Original Article

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Study of Cataract Surgical Outcome in Diabetic Patients

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Abstract

Purpose: To evaluate the postoperative outcome, cause of poor visual outcome and complication following cataract surgery in diabetic patients. *Methods:* It is a comparative study conducted on 100 diabetic patients & 100 non diabetic patients undergoing planned manual SICS attending Ophthalmology Dept. in NMCH & RC, Raichur during Nov 2010-Apr 2012. Detailed clinical history and ocular examination was done. These patients were followed up post surgery on day 1, 1st, 3rd, 6th week, 3rd & 6th month. *Results:* Post operatively corneal edema was found in 21% of the diabetic & in 12% of non diabetic patients. Preoperatively 4% of patients had mild NPDR & 8% had moderate NPDR. At the end of 6 month, progression of retinopathy was seen in 6% of the patients. CME was seen in 2% of the patients & CSME occurred in 2% of the patients, P.C.O was observed in 24% of diabetic and 14% of non diabetic patients post operatively. Post operative visual acuity improved in both group, no statistically significant difference was obtained in visual acuity outcome in both the group at the end of 6 month follow up, with p=0.28 (>0.05). *Conclusion:* To conclude diabetic patients with cataract have an overall good visual out come. With adequate blood sugar control, careful preoperative planning, a traumatic surgical techniques, appropriate postoperative medicines & close postoperative supervision, diabetic patients can achieve excellent vision after cataract surgery just like our other cataract patients.

Keywords: Diabetes Mellitus; Cataract; Post Operative Complication; Visual Acuity.

Introduction

A cataract is a clouding of the normally clear and transparent lens of the eye, which may prevent a clear image from forming on the retina, often both eyes are affected. It is one of the leading causes of blindness in the world today, accounting for 50% of blindness world wide [1].

Blindness due to cataract presents an enormous problem in India not only in terms of human morbidity but also in terms of economic loss and social burden. The annual incidence of cataract blindness in India is about 3.8 million [2]. About one sixth of world's total blind with visual acuity >3/60, lives in India [3].

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Diabetic patients have an increased risk of developing cataract and develop cataract at an earlier age than patients without diabetes [4,5,6]. In developed nations, 11–25% of all cataract surgery is performed in patients with diabetes and 1.2–5.0% of these patients will have concomitant diabetic retinopathy [7,8,9].

Diabetics have higher incidence of PCO. Rubeosis, neovascular glaucoma, macular edema, severe inflammation, vitreous hemorrhage, synechiae to IOL, retinal detachment and corneal decompensation can occur postoperatively [10]. Hence, this study is undertaken to know the complications of cataract surgery occurring usually in diabetic patients and their visual outcome compared to non diabetics.

Aims and Objectives

1. To study the postoperative outcome after cataract surgery in Diabetic patients.
2. To study the causes of poor visual outcome after cataract surgery in Diabetic patients.
3. To study the complications following cataract surgery in Diabetic patients.

Materials and Methods

The present study was conducted in Ophthalmology department at Navodaya Medical College Hospital and Research Centre Raichur. Institutional ethical committee clearance was taken for the conduct of the study and informed consent was taken from all the patients.

Source of data:

A prospective study was carried out in 100 diabetic and 100 non diabetic patients who underwent cataract surgery at Navodaya Medical College Hospital and Research Center Raichur, during November 2010 to April 2012.

Methods of data collection:

The study includes cases consisting of 100 diabetic & 100 non diabetic patients (control) who underwent cataract surgery at Navodaya Medical College Hospital and Research Center Raichur over approximately one and half year from November 2010 to April 2012 were compared for their surgical outcome. All surgeries will be performed by consultant ophthalmologist. The patients were followed up for six months post operatively at one week, three weeks, six week, three months and six months respectively. Patients were admitted one day before the surgery. Detailed history was taken regarding the symptoms, duration of diabetes, treatment for diabetes, blood sugar control, past history regarding any history of laser treatment was asked. Family history of diabetes was asked. Associated hypertension was also noted history of insulin use was asked and noted. Laboratory investigations included routine haematological investigations like Hb%, TLC, DLC, RBS, FBS, PPBS, Blood urea, Serum creatinine levels, Urine routine and microscopy. Detailed ocular examination including examination of outer segment with slit lamp biomicroscopy, best corrected visual acuity,intra ocular pressure with applanation tonometry, IOL power calculation was carried out. Fundus examination with direct, indirect and slit lamp biomicroscopy using 90D lens was done to know the stage of retinopathy whenever media permitted. Written informed consent was taken from patient. FFA was done in indicated cases. All cases underwent manual small incision cataract surgeryunder peribulbar block with 2% xylocaine plus adrenaline plus hyaluronidase done by consultant ophthalmologist. A detailed post operative examination of patients was done on 1st day, 1st week, 3 weeks, 6 weeks, 3rd month, and 6t h month. Fundus examination by direct, indirect and slit lamp biomicorscopy was done to know the stage of diabetic retinopathy, macular edema etc.

Inclusion Criteria:

- All patients diagnosed with cataract and diabetes mellitus.
- Patients presenting with all types of cataracts i.e. Cortical, Nuclear, Subcapsular and Capsular.
- 100 non diabetic patients with cataract age matched as control were taken.

Exclusion Criteria:

- Previous ocular trauma, subluxation of the cataractous lens.
- Patients with glaucoma.
- Previous intraocular surgery.
- Previous intraocular laser treatment.
- Patients with complicated cataract and anterior uveitis.
- Patients with uncontrolled hypertension.
- Patients below the age of 18 years.

Result

This clinical study evaluated 100 patients with diabetes were compared with 100 age matched controls that underwent cataract extraction and IOL implantation. Their postoperative outcome which occurred during the six month follow up was noted. The mean age group of the patients in diabetic was 58.43 yrs and in control were 60.15 yrs [Table 1]. It was concluded that in this study, cataract was higher in the age group less than 65 years. Women were more likely to suffer from cataract than men Out of 100 patients in Diabetic group there were 41 male & 59 female. And in control 44 were male and 56 were female. Most of the patients had complaints predominantly in the right eye in control & diabetic groups. Systemic hypertension though the most frequent co-morbid disease in both groups was more frequent amongst diabetics as seen in this study, 48% compared with 23% of the non diabetic counter parts. 12% of the diabetic patients were on insulin & 88% were on oral hypoglycemic drugs. Preoperative visual acuity in diabetic patients and control [Graph 1]. Preoperative slitlamp examination showed out of 100 patients. In diabetics 68% had immature cataract, 30% were

mature & 2% had hypermature cataract. In control 80% of the patients had immature cataract and 20% had mature cataract. All patients underwent small incision cataract surgery under peribulbar block with posterior chamber IOL implantation, performed by consultant ophthalmologist. On comparing postoperatively it was found that, the anterior segment complications were found to be more in diabetic group than the control In this study the corneal edema was seen in 21% of the patients in diabetics compared to 12% in non diabetics. Striate Keratopathy was seen in 14% of the subject in diabetics compared to 8% in control. Pigmentation over IOL was seen in 10% of the individuals in diabetics compared to 4% in non diabetics. Post operative use of steroid antibiotic eye drops helped in reducing operative inflammation in these patients. There was no incidence of neovascularization in this study. Endophthalmitis was found in one patient in diabetic group, studies suggest increase incidence of endophthalmitis in diabetics than non diabetics. The rate of development of PCO in the present study is 24% in diabetic & 14% in non diabetics. 4% of the patients had visual significant PCO in diabetics compared to 2% in control. Preoperative fundus evaluation had shown 12% of the patients had diabetic retinopathy of which 4% had mild NPDR & 8% had moderate NPDR [Table 2]. Post operatively at the end of 6 month follow up 14% of the patients had diabetic retinopathy; 86% had no diabetic retinopathy. 3 patients had mild NPDR, 9 patients had moderate NPDR & 2 had severe NPDR [Table 3]. The presence of pre-operative retinopathy, poor glycemic control and improper treatment may be the cause of retinopathy progression. CSME was found in 2 patients preoperatively. Postoperatively 2 patients developed CSME. CME occurred in 2% of the cases in diabetics than control group. Increase incidence of CME has been found to occur in diabetics. Post operative visual acuity improved in both control & diabetic group. No statistically significant difference was obtained in visual acuity outcome in both the groups at the end of 6 month p-value = 0.28 [Graph 2].

Table 1: Age Distribution in Diabetic and Control Groups

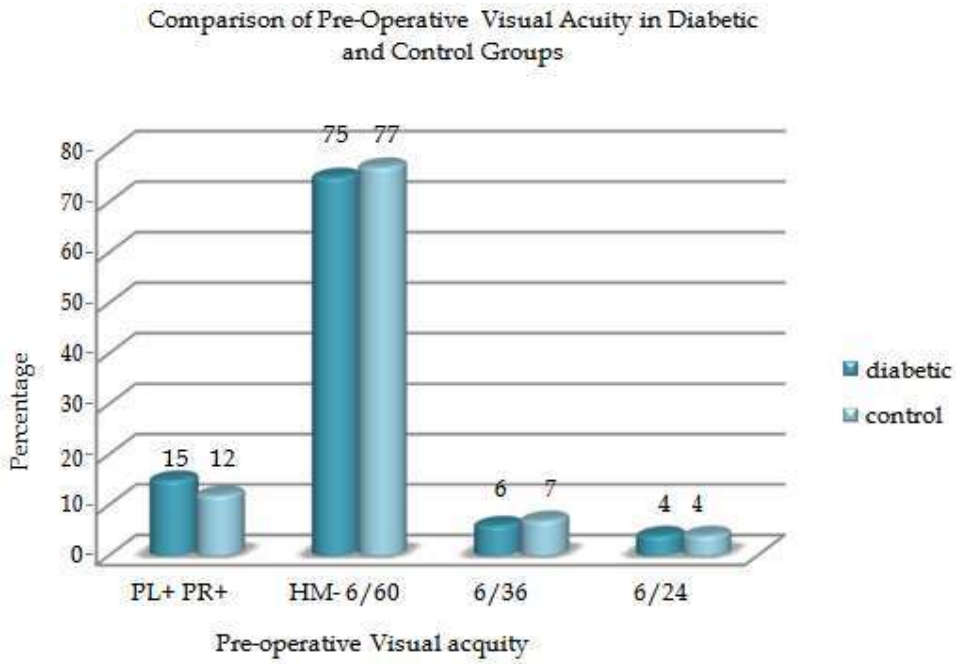
Age in yrs	Diabetic	Percentage	Control	Percentage
< 50	12	12%	7	7%
50-54	14	14%	15	15%
55-59	16	16%	13	13%
60-64	35	35%	31	31%
65-69	13	13%	19	19%
>=70	10	10%	15	15%
Total	100	100	100	100

Table 2: Pre Operative Diabetic Retinopathy

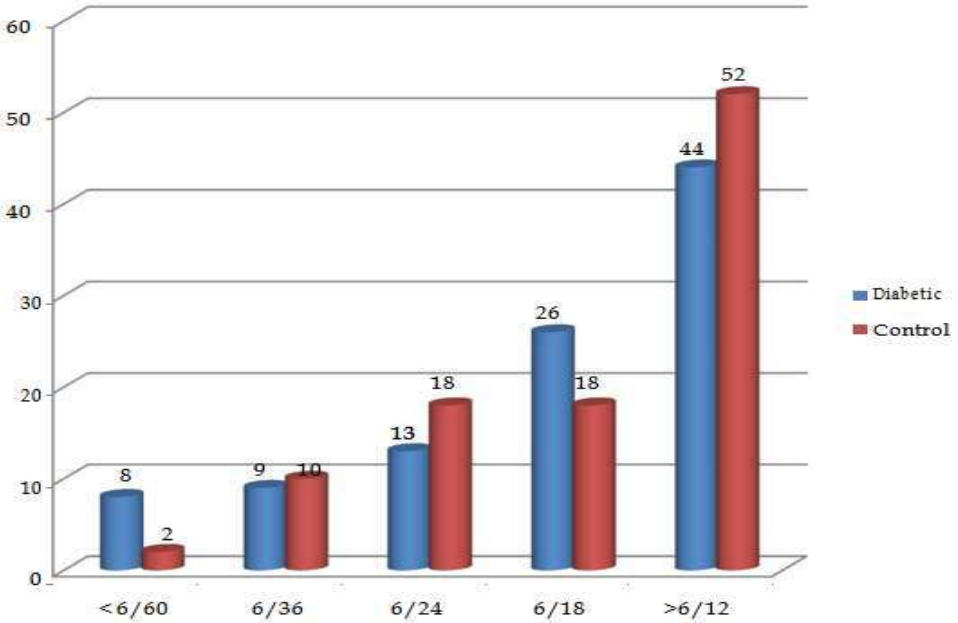
	Preoperative	Percentage	Post operative 1st day	Percentage
No diabetic retinopathy	50	50%	88	88%
No of cases fundus could not be assessed due to media opacity	41	41%		
Mild NPDR	2	2%	4	4%
Moderate NPDR	7	7%	8	8%
Severe NPDR	0	0	0	0
Total	100	100	100	100

Table 3: Post Operative Diabetic Retinopathy at 6 Month

	No of Cases	Percentage
No diabetic retinopathy	86	86%
Mild NPDR	3	3%
Moderate NPDR	9	9%
Severe NPDR	2	2%



Graph 1: Comparison of Pre-Operative Visual Acuity in Diabetic and Control



Graph 2: Post Operative Visual Acuity in Diabetic and Control Group at 6Th Months.

Discussion

In this study, highest number of patients were in the age group of 60-64 years that is 35% in diabetics & 29% in control. 10% in diabetics & 15% of the non diabetic patients were above 70 years. Remaining 42% of the patients in diabetics & 35% of the patients in control were below 60 years. The mean age group of the patients in diabetic group was 58.43±7.78 yrs and 60.15±8.32 yrs in control group. Similarly in this study in diabetic group more than 50% of the patients are below 65 years, showing increased prevalence of cataract in younger age group.

In this study, in diabetic group 59% were female and 41% were male. In control 44% were male & 56% were female. This coincides with the fact that

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 [11].

On examination of the patients on post operative day one, corneal edema was found in 21% & 12% of the cases in diabetic & non diabetics respectively which was considerably higher in diabetics compared to non diabetics. Striate keratopathy was found in 14% of the diabetic compared to 8% in non diabetics. Other studies showing similar higher percentage of striate keratopthy are Onakpoya H Oluwatoyin [12] et al. 30% in diabetic compared to 13% in control group. Pigments over IOL were seen in 10% of the cases in diabetics as compared to 4% in control. As seen in previous studies, there is increased pigment dispersion in diabetic patients undergoing cataract extraction and IOL implantation. This may be comparable with: Onakpoya H Oluwatoyin [12] et al. showed increase amount of pigment dispersion occurring in diabetic patients compared to control i.e 6 in diabetics and 1 in control.

In this study diabetic patients had more anterior chamber reaction compared to non diabetics. Similar observations were made studies conducted by Onakpoya H Oluwatoyin [12] et al; N D George [13] et al. Mechini [14] et al reported intraocular inflammation and its sequelae as the most common complication of their study and Ivancic [15] et al. reported inflammatory reaction fibrinous uveitis & PCO as the most common complications of cataract surgery among diabetics. 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 [16,17].

In this study the development of PCO in diabetics was 24% compared to 14% in non diabetics confirming the finding of increase in incidence of PCO in diabetics as shown in previous studies. Study by Ebihara Y [18] et al., also showed significant increase in PCO in diabetic compared to non diabetic patients. In total, out of 100 patients 6 patients, that is 6% of the patients showed progression in retinopathy. There were 3 patients with mild NPDR, 9 with moderate NPDR & 2 patients had severe NPDR. On comparing with other studies, Squirell [8] et al., showed progression in 20% of the eyes; Mittra [19] et al., showed 25%; A Zaczek [20] showed 21%; Antcliff [21] et al., 34%; Henricssion [22] et al., 43%; Pollack [23] et al., 3.8%; and N D George [13] et al. showed progression in 37.8%. In this study preoperative CSME was present in 2% of the patients, after cataract surgery 2 more patients developed CSME accounting to total of 4% of the cases at the end of 6 month.

Cystoid macular edema developed in 2% of the cases post operatively one at 6th week & other at 8th week postoperatively. None of the cases in control group developed CME. These results were similar with the study by A Zaczek [20] et al. which showed that cystoid macular edema occurred in eyes with diabetic retinopathy. In this study, visual acuity at the end of 6 month showed, 8% of the diabetic 2% of the control patients had vision < 6/60. 48% in diabetics & 46% in control had vision between 6/60 – 6/18, 44% of the diabetics & 52% of the control had a vision of greater or equal to 6/12. No statistically significant difference was found in this study between the 2 groups with a p-value=0.28 ($p>0.05$). Similar observations were made by Onakpoya H Oluwatoyin et al. [12] has shown that there is no statistically significant difference in visual acuity outcome in diabetic & control group. A Zaczek [20] showed that the BCVA 1 year after cataract surgery in eyes with no DR or mild to moderate DR was not significantly different from that of non diabetic control patients. This study also showed significantly poor visual acuity outcome in diabetics with retinopathy compared to control group. The cause of poor visual outcome in diabetic patients following cataract surgery was PCO and diabetic retinopathy. The cause of poor visual acuity outcome in patients in control group was age related macular degeneration, macular scar & optic atrophy.

Summary & Conclusion

To conclude diabetic patients with cataract have an overall good visual out come. With adequate blood sugar control, careful preoperative planning, atraumatic surgical techniques, appropriate postoperative medicines & close postoperative supervision, diabetic patients can achieve excellent vision after cataract surgery just like our other cataract patients.

References

1. Javitt JC, Wang F: Blindness Due to cataract epidemiology & prevention.Annu Rev Public Health 1996;17:159-77.
2. RB Vajpaye et al. Epidemiology of cataract in India: combating plan and strategies. Ophthalmic Res.1999;31(2):86-92.

3. Bhattarjee J et al. Methods for estimating prevalence and incidence of senile cataract blindness in a district? Indian journal of ophthalmology. 1996;44(4):207-211.
4. Dowler J, Hykin PG. Cataract surgery in diabetics. Curr Opin Ophthalmol. 2001;12:175-178.
5. Kleinbek R, Moss SE. Prevalence of cataracts in a population based study of patients with diabetes mellitus. Ophthalmology. 1985;92:1191-1196.
6. Klein BE, Klein R, Wang Q, Moss SSE. Older onset diabetes and lens opacities: the Beaver Dam Eye Study. Ophthalmic Epidemiol. 1995;2:49-55.
7. Harding JJ, Egerton M, van Heyningen R, Harding RS.Diabetes, glaucoma, sex and cataract: analysis of 10 Cataract Surgery and Diabetic Retinopathy 319 combined data from two case control studies. BrJ Ophthalmol. 1993;77:2 6.
8. Squirrell D, Bhola R, Bush J, et al. A prospective, case controlled study of the natural history of diabetic retinopathy and maculopathy after uncomplicated phacoemulsification cataract surgery in patients with type 2 diabetes. Br J Ophthalmol. 2002;86:565-571.
9. Flanagan DW. Progression of diabetic retinopathy following cataract surgery: can it be prevented? Br J Ophthalmol. 1996;80:777-779.
10. N D George, et al.,? Extra capsular cataract surgery with lens implantation in diabetics with and without proliferative retinopathy. Br. J Ophthalmol. 1991;75:09-12.
11. Kahn H, Leibowitz H, Ganley J, The Framingham eye study ; Association of ophthalmic pathology with variables previously measured in the Framingham heart study.Am J Epidemiol 1977;106: p33-41.
12. Onakpoya H Oluwatoyin, Bekibele O Charles, Adegbehingbe A Stella ?Cataract surgical outcomes in diabetic patient; case control study? Middle East African Journal of Ophthalmology. 2009;16(2): 88-91.
13. N D George, et al. Extra capsular cataract surgery with lens implantation in diabetics with and without proliferative retinopathy. Br. J Ophthalmol. 1991;75:09-12.
14. Mechini U, Cappelli S Virgili G. Cataract surgery & diabetic retinopathy. Semin Ophthalmol 2003;18: 103-8
15. Ivancic D, Mandic Z, Barack C, Kopic M. Cataract surgery & post operative complication in diabetic patients. Coll Antropol 2005;29:55-8.
16. Ionides A, Dowler JG, Hykin PG, et al. Posterior capsule opacification following diabetic extracapsular cataract extraction. Eye 1994;8:535-37.
17. Rice TA, Michels RG, Maguire MG et al. The effect of lensectomy on the incidence of iris neovascularization and neovascular glaucoma after vitrectomy for diabetic retinopathy Am J Ophthalmol 1983;95:1-11.
18. Ebihara Y, Kato S, Oshika T, Yoshizaki M, Sugita G. Posterior capsul Opacification after Cataract surgery in patients with diabetes mellitus. J Cataract Refract surg 2006;32:1184-1187.
19. Mittra RA, Borillo JL, Devs, et al. Retinopathy progression and visual outcomes after phacoemulsification in patients with diabetes mellitus. Arch opthalmol. 2000;118:912-17.
20. A Zaczek, G. Olivestedt, C. Zetterstrom, Visual outcome after phacoemulsification and IOL implantation in diabetic patients?. Br J Ophthalmol. 1999;83(9):1036-41.
21. Antcliff RJ, Poulsion A, Flangan DW. Phacoemulsification in diabetics. Eye 1996;16(p18):737-74.
22. Henricsson M, Heijl A, Janzon L. Diabetic retinopathy before and after cataract surgery. Br J ophthalmol. 1996;80:789-93.
23. Pollack A, Leiba H, Bukelman A, et al. The course of diabetic retinopathy following cataract surgery in eyes previously treated by laser photocoagulation. Br J ophthalmol 1992;76:228-31.