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COMPARATIVE EVALUATION OF MACULAR THICKNESS AFTER PHACOEMULSIFICATION VERSUS MANUAL SICS IN DIABETIC PATIENTS BY OPTICAL COHERENCE TOMOGRAPHY

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Abstract

Purpose: The main purpose of this study was to compare the macular thickness after uncomplicated Phacoemulsification versus manual SICS in known diabetic patient by OCT.

Methods: This study was prospective observational study involving 50 eyes of 50 patients with each arm having 25 patients. Group 1 was operated with Phacoemulsification with foldable IOL through 2.2 mm incision & group 2 were operated with manual SICS through 5.5 to 6.5 mm incision with PMMA IOL implantation. Macular OCT was performed in all patients during preoperative period & day 7 post op, 1st month, 3rd month & 6th month. The data were analyzed by using SPSS software (version22.0 SPSS Inc).

Results: The MCFT rose steadily in both group during post operative period with higher rise noted in SICS group throughout follow up. Significant difference in MCFT between Phaco & SICS group were noted with highest MCFT noted in 1st month follow up in both groups i.e. 231.6 micro m (SD+7.831) in Phaco group & 241.08 (SD+7.35) in SICS group. The MCFT returned to near pre OP value by 6th month.

Conclusion: 1 Age & Sex has no effect on macular thickness before and after any type of Cataract surgery be it Phaco or SICS.

2 Significant higher macular thickness was observed in SICS group so caution should be taken in SICS patients.

Keywords: Phacoemulsification, small incision cataract surgery (SICS), Cystoid macular edema

Introduction

Cataract is the most common form of ocular surgery. But its true long term effects on retinal functions are not yet fully understood. These retinal changes may be the result of remaining subclinical inflammation or may simply indicate poor recovery of eyes with aging retinal vasculature. In any case, the alterations need further investigation with the goal of developing improved therapies to prevent long term consequences.

In recent years, the evolution of the cataract operation has involved a progressive decrease in size of the incision for the extraction of the degenerated crystalline lens. The reduction of incision size has resulted in greater safety of surgical procedure, with more rapid rehabilitation of the patient in the postoperative period. Manual SICS is another variant of cataract surgery requiring less investment, but technically giving equivalent results.

One of the common causes of decrease in Visual acuity in post operative period is cystoids macular edema (CME). Progressive decrease in size of the incision for the extraction of opacified lens along with minimum handling of tissues leads to improved surgical outcome with decrease incidence of CME.

In skilled hands occurrence of Angiographic CME is approximately up to 20 - 30 % after convential extra-capsular cataract surgery (ECCE), 19 % after Phacoemulsification but angiographic CME does not necessarily reduce the visual acuity. [1] Studies have reported that the occurrence of CME varies between 1.5 to 2.3 % for Phaco.[2] There are many recognized and suspected risk factors for the development of CME, like diabetes mellitus, iris trauma, and posterior capsular tear etc. There are also many proposed mechanisms for the development of post cataract surgery CME but the most accepted mechanism appears to be prostaglandin induced edema i.e. increased prostaglandin production due to anterior segment inflammation.

OCT is the new technology which quantifies the thickness of retina & can differentiate between eyes with & without macular edema in real time. Various literatures are available comparing CME in Phacoemulsification and manual SICS. However there are very little data available comparing changes in above two groups of patient who are also suffering from diabetes mellitus.

Aims & objective

1. Evaluation of macular thickness in diabetic patients by Optical coherence tomography in uncomplicated Phacoemulsification & SICS
2. Comparison of both groups to identify any significant difference.

Material and methods:

This study is prospective observational study conducted at Regional institute of Ophthalmology, Patna. Institutional ethics committee permission and departmental research committee permission was obtained prior to study. All patients who fulfilled the inclusion and exclusion criteria of study were included. The patients were operated by single surgeon BPS between March 2018 and December 2019. The case history was obtained, and analysis was performed. After evaluation of criteria and analysis of case history 50 cases performed were included in this study. Only one eye of each patient was only included in the study.

- Group 1: Cases in which uncomplicated Phacoemulsification was performed through 2.2mm incision under topical anesthesia
- Group 2: Cases with manual SICS performed through 5.5- 6.5 mm Sclero corneal tunnel under peribulbar block

A total of 50 cases were enrolled with 25 each in both groups.

Inclusion criteria:

- All patients with media clear enough to allow OCT macula in preoperative period
- Patients with uneventful intraoperative and postoperative phase.

Exclusion criteria:

- Patient in whom there was any change in macula was present.
- Patients with any maculopathy or history of injection of anti Vegf.
- Complicated intraoperative phase or post-operative inflammations

All patients were evaluated in preoperative phase for complete anterior segment and posterior segment on slit lamp bio microscopy and indirect ophthalmoscope. IOP was measured with applanation tonometer. All patients were taken for OCT (macula) on model: 3D Maestro make: Topcon as per our protocol in preoperative phase and postoperative phase on day 7^{th},1^{st} month ,3^{rd} month & 6^{th} month.

All patients were prescribed standard treatment regime consisting of Tab. Ciprofloxacin 500mg BID for 3 days. Moxifloxacin eye drop QID for 2weeks, Tropicamide (0.8%) with phenylephrine (5%) HS for 7 days, Predinisolone acetate eye drop in tapering dose for one and half month & Nepafenac eye drop (0.1%) TID for one and half month during post operative period.

Observation:

All data was evaluated and entered in Microsoft excel spreadsheet. It was analyzed by using SSPE software (Version 22.0, SSPS inc.).Student's T test was used to analyze the data. P value <0.05 was taken as significant.

Demography

Table 1: Age & Sex distribution of cases in two groups

	Phacoemulsification group	Manual SICS group
No of patients	25	25
Age variation	55-75	50-85
50-59	7	5
60-69	12	12
70-85	6	14
Average age	63.88	62.76
M:F	13:12	9:16

Effect of gender

Table 2: Distribution of MCFT in both sex

Sex	Group	Pre-op	7^{th} day	1^{st} month	3^{rd} month	6^{th} month
		(all values in micron)				
Male	Phaco	205.92	222.30	231.30	210.69	209.38
	SICS	208.11	231.33	244.56	214.76	212.77
Female	Phaco	201.67	220.91	231.91	207.67	206.5
	SICS	204.37	228.93	239.93	213.18	211.87

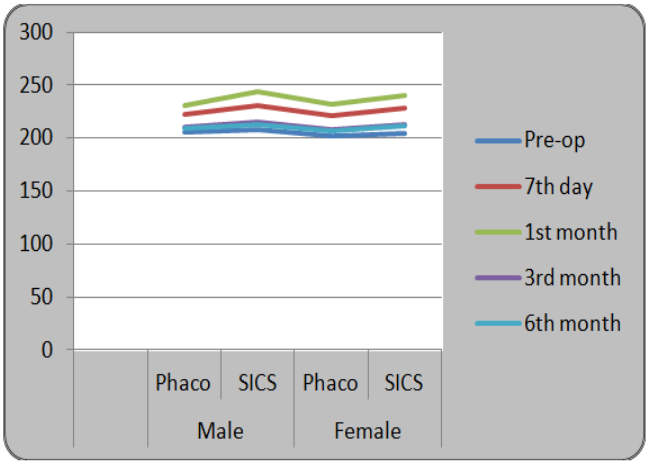

Figure 1: Distribution of MCFT in both sex

When the mean central foveal thickness was compared between two sex there was no significant difference in phacoemulsification group (p value was 0.62, 0.85, 0.35 and 0.41 respectively). In SICS group again there was no significant difference (p value being 0.42,0.11 , 0.51, & 0.69 respectively)

Comparison of MCFT between group 1 & 2.

Table 3: Comparison of MCT in both groups during pre op & post op period

Group	Pre-op	7th day	1st month	3rd month	6th month
Group 1	203.88	221.64	231.6	209.24	208
Group 2	205.72	229.8	241.8	213.76	212.2

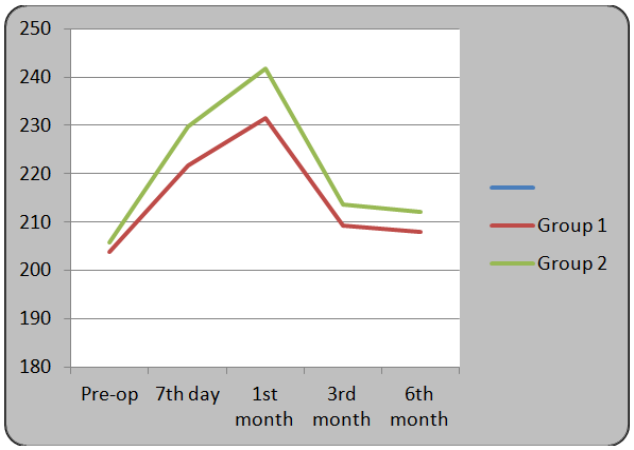

Figure 2: Graphical representation of comparison(MCFT) in both groups

Mean central foveal thickness between the two groups was calculated and statistically analyzed using student's t test. MCFT gradually increased from pre op value till 1st month post-op. in both groups. By the end of 6th month post op the MCFT reverted back to near pre operative value. Highest MCFT in both groups was at 1st month Phaco (231.6, SD 7.83) and

SICS (241.8, SD 7.35). There was no significant difference between MCFT on preoperative day in both groups (p=0.41). However, MCFT was always higher in SICS group during complete 6month period. The p value was 0.001 on 7th day, 0.03 on 3rd month and 0.04 at the end of 6th month respectively.

Discussion

Cataract surgery is one of the safest, most successfully and frequently performed surgery. [3,4]

The technique and results of cataract surgery have changed towards micro, safe surgery with predictable results during last few decades. The two most common surgical modifications which are successful and commonly performed are Phacoemulsification and manual small incision cataract surgery.

A survey of ophthalmic department of medical colleges shows that less than 50% of these institutions are imparting teaching and training in Phacoemulsification to their students. [3] SICS have been performed in many centers in India and Nepal with comparable visual outcome with reduced financial burden. It is significantly faster, less expensive and requires less technology. [5,6,7,8]

There is theoretically greater risk of inflammation in SICS because of larger incision, inadvertent iris trauma and most common cause of unexpected poor vision following SICS is CME which is postulated to be because of prostaglandins. [9,10]

Traditionally fundus fluorescein angiography has been the gold standard for diagnosing CME.[6] With advent of OCT the gold standard of evaluation of CME shifted towards non invasive procedure i.e OCT. This is more sensitive than angiography or clinical examination in detecting even mild CME. [11,12,13] OCT is superior in describing axial distribution of fluid and it achieves good reproductibility.[14]

In our study we enrolled 50 patients. There was no significant effect of age or sex on MFCT.

MCFT rose steadily in both groups during post-operative period. Similar results were reported by Indarnil roy et al [15]. Higher rise was noted in MCFT in SICS group throughout the follow up. Significant difference in MCFT between Phaco and SICS group was noted on 3rd , 7th day, 3rd month and 6 month follow up (p value was 0.002,0.001,0.03,& 0.04 respectively).

Highest MCFT was noted in 1st month follow up in both the groups (Phaco -231.6 ,SD 7.831) & (SICS 241.08 SD 7.35) respectively. The thickness reverted back to its preoperative value by last follow up of study but the values were still significantly higher than preoperative value in SICS group(p< 0.001) where as it was not significantly higher in Phaco group(p 0.07).

Clinically significant macular edema was not found at any point of time in any patient during the study period.

Conclusion:

Based on our study we can conclude by saying that there was no clinically significant effect on macular thickness be it Phaco or SICS when they are uncomplicated. Significant higher macular thickness was observed in SICS group as compared to Phaco group, so we should be more cautious in performing SICS especially in those patients who are at risk of developing CME or who have higher macular thickness in pre operative phase.

References:

1. Wright PL,Wilkinson CP, Balyeat et al. Angiographic cystoid macular edema after posterior chamber lens implantation. Arch Ophthalmlol 1988;106:740-744
2. Stark WK, Maumenee E, Fagadow W et al. Cystoid macular edema in pseudophakia. Surv Ophtalmol 1984; 28:442-451
3. Malik KPS, Goel RR. Manual of small incision cataract surgery.CBS publishers.1st edition 2003
4. Linebarger EJ, Hardten DR, Shah GK et al. Phacoemulsification and modern cataract ,Surv Ophthalmolol.1999;44:123-147

5. Ruit S, Paudayal G, Gurung R et al .An innovation in developing world cataract surgery: suture less extracapsular cataract extraction with intraocular lens implantation. Clin experiment ophthalmolo.2000Aug;28(4):274-9

6. Tabin G, Chen M, Espander L. cataract surgery for the developing world. Current Opin Ophthalmolo.2008jan ;19(1)55-9

7. Gupta Sk, Kumar A, Agrawal S. Cataract surgery under topical anaesthesia using 2% lignocaine jellu and intracameral lignocaine: is manual small incision cataract surgery comparable to clear corneal Phacoemulsification? Indian J Ophthalmolo.2010nov-Dec;58(6)537-40

8. Ruit S ,Tabin G, Chang D .A prospective randomize clinical trial of Phacoemulsification Vs manual sutureless small incision cataract surgery , Nepal.Am J Ophthalmolol 2007;143(1):32-38.

9. Albert DM, Miller JW, .Albert & Jakobiec's Principle And Practice Of Ophthalmology.3rd Edition. Saunders(Elsevier) 2008;1551-1553.

10. Venkateshr, Tan Cs, Singh G . Safety and efficacy of manual small incision cataract surgery for brunescent and black cataract.eye(Lond.) 2009May;23(5):1155-7

11. Miyake K , Ibaraki N, Prostaglandin and cystoid macular Edema Surv Ophthalmolo 47(Suppl 1) :S203-S218,2002

12. Kims J ,Belair Ml,Bressler Nm Et Al. A method of reporting macular edema after cataract surgery using optical coherencetomography.Retina.208;28(6):870-6.

13. Albert DM, Miller JW, Albert & Jakobiec's Principle And Practice Of Ophthalmology.3rd Edition, Saunders(Elsevier) 2008;1551-1553

14. Richard JA, Miles RS, Chauhan DS Et Al. Comparison between optical coherence tomography and fundus fluroscein angiography for the detection of cystoid macular edema in patients with uveitis, Ophthalmology 2000;107:593-599

15. Indranil Roy, Biswas PN,Ghosh S Et Al. Prospective randomized comparative study of macular thickness by OCT following Phacoemulsification & manual SICS;AIOC 2009