

# Central retinal thickness is the principal determinant of visual function in retinal vein occlusion

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**Purpose:** Optical coherence tomography (OCT) is the main diagnostic tool to detect morphological changes of the retina, and assess disease progression and treatment response in retinal vein occlusion (RVO). The purpose of this study was to determine the impact of retinal changes in baseline OCT images and demographic factors on visual acuity (BCVA) in untreated RVO patients.

**Methods:** Posthoc analysis including OCT data of treatment-naïve BRVO and CRVO patients from the Vienna Reading Center imaging database. Key inclusion criteria were a BCVA letter score between 73 and 19 ETDRS letters and age > 18 years. Primary outcome measure was the mean change in ETDRS letters associated with each individual biomarker, indicated by its regression coefficient. The latter was obtained by calculating multivariable regression models, using the backward method for variable selection. Morphological changes covered central retinal thickness (CRT), foveal contour, intra- and subretinal fluid (IRC, SRF), ELM/EZ integrity, disorganization of retinal inner layers, hyperreflective foci (HRF), conditions of vitreomacular interface and signs of ischemia. Demographic factors included age, disease duration and gender. Morphological grading was done manually by a masked and certified grader as well as retina expert of the reading center.

**Results:** Included were 381/301 patients with BRVO/CRVO, in which the following biomarkers were statistically significant: in BRVO, 100µm increase in CRT at the central subfield (CSF)/100µm increase in cyst height/IRC at center point (CP) correlated with a change in ETDRS letters of -8.7, -1.0, +2.4. In CRVO, 100µm increase in CRT at CSF/presence of IRC at the CP was associated with a loss of -9.7 and -4.5 letters. In the total cohort, 100µm increase in CRT at CSF/30HRF at the central B-scan/SRF at CP correlated with a change of -9.0, -1.9 and +2.5 letters. Letter changes due to age/female gender/doubling of disease duration were -2.5/-3.4/NI (not included) for BRVO, -1.3/NI/-0.8 for CRVO, and -2.0/-2.5/NI for the total cohort. Adjusted multiple R<sup>2</sup> for the respective model was 19.8%/28.4%/25.4%.

**Conclusions:** Structurally, an increase in CRT and the presence of IRC/SRF on baseline OCT images correlate most with vision in RVO patients at the treatment-naïve stage. When interpreting OCT images, fluid should thus be the focus of our attention in the monitoring and treatment of RVO patients.