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ORIGINAL ARTICLE

Diagnosis of cystoid macular edema by optical coherence tomography (OCT) after cataract extraction surgery with and without pre-operative use of NSAIDS.

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ABSTRACT… Objective: To compare mean macular thickness after cataract extraction surgery with and without pre-operative NSAIDs. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Ophthalmology, Madinah Teaching Hospital, Faisalabad. **Period:** 21-10-2022 to 20-04-2023. **Methods:** Total 640 patients (320 in each group) were involved in the study. In group-A patients received one drop of NSAID three times a day for one day prior surgery. In group-B, patients not received NSAID. **Results:** Results showed that there was a total 395 males and 245 females. Mean age of the patients was 48.24±5.54 in group A and 47.05±5.20 in group B. Comparison of macular thickness showed that thickness was 215.69±14.20 in group A and 227.99±06.09 in group B. There was a significant difference in macular thickness of two groups (P <0.001). **Conclusion:** In conclusion, preoperative usage of NSAIDs revealed statistically significant (p0.001) and clinically relevant benefits in avoiding macular edoema and preserving visual acuity in patients undergoing cataract surgery as compared to the non-NSAIDs group.

Key words: Cystoid Macular Edema, Cataract Surgery, NSAIDs.

INTRODUCTION

Cystoid macular edoema (CME) is still a significant reason that inhibits full visual recovery after cataract surgery.[1] Surgical trauma, postoperative inflammation, and tractional pressures on the macula have all been proposed as potential causes of CME after cataract surgery.[2] At 4-8 weeks postoperatively, fluorescein angiographic CME can occur in up to 50% of patients, although clinical CME arises in < 3% of cases. Recent research has demonstrated that macular edema, which is not detectable clinically but may be identified by optical coherence tomography (OCT), can be treated.[3]

The underlying illness process determines the primary etiology of CME, however most paths ultimately result in vascular instability and the blood-retinal barrier collapse. Fluid overwhelms the Muller cells in the retina, causing them to lysis.[4] This causes fluid to accumulate in the retina's outer plexiform and inner nuclear layers. Retinal vein blockage and diabetes can cause CME by directly inducing vascular instability. CME produced by uveitis or following cataract surgery, on the other hand, is most likely triggered by cytokines secreted by triggered inflammatory cells. They cause the blood-retinal barrier to break down causing capillary leakage.[5]

The greatest risk of post-cataract extraction CME or Irvine Gas occurs between 6 and 10 weeks after cataract extraction; the incidence rises with surgical problems including as vitreous loss, vitreous to the incision, and iris prolapse.[6] A topical NSAID should be applied both before and after surgery as usual procedure in phaco-emulsification to promote a prompt and full recovery of visual acuity.[4] In a study mean macular thickness was 197.9±26.6 microns in patients who used, NSIADs preoperatively and 203.6±24.8 microns in patients who did not use

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NSIADs preoperatively.[7]

Macular edoema is a significant side effect of cataract surgery. Although using topical NSAIDs to avoid CME following cataract surgery is becoming increasingly popular, the advantages remain unclear due to inconsistent findings, methodological constraints. This study compares the mean macular thickness following surgery for cataract extraction with and without NSAID usage prior to surgery.

METHODS

This Randomized Controlled Trial Was Carried Out in Ophthalmology Department, Madinah Teaching Hospital, Faisalabad from 21-10-2022 to 20-04-2023. Patients with cataract in one or both eyes seen on slit lamp examination, healthy fundus seen on slit lamp bio-microscopy and with relatively clear media to allow OCT seen with the help of distant direct ophthalmoscopy undergoing cataract extraction surgery. Sample size of 640 (320) was calculated by utilizing two ways of the WHO sample size calculator by taking mean macular thickness who used NSAIDs= 197.9±26.6 microns and mean macular thickness in No NSIADs= 203.6±24.8 microns at 80% power of study and level of significance = 5%. Patients with diabetic retinopathy seen on slit lamp bio-microscopy, hypertensive retinopathy seen on slit lamp bio-microscopy, history of trauma and any inflammatory disorder (uveitis) were excluded.

Patients hospitalized through the eye OPD who met the inclusion criteria were included after receiving clearance from the hospital ethical committee approval (UMDC/RERC/2022/060-18-10-22), and informed consent was obtained after explaining the whole procedure to the patient. Before proceeding every patient was underwent optical coherence tomography. Patients were randomized into two groups. In group-A, patients received one drop of NSAIDs three times a day for one day prior to surgery while patients in in group-B do not receive NSAIDs. The whole surgical procedure was performed by the senior consultant of our department. Macular thickness was assessed by using OCT after ten weeks of surgery. Follow-up was done and loss of follow-up was covered by contacting patient their contact number. All the information was recorded on proforma by researcher. SPSS version 25 was utilized to analyze all of the data. Categorical variables such as gender are presented as frequency and percentages and numerical variables such as age and macular thickness are presented as mean and SD. Independent sample t test was applied to compare mean thickness in both groups. P value of < 0.05 was taken significant.

RESULTS

Results showed that there was total 395 males and 245 females. In group A, there were 207 (64.7%) men and 113 (35.3%) women, while in group B, there were 188 (58.7%) men and 132 (41.3%) women. Figure-1 shows that both groups had a greater proportion of men with no statistically significant difference (p 0.122). The patients' mean age was 48.24±5.54 years in group A and 47.05±5.20 years in group B.

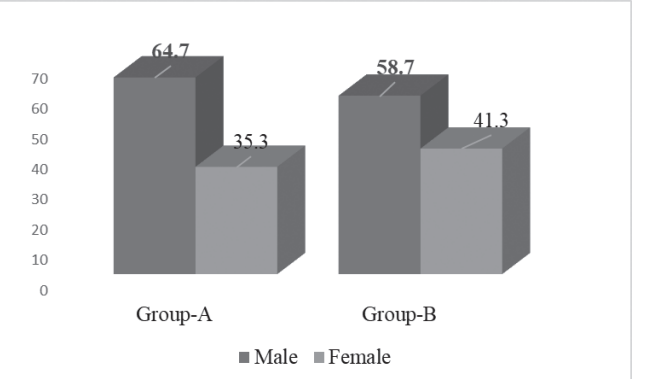

Figure-1. Gender-wise distribution of patients

Comparison of macular thickness showed that thickness was 215.69±14.20 in group A (with NSAIDs) and 227.99±06.09 in group B (with NSAIDs). Table-I indicates that there was a significant variation (P <0.001) in the macular thickness of the two groups.

The data was stratified with respect to age and gender and the results showed that thickness was higher in patients of group-B who have not used NSAIDs as shown in Table-II and III.

Group	Macular thickness (microns)	
	Mean ± S. D	
Group-A (with NSAIDs)	215.69 ± 14.20	
Group-B (without NSAIDs)	227.99	06.09
t value = -14.232, P <0.001		

Table-I. Comparison of macular thickness

Age	Group	Macular Thickness		P-Value
		Mean ± S. D		
40-50	Group-A (with NSAIDs)	215.20 ± 16.18		P<0.001
	Group-B (without NSAIDs)	227.96	06.20	
51-60	Group-A (with NSAIDs)	216.85	7.66	P<0.001
	Group-B (without NSAIDs)	228.08	5.77	

Table-II. Stratification of macular thickness with respect to age

Gender	Group	Macular Thickness		P-Value
		Mean	S. D	
Male	Group-A (with NSAIDs)	216.72	8.76	P<0.001
	Group-B (without NSAIDs)	227.95	6.68	
Female	Group-A (with NSAIDs)	213.80	20.68	P<0.001
	Group-B (without NSAIDs)	228.05	05.17	

Table-III. Stratification of macular thickness with respect to gender

DISCUSSION

CME is an adverse effect of cataract removal and other ocular surgeries and illnesses that can result in temporary or permanent vision loss. Subclinical, angiographic CME occurs in around 20%-30% of simple cataract surgery patients.[8,9] Acute, clinically significant CME has been recorded in 1%-2% of individuals after simple phacoemulsification.[10,11]

Macular edema, which has been documented to occur in up to 2% of individuals, is a prevalent cause of poor visual prognosis following uncomplicated cataract surgery.[12,13] When cataract extraction is exacerbated by posterior capsule rupture with vitreous loss or extensive iris damage, the incidence can reach 20%.[14] Furthermore, it is well established that diabetes individuals, particularly those with pre-existing retinopathies, are more prone to experience macular alterations following cataract surgery than non-diabetic patients.[15] Topical NSAIDs have been shown to be effective in the prevention and/or treatment of CME.[16]

Since corticosteroid and NSAIDs decrease the production of prostaglandin through distinct pathways, combination treatment may have an additive or synergistic impact. Several studies have proven the advantages of combination treatment.[17] It is now well understood that a combination of NSAID and steroid should be started upon clinical CME evidence.[18] Despite the fact that none of the licensed topical NSAIDs possess a specific indication for the treatment or prevention of CME, these medications are widely used off-label.

The most recent topical NSAID to get FDA approval for the management of pain and inflammation following cataract surgery is nepafenac 0.1% (Nevanac®). As the sole topical NSAID with a pro-drug structure, nepafenac is changed into its more potent metabolite, amfenac, by intraocular hydrolases found in vascular ocular tissues, especially the retina and choroid.[12] Case studies have already suggested that nepafenac 0.1% has efficacy against a variety of CME aetiologias.[19]

A research study found that NSAIDs were effective in treating chronic uveitis CME. Warren and Fox revealed that nepafenac 0.1% resolved macular edema in steroid responders.[20] NSAIDs may have prophylactic activity against CME in addition to CME treatment, according to Wolf et al stated that CME patients taking prednisolone demonstrated greater risk of CME as compared with prednisolone + nepafenac 0.1 mg%.[21]

In present study, mean macular thickness in

NSAIDs group was 215.69±14.20 macrons and in non-NSAIDs was 227.99±6.09 ($p<0.001$). Another study on mean CME as 236.91um + 2.53μm in Group A and 243.22um + 15.41μm in group.[4]

CONCLUSION

In conclusion, preoperative usage of NSAIDs revealed statistically significant ($p<0.001$) and clinically relevant benefits in avoiding macular edema and preserving visual acuity in patients undergoing cataract surgery as compared to the non-NSAIDs group.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

1. Yoon DH, Kang DJ, Kim MJ, Kim HK. **New observation of microcystic macular edema as a mild form of cystoid macular lesions after standard phacoemulsification: Prevalence and risk factors.** Medicine. 2018; 97(15):e0355.

2. Altintas AGK, Ilhan C. **Intravitreal dexamethasone implantation in intravitreal bevacizumab treatment-resistant pseudophakic cystoid macular edema.** Korean Journal of Ophthalmology. 2019; 33(3):259-66.

3. Miller KM, Oetting TA, Tweeten JP, Carter K, Lee BS, Lin S, et al. **Cataract in the adult eye preferred practice pattern.** Ophthalmology. 2022; 129(1):P1-P126.

4. Ullah W, Irfan M, Khan SAR, Ghalib A, Khalil ZU. **Role of topical nepafenac in preventing increase in macular thickness after phacoemulsification.** Journal of Postgraduate Medical Institute. 2020; 34(4):253-58.

5. McGhee CN, Zhang J, Patel DV. **A perspective of contemporary cataract surgery: The most common surgical procedure in the world.** Journal of the Royal Society of New Zealand. 2020; 50(2):245-62.

6. Ilveskoski L, Taipale C, Holmström EJ, Tuuminen R. **Macular edema after cataract surgery in eyes with and without pseudoexfoliation syndrome.** European Journal of Ophthalmology. 2019; 29(5):504-9.

7. Singh R, Alpern L, Jaffe GJ, Lehmann RP, Lim J, Reiser HJ, et al. **Evaluation of nepafenac in prevention of macular edema following cataract surgery in patients with diabetic retinopathy.** Clinical Ophthalmology. 2012; 1259-69.

8. Alam A, Idris M, Yaqoob H, Nathaniel E, Hussain SI, Sabir H. **Cystoid macular edema after extracapsular cataract extraction performed by residents: 10.36351/pjo. v36i3. 1029.** Pakistan Journal of Ophthalmology. 2020; 36(3):272-76.

9. Ehsan RB, Abbas S, Khan I, Ata F, Tehreem F, Farid A, et al. **The clinical impact of nepafenac 0.3% ophthalmic suspension in post-operative cataract diabetic patients.** Journal of Xi'an Shiyou University, Natural Science Edition. 2023; 19(06):26.

10. Sandhya B. **A comparative study of visual outcome and complications in phacoemulsification and manual small incision cataract surgery at rajarajeswari Medical College and Hospital Bengaluru.** Rajiv Gandhi University of Health Sciences (India); 2020.

11. Sharifi A, Hayati N, Zand A. **Outcomes and complications of phacoemulsification cataract surgery complicated by anterior capsule tear.** 2023.

12. Ahmad A, Haq SU, Hussain J, Rasul J. **Comparison of the efficacy of Diclofenac 0.1% and Nepafenac 0.1% on anterior chamber cells in patients undergoing cataract surgery: A prospective clinical practice trial.** Pakistan Journal of Medical Sciences. 2023; 39(5):1361.

13. Gallemore RP. **NSAIDs in treatment of retinal disorders.** Review of Ophthalmology. 2006; 13(11):81.

14. Tranos PG, Wickremasinghe SS, Stangos NT, Topouzis F, Tsinopoulos I, Pavesio CE. **Macular edema**. Survey of Ophthalmology. 2004; 49(5):470-90.

15. Hayashi K, Igarashi C, Hirata A, Hayashi H. **Changes in diabetic macular oedema after phacoemulsification surgery.** Eye. 2009; 23(2):389-96.

16. Wielders LH, Schouten JS, Winkens B, van den Biggelaar FJ, Veldhuizen CA, Findl O, et al. **European multicenter trial of the prevention of cystoid macular edema after cataract surgery in nondiabetics: ESCRS PREMED study report 1.** Journal of Cataract & Refractive Surgery. 2018; 44(4):429-39.

17. Shafi M, Khan MA, Lodhi Y, Aftab A, Sarfraz MH. **Central macular thickness after cataract surgery in patients with diabetes mellitus and without diabetes mellitus.** Pak Armed Forces Med J. 2021; 71(6):1993-96.

18. Walter KA, Lee RY, Chen K, Komanski C. **Incidence of cystoid macular edema following routine cataract surgery using NSAIDs alone or with corticosteroids.** Arquivos Brasileiros de Oftalmologia. 2019; 83:55-61.

19. Rathore P, Chander A, Rastogi P. **Effect of cataract surgery on macular thickness in diabetic patients.** Int J Med Ophthalmol. 2020; 2(2):73-6.

20. Kianersi F, Rezaeian-Ramsheh A, Rahimi A, Akhlaghi M, Dehghani A, Farajzadegan Z, et al. **Non-steroidal intravitreal injection for noninfectious uveitic cystoid macular edema: Systematic review and meta-analysis.** European Journal of Ophthalmology. 2023; 11206721231212777.

21. Merad M, Vérité F, Baudin F, Ghezala IB, Meillon C, Bron AM, et al. **Cystoid macular edema after rhegmatogenous retinal detachment repair with pars plana vitrectomy: Rate, risk factors, and outcomes.** Journal of Clinical Medicine. 2022; 11(16):4914.

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2	Haider Ali Chaudhry	Data curation, Formal analysis.	
3	Gulnaz	Writing - review and editing.	Gulnaz
4	Sadia Khalid	Methodology, Software.	Sadia Khalid