ASSESSMENT OF FOVEAL AVASCULAR ZONE USING FLUORESCEIN ANGIOGRAPHY AND OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN CENTRAL RETINAL VEIN OCCLUSION

Al i Metwally El Ghatit, Mohsen Ahmed Abou-shousha, Omar Ahmed Abd El Salam Abo El Ezz
Department of Ophthalmology, Faculty of Medicine, Alexandria University

Introduction

Retinal vein occlusion (RVO) is the second most common vascular retinal disease after diabetic retinopathy .Visual prognosis depends on the amount of retinal ischemia and macular edema. It has also been shown that the diameter of the FAZ is inversely correlated with the best corrected visual acuity. RVO can be categorized in ischemic and nonischemic vein occlusion depending on the area of non-perfusion in FA.

Fluorescein angiography (FA) remains the clinical gold standard for detecting vascular pathology in the retina. However, it is an invasive test that requires exposure to an exogenous contrast agent. Adverse effects of fluorescein range from nausea and pruritus to anaphylaxis.

Optical coherence tomography angiography (OCTA) has recently emerged as a promising noninvasive way to visualize retinal microvasculature. It uses the motion of erythrocytes illuminated with near-infrared light to generate perfusion maps. The longer wavelength avoids the potential for photochemical damage, which could be especially important for diseased retinas.

Aim of the work

The aim of the work was to assess foveal avascular zone in fluorescein angiography and optical coherence tomography angiography in eyes with central retinal vein occlusion as regards: area , perimeter and circularity of FAZ.

Assessment of FAZ at the level of superficial capillary plexus (SCP) & deep capillary plexus (DCP)

Patients and Methods

This study was carried out on 20 eyes with recent (within six months of incidence) central retinal vein occlusion (non-ischemic or ischemic). Cases are patients attending to outpatient clinics in Alexandria Hospital of Ophthalmology between 2020 and 2022, *S***ubjected to the following:**

1- Medical history taking.

2- Complete clinical ophthalmological examination:

A. Visual acuity testing using E chart. **B.** Intraocular pressure (IOP) measurement

C. Fundus examination biomicroscopy using 90˚non-contact lens.

***3- FA : to assess size FAZ* : Scanning protocol:**

A. Color photo mode. **B.** Red-free photo mode.

C. Fluorescein photo mode, with its different phases.

4- OCT: Zeiss Cirrus High Definition OCT (Cirrus HD-OCT, model 5000, Software version 6.0, Carl Zeiss Meditec, Inc) a spectral domain OCT.

Scanning protocol:

A. Macular cube512x 128 **B.** HD 5-line raster

5- OCT angiography: Zeiss AngioPlex OCT Angiography (Cirrus HD-OCT, model 5000, Software version 8.1, Carl Zeiss Meditec, Inc), to assess FAZ at the level of superficial capillary plexus (SCP) and deep capillary plexus (DCP).

Scanning protocol:

A. 3 x 3 macular angiography cube **B.** 6 x 6 macular angiography cube .

All the cases are studied by the same operator.

Results

Table 1: Intra class Correlation coefficient for FA and OCTA

	N	ICC coefficient	95% C.I	p	Level of a greement
FA vs. SCP (area)	17	0.973	0.928 – 0.990	<0.001*	Excellent
FA vs. SCP (perimeter)	17	0.349	-0.142 – 0.703	0.078	Poor
FA vs. SCP (circularity)	17	0.890	0.723 – 0.959	<0.001*	Good
DCP vs. FA (area)	15	0.088	-0.428 – 0.561	0.373	Poor
DCP vs. SCP (area)	15	0.099	-0.419 – 0.568	0.358	Poor

FA: Fluorescein angiography
OCTA: Optical coherence tomography angiography
SCP: Superficial capillary plexus
DCP: Deep capillary plexus
CI: Confidence interval
LL: Lower limit
UL: Upper Limit
***:** Statistically significant at $p \leq 0.05$

Table 2: Descriptive analysis of the studied cases according to FA, OCTA SCP and DCP

	Mean ± SD.
FA area	0.42 ± 0.16 mm2
FA perimeter	2.56 ± 0.47 mm
FA circularity	0.79 ± 0.08
OCTA SCP area	0.47 ± 0.20 mm2
OCTA SCP perimeter	3.16 ± 1.41 mm
OCTA SCP circularity	0.72 ± 0.11
OCTA DCP area	4.16 ± 2.42 mm2

SD: **Standard deviation**

FAZ area measurements on FA showed excellent agreement with measurements on OCTA at the level of SCP r, while OCTA at DCP showed poor agreement with both FA and OCTA at SCP.

As regards FAZ perimeter, OCTA at SCP showed poor agreement with FA, OCTA at DCP also showed poor agreement with both FA and OCTA at SCP.

As regards FAZ circularity, measurements on OCTA at SCP showed good agreement with FA, while OCTA at DCP showed poor agreement with both FA and OCTA at SCP.

Conclusion

OCTA of SCP can offer comparable data to FA as regards FAZ. OCTA may be superior to FA for the early evaluation of the FAZ in CRVO as vascular abnormalities are more pronounced in the deep layer. The main drawback of OCTA is shadowing of underlying vascular structure by edema.