THE CLINICAL IMPACT OF NEPAFENAC 0.3% OPHTHALMIC SUSPENSION IN POST-OPERATIVE CATARACT DIABETIC PATIENTS

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ABSTRACT

Background: Diabetes mellitus is a group of metabolic disorders which is followed by chronic hyperglycemia.

Aim: To assess the impact of 0.3% nepafenac ophthalmic suspension on macular thickness in mild and moderate NPDR following cataract surgery.

Methodology: This quasi-experimental study used non-probability purposive sampling from September 22 to May 23. Sixty patients with type 2 diabetes of 40-65 years of age, good glycemic control and mature cataracts were to undergone phacoemulsification were included. Patients with complicated cataract surgery or using topical or systemic NSAIDs and steroids and proliferative or severe NPDR were excluded. Diabetic cataract patients split into two groups of with and without taking nepafenac. Each group of 30 patients is divided into two subgroups of 15 patients in each with mild and moderate NPDR. All patients were examined for macular thickness by OCT before, one week and one month following cataract surgery. Data was analyzed by repeated measure ANOVA.

Results: Mild NPDR patients with taking nepafenac had mean macular thicknesses of 228µm, 224µm and 216µm while patients without taking nepafenac had mean macular thicknesses of 230µm, 244µm and 247µm preoperatively, one week, and one month after cataract surgery. Moderate NPDR patients with taking nepafenac had mean macular thicknesses of 260µm, 253µm and 245µm while patients without taking nepafenac had mean macular thicknesses of 258µm, 274µm and 282µm preoperatively, one week, and one month after cataract surgery. All groups had $p < 0.05$ (.000).

Conclusion: 0.3% nepafenac ophthalmic suspension is effective in reducing macular thickness in diabetic patients following cataract surgery with mild and moderate NPDR.

Keywords: Cataract Extraction, Non-steroidal anti-inflammatory drug, Macular edema, Retinopathy

INTRODUCTION

Diabetes mellitus is a term used to describe a collection of metabolic diseases that cause a long-term insulin resistance caused by insufficient insulin secretion, decreased responsiveness to insulin, or a combination of the two (1). The most common microvascular complication of diabetes is diabetic retinopathy (2). Vision loss from diabetic retinopathy may be one of the most distressing microvascular problems for those who are affected. The main risk factors for diabetic retinopathy are age, the duration of diabetes, poor glycemic control and other factors like obesity, nephropathy and dyslipidemia. DR is a rising global concern. DR now affects nearly 100 million people throughout the world and is anticipated to become a growing health issue, indicating that diabetes related vision loss and blindness increased 64% and 27%, respectively, between 1990 and 2010 (3). The diagnosis of diabetic retinopathy is made on the basis of clinical investigation of vascular anomalies in the retina (4).

Non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) are two clinically recognized stages of DR. NPDR is first stage of DR, which is characterized by capillary blockage and increased vascular permeability in the vasculature of retina. The microvascular characteristics features of NPDR include intraretinal haemorrhages, microaneurysms, abnormalities in venous calibre, intraretinal microvascular abnormalities formation, lipid exudates from the damaged vessels, retinal neovascularization and cotton-wool spots (5). The patients of diabetic retinopathy are asymptomatic initially; detailed fundus photography can detect minor retinal changes such as microaneurysms, haemorrhages, and hard exudates (4). NPDR is further categorized into mild, moderate, and severe categories, depending on whether or not diabetic macular edema develops (6).

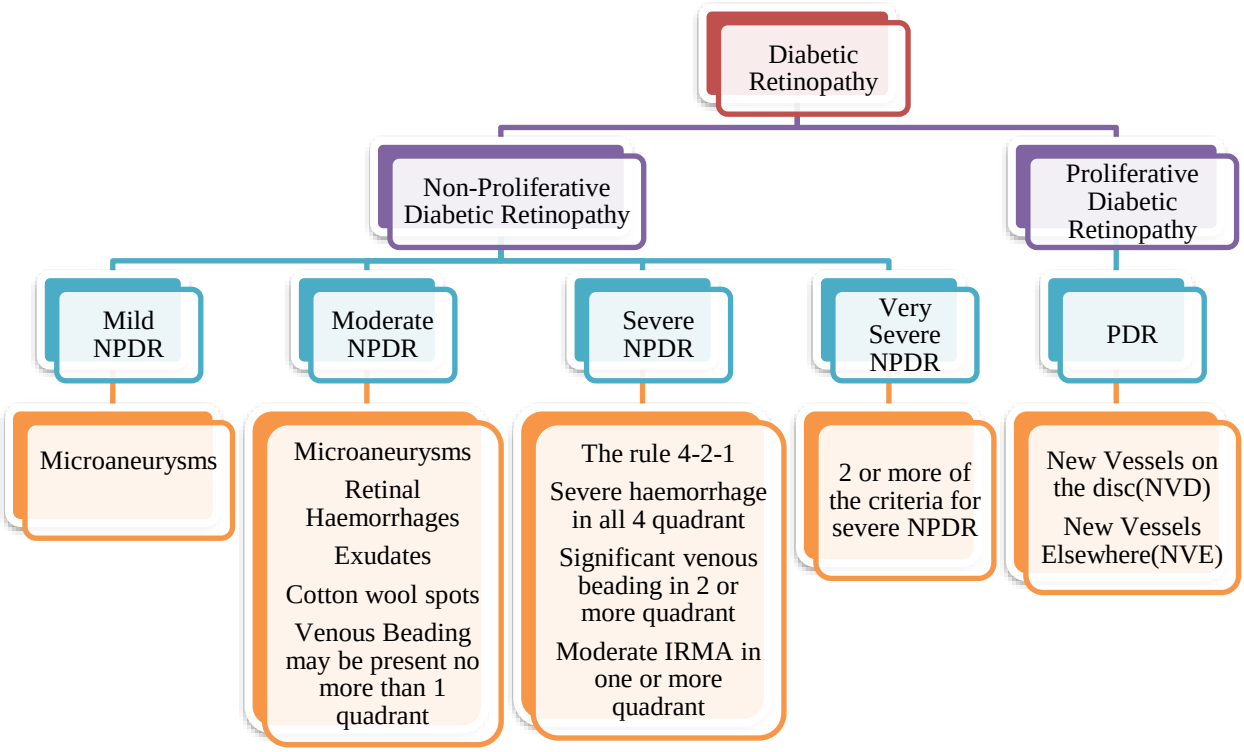

Figure 1.1: Classification of Diabetic Retinopathy.

Cataract is a main cause of vision loss in diabetic patients due to the fact that diabetic patients have a higher risk of developing cataracts and a faster rate of progression of existing cataracts (7). People diagnosed with diabetes under the age of 65 have a three- to fourfold increased risk of developing cataracts. Cataracts are twice as common in people over the age of 65 (8). There is evidence to suggest that people who have diabetes mellitus are at an increased risk of developing cataracts (9).

Following cataract surgery, inflammation appears to be a major cause of pseudophakic cystoid macular edema, according to the majority of researchers. The arachidonic acid is released from uveal tissue which may result in the production of inflammatory mediator leukotrienes by the lipoxygenase pathway or production of prostaglandins (PGs) via the cyclooxygenase (COX) pathway, according to the theory. All of these mediators of inflammation then penetrate posteriorly into the vitreous, thereby destroying the barrier that separates the blood and the retina. This disruption causes an increase in perifoveal capillary permeability and accumulation of fluid in the retina. Despite the retina's extensive formation and distribution of inflammatory mediators such as cytokines, it is not known why fluid collects in the macula as a result of perifoveal capillary leakage (10).

Optical coherence tomography, also known as OCT, is a reliable method for diagnosing pseudophakic CME because it can detect morphologic changes at an early stage and shows foveal cysts as a symptom of the disease. Because of the accumulation of intraretinal fluid in the outer plexiform layer and the regulation of the layout of cystoid cavities by Muller fibres, the typical appearance of an OCT scan is produced, and the thickness of the macula is also increased (11). Changes in macula are more likely to occur in diabetic patients, particularly those who have a history of retinopathies, following cataract surgery than they are in people who do not have diabetes (12).

Corticosteroids are used as a treatment for PCME because they inhibit the synthesis of prostaglandins and leukotriene. Corticosteroids inhibit phospholipase A2 in the arachidonic acid cascade, which results in decreased production of prostaglandin (PG). In addition to having anti-inflammatory effects, corticosteroids prevent the migration of macrophages and neutrophils, lessen the permeability of capillaries, and increase the constriction of blood vessels and decrease vasodilation (13). Corticosteroids are effective at reducing inflammation following surgery, but they have little effect on reduction of PCME and may result in rise of intraocular pressure (14).

Nepafenac is approved by FDA for use to treat postoperative inflammation brought on by cataract surgery and to reduce the risk of development of postoperative ME in diabetic patients. Nepafenac is also used to treat diabetic patients who have already experienced postoperative ME. There are two different formulations of the Nepafenac solution available: one with a dosing frequency of 0.1% three times per day, and the other with a dosing frequency of 0.3% once per day for improved compliance (9).

Nepafenac is prescribed to diabetic patients in order to reduce the likelihood that they will experience postoperative macular edema and treat inflammation brought on by cataract surgery (15). The corneal epithelium is penetrated well by nepafenac. Nepafenac is a drug that quickly perforates the cornea, and it is deaminated by hydrolases within the ocular structures such as the ciliary body epithelium, choroid, and retina to create the active metabolite, which is amfenac. Both COX-1 and COX-2 are blocked by amfenac's action, which results in a highly strong reduction in prostaglandin production (16). In comparison to other non-steroidal anti-inflammatory drugs, after topical treatment, it is anticipated that nepafenac will have good corneal penetration to intraocular tissues, and will therefore reach the posterior region of the eye (17). Nepafenac is the medication of choice of many eye doctors who treat diabetic patients (18).

1.2: OBJECTIVES

- To assess the macular thickness in post-operative diabetic patients with mild and moderate non-proliferative diabetic retinopathy.
- To assess the impact of 0.3% Nepafenac ophthalmic suspension on macular thickness in post-operative diabetic patients with mild and moderate non-proliferative diabetic retinopathy.

MATERIALS AND METHODS

Study design

Quasi experimental study design was used.

Place of study

The study was conducted at Arif Memorial Teaching Hospital.

Duration of study

The duration of study was from September 2022 to May 2023.

Sample size

The sample size was calculated 60 for study by using Raosoft formula with confidence interval of 95% and margin of error 5%. The sample size of sixty was divided into two groups. One group of thirty patients not taking nepafenac and another group of thirty patients taking nepafenac was further divided into two groups of fifteen each either having mild or moderate type of non-proliferative diabetic retinopathy.

Sampling technique

The data was conducted by the Nonprobability Purposive Sampling technique.

Inclusion criteria

- Age 40-65 years
- Both genders were included
- Patient with Type 2 diabetes mellitus
- Good Diabetic control
- Type 2 diabetes mellitus with mild non-proliferative diabetic retinopathy
- Type 2 diabetes mellitus with moderate non-proliferative diabetic retinopathy
- Mature cataracts and were to undergo phacoemulsification with implantation of the intraocular lens.

- All patients underwent phacoemulsification with posterior chamber lens implantation.
- Patient taking Nepafenac 0.3% ophthalmic suspension

Exclusion criteria

- Proliferative and severe stage of non-proliferative diabetic retinopathy
- Patients who had macular cysts, epiretinal membranes, and macular traction.
- Macular thickness greater than 300 µm were excluded.
- Patients with surgically cut corneal nerves, dry eye syndrome, penetrating grafts, pre-existing uveitis, glaucoma, or any significant pathology of the posterior segment.
- Diabetes mellitus patient with uncontrolled diabetes, cardiac problems, and rheumatoid arthritis
- Any patients who had complicated cataract surgery e.g., vitreous loss significant corneal edema, retained cortical material, rupture of the posterior capsule, or an intraocular lens not placed in the capsular bag.
- Patient using medications such as topical or systemic nonsteroidal anti-inflammatory drugs and steroids

Data Collection Instruments These instruments were used in this research study

- Slit Lamp (Carl Zeiss Meditec AG 07740 Jena)
- Optical Coherence Tomography (Niddek RS 3000)

Research Tools This research was carried out by self-structured Proforma.

Data Collection Methods

A total of 60 diabetic cataract patients including both genders, aged 40 to 65, were selected at Arif Memorial Hospital and Ittefaq Hospital Lahore. This Quasi experimental study design was conducted from September 22 to May 2023. The study included participants who met the inclusion criteria and provided their informed consent. After taking history the diabetic cataract patients were divided into two groups. One group of thirty patients not taking nepafenac and another group of thirty patients taking nepafenac was further divided into two groups of fifteen each for those having mild and moderate type of non-proliferative diabetic retinopathy. After taking informed consent the data was collected by using a slit lamp and patients was evaluated for cataract surgery. All patients were examined for macular thickness by OCT before, after, and after one month of surgery.

Data Analysis Method

Data analysis was done on the statistical package for the social sciences (SPSS) by applying repeated measure ANOVA.

Ethical Consideration

Each participant was instructed on the entire procedure and instructed on how to apply topical 0.3% Nepafenac drops. They were assured that any information they provided would be held in strict confidence and used solely for research purposes. Both verbal and written consent will be obtained from the patients briefing them sufficiently on the study's objectives and design, assuming appropriate time to examine all possibilities, ensuring that the included subjects grasp this information, volunteering subject matter and continuing to provide information, exchange information, and ask questions.

RESULTS

This study included sixty diabetic patients having mild and moderate non-proliferative diabetic retinopathy above forty to sixty-five years of age. Patients were divided into two groups. Thirty patients taking nepafenac along with conventional treatment after cataract surgery were kept in group 1. Thirty patients taking conventional treatment only were kept in group 2. Macular thickness was assessed in both groups. Results were analyzed by using repeated measure ANOVA.

4.1: Description of age of diabetic retinopathy patients taking nepafenac and without taking nepafenac

A total of sixty patients were selected of the age above than forty year and divided into two groups, one group of patients taking nepafenac and other without taking nepafenac. Out of this age range, the maximum and minimum age with which patients presented in group of patients taking nepafenac and other without taking nepafenac was 65 years and 45 years, 49 years and 65 years respectively. The mean value and standard deviation of the age were found to be 53.90 ± 5.71 in patients taking nepafenac and 56.70 ± 4.77 in patients without taking nepafenac as described in table 4.1.

Table 4.1: Age of patients of diabetic retinopathy with and without taking nepafenac.

	Minimum	Maximum	Mean	Std. Deviation
Age of the Patients taking nepafenac	45.00	65.00	53.9000	5.71357
Age of the Patients without taking nepafenac	49.00	65.00	56.7000	4.77890

4.2: Distribution of gender of diabetic retinopathy patients taking nepafenac

Out of the total sixty subjects for this study, one group of patients taking nepafenac and other without taking nepafenac. The percentage of gender distribution in both groups with and without taking nepafenac was 26.7% (N=16), 28.3% (N=17) were males and 23.3% (N=14), 21.7% (N=13) were females respectively as described in the table 4.2 and figure 4.1.

Table 4.2: Gender of diabetic retinopathy patients with and without taking nepafenac.

	Gender of the patients				
	Gender	**Frequency**	**Percent**	**Valid percent**	**Cumulative percent**
Gender of Patients taking nepafenac	**Male**	16	26.7	53.3	53.3
	Female	14	23.3	46.7	100.0
Gender of Patients not taking nepafenac	**Male**	17	28.3	56.7	56.7
	Female	13	21.7	43.3	100.0
	Total	60	100.0	100.0	

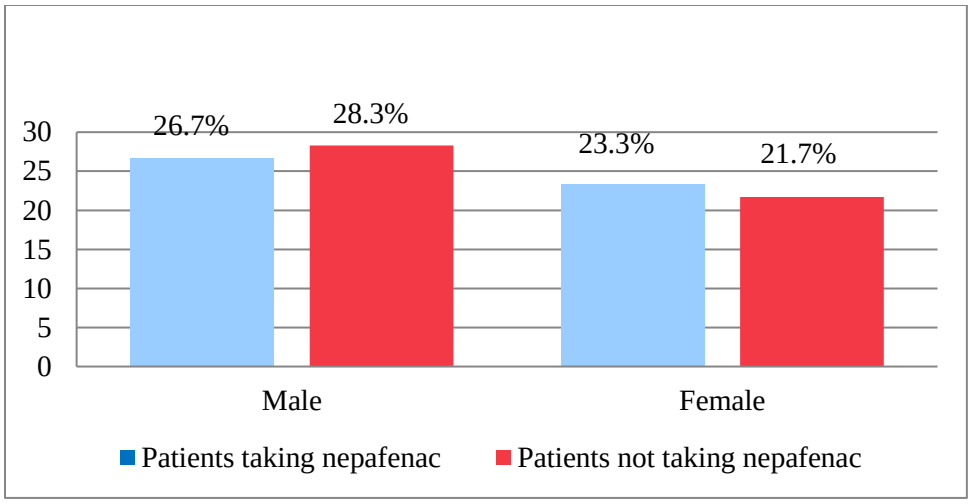

Figure 4.1: Gender of the patients with and without taking Nepafenac.

After applying the normality test on the data, p value of Shapiro-Wilk test is greater than 0.05. P value indicates that data was normal and parametric test were applied for analysis. Repeated measure ANOVA were used for analysis of the data.

4.3: Assessment of macular thickness in mild non-proliferative diabetic retinopathy patients taking nepafenac

Out of sixty patients, fifteen patients were taking nepafenac with mild non-proliferative diabetic retinopathy following cataract surgery. The mean value and standard deviation of macular thickness recorded pre-operatively, one week, one month following cataract surgery were 228.20 ± 7.022, 224.40 ± 9.78, 216.22 ± 9.059 respectively. The p value was < 0.05 (p= 0.000) which shows that result of this study was significant even within the subjects. According to the findings there was a significant difference present in the macular thickness mean values recorded at different time intervals as described in table 4.3, 4.4 and figure 4.2.

Table 4.3: Central Macular thickness in mild non-proliferative diabetic retinopathy using nepafenac.

	Mean	St. Deviation	N
Central macular thickness before using nepafenac in mild NPDR	228.20	7.02	15
Central macular thickness one week after using nepafenac in mild NPDR	224.40	9.78	15
Central macular thickness one month after using nepafenac in mild NPDR	216.22	9.05	15

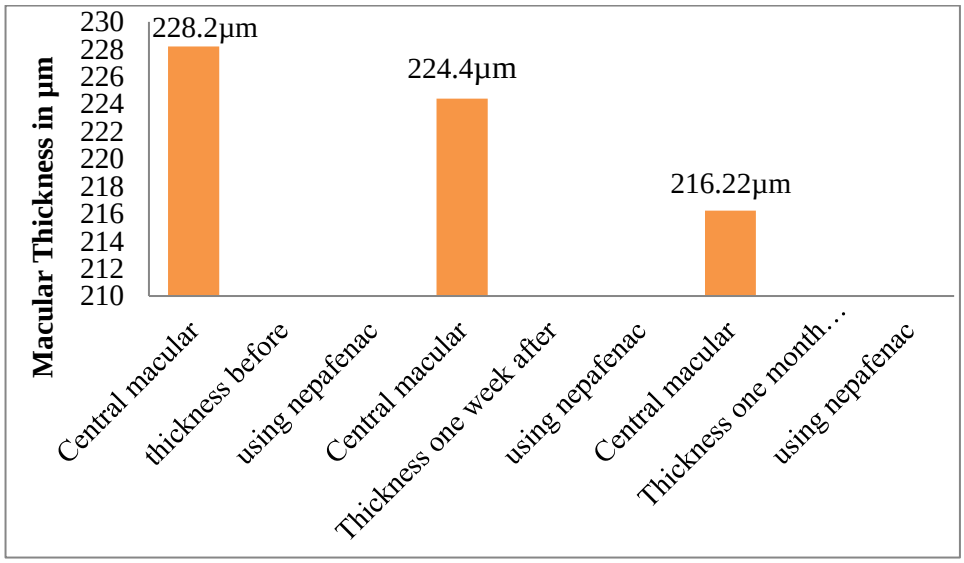

Figure 4.2: Central Macular thickness in mild non-proliferative diabetic retinopathy using nepafenac.

Table 4.4: Repeated measures ANOVA test.

		Type III Sum of Squares	df	Mean Square	F	Sig
Group 1	**Sphericity Assummed**	1114.97	2	557.48	24.10	0.000
	Greenhouse-Geisser	1114.97	1.624	686.49	24.10	0.000

Pairwise comparison for mild non proliferative diabetic retinopathy in patients taking nepafenac shows the relationship of pre-operative data(1) with follow up 1(2) and follow up 2(3), comparison of follow up 1(2) with preoperative data(1) and follow up 2(3) and comparison of follow up 2(3) with preoperative data(1) and follow up 1(2). The factor 1 represents the Pairwise comparison for mild non proliferative diabetic retinopathy in patients taking nepafenac. This Pairwise comparison shows relationship between these follow ups for which the mean difference and standard error as mentioned in below table. P value was < 0.05 (p= 0.000) which shows that result of the study was statistically significant.

Table 4.5: Pairwise comparison.

Factor 1	(J) Factor 1	Mean difference (I-J)	Std. Error	Sig
1	2	3.800	1.878	0.188
	3	11.933	2.022	0.000
2	1	-3.800	1.878	0.188
	3	8.133	1.279	0.000
3	1	-11.933	2.022	0.000
	2	-8.133	1.279	0.000

4.4: Assessment of Macular thickness in moderate non-proliferative diabetic retinopathy patients taking nepafenac

Out of sixty patients, fifteen patients were taking nepafenac with moderate non-proliferative diabetic retinopathy following cataract surgery. The mean value and standard deviation of macular thickness recorded pre-operatively, one week, one month following cataract surgery were 260.33 ± 13.82, 253.33 ± 14.06, 245.66 ± 14.93 respectively. The p value was < 0.05 (p= 0.000) which shows that result of this study was significant even within the subjects. According to the findings there was a significant difference present in the macular thickness mean values recorded at different time intervals as described in table 4.6, 4.7 and figure 4.3.

Table 4.6: Central Macular thickness in moderate non-proliferative diabetic retinopathy using nepafenac.

	Mean	St. Deviation	N
Central macular thickness before using nepafenac in moderate NPDR	260.33	13.82	15
Central macular thickness one week after using nepafenac in moderate NPDR	253.33	14.06	15
Central macular thickness one month after using nepafenac in moderate NPDR	245.66	14.93	15

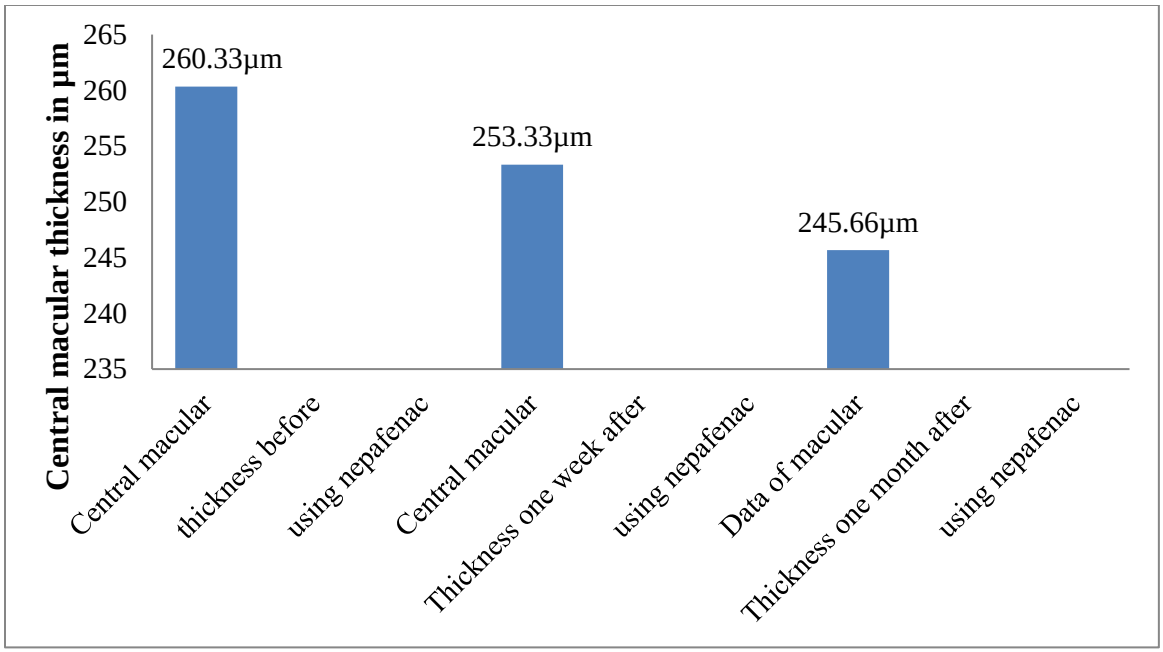

Figure 4.3: Central Macular thickness in moderate non-proliferative diabetic retinopathy using nepafenac.

Table 4.7: Repeated measures ANOVA test.

		Type III Sum of Squares	df	Mean Square	F	Sig
Group 1	**Sphericity Assummed**	1614.444	2	807.222	23.555	0.000
	Greenhouse -Geisser	1614.444	1.540	1048.348	23.555	0.000

Pairwise comparison for moderate non proliferative diabetic retinopathy in patients taking nepafenac shows the relationship of pre-operative data(1) with follow up 1(2) and follow up 2(3), comparison of follow up 1(2) with preoperative data(1) and follow up 2(3) and comparison of follow up 2(3) with preoperative data(1) and follow up 1(2). The factor 1 represents the Pairwise comparison for moderate non proliferative diabetic retinopathy in patients taking nepafenac. This Pairwise comparison shows relationship between these follow ups for which the mean difference and standard error as mentioned in below table. P value was < 0.05 (p= 0.000) which shows that result of the study was statistically significant.

Table 4.8: Pairwise comparison.

Factor 1	(J) Factor 1	Mean difference (I-J)	Std. Error	Sig
1	2	7.000	2.282	0.025
	3	14.667	2.518	0.000
2	1	-7.000	2.282	0.025
	3	7.667	1.467	0.000
3	1	-14.667	2.518	0.000
	2	-7.667	1.469	0.000

4.5: Assessment of Macular thickness in mild non-proliferative diabetic retinopathy patients without taking Nepafenac

Out of sixty patients, fifteen patients were not taking nepafenac with mild non-proliferative diabetic retinopathy following cataract surgery. The mean value and standard deviation of macular thickness recorded pre-operatively, one week, one month following cataract surgery were 230.26 ± 7.23, 244.80 ± 12.55, 247.66 ± 11.73 respectively. The p value was < 0.05 (p= 0.000) which shows that result of this study was significant even within the subjects. According to the findings there was a significant difference present in the macular thickness mean values recorded at different time intervals as described in table 4.9, 4.10 and figure 4.4.

Table 4.9: Central Macular thickness in mild non-proliferative diabetic retinopathy without taking nepafenac.

	Mean	St. Deviation	N
Pre-operative Central macular thickness without using nepafenac in mild NPDR	230.26	7.23	15
Central macular thickness after one week without using nepafenac in mild NPDR	244.80	12.55	15
Central macular thickness after one month without using nepafenac in mild NPDR	247.66	11.73	15

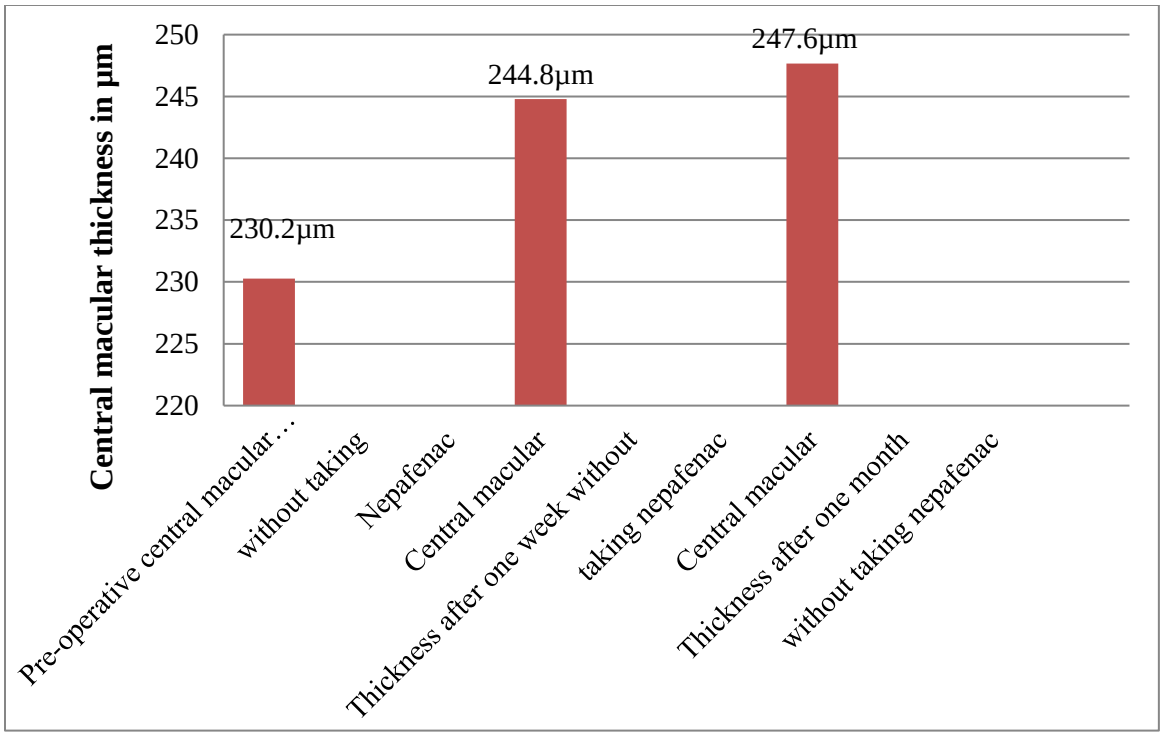

Figure 4.4: Central macular thickness in mild non-proliferative diabetic retinopathy without using nepafenac.

Table 4.10: Repeated measures ANOVA test.

		Type III Sum of Squares	df	Mean Square	F	Sig
Group 2	**Sphericity Assummed**	2610.978	2	1305.489	61.022	0.000
	Greenhouse -Geisser	2610.978	1.630	1601.618	61.022	0.000

Pairwise comparison for mild non proliferative diabetic retinopathy in patients without taking nepafenac shows the relationship pre-operative data(1) with follow up 1(2) and follow up 2(3), comparison of follow up 1(2) with preoperative data(1) and follow up 2(3) and comparison of follow up 2(3) with preoperative data(1) and follow up 1(2). The factor 1 represents the Pairwise comparison for mild non proliferative diabetic retinopathy in patients without taking nepafenac. This Pairwise comparison shows relationship between these follow ups for which the mean difference and standard error as mentioned in below table. P value was < 0.05 (p= 0.000) which shows that result of the study was statistically significant.

Table 4.11: Pairwise comparison.

Factor 1	(J) Factor 1	Mean difference (I-J)	Std. Error	Sig
1	2	-14.533	1.990	0.000
	3	-17.400	1.726	0.000
2	1	14.533	1.990	0.000
	3	-2.867	1.272	0.122
3	1	17.400	1.726	0.000
	2	2.867	1.272	0.122

4.6: Assessment of Macular thickness in moderate non-proliferative diabetic retinopathy patients without taking Nepafenac

Out of sixty patients, fifteen patients were not taking nepafenac with moderate non-proliferative diabetic retinopathy following cataract surgery. The mean value and standard deviation of macular thickness recorded pre-operatively, one week, one month following cataract surgery were 258.06 ± 13.88, as 274.00 ± 14.25 and 282.06 ± 17.92 respectively. The p value was < 0.05 (p= 0.000) which shows that result of this study was significant even within the subjects. According to the findings there was a significant difference present in the macular thickness mean values recorded at different time intervals as described in table 4.12, 4.13 and figure 4.5.

Table 4.12: Central Macular thickness in moderate non-proliferative diabetic retinopathy without taking nepafenac.

	Mean	St. Deviation	N
Pre-operative Central macular thickness without using nepafenac in moderate NPDR	258.06	13.88	15
Central macular thickness after one week without using nepafenac in moderate NPDR	274.00	14.25	15
Central macular thickness after one month without using nepafenac in moderate NPDR	282.06	17.92	15

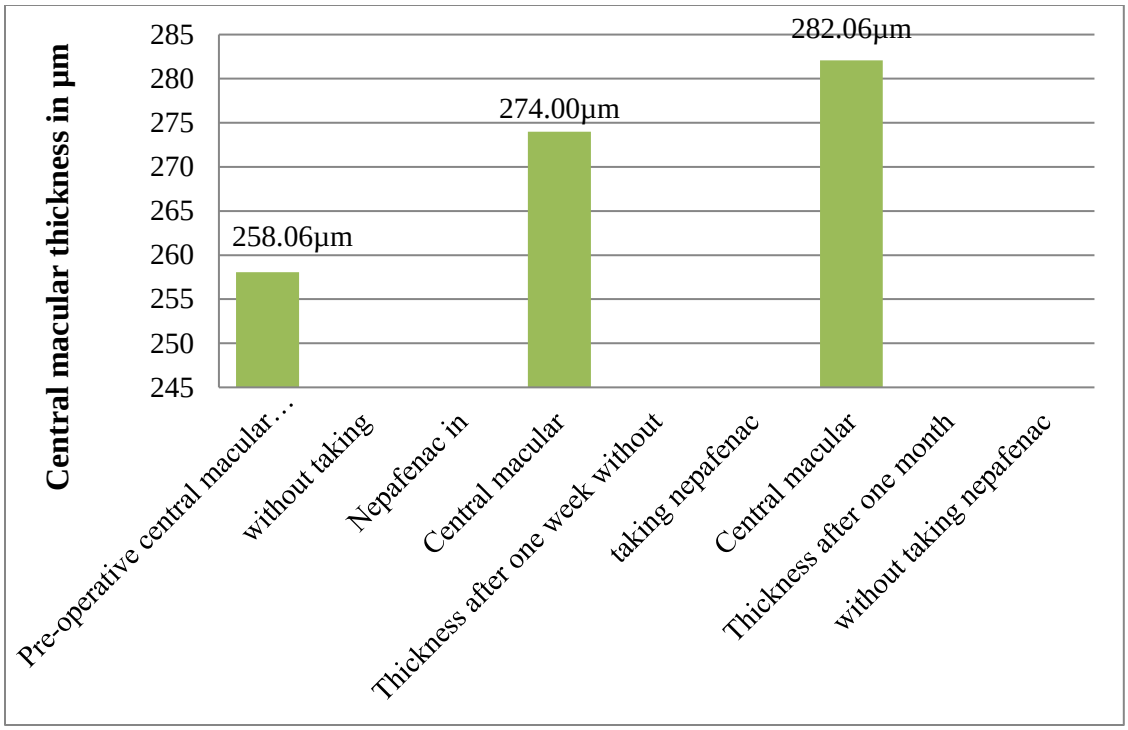

Figure 4.5: Central macular thickness in moderate non-proliferative diabetic retinopathy without using nepafenac.

Table 4.13: Repeated measures ANOVA test.

		Type III Sum of Squares	df	Mean Square	F	Sig
Group 2	**Sphericity Assummed**	2610.978	2	1305.489	61.022	0.000
	Greenhouse -Geisser	2610.978	1.630	1601.618	61.022	0.000

Pairwise comparison for moderate non proliferative diabetic retinopathy in patients without taking nepafenac shows the relationship pre-operative data(1) with follow up 1(2) and follow up 2(3), comparison of follow up 1(2) with preoperative data(1) and follow up 2(3) and comparison of follow up 2(3) with preoperative data(1) and follow up 1(2). The factor 1 represents the Pairwise comparison for moderate non proliferative diabetic retinopathy in patients without taking nepafenac. This Pairwise comparison shows relationship between these follow ups for which the mean difference and standard error as mentioned in below table. P value was < 0.05 (p= 0.000) which shows that result of the study was statistically significant.

Table 4.14: Pairwise comparison.

Factor 1	(J) Factor 1	Mean difference (I-J)	Std. Error	Sig
1	2	-15.933	3.002	0.000
	3	-24.000	3.381	0.000
2	1	15.933	3.002	0.000
	3	-8.067	2.666	0.027
3	1	24.000	3.381	0.000
	2	8.067	2.666	0.027

CHAPTER 5

DISCUSSION

The main aim of the study was to find the clinical impact of nepafenac 0.3% ophthalmic suspension in diabetic patients with mild or moderate non- proliferative diabetic retinopathy following cataract surgery.

A study conducted by Kwon et al in 2011 to assess the changes of macular thickness by OCT after cataract surgery. The change in macular thickness was evaluated before cataract surgery, one week, one to two months and after 6 months after cataract surgery. Macular edema developed in 19 eyes (18%) of the diabetic group, with 63% developing one month after surgery. Thirteen (68%) of the 19 eyes with macular edema had resolved by 6 months after surgery without treatment. It was concluded that there was significant increase in macular thickness following cataract surgery after one month (19). In present study, the mean macular thickness pre-operatively, after one week and one month was 230.26 um $\pm$ 7.23 SD, 244.80 um $\pm$ 12.55 SD and 247.66 um $\pm$ 11.73 SD respectively in patients not taking nepafenac in mild non-proliferative diabetic retinopathy. The P value was < 0.05 ($p = .000$) indicating that there was an increase in macular thickness after cataract surgery. It was concluded that macular thickness was higher in patients having mild non-proliferative diabetic retinopathy without taking nepafenac following cataract surgery.

Another study was conducted by Chen et al in 2016 to estimate the incidence of development of macular edema in diabetic eyes with or without pre-existing macular edema using optical coherence tomography. At the 1st and 3rd follow-ups, the mean central macular thickness was increased by 21.0 μm and 25.5 μm, respectively ($P<0.01$). Average increases in inner and outer ring thickness were 14.2 μm and 9.5 μm at 1 month, and 18.2 μm and 12.9 μm at 3 months. It was concluded that the central subfield, perifoveal and parafoveal sectors, all showed statistically significant increase in thickness of macula following cataract surgery (20). In present study the mean value of macular thickness in moderate non-proliferative diabetic retinopathy patients not taking nepafenac at preoperatively, one week, one month following cataract surgery was and 258.06 $\pm$ 13.88, 274.00 $\pm$ 14.25 and 282.06 $\pm$ 17.92 respectively and p value was less than 0.05 (.000). It was concluded that macular thickness was higher in patients having moderate non-proliferative diabetic retinopathy not taking nepafenac following cataract surgery.

Another study was conducted by Sarfraz et al in 2017 to assess the effectiveness of topical Nepafenac (0.1%) post-operatively in the prevention of macular edema after cataract surgery in individuals with non-proliferative diabetic retinopathy. The mean pre-operative central macular thickness , 3 months post-operative central macular thickness, mean change in CMT, and mean frequency change in CMT of patients taking nepafenac were 226.5±10.86m, 228.83±14.56 m, 2.33±10.45 m, and 1.05%, respectively. It was concluded that topical Nepafenac 0.1% is effective in preventing macular edema following cataract surgery in patients with non-proliferative diabetic retinopathy (NPDR) (21). In current study, non-proliferative diabetic retinopathy was further categorized to mild and moderate NPDR. The impact of nepafenac 0.3% on macular thickness was assessed in both groups. The mean macular thickness pre-operatively, one week, and one month following cataract surgery was 228.20 ± 7.02, 224.40 ± 9.78 and 216.2267 ± 9.0507 respectively in patients using nepafenac with mild non-proliferative diabetic retinopathy. It was concluded that topical nepafenac 0.3% ophthalmic suspension was found more effective in reducing macular thickness in diabetic patients with mild non- proliferative diabetic retinopathy following cataract surgery.

A research was done in year 2020 by Sahin et al to find out the effectiveness of nepafenac 0.1% eye drops in prevention of macular edema after the cataract removal. Participants who received topical nepafenac preoperatively has less increases in macular thickness in the central 1 mm region after 3 and 6 weeks with P=0.028 and 0.008, respectively). There was no significant increase in central macular thickness in patients taking 0.1% nepafenac. The results showed that topical steroids and nepafenac 0.1% treatment following cataract surgery reduced the early postoperative increase in macular thickness (22). In current study, participants who received 0.3% nepafenac ophthalmic suspension pre-operatively and postoperatively after one week and one month had reduced increase in macular thickness as compared to the group not taking nepafenac. The p value at baseline, one week, one month following cataract surgery in moderate non-proliferative diabetic retinopathy patients taking nepafenac was (p= .000). It was concluded that topical nepafenac 0.3% ophthalmic suspension was found more effective in reducing macular thickness in moderate non-proliferative diabetic retinopathy following cataract surgery.

5.2: CONCLUSION

- It was concluded that topical nepafenac 0.3% ophthalmic suspension was found more effective in reducing macular thickness in diabetic patients with mild and moderate non-proliferative diabetic retinopathy following cataract surgery.
- It was concluded that macular thickness was increased in mild and moderate non-proliferative diabetic retinopathy following cataract surgery in patients without taking nepafenac.

This study revealed that prevention is considerably safer and less expensive than invasive procedures like intravitreal or periocular injections, which may be used to treat diabetic individuals with macular edema following cataract surgery. Therefore professionals should educate the patient how to minimize the complications of diabetic retinopathy.

5.3: LIMITATIONS

- Difficulty in collecting the data at follow ups as patient hardly came for follow ups.
- It was difficult to ensure that all participants adhere consistently to the prescribed dosage and administration schedule, which could influence the study's results.

5.4: RECOMMENDATIONS

- Nepafenac is a cheap and effective treatment for prevention of cystoid macular edema in patients with mild and moderate diabetic retinopathy patient following cataract surgery.
- Physician should prescribe 0.3% nepafenac instead of more expensive treatment options along with conventional treatment.
- Nepafenac is an anti-inflammatory drug that reduces postoperative inflammation, minimizing pain, and accelerating healing.
- Nepafenac eye drops help the visual recovery process after cataract surgery by reducing inflammation, avoiding macular edema, and preventing CME. It is possible to restore clear and precise vision more quickly by eliminating these potential complications.
- Additional research should be conducted on the effectiveness of nepafenac in reducing inflammation and pain after intra ocular lens removal.

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