15,22,23}

Conclusion

In the patients, post-trabeculectomy cataract was the most common reason for temporal approach cataract surgery. The procedure was both safe and effective, resulting in better visual outcomes.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

The study was designed by A.M.O. and O.A.J. In terms of other aspects of the work, all authors contributed equally.

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Data availability

The authors confirm that the data supporting the findings of this study are available on request from the corresponding author, O.A.J.

Disclaimer

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References

- Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol*. 2012;96(5):614–618. <https://doi.org/10.1136/bjophthalmol-2011-300539>
- Global Burden of Diseases. Blindness and Vision Impairment Collaborators; Vision Loss Expert Group of the Global Burden of Disease Study. Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: The right to sight: An analysis for the Global Burden of Disease Study. *Lancet Glob Health*. 2021;9(2):e144–e160.
- Okoye OI, Aghaji AE, Ikojo IN. Causes of visual loss at a school for the blind in Nigeria. *Nig J Med*. 2009;18(3):306–310. <https://doi.org/10.4314/njm.v18i3.51198>
- Ruhagaze P, Njuguna KK, Kandeke L, Courtright P. Blindness and severe visual impairment in pupils at schools for the blind in Burundi. *Middle East Afr J Ophthalmol*. 2013;20(1):61–65. <https://doi.org/10.4103/0974-9233.106390>
- Asferaw M, Woodruff G, Gilbert C. Causes of severe visual impairment and blindness in students in schools for the blind in northwest Ethiopia. *Br Med J Glob Health*. 2017;2(2):e000264. <https://doi.org/10.1136/bmjgh-2016-000264>
- Kwarteng MA, Mashige KP, Naidoo KS, Boadi-Kusi SB, Govender-Poonsamy P. The prevalence and causes of low vision and blindness amongst learners at the Akropong School for the Blind in Ghana. *Afr Vision Eye Health*. 2021;80(1):a611. <https://doi.org/10.4102/aveh.v80i1.611>
- Aruta A, Marengo M, Marinuzzi S. History of cataract surgery. *Med Secoli*. 2009;21(1):403–428.
- Fong CSU, Mitchell P, Rochtchina E, Teber ET, Hong T, Wang JJ. Correction of visual impairment by cataract surgery and improved survival in older persons: The Blue Mountains eye study cohort. *Ophthalmology*. 2013;120(9):1720–1727. <https://doi.org/10.1016/j.ophtha.2013.02.009>
- Ruit S, Tabin G, Chang D, et al. A prospective randomized clinical trial of phacoemulsification vs manual sutureless smallincision extracapsular cataract surgery in Nepal. *Am J Ophthalmol*. 2007;143(1):32.e2–38.e2. <https://doi.org/10.1016/j.ajo.2006.07.023>
- Pershing S, Kumar A. Phacoemulsification versus extracapsular cataract extraction: Where do we stand? *Curr Opin Ophthalmol*. 2011;22(1):37–42. <https://doi.org/10.1097/ICU.0b013e3283414fb3>
- Cook C, Carrara H, Myer L. Phaco-emulsification versus manual small-incision cataract surgery in South Africa. *S Afr Med J*. 2012;102(6):537–540. <https://doi.org/10.7196/SAMJ.5393>
- Mallik VK, Kumar S, Kamboj R, Jain C, Jain K, Kumar S. Comparison of astigmatism following manual small incision cataract surgery: Superior versus temporal approach. *Nepal J Ophthalmol*. 2012;4(1):54–58. <https://doi.org/10.3126/nepjoph.v4i1.5851>
- Jauhari N, Chopra D, Chaurasia RK, Agarwal A. Comparison of surgically induced astigmatism in various incisions in manual small incision cataract surgery. *Intl J Ophthalmol*. 2014;7(6):1001–1004.
- Yoon JH, Kim KH, Lee JY, Nam DH. Surgically induced astigmatism after 3.0 mm temporal and nasal clear corneal incisions in bilateral cataract surgery. *Indian J Ophthalmol*. 2013;61(11):645–648. <https://doi.org/10.4103/0301-4738.119341>
- Nikose AS, Saha D, Laddha PM, Patil M. Surgically induced astigmatism after phacoemulsification by temporal clear corneal and superior clear corneal approach: A comparison. *Clin Ophthalmol*. 2018;12:65–70. <https://doi.org/10.2147/OPTH.S149709>
- Aykut V, Kirgiz A, Gulay B, Celik U. Comparison of pre-incision and single-stepped clear corneal incision in phacoemulsification cataract surgery. *Eur Rev Med Pharmacol Sci*. 2014;18:1698–1703.
- Lou L, Ye X, Xu P, et al. Association of sex with the Global Burden of Cataract. *JAMA Ophthalmol*. 2018;136(2):116–121. <https://doi.org/10.1001/jamaophthalmol.2017.5668>
- Arthur E, Sadik AA, Kumah DB, et al. Postoperative corneal and surgically induced astigmatism following superior approach manual small incision cataract surgery in patients with preoperative against-the-rule astigmatism. *J Ophthalmol*. 2016;2016:9489036. <https://doi.org/10.1155/2016/9489036>
- Kamiya K, Iijima K, Ando W, Shoji N. Comparison of mean and centroid of surgically induced astigmatism after standard cataract surgery. *Front Med*. 2021;8:670337. <https://doi.org/10.3389/fmed.2021.670337>
- Agrawal R, Murthy S, Ganesh SK, Phaik CS, Sangwan V, Biswas J. Cataract surgery in uveitis. *Int J Inflam*. 2012;2012:548453. <https://doi.org/10.1155/2012/548453>
- Zawar SV, Gogate P. Safety and efficacy of temporal manual small incision cataract surgery in India. *Eur J Ophthalmol*. 2011;21(6):748–753. <https://doi.org/10.5301/EJO.2011.6521>
- Hennig A, Kumar J, Yorston D, Foster A. Sutureless cataract surgery with nucleus extraction: Outcome of a prospective study in Nepal. *Br J Ophthalmol*. 2003;87:266–270. <https://doi.org/10.1136/bjo.87.3.266>
- Gogate PM, Kulkarni SR, Krishnaiah S, et al. Safety and efficacy of phacoemulsification compared with manual small incision cataract surgery by a randomized controlled clinical trial: Six-week results. *Ophthalmology*. 2005;112(5):869–874. <https://doi.org/10.1016/j.ophtha.2004.11.055>