Comparison Of Pupil Dilataion Obtained In Type 2 Diabetic And Nondiabetic Patients

Dr.Godhuli Patri *(2nd yr PG resident)* ***Prof Dr. Prafulla Chandra Mahapatra***
Dept of Ophthalmology, Hitech Medical College , Bhubaneswar

Introduction :

India has one of the most alarming number of diabetic patients which is also expected to increase in the near future. Diabetic retinopathy, a major complication of diabetes is one of the easily demonstrable example of micro vascular assault that this disease can produce and is also an early feature.Pupillary autonomic neuropathy is considered an early sign of the development of systemic autonomic neuropathy. An optimal modality of diagnosis is not yet found out for the early detection of eye disease caused by diabetes. Pupillary dilatation is an essential part for the screening of early diagnosis of diabetic retinopathy. Interestingly, sympathetic denervation is associable to the duration of diabetes the study[4].Hence this study is designed to investigate the effect of pupil dilatation (mydriasis) brought about in diabetic and non-diabetic population by topical tropicamide 0.8% w/v and phenylephrine 5% w/v and also its relationship to the duration of diabetes.

Purpose:

The purpose of this study was to evaluate obtained mydriasis with topical Tropicamide 0.8% and phenylephrine 5 % in diabetic and non diabetic subject and to study the effect of duration of diabetes on dilatation of pupil.

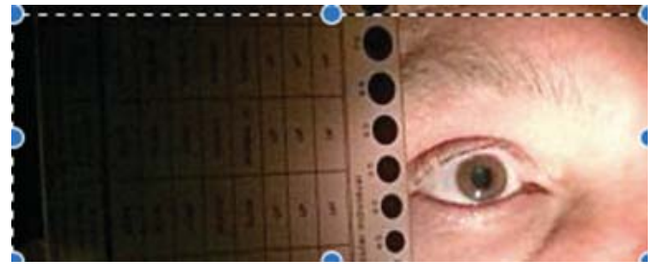
Method:

The study was conducted over a three month period from august 2016 to October 2016 in Hitech Medical College & Hospital, Bhubaneswar. 120 eyes from 60 patients (35 type 2 diabetics with duration of diabetes >=8 yrs and 15 non diabetics) were dilated with tropicamide 0.8% w/v and phenylephrine 5% w/v. In both groups pupil diameters were measured after 40 minutes using pupil gauge.Study population included were patients requiring pupil dilatation for fundus examination. Patients below the age of 45years and those more than 75 years were excluded from this study.Patients with any active or previous eye infection or previous ocular surgery including laser treatment ,posterior synechiae, shallow anterior chamber, angle closure glaucoma, ocular disorders involving iris, history of ocular injuries, hypertension ,neurological, cardiovascular disorders were also excluded from this study.

One to three drop per eye of the drug was administered and patients were advised to keep their eyes closed for 40 minutes.In both groups pupil diameters were measured after 40 minutes. Pupil diameter was vertically measured with a pupil gauge under bright light without magnification. The pupil gauge comprises a sequence of multiple half and full circles progressing in diameter from 2 to 12 mm with 1mm increment. The eye was illuminated with a torchlight during measurement.

The pupil diameter was compared to the size of these circles on the pupil gauge. Blood pressure and pulse rate were checked prior to application and every 15 minutes thereafter.

Statistical Analysis Data are expressed as mean + standard deviation. Studentâ•™s t-test (paired) SPSS was used for statistical evaluation of the experimental data The difference of the mean pupil size between diabetics and non diabetics after dilatation were tested with 2 tailed t- test.



Result

Total number of patients participated in this study was 60, and age ranges from 45 to 75 years. Mean age of non diabetic participants was 51.09 +/- 6.4 years and diabetic patients were 60.0.6 +/-7.1 years.There was no significant difference between the ages of these two groups. Mean duration of diabetics was 10 years.Mean pupil diameter in non-diabetics was 7.76 (Right Eye (RE)), 7.74 (Left Eye (LE)) and 7.19(RE) and 7.18(LE) mm in diabetics (p- value = 0.001). Pupil diameter was greater than 7mm in all patients.There is a significant negative correlation observed with duration of diabetes and dilatation of pupils, as the duration of diabetes increases there is significant decrease in the dilation of the pupil p-value for both RE and LE is 0.001.The study also showed that as the duration of diabetes increases there is significant decrease in the dilation of the pupil .

EYE	DIABETES	NUMBER	MEAN	STD DEVIATION	P VALUE
LEFT	NO	25	7.74		0.01
	YES	35	7.18		
RIGHT	NO	25	7.76		0.01
	YES	35	7.19		

Table : pupillary dilatation in diabetic subjects and non diabetic subjects

Discussion :

The quality of an intraocular examination depends on adequate pupil dilatation. The ideal mydriatic agents shouldprovide rapid dilatation of the pupil wide enough to permit thorough ocular evaluation, without having any significant local or systemic adverse effects. Since phenylephrine is associated with [2]dangerous cardiovascular side effects, using lower concentration of the drug and reducing its repeated application can reduce the risk of side effects. In this study, using a combination of tropicamide 0.8% and phenylephrine 5%, it was found that there was significant difference in the mean pupil dilation in both diabetics and non diabetics. But pupil dilatation was more than 7 mm in both the groups[1]. Thus, limiting topical drop from one to two drops can reduce side effect as well as the cost of using multiple applications.. Repeated application of the drug was usually practiced to accelerate the pupil dilatation.Various study on single dose of tropicamide 1% and phenylephrine 10 % for pupil dilatation showed that single dose of above drugs produced equivalent pupil dilatation compared to multiple applications.[7] In another study by Hsiao - Lei et al, in long term diabetic patients with tropicamide 1% and phenylephrine 10% showed poorer response to pharmacological mydriasis, and also in [5]long term diabetic patients with diabetic retionopathy than non diabetics. But both groups achieved adequate pupil dilatation for fundus examination with the combination (more than 7mm). Higher prevalence of small pupil size was found in patients with diabetic retinopathy.

Another study by Coblentz et al on comparison between obtained mydriasis in non diabetic and Type 2 diabetic patients showed that diabetic patients can achieve mydriasis as satisfactory as non diabetic patients (More than 7mm) with tropicamide 1% and phenylephrine 10%.

Conclusions:

Long-term diabetic patients showed poorer response to pharmacological mydriasis than nondiabetic patients.

Higher prevalence of small pupil size was found in patients with diabetic retinopathy.When a combination of tropicamide 0.8% and phenylephrine 5% is used, diabetic patients can achieve mydrisasis required for funduscopy , but there is a significant decrease in the dilatation of pupil with the increasing duration of diabetes.

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