National Journal of Medical and Allied Sciences

[ISSN Online: 2319 – 6335, Print: 2393 – 9192|Original article |Open Access]

Website:-www.njmsonline.org

EFFECT OF NEPAFENAC 0.1% ON MACULAR THICKNESS DURING IMMEDIATE POST OPERATIVE PERIOD AFTER PHACOEMULSIFICATION IN PATIENTS WITH LOW RISK FOR CYSTOID MACULAR EDEMA

Feroz Farook[1], Muhemmed Swadique[2], J. Muthiah[3], Rajesh. P[4]

[1]Resident in Ophthalmology, Al Salama Eye Hospital, Perinthalmanna, [2]Professor of Ophthalmology, MES Medical College, Perinthalmanna, [3]Professor of Ophthalmology ,Al Salama Eye Hospital, Perinthalmanna, [4]Senior Consultant , VR services , Al Salama Eye Hospital, Perinthalmanna

ABSTRACT

Introduction: To evaluate the effect of nepafenac 0.1% after routine phacoemulsification in patient at low risk for cystoids macular edema.

Material and methods: This prospective hospital based study consists of 70 eyes of 70 subject with no risk factor for cystoid macular edema who underwent phacoemulsification by an experienced surgeon. All 70 subjects received preoperative nepafenac. 35 subjects received nepafenac post operatively (treatment). SD OCT (Spectral domain optical coherence tomography) and visual acuity measurement were taken pre op and post op (1 week, 1month). Final end point where comparison of macular thickness and visual acuity between two group.

Result: All subjects in this study had excellent visual outcome post cataract extraction. There was small increase in macular thickness in both treatment and control group with no difference in visual acuity between first and second post op visits.

Conclusion: There is an increase in macular thickness measured by OCT in low risk patients after phacoemulsification there was no clinical effect on final visual acuity.

Keywords: Nepafenac, phacoemulsification, OCT, cystoid macular edema

Corresponding Author: Dr Feroz Farook, Al Salama Eye Hospital , ferozfarook@gmail.com

INTRODUCTION

Cystoid macular edema (CMO) although not frequent after the introduction of phacoemulsification, is still a main cause of unfavourable visual outcome after uneventful cataract surgery. Pseudophakic clinically significant CMO is defined differently by various authors. When it is associated with a decrease in visual acuity of 20/40 or worse, it is categorized as clinically significant. The incidence after phacoemulsification is reported to be 0.1–2% in healthy populations[1,2,3,4,5.] The incidence may be as high as 20% when cataract extraction is complicated by posterior capsule rupture withvitreous loss or severe iris trauma. Although the exact pathology of mechanism is not known, the role of surgical trauma with release of prostaglandins and blood retinal barriers disruption is suspected [6,7]. Light toxicity and vitreo-macular traction may also have a role. Nepafenac ophthalmic suspension 0.1% (Nevanac; Alcon Research Ltd, Fort Worth, TX) is a topical NSAID indicated for the treatment of pain and inflammation associated with cataract surgery. The advantages of NSAIDs over corticosteroid include stability of IOP, reduced incidence of secondary infection and benefit of analgesia. The purpose of our study is to evaluate the effect of Nepafenac 0.1% on macular thickness with the help of OCT in patient undergoing phacoemulsification.

MATERIAL AND METHODS

This is a prospective study done in Al Salama eye hospital which is an associate institution of MES Medical College. Institutional ethical committee approval was obtained. Informed consent was obtained in accordance with Helsinki declaration. Seventy patients who met inclusion and exclusion criteria were included in this study. Inclusion criteria were age between 50 -70, non complicated cases without any systemic or ocular disease. Exclusion criteria where age below 50 and above 70 and subject with ocular or systemic diseases that increase risk of CME which include medically treated diabetes mellitus, history of uveitis, use of topical prostaglandin analogue for glaucoma, macular degeneration, retinal vascular disease , prior intraocular surgery or laser , systemic drugs which cause CME and complicated cataract surgeries. Nepafenac group were advised to use it 2 days before surgery, on the day of surgery and to continue for one month. Preoperatively, all patients underwent a thorough ophthalmic examination and review of concurrent medications and medical history. The ophthalmic examination included best-corrected visual acuity (BCVA logmar), slit lamp examination, IOP measurement by Goldman applanation tonometry, and fundus examination. Macular OCT (Stratus OCT, Carl Zeiss Meditec, Dublin, CA, USA) was performed on all patients prior to surgery. The combination of tropicamide 0.8% with phenylephrine 5%, 1 drop every 15 minutes (2 doses) was used as a topical mydriatic in both treatment groups. Additionally, 1 drop of nepafenac was administered every 15 minutes (4 doses) 1 hour prior to surgery in both group. All patients underwent phacoemulsification and IOL implantation inside the capsular bag (Acrysof IQ, Toric or ReSTOR) under topical (1%) anesthesia by an experienced surgeon. Postoperatively, eyes received moxifloxacin 0.5% four times a day for 3 weeks and prednisolone acetate 1% four times a day for 1 month. Nepafenac group were given it to use twice a day. Statistical analysis was done using SPSS 15.0 SAS 9.2,and R environment ver.2.11.1 and Microsoft word and Excel have been used to generate graphs, tables etc**.** Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

Statistical Methods 8-11: Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. The following assumptions on data is made,

Assumptions:

1.Dependent variables should be normally distributed,

2.Samples drawn from the population should be random, Cases of the samples should be independent

Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters.

Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

Significant figures

+ Suggestive significance (P value: $0.05<P<0.10$)

* Moderately significant (P value:$0.01<P \leq 0.05$)

** Strongly significant (P value: $P \leq 0.01$)

Statistical software:

The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS

One eye of each of 70 subjects were enrolled in this study and divided in to two groups (Group 1 using Nepafenac , Group 2 not using Nepafenac). Randomization into two groups was done according to the Patient medical record numbers. Those with even ending number were selected into the Group 1 and rest remaining to the Group 2. All subjects had uncomplicated phacoemulsification with implantation of posterior chamber IOL and completed follow up. There was no adverse effect noted by subjects using Nepafenac. The mean age of the patients in two group were almost similar (61.00 ±4.03) and control (61.74±3.91) p-value 0.437 (Table: 1). Both group had excellent visual acuity following

cataract surgery which was stable in both post operative visits in both groups (0.06±0.09) p-value0.798. (Table: 2).

Table 1: Age distribution of patients

Age in years	With Nepafenac		Without Nepafenac	
	No	%	No	%
51-60	18	51.4	15	42.9
61-70	17	48.6	20	57.1
Total	35	100.0	35	100.0
Mean ± SD	61.00±4.03		61.74±3.91	

Table 2: VA LogMar: A Comparative assessment @ pre-op, post-op1week and Post-op 2nd week (student t test)

OCT	With Nepafenac	Without nepafenac	P value
Pre operative	237.00±14.58	232.43±14.80	0.197
Post op first visit	242.14±14.67	239.14±15.48	0.408
Post op 2nd visit	239.31±14.79	246.37±15.72	0.057+

Table 3: OCT a comparative assessment

VA Log Mar	With Nepafenac	Without Nepafenac	P value
Pre op	0.70±0.17	0.68±0.18	0.684
Post op 1 week	0.06±0.09	0.06±0.09	0.798
Post op 2nd visit	0.06±0.09	0.06±0.09	0.798

Table 4: Increase macular thickness

Variables	With nepafenac	Without nepafenac	P value
Increase macular thickness	5.03±1.87	6.51±2.29	0.004**
Increase macular Thickness second visit	2.46±1.12	14.09±3.52	<0.001**

All eyes had normal pre operative OCT scans. The pre operative OCT measurements, first and second visit central macular thickness were statistically comparable between two groups (p-value-0.197, p 0.408 ,p 0.057)Table 3. OCT analysis of change in macular thickness in Group :1 on first and second visit were 5.03± 1.87 and 2.46±1.2(p value 0.004) and group 2 were 6.51+/-2.29 and 14.09+-3.52 p value 0.001 which shows a statistically significant relation.(Table 4)

DISCUSSION

The detection of CME can be either through clinical examination, angiographic or OCT. Of these 3 techniques OCT has highest sensitivity followed by angiography. After routine phacoemulsification, OCT measured macular thickness increase seems to peek at 4-6 weeks postoperatively. Our estimate of clinically significant increase is 25 μm. Currently no standardized protocol exists for prophylaxis and management of pseudophakic CME because of lack of prospective randomized clinical trials. Topical nonsteroidal anti-inflamatory drugs are frequently used off label in the prophylaxis and treatment of pseudophakic CME. Currently NSAIDs are approved by food and drug administration for post operative inflammation only. Biro et al[12] in a study that measured the foveal and perifoveal thickness of the retina after phacoemulsification found a significant increase edema detected using OCT at postoperative day 7 to 6 months. The initial preoperative average value of 234.1±2.6 μm in the 6.0 mm perifoveal region increased to 242.5±2.6 μm 1 week, to 247.7±4.6 μm 1 month and to 246.0±5.9 μm 2 months after surgery. Binder[11]also conducted a similar study and reported the presence of macular oedema especially prominent in the perifoveal regions, starting from the postoperative seventh day, which continued postoperatively until 6 months. In a randomized clinical trial by Wittpen et al [14] , studied effect of ketorelac 0.4% and prednisolone 1% versus prednisolone acetate alone after uncomplicated cataract surgery in patient with low risk for CME. This study supports the use of preoperative and post operative NSAID to minimize macular edema. The result showed significant increase in OCT macular thickness in steroid group (9.6 μm) v/s ketorelac /steroid group (3.9 μm)at 4 week after surgery.Subjects in both group had excellent final BCVA.There was no difference between the group for BCVA worse than 20/40 or contrast sensitivity. In our study an increase in macular thickness was detected by SD-OCT after surgery starting from post op day 7 and post op one month. It is usually thought that retinal thickness would be increased after cataract surgery due to post op inflammation, especially without using NSAID. This is consistent with our finding that the majority of eyes after cataract surgery

demonstrate at least minimal increases in OCT thickness. A study by Al Meida [15] evaluating the efficacy of prophylactic NSAIDs versus placebo on macular volume one month after phaco in patient with no risk factor for macular edema and no intra ocular complication, the author found no statistically significant difference between 3 study group (p=0.29). This study concluded that in low risk patient prophylatic use of topical ketorelac or nepafenac seems to offer no benefit in preventing OCT changes indicative of macular edema after surgery. However in another previous study by same author AL meida et al comparing placebo in at risk patients with uveitis, diabetes or macular disease ,found that ketorelac significantly decreased macular edema after cataract surgery.The recommendation remains that for at risk patients , prophylactic use of topical NSAIDs is an efficous and safe intervention to minimize post operative macular edema. In our study although there is an increase in macular thickness seen on first post op visit in nepafeaanc group which decreased in second visit and on control group there was an increase in macular thickness from first visit BCVA remain unchanged in both group. Our cut off value for macular edema was 25 µm, which none of our subjects reached. Such results raise the issue of the cost effectiveness of routine administration of CME prophylactic treatment with both corticosteroid and NSAIDs for patients at low risk of CME. However, cost effectiveness ratio is certainly lower in diabetic and uveitic patients who are at higher risk of CME and are reported to benefit from routine concomitant use of NSAIDs and corticosteroids .

CONCLUSION

An important clinical issue after routine phacoemulsification is the effect of increased macular thickness on BCVA. In our study we found that there is an increase in macular thickness measured by OCT in low risk patients after phacoemulsification, there was no clinical effect on final visual acuity on both visits. Such results raise the issue of the cost effectiveness of routine administration of CME prophylactic treatment with both corticosteroid and NSAIDs for patients at low risk of CME. Since ultimate BCVA was excellent in both groups, our study does not support the routine use of postoperative nepafenac .

ACKNOWLEDGEMENT

The authors would like to thank Dr.K.P.Suresh, Scientist (Biostatistics), National Institute of Veterinary Epidemiology and Disease Informatics(NIVEDI), Bangalore for his contributions to the statistical methods and guiding analysis.

REFERENCES

1.Irvine S. A Newly Defined Vitreous Syndrome Following Cataract Surgery. American Journal of Ophthalmology. 1953;36(5):599-619.
2.Ray S, Amico D. Pseudophakic cystoid macular edema. Seminars in Ophthalmology. 2002;17(3-4):167-180.
3.Rossetti L, Chaudhuri J, Dickersin K. Medical prophylaxis and treatment of cystoid macular edema after cataract surgery. Ophthalmology. 1998;105(3):397-405.
4.Mentes J, Erakgun T, Afrashi F, Kerci G. Incidence of Cystoid Macular Edema after Uncomplicated Phacoemulsification. Ophthalmologica. 2003;217(6):408-412.
5.Ursell P, Spalton D, Whitcup S, Nussenblatt R. Cystoid macular edema after phacoemulsification: relationship to blood “aqueous barrier damage and visual acuity. Journal of Cataract & Refractive Surgery. 1999;25(11):1492-1497.
6.Miyake K, Ibaraki N. Prostaglandins and Cystoid Macular Edema. Survey of Ophthalmology. 2002;47:S203-S218.
7.Perente I, Utine C, Ozturker C, Cakir M, Kaya V, Eren H et al. Evaluation of Macular Changes After Uncomplicated Phacoemulsification Surgery by Optical Coherence Tomography. Current Eye Research. 2007; 32(3):241-247.
8.Bernard Rosner (2000), Fundamentals of Biostatistics, 5th Edition, Duxbury, page 80-240.
9.Robert H Riffenburg. Statistics in Medicine. Academic press. 2005; (2):85-125.
10.Sunder Rao PSS, Richard J et al. An Introduction to Biostatistics, A manual for students in health sciences, New Delhi: Prentice hall of India. 2006; (4):86-160.
11.Suresh K.P. and Chandrasekhar S. Sample Size estimation and Power analysis for Clinical research studies. Journal Human Reproduction Science. 2004; 5(1):7-13.

12. Biro Z, Balla Z, Kovacs B. Change of foveal and perifoveal thickness measured by OCT after phacoemulsification and IOL implantation. Eye. 2006;22(1):8-12.
13. Binder SP. OCT detects higher than expected incidence of macular oedema after cataract surgery. Eurotimes 2004;9:1–3
14. Wittpenn J, Silverstein S, Heier J, Kenyon K, Hunkeler J, Earl M. A Randomized, Masked Comparison of Topical Ketorolac 0.4% Plus Steroid vs Steroid Alone in Low-Risk Cataract
15. Al Meida D, Johnson D, Hollands H, Smallman D, Baxter S, Eng K et al. Effect of prophylactic nonsteroidal antiinflammatory drugs on cystoid macular edema assessed using optical coherence tomography quantification of total macular volume after cataract surgery. Journal of Cataract & Refractive Surgery. 2008;34(1):64-69.

Conflicts of Interest: None Funding: None

Citation: Farook F, Swadique M, Muthiah J, Rajesh P. Effect of Nepafenac 0.1% on Macular Thickness During Immediate Post Operative Period after Phacoemulsification in Patients With Low Risk for Cystoid Macular Edema. National Journal of Medical and Allied Sciences 2016; 5(2):20-24