ULTRA-WIDE FIELD Fluorescein Angiography in SICKLE CELL RETINOPATHY: Correlations Between Peripheral Non-perfusion Area and Macular Vascular Density on Optical Coherence Tomography Angiography.

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Purpose

In patients with sickle cell retinopathy (SCR), to study correlations between peripheral retinal nonperfusion assessed using ultra-wide field fluorescein angiography (UWF-FA) and the automatically quantified macular vascular densities in the superficial (SCP) and deep capillary plexus (DCP) obtained using optical coherence tomography angiography (OCTA).

Methods

Prospective, observational study of patients with sickle cell retinopathy who underwent a comprehensive ophthalmic examination including UWF-FA (Optos, Marlborough, MA) and OCTA using the AngioVue OCTA system (Optovue RTVue XR 100; AVANTI, Fremont, CA) and PlexElite (Zeiss). Vascular densities in the superficial capillary plexus and DCP, as well as the area of the foveal avascular zone, were measured using AngioAnalytics software. Ischemic areas were manually selected and the ischemic index was automatically calculated in mm² with the Optos Advance software using a correction factor in the peripheral retina.
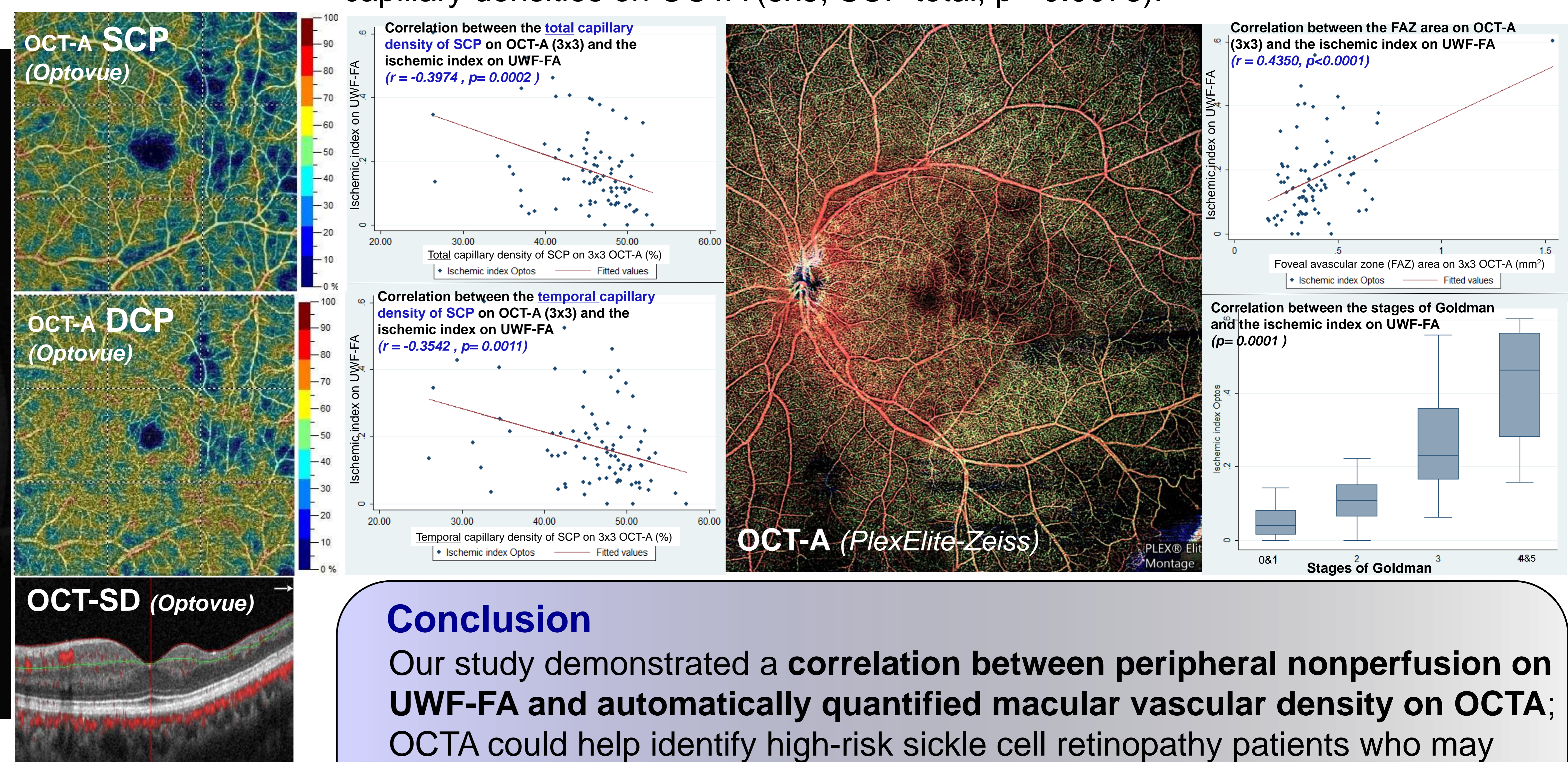
Results

Eighty-four eyes from 42 consecutive patients (22 men, 20 women) with SCR were included between June 2017 and March 2018. Mean age was 32.3 years (min 14; max 68). Twenty-one patients (42 eyes) were SS, 19 patients (38 eyes) were SC and 2 patients were SB0. Twenty-four eyes (29%) were previously treated with laser. Mean BCVA was 0,1 LogMAR (min 3; max -0.1).

The **ischemic index** measured in the peripheral retina on UWF-FA was correlated with the measured **FAZ** on OCTA (Person, r =0.4350 , p<0.0001), and with the **capillary densities** of the total SCP (Person, r = -0.3974 , p= 0.0002) and of the parafoveolar temporal SCP (r = -0.3542 , p= 0.0011) on OCTA 3x3.

The **ischemic index** was also correlated with the **capillary densities** of the total DCP (r = -0.3344 , p= 0.0021) and of the temporal DPC (r = -0.3297 , p= 0.0025) on OCTA 3x3.

The ischemic index was also correlated with the capillary densities on OCTA 6x6. The stages of Goldman were correlated with the ischemic index (p= 0.0001) and with the capillary densities on OCTA (3x3, SCP total, p= 0.0073).

UWF-FA (Optos California)

OCT-A SCP (Optovue)

OCT-A DCP (Optovue)

OCT-SD (Optovue)

Correlation between the total capillary density of SCP on OCT-A (3x3) and the ischemic index on UWF-FA (r = -0.3974 , p= 0.0002)

Correlation between the temporal capillary density of SCP on OCT-A (3x3) and the ischemic index on UWF-FA (r = -0.3542 , p= 0.0011)

OCT-A (PlexElite-Zeiss)

Correlation between the FAZ area on OCT-A (3x3) and the ischemic index on UWF-FA (r = 0.4350, p<0.0001)

Correlation between the stages of Goldman and the ischemic index on UWF-FA (p= 0.0001)

Conclusion

Our study demonstrated a **correlation between peripheral nonperfusion on UWF-FA and automatically quantified macular vascular density on OCTA**; OCTA could help identify high-risk sickle cell retinopathy patients who may benefit from further evaluation using UWF-FA. UWF-FA allowed a more precise topographic analysis of vascular abnormalities and ischemia areas than with conventionnal fluorescein angiography.

References

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