INTRODUCTION

OCT imaging has become an indispensable tool in uveitis practice. It is the standard diagnostic technique in the detection, monitoring of treatment, and determination of prognosis in uveitic macular edema (ME) as well as in other macular and extramacular inflammatory changes. OCT technology has evolved in the last 2 decades from time domain OCT (TD-OCT) to spectral domain OCT (SD-OCT) and recently to the enhanced-depth imaging OCT (EDI-OCT) and Topcon’s Swept Source OCT (SS-OCT).1

The innovation of SS-OCT, introduced in clinical practice in 2012, provides several advantages over SD-OCT.2 These include
1. higher resolution;
2. improved penetration through opacities, including vitreous haze and cataract;
3. faster acquisition times; and
4. greater depth and breadth of imaging.

This allows the simultaneous detailed documentation of all structures, including vitreoretinal interface, retinal layers, retinal pigment epithelium (RPE), and choroid.2

We have been using the Topcon high-resolution SS-OCT system in our department for more than 2 years. This allows for improved qualitative and quantitative assessment of uveitis-related posterior segment changes and for a better understanding of distinct changes at the vitreoretinal interface, inner and outer retinal layers, and choroid that are specific to various inflammatory entities.

SS-OCT FOR UVEITIC ME AND OTHER MACULAR COMPLICATIONS

SS-OCT enables noninvasive, objective, and precise detection, classification, and quantification of uveitic ME. It is also very useful in monitoring the therapeutic response and determining visual prognosis (Figure 1).1

There is a negative correlation between macular thickness or volume and VA, similar to that found in diabetic macular edema. The presence of cystoid changes in the outer plexiform and inner nuclear layers and epiretinal membranes are considered factors predictive of a poor visual outcome.

Figure 1. SS-OCT in a patient with idiopathic intermediate uveitis shows cystoid ME and serous retinal detachment in the left eye on a cross-sectional macular B-scan (A). Resolution of cystoid spaces and subfoveal fluid after treatment (B).
Exudative retinal detachment (ERD) is associated with lower initial VA but higher rates of ME resolution and VA increase. Loss or disruption of the ellipsoid zone (EZ, also called photoreceptor IS/OS junction line) is associated with increased risk of macular atrophy and worse VA.\(^1,2\)

SS-OCT is also an essential tool for detecting uveitic macular changes other than ME, including epiretinal membrane formation, vitreomacular traction, foveal atrophy, and lamellar or full-thickness macular hole. Macular atrophy is associated with longer disease duration and worse VA.\(^1,2\)

**DIAGNOSING AND MONITORING OF INFECTIOUS AND NONINFECTIOUS RETINITIS WITH SS-OCT**

SS-OCT enables accurate detection, characterization, and monitoring of vitreous and retinal changes associated with infectious or noninfectious retinitis or retinochoroiditis, including toxoplasmosis, toxocariasis, viral retinitis, fungal retinitis, and Behçet uveitis (Figure 2).\(^1,3\)

**DIAGNOSING AND MONITORING OF OUTER RETINAL AND CHOROIDAL DISEASE WITH SS-OCT**

Various specific changes in the outer retina can be clearly identified by SS-OCT in white dot syndromes, such as multiple evanescent white dot syndrome (MEWDS), acute posterior multifocal placoid pigment epitheliopathy (APMPPE), idiopathic multifocal choroiditis, punctate inner choroiditis, and serpiginous choroiditis. They mainly include disruption of the EZ, hyperreflective areas overlying the RPE, and RPE alterations. Hyperreflective lesions gradually resolve over time, with partial or complete restoration of the EZ (Figure 3).\(^1\)

SS-OCT is an essential tool in the diagnosis and monitoring of response to treatment in patients with acute Vogt-Koyanagi-Harada disease.\(^4\) Key SS-OCT findings include multifocal ERD, subretinal hyperreflective dots, subretinal septa, retinal/RPE folds, and choroidal thickening (Figure 4).\(^1,4\) Accurate evaluation of choroidal inflammatory changes thanks to SS-OCT is also essential for other inflammatory entities including sympathetic ophthalma, posterior scleritis, and Birdshot chorioretinopathy.\(^1\)

**ASSESSING AN INFLAMMATORY REACTION WITH SS-OCT**

Recent data show that SS-OCT may allow qualitative and quantitative analysis of anterior chamber and vitreous inflammatory reaction. It may be useful as a quantitative and objective marker of disease activity and treatment response, especially in eyes with corneal haze or edema.\(^5\)

**SS-OCT-A TECHNOLOGY**

OCT angiography (OCT-A) using SS technology (SS-OCT-A) is a new noninvasive imaging modality, allowing the mapping of the retinal and choroidal microvasculature by calculating motion contrast in OCT B-scans acquired repeatedly at the same location. It is particularly useful in the diagnosis and management of retinal vasculitis, choriocapillaritis, and
inflammatory choroidal neovascularization. SS-OCT-A was found to be better than fluorescein angiography in detecting and characterizing perifoveal microvascular changes in eyes with Behçet uveitis, with the deep capillary plexus being more severely affected than the superficial capillary plexus (Figure 5).6

CONCLUSION

OCT has become an essential component of the multimodal imaging approach for the diagnosis and management of inflammatory chorioretinal diseases. The recent advent of SS-OCT has provided significant advantages over SD-OCT, allowing for improved qualitative and quantitative assessment of posterior segment changes associated with uveitis, including ME, other macular complications, inner and outer retinal structural alterations, and choroidal inflammation.

OCT-A using SS technology is a new noninvasive and dyeless imaging modality that provides a detailed, 3D mapping of retinal and choroidal microvasculature. SS-OCT-A is particularly useful for the diagnosis and management of retinal vasculitis, chorio-capillaritis, and inflammatory choroidal neovascularization. ■


SOUROUR ZINA
Department of Ophthalmology, Fattouma Bourguiba University Hospital, Faculty of Medicine, University of Monastir, Tunisia
sourourzina@hotmail.com
Financial disclosure: None

MOLKA KHAIRALLAH
Department of Ophthalmology, Fattouma Bourguiba University Hospital, Faculty of Medicine, University of Monastir, Tunisia
molka_k@hotmail.fr
Financial disclosure: None

MONCEF KHAIRALLAH
Department of Ophthalmology, Fattouma Bourguiba University Hospital, Faculty of Medicine, University of Monastir, Tunisia
moncef.khairallah@yahoo.fr
Financial disclosure: Speaker (Topcon)