Automated Vessel Density Detection in Fluorescein Angiography Images Correlates With Vision in Proliferative Diabetic Retinopathy

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Summary

• We developed an algorithm that can quickly and reliably quantify retinal vessel density from FA images

• We found a positive correlation between computed vessel density and BCVA in PDR patients, but not CRT



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Retinal Non-Perfusion and PDR







Fluorescein Angiography



Assessing Retinal Blood Flow **Optical Coherence Tomography Angiography**



Arya and Waheed, 2018



Shortcomings of Quantifying Retinal Vessels Limitation of the peripheral retina captured on OCTA Inability to quantify FA beyond manual vessel detection



Sadda, et al 2015



Contrast Affects Vessel Visualization







References	Conclusions		

Purpose

Automate vessel detection and quantification from FA images

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Purpose









We designed an algorithm to detect retinal vessels from FA images



We performed a secondary analysis of the RECOVERY trial







We designed an algorithm to detect retinal vessels from FA images







Secondary analysis of the RECOVERY trial images

Detected Vessel Map





Vessel density calculations are reliable and fast



Differences in vessel density correlate with BCVA, but not CRT





Automated vessel detection is unaffected by contrast

Original UWFFA image

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Sample high magnification regions Detected vessels Contrast-enhanced Low contrast







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Vessel density calculations are reliable and fast



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0.14	0.16	0.18	0.2
Vessel	Density		





Vessel density correlates with BCVA

r = 0.407, p=0.0075









Vessel density correlates with BCVA



Vessel density does not correlate with CRT

r = 0.0533, p = 0.7376

Our algorithm quickly and reliably quantifies retinal vessel density from FA images

We found a positive correlation between computed vessel density and BCVA in PDR patients, but not CRT

Future directions include studying longitudinal vessel density changes

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