



PHACOEMULSIFICATION; OUTCOME OF PHACOEMULSIFICATION IN DIABETIC PATIENTS AT A TERTIARY CARE HOSPITAL LARKANA

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ABSTRACT... Objectives: The objective of this study is to evaluate visual outcome after phacoemulsification in diabetic patients. **Study Design:** Prospective study. **Setting:** Ophthalmology department of Shaheed Mohtarma Benazir Bhutto Medical University Larkana. **Period:** January 2017 to April 2018. **Method:** Over a period of 15 months, all diabetic patients having cataracts were part of the study. All these patients would undergo phacoemulsification for cataract removal by a single ophthalmologist. A total of 76 participants were included and their consent was taken. Visual acuity and progression of diabetic retinopathy would be assessed 12 months post-operatively. **Results:** The data included 76 patients, among which 32 were females (43%) and 44 males (57%). The mean age of females were 58 + 6.8 years and that of males were 62.5 + 9.3. Mean hbA1c of 76 patients were 9.2. At the end of first post-operative year of the 76 operated eyes, 46 eyes (60.52%) indicated no progression of diabetic retinopathy, whereas 30 eyes (39.47%) showed no progression of retinopathy. There was no significant discrepancy in progression of retinopathy in the number of operated and un-operated eyes post-operatively. Retinopathy progression was related to higher mean hbA1c OE p= 0.001 NOE p=0.015). **Conclusion:** The number of people having diabetes mellitus is increasing exponentially. Early diagnosis and good diabetic control is associated with slow development of cataract. Uncomplicated phacoemulsification leads to good visual outcome and better quality of life.

Key words: Diabetic Retinopathy, Cataract, Phacoemulsification.

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INTRODUCTION

The number of people having diabetes mellitus will increase from 171 million in 2000 to 366 million in 2030 by estimation. Worldwide, cataract is a major cause of blindness, affecting approximately 18 million people.^{1,2} Cataract is one of the earliest complication of diabetes, significantly altering the lifestyle. Intensive blood pressure control and proper glycemic control reduces the risk of onset of retinopathy and slowing its progression.^{3,4} Nephropathy affects progression of diabetic retinopathy, increased serum lipids cause macular exudation, anemia and smoking results in progression of retinopathy.⁵ The procedure of choice for age related cataract is known as phacoemulsification. This involves ultrasonic waves which act on the cataract and emulsify it. This procedure is considered safe when compared with the manual extracapsular

cataract surgery. However, phacoemulsification is associated with some complications. Some of which include corneal or macular edema, posterior capsular rupture and endophthalmitis.^{6,7,8} Hyperglycemia causes loss of lens transparency inducing temporary lens opacification and swelling. It is also stated that rapid glycemic control can reverse the formation of opacities. Diabetic patients are more prone to developing complications after phacoemulsification. Due to increased inflammation in diabetic patients after surgery increases their risk for development of cystic macular edema.⁹ At cellular level, diabetic patients have dysfunction of the corneal epithelium which predisposes them to development of complications after phacoemulsification. Hyperglycemia results in an increased activity of some enzymes like aldose reductases and metalloproteinases. There are

disturbances in cell migration which results in poor healing.^{10,11} Clinical and refractive outcomes of surgery vary among surgeons due to manual creation of incision and phacoemulsification. The primary outcome defining the success of surgery is the visual acuity. Post-operative final visual acuity has been categorized into three groups characterizing good vision as (6/6 - 6/12), impaired vision as (6/18 – 3/60) and poor vision as (< 3/60)¹⁰ by WHO.¹² Diabetic patients have higher incidence of formation of cataract and earlier age of presentation than non-diabetics.^{13,14} Most common predictors of visual outcome are extent of pre-operative retinopathy and duration of diabetes.¹⁵ Previously suggested that there is progress in retinopathy after extra capsular cataract extraction (ECCE) and delaying surgery in patients with advanced diabetic retinopathy was considered.¹⁶ Recently with the advent of surgical techniques, modern phacoemulsification provides the benefit of smaller incisions, early vision rehabilitation and less post-operative inflammation.¹¹ Now a shift in attitude leading to earlier cataract extraction shows improved visual outcome.

To prevent progression of underlying retinopathy and early treatment of macular edema, pan retinal photocoagulation is performed preoperatively. Performing surgery before any visible lens opacity, the risk of clinically significant macular edema (CSME) is reduced.¹⁷ According to ETDRS, the predictors of poor visual outcome include CSME, severe retinopathy, and poor preoperative visual acuity. CSME is an indicator of poor post-operative visual acuity and final visual acuity is worse than 20/200 is reported.¹⁸

METHOD

This prospective study aims to assess visual outcome after one year of phacoemulsification in patients with diabetes. Over a period of 15 months, all diabetic patients having cataracts were included in the study. All these patients would undergo phacoemulsification for cataract removal by a single ophthalmologist. Data collected included patient's age, gender, diabetic control, and other systemic disease. The study was conducted at ophthalmology department

of Shaheed Mohtarma Benazir Bhutto Medical University Larkana during the time of January 2017 to April 2018. A total of 76 participants were included and their consent was taken. All participants were assured that their data would be kept anonymous and all possible methods of privacy would be undertaken.

An ophthalmologic examination including assessment of visual acuity and diabetic retinopathy was carried out. This pre-operative assessment of affected and un-affected eye was carried out. All other protocols for ophthalmic surgery were observed. Patients were asked for follow-up every three months. Visual acuity and progression of diabetic retinopathy would be assessed 12 months post-operatively.

RESULTS

The data included 76 patients, among which 32 were females (43%) and 44 males (57%). The mean age of females were 58 ± 6.8 years and that of males were 62.5 ± 9.3 . Mean hbA1c of 76 patients were 9.2. After one year of phacoemulsification, patients were assessed for visual outcome and progression of diabetic retinopathy.

After intervention, the visual acuity was improved by two or more lines in 71% (n=54) of patients. Overall 75% of patients (n=57) had a final visual acuity of equal or greater than 20/40. Pre-operative diabetic retinopathy, prolonged surgical duration was associated with retinopathy progression.

At the end of first post-operative years of the 76 operated eyes, 46 eyes (60.52%) showed progression of retinopathy of (Grade Mild to Moderate non proliferative diabetic) retinopathy of which 27 were males while 19 were females, whereas 30 eyes (39.47%) showed no progression of retinopathy of which 17 were males while 13 were females. Comparing the cases of retinopathy versus no retinopathy, risk factors associated with retinopathy were long duration of diabetes and higher levels of hbA1c. There was no significant variances in progression of retinopathy in the number of operated and un-operated eyes post-operatively. Progression of

retinopathy was related to higher mean hbA1c OE $p=0.001$ NOE $p=0.015$).

Variable	No. Patients	Percentage
Gender		
Male	44	57.89%
Female	32	42.10%
Age (Means)		
Male	62.5 ± 9.3 years	
Female	58 ± 6.8 years	

Table-I. Demographic variables. n=76

Progression of Retinopathy	Gender	
	Male	Female
Yes (n=46)	27(35.52%)	19(25%)
No (n=30)	17(22.36%)	13(17.10%)

Table-II. Analysis of progression of retinopathy (n=76)

DISCUSSION

Uncomplicated phacoemulsification and good diabetic control were factors associated with improved visual outcome. Cataract has been one major cause for limitations in daily activities of life. It not only obscures vision but also prevents examination fundus, unless it is performed by an expert. Therefore cataract surgery holds benefits a lot more than we can measure. It provides a patient with visual rehabilitation, diagnostic and therapeutic purposes. Along with the defect of retinopathy, diabetes also impairs the blood-aqueous barrier.¹⁹ With advances in medical technology, phacoemulsification is recommended because incision is smaller, recovery time is short and less post-operative complications. Major factors for retinopathy progression include age, severity of pre-operative diabetic retinopathy, duration of diabetes and levels of hbA1c.²⁰

Our results also proved that duration of diabetes and higher hbA1c levels increase risk of retinopathy. There was no relationship between age and progression of diabetic retinopathy. HbA1C values represent the glycemic control of past few months²¹ few studies concluded that retinopathy progression may represent natural course of the disease.²² According to a previous study which compared results of phacoemulsification in non-diabetic patients, outcomes were reported to be worse in diabetic patients, especially with

already developed diabetic retinopathy, however many studies reported good visual outcome after cataract surgery.²³ We only have assessed visual outcome and retinopathy after 1 year of phacoemulsification, which shows definite improvement and visual outcome. Improved visual outcome is directly proportional to patient satisfaction and better health care. Neovascular involvement in retinopathy suggests a progressive stage and is a bad prognostic factor for visual outcome.

Better results were obtained when neovascular involvement should be treated with PRP. Neovascular glaucoma if developed along with cataract, medical therapy alone doesn't provide relief.²⁴ Hyperglycemia is a major cause of transient refractive errors in patients. Unstable sugar levels are thought to be associated with altered morphology of the crystalline lens.²⁵ Alterations in corneal topographic parameters due to fluctuating glucose levels are source of errors in cataract surgery.²⁶ Photic retinopathy is an avoidable complication of cataract surgery, and more profoundly occurs in diabetic patients according to a research done in 2006. The study suggests that diabetic patients are more vulnerable to photic injury and surgeons should take necessary precautions. Surgeons should take necessary precautions to avoid complications which could have been avoided.²⁷ Previous studies focused more on visual acuity and less rehabilitation. In a prospective study done patients at variable stages of diabetic retinopathy were assessed for functional outcome after diabetic retinopathy. Their study proved that advanced diabetic retinopathy have poor functional outcome despite improvement in visual acuity.²⁸

CONCLUSION

People having diabetes mellitus is increasing exponentially. Early diagnosis and good diabetic control is associated with slow development of cataract. Uncomplicated phacoemulsification leads to good visual outcome and better quality of life. Diabetics may not have the same prognosis as compared to no-diabetics, but early surgery can make a difference. Diabetic retinopathy especially

severe has no functional visual outcome, despite surgery.

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*Making mistakes is something everyone does.
Learning from them is not.*

– Unknown – ”

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
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2	Naeem Akhtar Katpar	Data collection Critical revision of the article for important intellectual content.	
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