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ABSTRACT ARVO

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TITLE

Diurnal refractive error fluctuations in diabetic and control subjects

Purpose:

Refractive error has been shown to fluctuate in poorly controlled diabetic patients. The purpose of this study was to measure acute diurnal fluctuations in refractive error and blood glucose levels (BGLs) in diabetic and control subjects.

Methods:

Twenty-one type 2 diabetic subjects (age 56 ± 11 years), 20 type 1 diabetic subjects (age 38 ± 15 years) and 20 non-diabetic controls (age 49 ± 23 years) took part in the study. Refractive error was measured with an OPD ARK-10000 autorefractometer (Nidek) and BGLs were measured using a finger stick test (Hemocue). All measurements were taken between 8AM and 8PM at approximately two-hourly intervals. Using power vector analysis the variability in refractive error was mapped against time of day and related to BGLs, HbA1c, diabetic status and duration of disease.

Results:

Refractive error did not fluctuate significantly during the day in any of the three groups (ANOVA $p > 0.05$). The mean $\pm$ SD values for BGLs during the day were 10.4 ± 4.40 mM/l in DM type 2, 10.3 ± 5.30 mM/l in DM type 1, and 5.4 ± 1.04 mM/l in control subjects. BGLs changed significantly during the day and between groups (ANOVA $p < 0.0005$). The correlations between refractive error components (mean sphere, J180 and J45) and BGLs did not reach statistical significance (ANOVA $p > 0.05$). Multiple regression analysis showed that neither BGLs, HbA1c, diabetic status, nor duration of disease had a significant effect on diurnal refractive error measurements. ($p > 0.05$).

Conclusions:

Diurnal changes in BGLs do not result in significant acute refractive error fluctuations in diabetic patients, as measured with an autorefractometer.

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