

Outcome Assessment of Cataract Surgery in Diabetic and Non-diabetic Patients: Prospective Analytical Study

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Received: 06-07-2021 / Revised: 19-08-2021 / Accepted: 28-09-2021

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Conflict of interest: Nil

Abstract

Aim: The aim of this study comparison of outcomes after cataract surgery in diabetic and non-diabetic patients.

Methods: This prospective analytical study was carried out in the Department of ophthalmology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India, for 14 months. Comparison outcome of cataract surgery in 100 diabetics as compared to 100 nondiabetics Within 15 days of Cataract surgery, all the patients underwent fasting blood glucose analysis. Recording of the complete intra-surgical and post- surgical complications along with visual acuity was done at 15 days, three month and six months' time in all the subjects.

Results: In diabetic group 45(45%) were females and 55(55%) were males. Among the non-diabetics, 57 (57%) were males & 43(43%) were females. At 15 days time, the occurrence of Post- surgical visual acuity in diabetic group and non-diabetic group was found to be 0.24 and 0.33 respectively. At three month's time, the occurrence of Post- surgical visual acuity in the diabetic group and the non-diabetic group was found to be 0.33 and 0.44 respectively (table 2). Glycemic control was assessed using fasting blood sugar levels at the time of admission. Of the 100 patients in the diabetic group, 37(37%) had high blood glucose level (FBS: >100mg/dl). Their blood sugar was controlled and they were operated. 63(63%) patients had normal blood sugar levels at the time of examination (70-100mg/dl). Non- significant results were obtained while comparing the mean. Post- surgical visual acuity in between the two study groups at different time intervals (p value > 0.05). Striate keratopathy Was most commonly encountered post- surgical complication in the diabetic group 15 (15%) and the non-diabetic group 10(10%) and followed by Posterior capsular opacity 13(13%) and 9(9%) and Posterior capsular rent 12% and 6% in diabetic and non-diabetic, Pigment dispersion 12% and 9% per in diabetic and non-diabetic patients respectively.

Conclusion: we concluded that the small incision cataract surgery in diabetics without diabetic retinopathy yields similar visual outcomes as non-diabetics. There is a higher incidence of post-operative complications among diabetics, which can be managed conservatively.

Keywords: diabetic and non-diabetic.

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Introduction

Diabetes mellitus is one of the common systemic problems affecting a variety of people worldwide. Various risk factors for development of diabetes include population growth; ageing, urbanization, sedentary lifestyles and an increasing prevalence of obesity[1] By 2030, it is estimated that global prevalence of diabetes would reach approximately 4.4 percent[2]Cataract is considered as a major cause of visual impairment in diabetic patients. Cataract in diabetic patients decreases the visual acuity, makes it difficult or nearly impossible to perform an adequate examination of the retina and to provide photocoagulation treatment. Therefore, it is important to perform cataract surgery for visual rehabilitation, and for diagnostic and therapeutic reasons in diabetic patients with cataract. The association between diabetes and cataract formation has been shown in clinical, epidemiological, and basic research studies. The incidence of diabetic cataracts has been rising steadily.[3,4] Fully describing the pathomechanisms that may help delay or prevent the development of cataract in diabetic patients remains a challenge. Although newer techniques have made cataract surgery safe and predictable, certain intrinsic problems in diabetes lead to poorer visual outcomes in diabetics compared to non-diabetics.

Diabetics are vulnerable to intra- and post-operative complications, retinopathy (DR) progresses more rapidly in diabetic patients after cataract surgery; a ruptured capsule[5] can be a factor in rubeosis. Both diabetes and cataract pose an enormous health and economic burden, particularly in developing countries, where diabetes treatment is insufficient and cataract surgery often inaccessible[1] Many previous studies have shown that either DR or level of DR severity, predicts worse postoperative visual outcomes in patients

with diabetes[6,7] With the advent of modern phacoemulsification cataract surgery, the overall postoperative visual outcome has been found to have improved for the large majority of cataract surgical patients.[12,13]

Material and methods

This prospective observational study was carried out in the Department of ophthalmology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India, for 14 months.

Methodology

We analyzed a total of 100 diabetic and 100 age-matched non- diabetic subjects. All those diabetic cases that underwent cataract surgery were included in the present study.

Patients with history of diabetes, Patients within the age group of 30 to 65 years, Patients without any known drug allergy and Patients without any other systemic illness were included in this study. Patients with traumatic cataracts and Patients with uveitic or complicated cataracts were excluded from this study. Non-diabetic group subjects included subjects with comparable age and sex, who had cataract extraction during the same period. Based on the fasting sugar levels of more than 120 mg/dl, diagnosis of diabetes was made. Within one week of surgery, all the patients underwent fasting blood glucose analysis. Glycemic control in the subjects was divided such as Good (<70mg/dl), Moderate (70-100mg/dl) or Poor (>100mg/dl). Under the administration of peri-bulbar anaesthesia, extra capsular cataract extraction with posterior chamber intraocular lens implantation was done in all the subjects. Recording of the complete demographic details of all the subjects along with clinical details was done separately. Recording of the complete intra-surgical and post-surgical complications

along with visual acuity was done at 15 days, three month and six months' time in all the subjects. Recording of the mean

Snellen acuity was done in all the subjects[14]

Results

Table 1: distribution of diabetic male and female

Diabetic patients	Diabetic	Non-Diabetic
Male	45(45)	57 (57)
Female	55(55)	43(43)
	100	100

Table 2: Distribution of cases according to FBS

FBS	N	%
Normal (70-100)	63	63
High (>100)	37	37
Total	100	100

Table 3: Post- surgical visual acuity in subjects of diabetic and control group

Post- surgical period	Diabetic patients	Non-diabetic patients	p- value
15 days	0.24	0.32	>0.05
Three months	0.32	0.44	>0.05
Six months	0.45	0.62	>0.05

Table 4: Complications occurring both study groups

Complications		Diabetic patients (N)	%	Non-diabetic patients (N)	%
Intra- surgical	Hyphema	4	4	4	4
	Vitreous loss	5	5	5	5
	Posterior capsular rent	12	12	6	6
Post-operative complications	Striate keratopathy	15	15	10	10
	Pigment dispersion	12	12	9	9
	Raised intra-ocular pressure	3	3	2	2
	Posterior capsular opacity	13	13	9	9
	Wound dehiscence	3	3	0	0
	Intra-ocular lens displacement	3	3	0	0

A total of 100 diabetic patients were included in the study group while another 100 non-diabetic patients comprised of control group. Mean age of subjects in the study group and control group was 47.6 and 52.6 years respectively. In diabetic group 45(45%) were females and 55(55%) were males. Among the non-diabetics, 57 (57%)

were males & 43(43%) were females. At 15 days time, the occurrence of Post- surgical visual acuity in diabetic group and non-diabetic group was found to be 0.24 and 0.33 respectively. At three month's time, the occurrence of Post- surgical visual acuity in the diabetic group and the non-diabetic group was found to be 0.33 and 0.44 respectively (table 2). Glycemic

control was assessed using fasting blood sugar levels at the time of admission. Of the 100 patients in the diabetic group, 37(37%) had high blood glucose level (FBS: >100mg/dl). Their blood sugar was controlled and they were operated. 63(63%) patients had normal blood sugar levels at the time of examination (70-100mg/dl). Non-significant results were obtained while comparing the mean. Post-surgical visual acuity in between the two study groups at different time intervals (p value > 0.05). Striate keratopathy Was most commonly encountered post-surgical complication in the diabetic group 15 (15%) and the non-diabetic group 10(10%) and followed by Posterior capsular opacity 13(13%) and 9(9%) and Posterior capsular rent 12% and 6% in diabetic and non-diabetic, Pigment dispersion 12% and 9% per in diabetic and non-diabetic patients respectively.

Discussion

The chronic hyperglycemia of diabetics is associated with long term damage, dysfunction and failure of various organs kidneys, nerves, heart, blood vessels and eyes. In diabetic patients, cataract is one of the major causes of blindness in developing countries. However, the exact pathogenesis of diabetic cataract development is not known. There is associated higher risk of development of complications in diabetic patients undergoing cataract surgery. However, exact incidence of these complications is still unknown[15,17] Hence; under the light of above evidence, we planned the present study to evaluate and compare the prognosis of cataract surgeries in diabetic and non-diabetic patients.

In this study, In diabetic group 45(45%) were females and 55(55%) were males. Among the non-diabetics, 57(57%) were males & 43(43%) were females. Various studies have proven the prevalence of cataract itself is more common in females than males. In the Framingham eye study also senile lens changes were more

common in women. Age related cataract is a bilateral condition, one eye affected earlier than the other.[18]

In the present study, we observed non-significant results while comparing the mean post-surgical visual acuity in between the study group and the control group (p value > 0.05). At 15 days time, the occurrence of Post-surgical visual acuity in diabetic group and non-diabetic group was found to be 0.24 and 0.33 respectively. At three month's time, the occurrence of Post-surgical visual acuity in the diabetic group and the non-diabetic group was found to be 0.33 and 0.44 respectively. Onakpoya OH et al determined the visual outcome of cataract surgery in diabetes mellitus with advanced cataract in a tertiary institution in Nigeria. Twenty three consecutive patients with diabetes and 23 age and sex matched non-diabetic control patients who had extra capsular cataract extraction for advanced cataract. Twenty three patients with diabetes mellitus and 23 non diabetic controls were studied; mean duration of diabetes was 8.1 ± 7.2 years. The mean post-operative visual acuity in diabetics was 0.11 ± 0.38 , 0.33 ± 0.57 and 0.38 ± 0.49 at one week, two months and six months compared with 0.23 ± 0.19 , 0.46 ± 0.37 and 0.48 ± 0.31 in non-diabetics. ($p=0.207$, 0.403 and 0.465 respectively). Improvement in preoperative visual acuity was noted in 84% and 91% in diabetics and non-diabetics respectively. Poor visual outcome in diabetics was mainly due to diabetic retinopathy, maculopathy or diabetes related surgical complications. Visual improvement was seen following surgery for advanced cataract in diabetics in this study population. Post-operative monitoring for treatment of diabetic retinopathy may enhance visual outcome[14]

Lara-Smallings A et al described preoperative risk factors associated with visual outcomes for diabetic patients undergoing cataract surgery and appropriate nursing interventions for these patients. Literature review of risk factors

and cataract surgery outcomes in terms of complications, visual acuity, and visual functioning of diabetic patients was undertaken. Preoperative risk factors and postoperative complications, including inflammation and cystoid macular edema (CME), were also examined. To emphasize evidence of best practices, the role of the nurse as educator and advocate was further explored in terms of their impact on diabetes management of the patient to improve visual results. Diabetic patients of advanced age, with a history of diabetic retinopathy who are taking insulin and have elevated Hb A1C levels, may have an increased risk of intraoperative and postoperative complications and decreased postoperative visual acuity and visual functions that may affect their quality of life. High-risk factors should be identified in diabetic patients when developing a perioperative patient education plan to help reduce their risk of cataract complications and improve their visual outcomes[19]

Glycemic control was assessed using fasting blood sugar levels at the time of admission. Of the 100 patients in the diabetic group, 37(37%) had high blood glucose level (FBS: >100mg/dl). Their blood sugar was controlled and they were operated. 63(63%) patients had normal blood sugar levels at the time of examination (70-100mg/dl). All 100 diabetic patients were on treatment for type 2 diabetes mellitus with either injection insulin or oral hypo-glycemic agents.

In this study the development of PCO in diabetics was 13(13%) compared to 9(9%) in non- diabetics, at the end of 4 weeks, confirming the finding of increase in incidence of PCO in diabetics as shown in previous studies. Study by Ebihara Y et al[20] also showed significant increase in PCO in diabetic compared to non- diabetic patients. A study by Hyashi K et al. also showed significant increase in PCO in diabetics after cataract extraction compared to nondiabetics.

Pigments over IOL were seen in 3(3%) of the cases in diabetics as compared to 0 % in the Non- diabetic group. Previous studies it has been shown that, there is increased pigment dispersion in diabetic patients undergoing cataract extraction and IOL implantation. This may be comparable with: Onakpoya H Oluwatoyin et al[14] showed increase amount of Pigment dispersion 10.83% and 7.5% per in diabetic and non-diabetic patients respectively.

Longer duration of surgery is associated with increased post-operative inflammation. Fibrinous exudates & posterior synechiae was not found in our study compared to previous study. None of the patients in our study had anterior segment neovascularization, as reported in previous studies.

Conclusion

We concluded that the small incision cataract surgery in diabetics without diabetic retinopathy yields similar visual outcomes as non-diabetics. There is a higher incidence of post-operative complications among diabetics, which can be managed conservatively.

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