

Post-Operative Astigmatism and Visual Outcome among Superior Approach Manual Small Incision Cataract Surgery at Surgical Eye Camp in Nepal

Suresh Raj Pant*, Ramesh Chandra Bhatta and Suresh Awasthi

Department of Ophthalmology, Geta Eye Hospital, Kailali, Nepal

*Corresponding author: Dr. Suresh Raj Pant, Department of Ophthalmology, Geta Eye Hospital, Kailali, Nepal, Tel:+977-91575204; E-mail: drspant1@hotmail.com

Received date: May 13, 2019; Accepted date: June 27, 2019; Published date: July 04, 2019

Copyright: © 2019 Pant SR, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Objective: To evaluate post-operative astigmatism and visual outcome among patients with superior approach manual small incision cataract surgeries at surgical eye camp in Nepal.

Method: This is a retrospective, case study of post-operative astigmatism after cataract surgery. This study was conducted at Geta Eye Hospital using data collected from surgical eye camp in Kanchanpur district of Nepal. A total of 106 records of cases that had undergone superior approach manual small incision cataract surgery (MSICS) during February 2017 in a surgical eye camp were selected. Records of patients who did not attend follow up at 4 to 6 weeks were excluded. Post-operative visual acuity, retinoscopy and subjective refraction data were collected from patient records at 4 to 6 weeks follow up.

Results: Of 106 cases followed up at 4-6 weeks of surgery 42(39.6%) had astigmatism of 0.5 to 1 diopter (D), 36 (34%) had 1.25 to 2 diopters, 16 (15.1%) had 2.25 to 3.0 diopters, 11 (10.4%) had <0.5 diopter and 1 (0.9%) had >3.0 diopters. Altogether 64 (60.3%) cases had uncorrected visual acuity \geq 6/18 and 100 (94.3%) cases had best corrected visual acuity \geq 6/18. There was statistically significant difference between uncorrected and best corrected visual acuity ($p=0.001$).

Conclusion: Superior approach manual small incision cataract surgery had significant astigmatism at 4-6 weeks follow-up, though it gives good post-operative visual outcome after refractive correction.

Keywords: Small incision cataract surgery; Astigmatism; Eye camp; Visual outcome; Uncorrected visual acuity; Retrospective case study; Retinoscopy

Introduction

Although there has been improvement in surgical techniques and cost effective intervention programs, cataract remains the leading cause of blindness consisting of one third of the global blindness. Globally, 216.6 million people were visually impaired due to different causes and 36 million people were blind [1]. Backlog of untreated cataract still remains high largely due to increasing life expectancy and low up take of cataract surgical services in developing countries. In Nepal, cataract is the leading cause of blindness. Prevalence of blindness ($VA < 3/60$) was reported as 2% in 50+ population (3,978,149) of which 62.2% was due to cataract [2].

The mainstream of cataract management is cataract surgery. In developed countries almost all cataract surgeries are done using Phaco-emulsification technique. But in the developing countries like Nepal MSICS is still the choice of surgery, as the Phaco-emulsification surgery is not affordable by middle and low income people due to its high costs.

Study in eastern Nepal reported, significantly less mean astigmatism (1.7 ± 1.35 D), among interrupted sutures in comparison to surgeries

performed with continuous sutures (3.53 ± 2.19 D) at the end of 6 weeks (unpaired t test $p < 0.01$) [3].

Study in India reported 66% in ECCE with continuous sutures and 60% with interrupted sutures developed with the rule astigmatism [4].

Previous studies reported best corrected good VA ($\geq 6/18$) after cataract surgery varies from 98.4% to 63.2% at hospital and 87.9% to 34.1% at eye camps [5-8].

Outcome of SICS study in Nepal reported uncorrected VA $\geq 6/18$ in 70.5%. Best corrected VA $\geq 6/18$ was reported in 96.2% of eyes at 6 weeks and 95% at 1 year [9]. A study comparing Phacoemulsification and SICS in Nepal reported average keratometric astigmatism of 0.8 diopter in SICS with temporal approach incision versus 0.7 diopter in Phaco group in which 89% of SICS patients had uncorrected and 98% had best corrected visual acuity $\geq 20/60$ (6/18). Same study reported in Phaco group 85% had uncorrected and 98% had best corrected visual acuity $\geq 20/60$ (6/18) at six months and recommended SICS as more appropriate procedure for developing countries [10]. Similar study in India found 81.08% of Phaco group and 71.1% of SICS group had presenting VA $\geq 6/18$ which improved to 98.4% with best correction in both groups. Both the techniques are equally effective for visual outcome at 6 weeks [4]. Study done in Pakistan reported 93.4% had uncorrected VA $\geq 6/18$ at 6 Weeks [11]. Above studies show manual small incision gives good outcome with minimum cost and most appropriate technique for developing countries.

Previous study reported mean corneal astigmatism of 2.12 ± 0.99 diopters, ranging from 0.25-5.25 diopters at base hospital patients and 2.39 ± 1.29 diopters ranging from 0.25-8 diopters at surgical eye camps at 4-6 weeks post operatively [12]. Study reported from India shows statistically significant difference in surgically induced astigmatism in superior versus temporal incision technique of MSICS with mean astigmatism of 1.45 diopters (± 0.7387) and 0.75 diopters (± 0.4067) [13]. Study done at Yuyan District Hospital China shows mean astigmatism of 1.92 diopters at 4 weeks post operatively in MSIC surgery with superotemporal incision and gradually declines between 1 to 12 weeks [14].

Present study was designed to evaluate post-operative astigmatism among superior approach manual small incision cataract surgery at eye camp in Nepal.

Method

This is a retrospective case study conducted at Geta Eye Hospital using data collected following cataract surgery at eye camp held in the Far West Province of Nepal. The study was conducted during the period of February to June 2017. A total of 106 records of patients who had undergone superior approach manual small incision cataract surgery and attended for follow up at primary eye center at 4 to 6 weeks were selected for the sample of study. Chi square test was used to calculate p value and p value < 0.05 was considered to be statistically significant.

Study areas

Post-operative records of cataract patients followed up on 4 to 6 weeks at primary eye center after surgical eye camp. The surgeries were performed at temporarily prepared operation theater at primary health center located in a remote village 45 kilometers away from Geta Eye Hospital. The socioeconomic status of the area chosen roughly represents population of the province.

Inclusion and exclusion criteria

Post-operative records of all patients operated for cataract using SICS with posterior chamber intra ocular lens implantation procedure that attended follow-up at 4 to 6 weeks were included for study. The study excluded record of patients who did not attend follow up at 4 to 6 weeks.

Ophthalmic examination

One experienced Ophthalmic Assistant assessed visual acuity using Snellen's visual acuity chart and performed retinoscopy using streak Retinoscope Heine Beta 200 with subjective refraction on all patients. The demographic details and ocular examination that included pre-operative visual acuity assessment, anterior segment examination with portable slit lamp and posterior segment examination with direct ophthalmoscope were recorded from the medical record cards.

Results

Mean age of patients followed-up at 4 to 6 weeks of cataract surgery was 65.5 years, ranging from 40 to 88 years. Mean astigmatism was 1.3 diopters, ranging from 0.0 to 3.5 diopters at 4-6 weeks follow-up post operatively. Of 106 cases followed up at 4-6 weeks of surgery 42(39.6%) had astigmatism of 0.5 to 1 diopter, 36 (34%) had 1.25 to 2 diopters, 16

(15.1%) had 2.25 to 3.0 diopters, 11 (10.4%) had <0.5 diopter and 1 (0.9%) had >3.0 diopters (Table 1).

| Astigmatism in Diopters | Number (%) |
|-------------------------|------------|
| <0.5 | 11 (10.4%) |
| 0.5-1.0 | 42 (39.6%) |
| 1.25-2.0 | 36 (34%) |
| 2.25-3.0 | 16 (15.1%) |
| >3.00 | 1 (0.9%) |
| Total | 106 (100%) |

Table 1: Postoperative Astigmatism in diopters at 4-6 weeks follow-up.

Preoperatively out of 106 cases 58(54.7%) had visual acuity <6/18 to 6/60 and 48(45.3%) had visual acuity of <6/60. After surgery 64 (60.4%) had uncorrected visual acuity (UVA) $\geq 6/18$, 41 (38.7%) had UVA <6/18 to 6/60 and only one (0.9%) had UVA <6/60. After refractive correction 100 cases (94.3%) gained best corrected visual acuity (BCVA) $\geq 6/18$, 5 (4.7%) had BCVA <6/18 to 6/60 and only one (0.9%) had BCVA <6/60 (Table 2). There was statistically significant difference between uncorrected visual acuity and best corrected visual acuity ($p=0.001$).

| VA Category | Preoperative VA | Postoperative VA | |
|-----------------|-----------------|------------------|----------------|
| | | Uncorrected | Best corrected |
| 6/18 and better | 0 (0.0%) | 64 (60.4%) | 100 (94.3%) |
| <6/18 to 6/60 | 58 (54.7%) | 41 (38.7%) | 5 (4.7%) |
| <6/60 | 48 (45.3%) | 1 (0.9%) | 1 (0.9%) |
| Total | 106 (100%) | 106 (100%) | 106 (100%) |

Table 2: Pre and post-operative visual acuity.

Discussion

Cataract surgery techniques are changing with time but still manual small incision cataract surgery is a popular method in developing countries like Nepal. It has several advantages over phaco-emulsification like: low cost, fewer complications, less time consuming, suitable for mature and brown cataract. We selected post-operative cataract patients with superior approach MSICS as it is commonly used in different hospitals within the country similar to other developing countries.

This study showed excellent best corrected visual outcome at 4-6 weeks follow up after surgery. In addition to the standard procedures followed in the camp, well experienced surgeon, well experienced technician for biometry and sterilization could have contributed for the result achieved. Postoperative astigmatism findings were comparable with the study done in similar settings in eastern Nepal but were slightly higher than the findings reported in India.

Provision of surgical services at their doorstep can be an effective approach to eliminate blindness in countries with poor socioeconomic status and transportation facilities. Small incision cataract surgeries

done in eye camps give remarkably good visual outcome if standard surgical procedures are followed.

Superior approach manual small incision cataract surgery had significant astigmatism at 4-6 weeks follow-up though it gives good post-operative visual outcome after refractive correction. In a study done in Nepal reported 70.5% had UVA 6/18 or better which is better than our study and BCVA 96.2% which is comparable to our study at 6 weeks follow up [9]. Comparative study on Phacoemulsification vs. Small incision cataract surgery with temporal approach incision in Nepal [10] reported less post-operative astigmatism compared to our study. Postoperative astigmatism in this study is comparable with postoperative astigmatism with superotemporal incision in a study reported in china [14]. Though significant astigmatism following superior approach small incision cataract surgery has been reported in a study in India [13], very few studies has been done in our population.

Conclusion

Hence preoperative corneal astigmatism should be considered while choosing superior versus temporal approach small incision cataract surgery. In view of large number of SICS performed every year in Nepal, findings from this study could be useful in reducing post-operative astigmatism.

The limitations of the study were long-term changes in astigmatism were not studied and patients were selected from one eye camp only.

Acknowledgements

The authors would like to thank Nepal Netra Jyoti Sangh, Geta Eye Hospital and technical team for making medical records available and for resources to conduct this study.

References

1. Bourne RRA, Flaxman SR, Braithwaite T, Cicinelli MV, Das A, et al. (2017) Vision Loss Expert Group. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. *Lancet Glob Health*. 5: e888-e897.
2. Sapkota, Yuddha, Hans, Limburg (2013) Epidemiology of Blindness in Nepal: 2012.
3. Sood A, Thakur SK, Kumar S, Badhu B (2003) Keratometric astigmatism after ECCE in eastern Nepal. Continuous versus interrupted sutures. *Indian J Ophthalmol* 51: 53-57.
4. Gogate PM, Kulkarni SR, Krishnaiah S, Deshpande RD, Joshi SA, et al. (2005) Safety and efficacy of phacoemulsification compared with manual small-incision cataract surgery by a randomized controlled clinical trial: six-week results. *Ophthalmology* 112: 869-874.
5. Tesfaye H, Asefa Y, Bayu S, Bejiga A (2002) Outcome of extra capsular cataract extraction with posterior chamber intraocular lens implantation performed at a cataract surgical campaign. *Ethiop J Health Dev* 6: 77-83.
6. Kapoor H, Chatterjee A, Daniel R, Foster A (1999) Evaluation of visual outcome of cataract surgery in an Indian eye camp. *Br J Ophthalmol* 83: 343-346
7. Gogate P, Kulkarni AN (2002) Comparison of cataract surgery in a base hospital and in peripheral eye camps. *Community Eye Health* 15: 26-27.
8. Das T, Venkataswamy G (1983) Surgical results: comparison of patients operated in "eye camp" with patients operated in the hospital. *Indian J Ophthalmol* 1983: 31.
9. Hennig A, Kumar J, Yorston D, Foster A (2003) Sutureless cataract surgery with nucleus extraction: outcome of a prospective study in Nepal. *Br J Ophthalmol* 87: 266-270.
10. Ruit S, Tabin G, Chang D, Bajracharya L, Kline DC, et al. (2007) A prospective randomized clinical trial of phacoemulsification vs. manual suture less small incision extra capsular cataract surgery in Nepal. *Am J Ophthalmol* 143: 32-38.
11. Zaman M, Shah AA, Hussain M, Babar TF, Marwat MT, et al. (2009) Outcome of sutureless manual extra capsular cataract extraction. *J Ayub Med Coll Abbottabad* 21: 39-42.
12. Bhatta RC, Krishnaiah S, Pant BP, Sapkota YD (2011) 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 Clinic Exp Ophthalmol* 2: 186.
13. Malik VK, Kumar S, Kamboj R, Jain C, Jain K, et al. (2012) Astigmatism following manual small incision cataract surgery. *Nepal J Ophthalmol* 4: 54-58.
14. Guan C, Xiao T (2012) Astigmatism following Small Incision Cataract Extraction through Superotemporal Incision. *Eye Science* 27: 94-97.