

The Use of Optical Coherence Tomography to Determine the Effect of Thiazolidinediones on Retinal Thickness in Patients with Type 2 Diabetes

Aaron K. Tarbett, O.D.,¹ LTC Ronald C. VanRoekel, O.D.,² Robin S. Howard, M.A.,³
and COL MC Robert A. Vigersky, M.D.⁴

Abstract

Objective:

Thiazolidinediones (TZDs) are insulin-sensitizing agents that are associated with peripheral edema and have been reported to be associated with diabetic macular edema (DME). We hypothesized that TZDs produce subclinical increases in retinal thickness that may be detected by optical coherence tomography (OCT) but are not seen on routine dilated funduscopic examination.

Research Design and Methods:

We used OCT to screen for subclinical DME in a cross-sectional study of patients with type 2 diabetes; 29 patients were taking TZDs and 58 were not taking TZDs. We analyzed data using multiple linear regression analysis to investigate associations of retinal thickness with clinical characteristics.

Results:

There was no significant difference between the central subfield retinal thickness in the non-TZD group (206.4 ± 28.0 microns; $n = 59$) and TZD group (204.1 ± 26.1 microns; $n = 29$) ($p = .72$) nor were there significant differences in any other retinal subfield. There was no significant correlation of retinal thickness with laboratory results studies—peripheral edema, gender, age, duration of diabetes, individual, or combinations of medications. Retinal thickness differences between regions displayed normal anatomical variation. However, ethnic differences were found in which African-Americans had thinner retinas in all regions than Caucasians regardless of whether or not they used TZDs.

Conclusions:

These data suggest that TZDs do not cause subclinical DME in a demographically diverse patient population with diabetes. The established normal ranges for macular thickness may require adjustment based on ethnicity.

J Diabetes Sci Technol 2011;5(4):945-951

Author Affiliations: ¹Optometry Clinic, Walter Reed Army Medical Center, Washington, District of Columbia; ²DiLorenzo Tricare Health Clinic, Washington, District of Columbia; ³Department of Clinical Investigation, Biostatistics Section, Walter Reed Army Medical Center, Washington, District of Columbia; and ⁴Endocrinology Service, Walter Reed Army Medical Center, Washington, District of Columbia

Abbreviations: (BDR) background diabetic retinopathy, (CI) confidence interval, (DME) diabetic macular edema, (HbA1c) hemoglobin A1c, (LDL) low-density lipoprotein, (OCT) optical coherence tomography, (RM ANOVA) repeated measures analysis of variance, (SD) standard deviation, (TZD) thiazolidinedione, (WRAMC) Walter Reed Army Medical Center

Keywords: diabetic macular edema, optical computerized tomography, oral antidiabetic agents, retinal thickness, type 2 diabetes mellitus, thiazolidinediones

Corresponding Author: Robert A. Vigersky, M.D., Endocrinology Service, Walter Reed Army Medical Center, 6900 Georgia Avenue NW, Washington, DC 20307-5001; email address robert.vigersky@amedd.army.mil