Stein Eye Institute

### Introduction

trimester high risk pregnancies to low risk pregnancies.



nasal, temporal, and inferior regions are shown, with the fovea being 1mm in diameter. The parafoveal region is the sum of the superior, nasal, temporal, and inferior subfields.

# Characterizing changes in retinal perfusion in high risk pregnancies with optical coherence tomography angiography

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> centered over the fovea (row 2). The area of the binarized image (row 3) is summed to calculate summative vessel perfusion density. The image is subsequently skeletonized and the area calculated again to determine vessel length density.

### **Results/Discussion**

A total of 134 and 16 eyes from women with high and low risk pregnancies, respectively, were imaged (Figure 2). The most common reasons for high risk pregnancy were advanced maternal age (55 patients), diabetes mellitus (16 patients), intrauterine growth restriction (12 patients) and hypertension (12 patients). High risk eyes demonstrated significant decreases in PD and VLD in the foveal zone of all three vascular beds in comparison to low risk eyes. However, when the entire field of view was analyzed, only PD and VLD of the SVP showed significance hypoperfusion. The foveal zone may be the most sensitive area to examine due to the baseline low perfusion of the foveal avascular zone relative to the rest of the retina. Imaging was repeated in 6 eyes in 3 women with high risk pregnancies in the postpartum period. Postpartum imaging revealed a nonsignificant trend toward opposite perfusion changes in SVP-PD/VLD and DCP-PD/VLD. This suggests a reversal of vascular perfusion changes in pregnancy. However, postpartum data is significantly limited by the limited number of eyes imaged.

Perfusion density, foveal zone					Vessel length density, foveal zone			
	High risk pregnancy	Low risk pregnancy	P value			High risk pregnancy	Low risk pregnancy	P value
SVP	7.97 ± 4.02	14.56 ±4.42	<0.0001		SVP	$1.91 \pm 0.96$	3.54 ±1.15	0.0001
ICP	17.02 ± 4.34	22.82 ± 2.60	<0.0001		ICP	4.12 ± 1.06	5.54 ± 0.76	<0.0001
DCP	7.55 ± 4.11	11.25 ± 4.40	0.0068		DCP	$1.90 \pm 1.04$	2.87 ± 1.18	0.0080
Derfusion density, anting income								

Perfusion density, entire image			vesser length density, entire image				
	High risk pregnancy	Low risk pregnancy	P value		High risk pregnancy	Low risk pregnancy	P value
SVP	31.91 ± 1.56	33.46 ± 1.25	0.0003	SVP	8.25 ± 0.55	8.72 ± 0.66	0.0162
ICP	31.92 ± 1.40	32.38 ± 1.27	0.2152	ICP	8.48 ± 0.45	8.51 ± 0.38	0.5843
DCP	32.66 ±1.85	32.32 ± 1.18	0.3570	DCP	8.83 ± 0.60	8.63 ± 0.45	0.1577

**Table 1.** Significant hypoperfusion was found in the PD and VLD of all three vascular beds in the foveal zone. However, when the entire field of view was analyzed, only the SVP demonstrated significant hypoperfusion in both PD and VLD.

- vasculature during pregnancy.

- reversed with delivery.



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## Conclusions

1) OCT-A can be used to safely and noninvasively characterize the retinal

2) Relative to low risk pregnancies, high risk pregnancies experience significant reductions in vascular perfusion in the SVP-PD and SVP-VLD. 3) Changes in the retinal vasculature in pregnancy trend towards the

opposite direction in the postpartum period, suggesting reversibility.

4) Further studies may be warranted to better characterize the effect of risk factors on retinal vasculature perfusion and if perfusion changes are fully