Original Research Article

Study of Outcome of High Volume Manual SICS and Complications in Garhwal Himalayan Region

Cataract, a leading cause of global preventable blindness, has prevalence (based on Indian definition) of over 12 million people in India and incidence (based on WHO definition) is around 3.8 million new cases per year.[1,2,3] The current levels 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. The advent of Manual SICS (MSICS) gave improved visual outcome, being cheaper and requiring lesser time.[4-8] Phacoemulsification was too expensive an affair and took more time than MSICS.[9-12] This shift was the genesis of the concept of 'high volume with high quality' in cataract surgery. The definition of high volume cataract surgery is variable.[13-15] But more important than the absolute daily volume of cataract surgeries done, is the number of cases operated per hour as increased CSR caused more complications.A skillful surgeon operating quickly, not only reduces the backlog, but also minimizes surgical handling thereby reducing inflammation and improving outcomes.

Aim of the Study

To compare High Volume with Low Volume Cataract Surgery Outcomes in a tertiary eye care hospital in Garhwal Himalayan Region, over a 30-day period, in terms of Quality as gauged in terms of Intra-operative complications and their management and Post-operative complications and their management (on day 1 and day 30).

Materials and Methods

A prospective, randomized, observational study conducted on 300 eyes of 300 patients at a tertiary hospital Garhwal Region, with a total duration of 4 months was taken for

data collection. Patients were divided into 2 groups: A) those coming in the low volume season (summer months) and B) those coming in the high volume season (winter months). Normal standard protocols were followed pre/per/post operatively. Outcomes in these 2 groups were compared in terms of the above mentioned parameters after dividing the complications into sub groups: mild; moderate and severe (based on severity and morbidity).

Exclusion Criteria

i) Cataract surgery combined with any other procedure / type of surgery in the same sitting.
ii) All "Guarded Visual Prognosis "cases
iii) All patients with diabetes or any other systemic disease that would directly affect the surgical outcome.

Independent T test was used for analyzing the data.

Results

This study had a total of 300 patients enrolled in the study, 150 each were present in the month of August (low volume month) and December (high volume month).

Of the 150 patients operated in one of the low volume month, intra- operative complication was found in 12(10.43%). Premature entry was seen in 1 case (0.87%). Peripheral DM Detachment occurred in 1 case (0.87%), Capsulorrhexis extension in 6 case (5.22%) and posterior capsular rupture with vitreous loss in 4 cases (3.48%).

Table 1 –Intra Op Complications and management

MSICS Group				
Intra op Complications	August	Secondary Interventions	December	Difference

	No %		No. %	Secondary interventions
Morbidity causing complications				
Hyphema	0	0	0	0
Iridodialysis	0	0	0	0
Total no of complications	0	0	0	0
Total patients complicated	150		150	

Similarly, of the 150 patients operated in the high volume month (December), intra-operative complication was found in 12 cases (10.43%). Premature entry was seen in 4 cases (3.48%). DM Detachment was present in 1 cases (0.87%), Iris chaffing was present in 3 cases (2.61%), Capsulorrhexis extension was present in 1 case (0.87%), PCR with vitreous loss was present in 2 case (1.74%) and zonular dialysis was seen in 1 case (0.87%).

Table 2: 1st day Post-operative Complications and Management

MSICS GROuP							
1st day post-op.	**August**			**December**		**Difference**	
Complications	**No.**	**%**	**Secondary Intervention**	**No.**	**% Secondary Intervention**		
TEMPORARy MORBIDITy CAuSING COMPlICATIONS							
Wound gape/leak	0	0		2	1.75	Sutures at tunnel	2
Striate Keratopathy	5	4.35	Conservative	8	7.02	Conservative	3
Corneal oedema	10	8.70	Conservative	10	8.77	Conservative	0
Retained lens/Cortical Matter	4	3.48	Conservative	1 3	0.88	Conservative	-

Significant AC cells (>+3)	0	0		17	14.91 17	Conservative	
Significant AC flare(>+2)	0	0		2	1.75	Conservative	2
Shallow AC depth (< ¼;VH grading)	0	0		1	0.88	AC formation	1
Fibrin membrane/ fibrin strand	1	0. 87		0	0	0	
Diffuse Hyphaema	5	4.35	Conservative	5	11.90	Conservative	
Total no. of Complications	25	21.74		46	40.35		
Total No. of Patients	150			150			

74
75
76
77
78
79

Table 3: 1st day Post-operative Complications and Management

MSICS GROuP						
1st day post-op. August				**December**		**Difference**
Complications	**No.**	**%**	**Secondary Intervention**	**No.**	**% Secondary Intervention**	
POTENTIA▌ly VISION THREATENING COMP▌ICATIONS						
Vitreous in AC	1	0.87	AV	0	0	0
Severe Iritis	1	0.87	Conservative	1	0.880	Conservative
IOL drop	0	0		0	0	0
RD/Vh	0	0		0	0	0
Total no. of	2	1.74		1	0.88	

Complications			
Total no. Patients	115		114
Total Patients with Complications	25	21.74	43 37.72

80
81
82
83
84

Table 4: Month Post-Operative Complications and Management

MSICS GROuP						
1 month	**August**			**December**		**Difference**
Post-operative Complications	**No.**	**%**	**Secondary Intervention**	**No.**	**%**	**Secondary Intervention**
MINOR COMPLICATIONS						
Persisting DM Detachment (peripheral)	0	0		0	0	0
Slightly Decentred IOL	1	2.22	No intervention	0	0	-1
Total no. of Complications	1	2.22		0	0	
Total No. of Patients	45			52		

85
86
87
88
89

Table 5: Month Post-Operative Complications and Management

MSICS GROuP						
1 month	August			December		Difference
Post-operative Complications	No.	%	Secondary Intervention	No.	%	Secondary Intervention
TEMPORARy MORBIDITy CAuSING COMPlICATIONS						
wound gape/ leakage	0	0		0	0	0
Diffuse Hyphaema	0	0		0	0	0
Total no. of Complications	0	0		0	0	
Total No. of Patients	45			52		

90
91
92

Table 6: 1 Month Post-Operative Complications and Management

MSICS GROuP						
August			December		Difference	
Post-operative Complications	No.	%	Secondary Intervention	No.	%	Secondary Intervention
POTENTIAlly VISION THREATENING COMPlICATIONS						
Uveitis	0	0		0	0	0
Vitreous in AC	0	0		0	0	0
Corneal decom-pensation/ bullous keratopathy	0	0		0	0	0
IOL drop	0	0		0	0	0
RD/CME/Vh	0	0		0	0	0
Late –onset Endophthalmitis	0	0		1	1.921	IV antibiotics

Any other (DM With CO)	0	0	1	1.92	Conservative Loss 1
Total no. of Complications	0	0	2	3.84	
Total patients	45		52		
Total Patients with Complications	1	2.22	2	3.84	

DISCUSSION

The present study showed total complications at 1 month post-operative period met were 2.22% (1/45) and 3.84% (2/52) in the low and high volume month respectively.

Parikshit Gogate *et. al.* compared, in 200 patients, complications by 4 surgeons equally proficient in both MSICS and Phacoemulsification. The table below compares their various findings with that of our study:

Schein *et. al.* and other studies too mentioned little effect of surgical technique and volume of cases.(21-24)

Ruit *et. al.* reported 2.9% surgical complications at 2 months. Also Chaim M. Bell *et. al.* and Jacobs PM mentioned lesser complications with larger number of surgeries in a day while Ninn-Pedersen K *et. al.*mentioned otherwise (*i.e.*, a 2.9-fold greater risk in low-volume surgeons).

In our study in the high volume settings, we had a solitary case of late onset post-operative endophthalmitis.(25-28)

The present study shows a higher percentage of endophthalmitis in our high volume setting as compared to other similar settings in India also. This may be due to the reason that in the present study the sample size is small compared to other studies which were basically designed to study endophthalmitis incidence.

Also there may be an attrition bias as the records of our hospital show a 0.3%- 0.5% of endophthalmitis rate.

Also this study was done as an 'intention to treat' analysis and therefore the incidence of endophthalmitis cannot be represented by this study which is just comparison of high volume and low volume month complications.

In the present study, the complication rates are either comparable or lower(with the exception of the sole endophthalmitis case in the manual SICS group), than other studies- in both the surgical groups.

Also different studies showed that the various complications did not have a specific pattern. They also showed that individual complications were independent of the surgical volume difference and seemed to be more dependent on each surgeon's skill and technique.
On further analyzing the present study it was seen that outcomes of complications did not have a statistical difference (both Phaco group and MSICS) by change in volume of surgeries performed as some complications occurred more in low volume setting while others in high volume settings.

CONCLUSION

As gauged in terms of intra-operative, post-operative complications on 1st day and at one month follow up, High Volume Cataract Surgery (greater than 40 MSICS surgeries) does not affect the quality when compared with Low Volume Cataract Surgery over a 30-days period in a tertiary institute in Central India.

REFERENCES

1. Thylefors B, Négrel AD, Pararajasegaram R, Dadzie KY. Global data on blindness. *Bull World Health Organ.* 1995;73:115-21.
2. Available data on blindness (update 1987). World Health Organisation's Programme for the Prevention of Blindness, WHO/PBL/87.14.
3. Minassian DC, Mehra V, "3.8 Million blinded by cataract each year: Projections from the first epidemiological study of incidence of cataract blindness in India". *British Journal of Ophthalmology* 1990;74:341-3.
4. National Programme for Control of Blindness, India - A report, p.34-36.
5. 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).

6. Sir John Wilson; Clearing the cataract backlog; From IMPACT: An International Initiative against Avoidable Disablement. *British Journal of Ophthalmology.* 1987;71:158-60.

7. Fernandez ST. Cataract blindness and manpower planning. *Indian J Ophthalmol* 1988;36:107-8.
8. "Achievements under Cataract Blindness Control Project: 1994-2002", NPCBIndia, Quarterly Newsletter of National Programme for Control of Blindness and Vision 2020: The Right to Sight Initiative", 1 (2), July-September 2002.
9. Prajna NV, Chandrakanth KS, Kim R, Narendran V, Selvakumar S, Rohini G, *et. al*. The Madurai Intraocular Lens Study.2: Clinical outcomes. *Am J Ophthalm.* 1998;125:14–25.
10. Minassian DC, Rosen P, Dart JK, Reidy A, Desai P, Sidhu M. Extracapsular cataract extraction compared with small incision surgery by phacoemulcification: A randomised trial. *Br J Ophthalmology.* 2001;85:822–9.
11. 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.
12. 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.
13. 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.
14. Ruit S, Tabin G, Chang D, Bajracharya L, Kline DC, Richheimer R, *et. al*. A prospective randomized clinical trial of Phacoemulsification vs. manual sutureless small-incision extra capsular cataract surgery in Nepal. *Am J Ophthalmol.* 2007;143:32–8.
15. Balent LC, Narendrum K, Patel S, Kar S, Patterson DA. High volume Sutureless Intraocular lens surgery in a rural eye camp in India; Ophthalmic Surg. Lasers. 2001 Nov-Dec; 32(6):446-55.
16. Zawar SV, Gogate P; Safety and efficacy of temporal manual small incision cataract surgery in India. *Eur J Ophthalmol.* 2011;Apr 5:6521.
17. Fletcher A, Vijaykumar V, Selvaraj S, Thulasiraj RD, Ellwein LB. The Madurai Intraocular Lens Study.3: Visual functioning and quality of life outcomes. *Am J Ophthalmol.* 1998;125:26–35.
18. G Natchiar, RD Thulasiraj, and R Meenakshi Sundaram; Cataract surgery at Aravind Eye Hospitals: 1988–2008. *Community Eye Health* 2008;21:40–2.
19. Natchiar G, Robin AL, Thulasiraj RD, Krishnaswamy S Attacking the backlog of India's curable blind. The Aravind Eye Hospital model. *Arch Ophthalmol*. 1994;112:987-93.
20. D Yorston;High-volume surgery in developing countries; *Eye* 2005;19:1083–9.
21. M Habib, K Mandal, C V Bunce, and S G Fraser; The relation of volume with outcome in Phacoemulsification surgery; *Br J Ophthalmol.* 2004;88:643–6.

22. Schein OD, Steinberg EP, Javitt JC, *et. al*. Variation in cataract surgery practice and clinical outcomes. *Ophthalmology* 1994;101:1142–52.

23. Chandra Kumar,Chris Dodds,Gary Fanning, Editors. Hill Jerry, Stancel Gina, Authors; High Volume Cataract Surgery; User Review of ophthalmic anaesthesia, Swets and Zeitlinger Publishers.Available from: http://www.worldcat.org/title/ophthalmic-anaesthesia/oclc/50428990/viewport.
24. Fujishima H, Toda I, Yagi Y, Tsubota K. Quantitative evaluation of postsurgical inflammation by infrared radiation thermometer and laser flare-cell meter. *J Cataract Refractive Surg.* 1994;20:451-4.
25. Mueller-Jensen K, Rorig M, Hagele J, Zimmermann H. Effect of cataract technique and duration of surgery on fibrin reaction after IOL implantation. *Ophthalmologe* 1997;94:38-40.
26. Allen Foster. Cataract and "Vision 2020—the right to sight" Initiative. *Br J Ophthalmol* 2001;85:635–9.
27. Murthy GVS *et. al.* National survey on blindness and visual outcomes after cataract surgery (2001–2002): report. National Programme for Control of Blindness, Ministry of Health and Family Welfare, Government of India, New Delhi, 2003.
28. Venkata G, Murthy S, Gupta SK *et. al*. Current estimates of blindness in India. *Br J Ophthalmol* 2005;89:257–60.
29. 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;143:32–8.
30. Trivedy J. Outcomes of high volume cataract surgery. *Nepal J Ophthalmol* 2011;3:31-8.