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Conflicts of interest : NONE

Purpose

To describe ophthalmological features of Takayasu disease evaluated by fundoscopy, fluorescein angiography and OCT-angiography (OCT-A).

Methods

Inclusion criteria

All patients with Takayasu disease followed in Pitié Salpêtrière from 2004 to 2017 were retrospectively included.

Methods

All underwent complete ophthalmological examination including fluorescein angiography and SD OCT. Most of them underwent OCT-A (Heidelberg). The OCT-A were analyzed to evaluate perifoveal anastomotic capillary arcade disruption, capillary perifoveolar density and the presence of microaneurysms. The foveal avascular zone (FAZ) was measured at the level of superficial (SCP) and deep capillary plexus (DCP).

Results

Clinical features of patients

13 patients (26 eyes) – sex ratio M/F: 2/11 – Mean age: 52

Fluorescein angiography (AF) findings: Uyama and Asayama classification

Stage I (dilatation of retinal veins): 5 eyes
Stage II (microaneurysms): 10 eyes
Stage III (ischemic arteriovenous shunts): 2 eyes
Stage IV (ischemic complications) : 3 eyes

OCT-A findings (14 eyes)

Disruption of the perifoveal anastomotic capillary arcade in SCP: 11 eyes
Microaneurysms: 5 eyes
Rarefaction of the perifoveolar vascular density at the level of SCP: 11 eyes
Average FAZ at the level of SCP: 0.34mm² for Takayasu group vs 0.27 mm² for healthy group

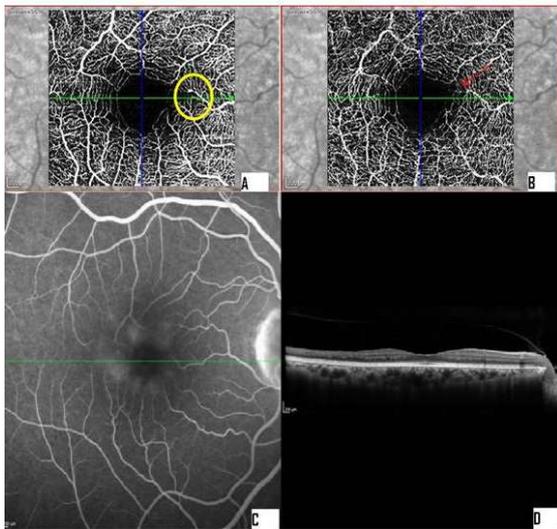


Figure 1. OD. Multimodal imaging of a 70 year-old patient with grade III Takayasu retinopathy.

OCT Angiogram of SCP (A) and DCP (B) both present enlarged FAZ and reduced perifoveolar vascular density. Microaneurysms are visible in SCP (yellow circle). There are ruptures in the perifoveolar vascular arcade (red arrow) in DCP but not in SCP. Intermediate frames of fluorescein angiography (C) with perifoveolar leakage, arteriovenous shunts are not visible on the posterior pole. (D): Spectral domain OCT. Normal macular profile.

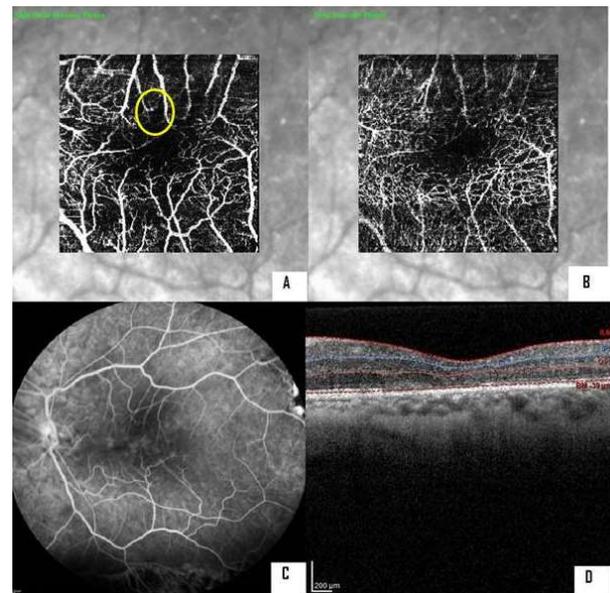


Figure 2. OS. Multimodal imaging of a 36 year-old patient with past history of central retinal artery occlusion. OCT angiogram of SCP (A) and DCP (B) reveal enlargement of the FAZ, disruption of the perifoveolar vascular arcade, rarefaction of the perifoveolar vascular density and altered vascular architecture. Microaneurysms are seen in SCP (yellow circle). Intermediate frames of fluorescein angiography (C) : macular leakage persists on the posterior pole. Spectral Domain OCT (D) reveals foveal ellipsoid zone interruption and external retina thickening.

Discussion

Takayasu patients seem to present an enlargement of the FAZ compared to healthy group. Enlargement of FAZ is already described in diabetes, age related macular degeneration or sickle cell disease as a sign of ischemy.

Advantages of OCT-A in Takayasu Retinopathy :

No intravenous injection, better visualisation of vascular network, ability to detect ischemy earlier than AF. It seems to be a new complementary exam, particularly in case of normal AF or early stages of Takayasu retinopathy.

Limits :

Small cohort of patients, the lack of vascular density measurement and the limits of OCT-A technology, projection artefacts and segmentation errors

Conclusion

AF remains the gold standard for studying Takayasu retinopathy as ischemic signs are mostly peripheric and OCT A is not yet able to study peripheric retina. Macular abnormalities are uncommon in Takayasu but OCT A study reveals ischemic signs in most of the patients, even if they present no retinopathy in AF. OCT A seems to have an interest to study macular ischemy in early stages of retinopathy.