

The Impact of Volume on Cataract Surgery Visual Outcome

Atif Anwar^{1*}, R H Maniar², Sakeena Mushfiq³

¹Assistant Professor, Department Of Jarahat, Faculty Of Unani Medicine, AMU, Aligarh, UP, India. ²Consultant, Department Of Ophthalmology, Shushrusha Hospital, Dadar, Mumbai, India. ³Assistant Professor, Dept. Community Medicine, JNMC, AMU, Aligarh, India.

ABSTRACT

Background: To compare High Vs. Low Volume SIC Surgery Outcomes in tertiary Institute in Central India, in terms of **Quality** as gauged by **Visual acuity parameters** at 1 month follow-up.

Methods: A prospective, randomized, observational study done on **230 eyes** of 230 patients at a tertiary Institute In Central India, with a total duration of 4 months. Patients underwent MSICS by 3 experienced surgeons & were divided into 2 groups: (A) patients coming in low volume season (summer month) & (B) patients in the high volume season (winter month). BCVA in these 2 groups were compared at 1 month follow up. Independent T test was used for analysis.

Results: In high vs. low volume setting Best Corrected Visual Acuity ($p=0.06$) was not statistically significant at 1 month follow up. **Conclusions:** Gauged in Visual Acuity parameters, High Volume MSICS does not affect the quality when compared

with Low Volume MSICS Surgery over a 30-days period in a tertiary institute in Central India.

Keywords: high volume cataract surgery, low volume cataract surgery, visual acuity, manual SICS

Received: 08.08.17 | Accepted: 23.08.17

Corresponding Author

Dr. Atif Anwar, Assistant Professor, Department of Jarahat, Faculty of Unani Medicine, AMU, Aligarh, UP, India

How to cite this article: Anwar A, Maniar RH, Mushfiq S. The Impact of Volume on Cataract Surgery Visual Outcome. Int Arch BioMed Clin Res. 2017;3(3):52-55. DOI:10.21276/iabcr.2017.3.3.14

Source of Support: Nil, **Conflict of Interest:** None

Copyright: © the author(s) and publisher. IABCR is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882. This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited


INTRODUCTION

Cataract has been one of the leading causes of preventable blindness all over the globe.^[1] The current levels^[2] of cataract surgery are around 2.7 million cases per year, and this is far below what needs to be done to clear the backlog and also tackle the incidence.^[3]

During the 1960s, surveys revealed the formidable scale of 'over-burden' of blindness due to cataract (40% of blindness)^[4] in the Indian sub-continent. In 1969 the 'Royal Commonwealth Society for the Blind' launched the 'Eyes of India' campaign to help organize large treatment projects, such as eye camps for cataract and to identify the major causes of rural blindness in India. The 1972-73 Indian Council of Medical Research (ICMR) survey established that 9 million people were blind in India of which 5.5 million were due to mature cataracts alone.^[4] A scientifically

planned National Programme for the Control of Blindness (NPCB) was initiated in 1976 by Prof. L.P. Agarwal, R.P. Centre for Ophthalmic Sciences, New Delhi. The Government of India was fully committed to the programme and prevention of blindness received priority in the 20 point programme.^[4]

Many institutes took up this challenge by devising high volume "conveyer belt" surgical techniques which varied with different settings. From the 2001 census of Tamil Nadu we get to know that cataract surgeries done by Government hospitals were about 7.17 % only, while 10.16 % were done in eye camps, 7.86 % in private clinics and the rest (74.82%) by non-profit organizations (NGOs like Aravind Eye Hospital).^[5] A somewhat similar scenario has been seen in other states as well. Sadguru Netra Chikitsalaya in Chitrakoot, MP, India, is one such leading example in Central India.^[5,6] With the advent of Manual SICS (MSICS), the quality of visual outcome improved and, as it required lesser time and was cheaper.^[7-9] Therefore, many surgeons preferred it over older techniques of cataract surgery. The

Access this article online	
Website: www.iabcr.org	Quick Response code 
DOI: 10.21276/iabcr.2017.3.3.14	

definition of high volume cataract surgery is variable, changing in relation to the locality and the individual standards set by each care provider.^[10-12]

This research takes into account the Visual quality outcome in a high volume manual small incision cataract surgery set-up and compares it to the same in a low volume one.

METHODS

The present study was a randomized, prospective, observational, comparative study conducted at a tertiary centre in Central India, on 230 eyes of 230 patients. The study duration was 4 months in which 2 consecutive months sets – one month of operating period (August 2010 - low volume month and December 2010 - high volume month) and one month of follow up period of the operated cases (low volume- September 2010 and high volume-January 2011 respectively) was taken for data collection. All the patients who had come on their own or through screening camps & opted the surgery of their choice (MSICS) after counselling. All patients without any complications affecting vision or those not fulfilling the exclusion criteria were taken up for surgery by the surgeons chosen for the study. This was done only after taking proper consent on a printed consent form. There were three experienced MSICS surgeons (who have performed more than 5000 MSICS surgeries each) chosen for the study purpose. Only those ophthalmic surgeons having sufficient surgical experience of operating in high volume conditions were recruited for the study. There was a provision for a break after about 2 hours of continuous surgery. This was however, not mandatory. Patients above the Sample size were taken to avoid skew due to attrition. Operation was done under proper standard protocol. Both pre-op and post-op standard protocols were followed and vision was noted both pre-operatively and post-operatively at 1 month. Independent T test was then used to calculate the results.

RESULTS

230 patients had undergone SICS, 115 each in the month of August (low volume month) & December (high volume month). The period of study was four months. The Mean age (August) was 61.70 ± 9.98 years and Mean age (December) was 61.68 ± 9.40 years.

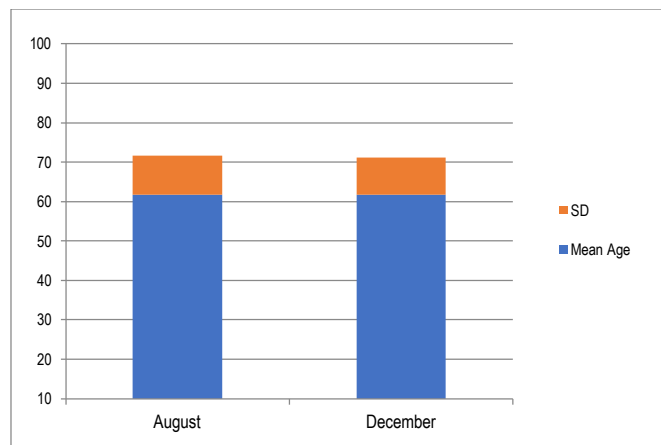


Chart 1: The Mean age distribution in high volume and low volume month.

Manual SICS & VISUAL ACUITY PARAMETERS

The various visual parameters in Manual SICS for the month of August and December are as follows.

Table 1: 1 month post-operative best corrected visual acuity (August)

1month Post – op. BCVA(August)	Number of cases	Percentage (%)
6/6	27	60.00
6/9	7	15.55
6/12	9	20.00
6/18	2	4.45
6/24	0	0
6/36	0	0
>6/60	0	0
Total	45	100

The above table gives the number and the percentages of the visual acuity in as taken by Snellen’s chart and then converted to LogMAR values. Of the total of 45 patients that followed up at 1 month, 6/6 visual acuity is present in 27(60.00%) cases; 6/9 in 7(15.55%) cases; 6/12 in 9(20.00%) cases and 6/18 in 2(4.45%) cases. Here it is evident that 100% of cases have a visual acuity of 6/18 or better.

Table 2: 1 month post-operative best corrected visual acuity (December)

1month Post – op. BCVA(December)	Number of cases	Percentage (%)
6/6	20	38.46
6/9	20	38.46
6/12	6	11.55
6/18	3	5.77
6/24	1	1.92
6/36	1	1.92
≥6/60	1	1.92
Total	52	100

Similarly, the above table gives the number and the percentages of the visual acuity in as taken by Snellen’s chart and then converted to LogMAR values. Of the total of 52 patients that followed up at 1 month, 6/6 visual acuity is present in 20(38.46%) cases; 6/9 in 20(38.46%) cases; 6/12 in 6(11.55%) cases; 6/18 in 3(5.77%) cases; 6/24 in 1(1.92%) case; 6/36 in 1(1.92%)case and 6/60 in 1(1.92%)case. Here it is evident that 94.24% of cases have a visual acuity of 6/18 or better.

Also 75.55% and 76.92% showed 6/9 or better BCVA at 1month in patients in the low and high volume settings respectively.

Of the 115 patients operated in August the pre-operative & first day post-operative uncorrected visual acuity (UCVA) was recorded and their mean calculated. At one month uncorrected visual acuity (UCVA) and best corrected visual

acuity (BCVA) were recorded and mean calculated, for those patients who had followed up at 1 month.

Table 3: Mean Pre-operative uncorrected visual acuity

VA Parameters	August		December	
	Mean/SD	No.	Mean/SD	No.
Pre-op. UCVA mean	1.55 ± 0.46	115	1.65 ± 0.39	115
1 st day Post-op. UCVA	0.60 ± 0.38	115	0.71 ± 0.34	114
1 st month UCVA	0.55 ± 0.31	45	0.58 ± 0.31	52
1 st month post-op. BCVA	0.11 ± 0.15	45	0.19 ± 0.21	52
Pre-op. UCVA (with 1 mth follow up)	0.55 ± 0.31	45	1.65 ± 0.38	52

Table 4: BCVA Comparison with other studies in MSIC surgeries

Other Studies	SICS Post – op. BCVA(> 6/18)	SICS Post – op. BCVA(> 6/9)
Trivedy J ¹³	81.8%	NA
Venkatesh R et al ^{*14}	98.2%	NA
R Venkatesh et al ¹⁵	94.4%	NA
Ruit S et al ¹⁶	98.0%	NA
Gogate PM et al ¹⁷	98.4%	NA
Present study Low volume	100%	75.55%
High volume	94.24%	76.92%

The results of visual outcome show us that volume of surgical cases does not have an effect on the visual outcomes.

The statistical significance was as follows:

a) For August:

When comparing Pre-op UCVA with 1st day post-op UCVA, the p value (95% CI) was <0.0001 which was found to be statistically significant as calculated by Independent student t-test.

When comparing Pre-op UCVA (with 1 month follow up) with 1 month post-op BCVA, the p value (95% CI) was <0.0001 which was also found to be statistically significant as calculated by Independent Paired student t-test.

b) For December: When comparing the Pre-op UCVA with 1st day post-op UCVA, the p value (95% CI) was <0.0001 which was found to be statistically significant as calculated by Independent Paired student t-test.

When comparing Pre-op UCVA (with 1 month follow up) with 1 month post-op BCVA, the p value(95% CI) was <0.0001 which was found to be statistically significant as calculated by Independent paired student t-test.

c) For August Vs. December

On analysing with Independent t- test, the p value (95% CI) the comparison of Post-operative BCVA between the 2 months (August & December), was 0.06, which was not statistically significant.

DISCUSSION

Studies conducted for manual SICS, such as reported by Trivedy J^[13] showed 81.8% patients with a BCVA of 6/18 or better. At 6 weeks, the BCVA of 6/18 or better in 98.2% cases(P = 0.59) was reported by Venkatesh R et al.^{*[14]} Also R Venkatesh et al^[15] reported a BCVA of 6/18 or better in 94.4% cases in another study at 40 days post-operative period. Study by Ruit S et al^[16] reported 98.0% cases with a BCVA of equal to or better than 6/18 at 6 months follow up. Gogate PM et al^[17] also reported similar results (98.4%) in their clinical trial. Zawar SV et al.^[18] also showed similar results.

In our study when a comparison was made between the post-operative BCVA at 1 month between the high & low volume month the p-value (with 95% confidence interval) was not significant (Independent t-test; p= 0.056).

CONCLUSION

High Volume Cataract Surgery Output (greater than 40 MSICS surgeries per day per surgeon) does not affect the quality as gauged in terms of Visual acuity parameters at one month follow-up when compared with Low Volume Cataract Surgery Output (15 or less MSICS surgeries per day per surgeon) in a tertiary hospital scenario in Central India, over a 30-days period.

ACKNOWLEDGEMENTS

First of all I would like to thank all those people who have been with me in my darkest hours of life, especially my mother & wife. What all has been possible is due to the patience and love and hard work shown by my teacher and mentor Dr R H Maniar in building me as a whole. I am really indebted to Dr Sunil Moreker Sir for having me as his student and subordinate. I thank the Sadguru family for having made me into a professional imparting me the required skills that has been of utmost importance throughout. Finally I would especially thank Dr Suraj Bhagde for his relentless efforts in shaping this study.

REFERENCES

1. Thyelfors B, Négrel AD, Pararajasegaram R, Dadzie KY. Global data on blindness; Bull World Health Organ. 1995;73(1):115-21.
2. National Programme for Control of Blindness, India - A report, p.34-36.
3. R.D.Thulasiraj, R.Priya and S. Saravanan , Lions Aravind Institute of Community Ophthalmology, High Volume, High Quality Cataract Surgery; Indian Journal of Community Health, Special issue on Community Eye Health; July - December 1997. Volume 3(No.2).
4. Sir John Wilson; Clearing the cataract backlog; From IMPACT: An International Initiative against Avoidable Disablement; British Journal of Ophthalmology, 1987, 71, 158-160.
5. "Achievements under Cataract Blindness Control Project: 1994-2002", NPCB-India, Quarterly Newsletter of National Programme for Control of Blindness & Vision 2020: The Right to Sight Initiative", 1 (2), July-September 2002.
6. Integrated hospital Management System software, SNC, chitrakoot, 2010; accessed on 30 July 2011.
7. Gogate P, Deshpande M, Wormald R, Deshpande R, Kulkarni S. Extra capsular cataract surgery compared with manual small incision cataract surgery in community eye care setting in western India: A randomized control trial. *Br J Ophthalmol.* 2003; 87:667-72.

8. Gogate P, Deshpande M, Wormald R. Is manual small incision cataract surgery affordable to developing countries? A cost comparison with extra capsular cataract extraction. *Br J Ophthalmol*. 2003;87:843–6
9. Gogate P, Deshpande M, Nirmalan P. Why do Phacoemulsification? Manual small incision cataract surgery is almost as effective and more economical. *Ophthalmology*. 2007; 114:965–8.
10. D Yorston; High-volume surgery in developing countries; *Eye* (2005) 19, 1083–1089.
11. M Habib, K Mandal, C V Bunce, and S G Fraser; The relation of volume with outcome in Phacoemulsification surgery; *Br J Ophthalmol*. 2004 May; 88(5): 643–646.
12. Schein OD, Steinberg EP, Javitt JC, et al. Variation in cataract surgery practice and clinical outcomes. *Ophthalmology* 1994;101:1142–52.
13. Trivedy J. Outcomes of high volume cataract surgery. *Nepal J Ophthalmol* 2011; 3 (5): 31-38.
14. Venkatesh R, Tan CS, Sengupta S, Ravindran RD, Krishnan KT, Chang DF. Phacoemulsification versus manual small-incision cataract surgery for white cataract. *J Cataract Refract Surg*. 2010 Nov;36(11):1849-54.
15. R Venkatesh, R Muralikrishnan, Linda Civerchia Balent, S Karthik Prakash, N Venkatesh Prajna; Outcomes of high volume cataract surgeries in a developing country; *Br J Ophthalmol* 2005;89:1079–1083.
16. Sanduk Ruit, Geoffrey Tabin, David Chan; A Prospective Randomized Clinical Trial of Phacoemulsification vs Manual Sutureless Small-Incision Extracapsular Cataract Surgery in Nepal; *Am J Ophthalmol* 2007;143:32–38
17. Gogate PM, Kulkarni SR, Krishnaiah S, Deshpande RD, Joshi SA, Palimkar A, Deshpande MD; Safety and efficacy of phacoemulsification compared with manual small-incision cataract surgery by a randomized controlled clinical trial: six-week results. *Ophthalmology*. 2005 May;112(5):869-874.
18. Zavar SV, Gogate P; Safety and efficacy of temporal manual small incision cataract surgery in India. *Eur J Ophthalmol*. 2011 Apr 5. ; 6521.

