Queries for wjem-13-02-10w

1. Author: This article has been lightly edited for grammar, style, and usage. Please compare it with your original document and make changes on these pages. Please limit your corrections to substantive changes that affect meaning. If no change is required in response to a question, please write “OK as set” in the margin. Copy editor
Retinal arteriovenous ratio (AVR) and retinal arteriolar tortuosity measures were determined from fundus photographs using the ImageJ Software (NIH, Washington, DC). The AVR was calculated incorporating aspects of the method of Parr and Spears.\textsuperscript{1,2} The diameter of each optic disc was measured, then an overlay was placed on each photograph to demarcate the measurement zone (Figure). Each photograph was magnified 4.5 times to permit measurement, and the green channel was used to enhance contrast. Each vessel coursing through the measurement zone was identified as an arteriole or a venule. The diameter of each vessel was measured by marking its edges, then calculating the distance between the edges using the formula $a^2 + b^2 = c^2$. The average diameter of each vessel was calculated from 3 measurements within the measurement zone, and an average AVR was determined using the diameters of the 3 largest arterioles and venules. Two subjects were excluded from this analysis because of ungradable fundus photographs. In another subject, the AVR from a single gradable eye was used for analysis. A previous study demonstrated substantial correlation between the arteriolar and venular diameters of fellow eyes and moderate correlation between their AVR.\textsuperscript{3}

Tortuosity was determined based on the method of Lotmar et al.\textsuperscript{4} Tortuosity measurements were performed on the 2 largest arteries in the temporal field of each eye. A line was drawn tangent to the troughs of the first arc as each given artery emerged from the optic disc, and length from trough to trough was measured using ImageJ. An average of 3 length measurements was calculated. Another line was drawn perpendicular to the baseline, and the distance was measured from the baseline to the highest point on the arc. The average of 3 measurements defined the value for height. The relative length variation, used as the measure of tortuosity in this analysis, was calculated according to the equation $\Delta l/l \approx 8/3 \times (h/l)^2$, where $l =$ length and $h =$ height. An average relative length variation was calculated from the values obtained for each individual eye. One subject was excluded from the tortuosity analysis because of inadequate photograph quality in both eyes. Two subjects had inadequate photograph quality in one eye; in these cases, the other eye was used for analysis.

REFERENCES


Figure. Color fundus photograph of the right eye with overlay demonstrating the measurement zone for determination of arteriovenous ratio, located between 1.5 and 2 disc diameters from the optic disc margin.