

**EVALUATION OF NEPAFENAC EYE DROPS IN
PREVENTION OF MACULAR EDEMA FOLLOWING
CATARACT SURGERY IN PATIENTS WITH
DIABETIC RETINOPATHY**

Thesis

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List of Abbreviations

μm	Micrometer
3-D	Three-dimension
BCVA	Best corrected visual acuity
BRB	Blood-Retina Barrier
CC	Choriocapillaris
CME	Cystoid macular edema
COX	Cyclooxygenase
DM	Diabetes mellitus
DME	Diabetic macular edema
DR	diabetic retinopathy
ECCE	Extracapsular cataract extraction
ELM	External limiting membrane
ERM	Epiretinal membrane
ETDRS	Early treatment diabetic retinopathy study
FA	Fluorescein angiography
FAZ	Foveal avascular zone
GCL	Ganglion cell layer
HS	Highly significant
ICCE	Intracapsular cataract extraction
ILM	Internal limiting membrane
INL	Inner nuclear layer
IOP	Intraocular pressure
IPL	Inner plexiform layer
IS/OS	Inner and outer segment
LECs	Lens epithelial cells
LogMAR	Logarithm minimal angle of resolution

List of Abbreviations

ME	Macular edema
MFT	Mean foveal thickness
mm	millimeter
MMFT	Minimal mean foveal thickness
NFL	Nerve fiber layer
NS	Non-significant
NSAID	Nonsteroidal anti-inflammatory drug
OCT	Optical coherence tomography
ONL	Outer nuclear layer
OPL	Outer plexiform layer
P	P value
PC IOL	Posterior chamber intraocular lens
PCO	Posterior capsular opacification
PMMA	Polymethyl methacrylate
PRP	Pan retinal photocoagulation
PSC	Posterior subcapsular cataract
r	Correlation coefficient
RLA	Retinal leakage analyzer
RNFL	Retinal nerve fiber layer
RPE	Retinal pigment epithelium
S	Significant
SD	Standard deviation
SD-OCT	Spectral domain-OCT
SPSS	Statistical Package of Social Science Software program
TD-OCT	Time domain-OCT
VEGF	Vascular endothelial growth factor

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Introduction



Introduction

Cystoid Macular Edema (CME) represents the most common cause of unexpected visual loss or sub-optimal visual outcome after cataract surgery. CME may occur following complicated or uncomplicated cataract surgery, without significant race or gender predilection (*Ray and D'Amico, 2002*).

In United States, the incidence of Clinically Significant Macular Edema (CSME) with decreased vision following cataract surgery is only about 0.2-1.4% after modern phacoemulsification surgery. The percentage was higher in older techniques of cataract surgery, where CME could occur in up to 20-60% of eyes (*Bélair et al, 2009; Shelsta and Jampol, 2011*).

The incidence of macular changes following cataract surgery in diabetic patients is higher, especially those with pre-existing retinopathies, compared with non-diabetic individuals (*Johnson, 2009*).

The rate of development of macular edema in diabetic populations (with or without diabetic retinopathy) varies across studies, ranging from 31% to 81% at various time points following cataract extraction (*Krepler et al., 2002*).

OCT provides a quantitative description of macular edema in the form of retinal thickness and volume. OCT is highly more sensitive than fundus examination by slit-lamp biomicroscopy in detection of any small changes in retinal thickness (*Hee et al., 1995*).

Nepafenac ophthalmic suspension 0.1% is a topical NSAID which was prescribed for the treatment of pain and inflammation associated with cataract surgery. Nepafenac is a prodrug that rapidly penetrates the cornea and is deaminated to form the active metabolite, amfenac, by intraocular hydrolases within ocular tissues (*Gaynes and Onyekwuluje, 2008*).

Amfenac as well as nepafenac are potent inhibitors of the cyclooxygenase enzyme isoforms (COX1 and COX2) (*Lane, 2006*).

Topical nepafenac also may inhibit choroidal neovascularization (CNV) and ischemia-induced retinal neovessels in rats by decreasing the production of VEGF. Topical ocular nepafenac also had prevented the development of induced panretinal edema in rabbit (*Takahashi et al., 2003*).

Subjects and Methods:

Thirty eyes of diabetic patients with cataract who are candidates for phacoemulsification and posterior chamber intraocular lens (IOL) implantation were divided into two groups; Group 1 (control group) consisted of 15 eyes and Group 2 (nepafenac group) consisted of 15 eyes.

Preoperative evaluation will be performed including best corrected visual acuity (BCVA), slit-lamp biomicroscopy, indirect ophthalmoscopy, intraocular pressure (IOP) measurement, and biometry to calculate IOL power and measurement of macular thickness using OCT.

Postoperative examinations are to be performed one day, one week and one month after surgery. All of the patients will be subjected to ophthalmological examination including BCVA, biomicroscopy, IOP measurement, indirect ophthalmoscopy.

OCT will be performed one month postoperatively. Exclusion criteria are subjects who have dense cataract or subjects with prior intraocular surgery of any type, history of uveitis, or the presence of any retinal or choroidal disease, other than diabetes, that could affect retinal thickness.

Aim of the Work



Aim of the Work

The aim of this study is to assess the effect of using nepafenac ophthalmic suspension to prevent the development of macular edema in diabetic individuals following uneventful phacoemulsification and posterior chamber intraocular lens (PC IOL) implantation.