OBESITY MAY INFLUENCE MEASUREMENTS OF CHOROID THICKNESS IN OPTICAL COHERENCE TOMOGRAPHY

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Background: Excessive weight is a well-known risk factor for microvascular diseases. Changes in thickness in a vascular tissue, such as the choroid, can be useful to evaluate the effect of obesity on the microvascular system. The aim of this study was to evaluate the effect of obesity on choroid thickness.

Materials and Methods: The prospective clinical study included examination of the right eyes of 72 patients. The right eye of 68 patients were examined and served as the controls. A complete ophthalmological examination and OCT imaging were performed for each group study and data were analyzed in the Statistical Package for Social Sciences (SPSS) software version 20.0. Results: The obese group consisted of 72 female patients with a mean age of 37.2 (±7.1) years. The control group included 65 female subjects with a mean age of 37.8 (±7.9) years (p>0.05). There was no significant difference observed for the foveal thickness between the control and obese group. In the obese group, the OCT imaging revealed significant choroid tissue thickening subfoveally at the area of 500 μm temporal to the fovea. There was a positive correlation between obesity and OCT imaging. Conclusion: Obesity may influence choroid thickness. OCT imaging was found to be better than BM and CT.

Keywords: choroid, obesity, obese women, optical coherence tomography.

Introduction

Obesity is a common health problem and its prevalence is increasing worldwide [1-3]. The association of obesity with retinal degeneration, formation, and age-related macular degeneration has been shown in varying degrees. Researchers have hypothesized that retinal microvascular changes are precursors to developing obesity based on experimental and observational studies [4-8]. The increased BMI has been associated with the prevalence of higher body mass index (BMI) and the increased risk of incident obesity [9]. In this study, we have evaluated the posterior segment of the eye in order to assess the influence of obesity on the microvascular system of the eye. The results show that obesity is associated with a thicker choroid, which can be a predictor of the development of obesity.

Table 1: Demographics of the groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Age (years)</th>
<th>BMI (kg/m²)</th>
<th>Weight (kg)</th>
<th>Height (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obese</td>
<td>37.2±7.1</td>
<td>27.9±6.8</td>
<td>160.6±16.9</td>
<td>60.2±8.0</td>
</tr>
<tr>
<td>Control</td>
<td>37.8±7.9</td>
<td>23.9±5.0</td>
<td>168.9±16.4</td>
<td>60.2±8.0</td>
</tr>
</tbody>
</table>

Table 2: Changes in foveal thickness and choroidal thickness

<table>
<thead>
<tr>
<th>Group</th>
<th>BMI (kg/m²)</th>
<th>FT (μm)</th>
<th>Choroidal thickness (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obese</td>
<td>25.1±9.8</td>
<td>1050±150</td>
<td>550±150</td>
</tr>
<tr>
<td>Control</td>
<td>1050±150</td>
<td>550±150</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

In the eye, CT may be affected by several factors, such as age, axial length, and refractive errors [7-8]. Elliptical changes in CT have also been reported [9]. It is believed that systemic blood pressure and intracocular pressure induce choroidal changes through an autoregulatory mechanism [10]. Therefore, because the choroid possesses a rich vascular structure, all of the abovementioned factors have the potential to alter the CT [11]. A number of studies have shown that CT plays a prognostic or predictive role in various topical levels (including diabetes, diabetic retinopathy, and AMD), and systemic diseases (e.g., hypertension, anemia, and rheumatoid arthritis) [12-14]. Jang et al. reported the effects of obesity on the microvascular system; hyperviscosity and elevated blood pressure were found to be the major causes of the vascular alterations in obese women [15]. In another study by Kavakalli et al., both retinal venous and arterial dilation were found in hypertensive patients [16]. Research by Salo et al. studied the retinal venous system in 800 subjects and reported an incidence of 5 years of obesity in some patients [17]. The authors found a positive correlation between vessel caliber and BMI, however, no correlation was observed between these changes and the development of obesity.

In this study, CT was found to be significantly reduced in the obese-control group, except for the temporal measurement of 1500 μm. In the temporal measurement, there was no significant difference observed between the groups. In our study, obesity was associated with a thicker choroid and choroidal layer of the eye. In the present study, the obesity group consisted of patients with a BMI ≥ 30, and subjects with a BMI ≤ 25 constituted the control group. To avoid any diurnal effect, we performed all the measurements at the same time of the day. We also included patients with a history of local and systemic diseases. Although no significant differences were found for FT between the groups, there was a significant increase in CT at certain points (FT between 100 and 1500 μm) in the obese group. The results indicate that there was a positive correlation between BMI and FT, and multiple linear regression analysis revealed that CT was independently affected by the age of the patients.

In summary, our data provides evidence for a relationship between CT and obesity in female patients. Vascular abnormalities may occur at earlier stages in obesity and retinal circulation may be a predictor for the disease process. The assessment of CT is a quick and non-invasive technique, which can be utilized to determine such abnormalities. Nevertheless, it is unclear how this data may be applied to individual patients and how it can benefit obesity management. This suggests that CT measurement has a predictive role and should be included among the parameters that may affect CT results in obese women.

References