Miscellaneous

Three Dimensional Spectral Domain Optical Coherence Topography in Ocular Toxoplasmosis

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Abstract

A 27 year old female presented with blurring of vision accompanied by floaters in her right eye one month back. On presentation, visual acuity was 20/400 in right eye and fundus examination showed two well defined chorioretinal atrophic scars, one involving macula and other temporal to the disc. Spectral domain optical coherence tomography (SD-OCT) revealed increased reflectivity from the inner retinal layer, retinal thinning and choroidal shadowing. Three dimensional Spectral Domain Optical Coherence Tomography (SD-OCT) is a non-invasive, helpful tool to describing the morphological changes in lesion of healed toxoplasmosis, that were not apparent on clinical examination, which may expand the clinical spectrum of the disease.

Delhi J Ophthalmol 2019;30;76-78; Doi http://dx.doi.org/10.7869/djo.490

Keywords: *Three dimensional Spectral Domain Optical Coherence Tomography (SD-OCT), Ocular toxoplasmosis, RPE hyperplasia, Segmentation maps*

Ocular toxoplasmosis is the most common cause of posterior uveitis worldwide.[1] Acquired toxoplasmosis in the immunocompetent patients occurs with an incidence of 2-20%. It is often asymptomatic, with only 10-20% symptomatic with mild lymphadenopathy, flu-like symptoms or visual disturbance.[2] Spectral-domain optical coherence tomography (SD-OCT) has enabled identification of morphological features underestimated on clinical examination in patients with ocular toxoplasmosis. Spectral-domain optical coherence tomography has revealed diffuse macular edema, vitreomacular traction, maculoschisis, focal choriocapillaris/choroidal relative hyper-reflectivity, and posterior vitreous detachment.[3]

Case History

A 27- year- old female presented with blurring of vision accompanied by floaters in her right eye before one month. This was followed by diminution of vision in the right eye. On examination her visual acuity was 20/400 in right eye and 20/20 in left eye on Snellen's chart. Anterior segment of both the eyes were within normal limits on slit lamp examination. There was absence of retrolental cells & AC cells. Dilated ophthalmoscopic examination of the fundus of right eye revealed a grade 1 vitritis (Table 1) with two well defined chorioretinal atrophic scars, one involving the macula and the other temporal to the disc. The scars were 2 disc diameters in size with retinal pigment epithelial (RPE) hyperplasia. Fundus of the left eye was within normal limits. Serological assessment was negative for IgM but serum IgG to toxoplasma was elevated. Spectral domain optical coherence tomography (SD-OCT) was performed using macular cube 512 × 128 scan feature (Figure 1 and 2). The horizontal scan of the right eye along the centre of the lesion involving the macula showed an atrophic retina with a retinal thickness of 70 μm. The areas with RPE hyperplasia showed hyperreflectivity with posterior shadowing. The areas with atrophic RPE showed increased choroidal hyperreflectivity. The second lesion superonasal to the macula shows no significant structural changes in the retina on the horizontal scan. The three dimensional tomographical map using the segmentation technique shows thinning of the retina involved by both the macular lesion and the lesion superonasal to the macula. (Figure 3) The internal limiting membrane segmentation map shows surface alterations

Table 1: Grading of vitreous haze (Nussenblatt 1985/National Eye Institute)

Score	Description	Clinical Findings
0	Nil	None
0.5+	Trace	None
1	Minimal	Posterior pole clearly visible
2	Mild	Posterior pole details slightly hazy
3	Moderate	Posterior pole details very hazy
4	marked	Posterior pole details barely visible
5	Severe	Fundus details not visible

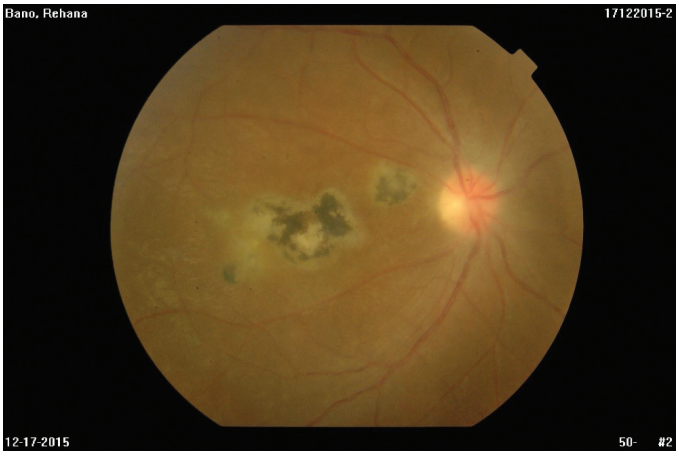

Figure 1: *Color fundus photograph shows two healed toxoplasmosis scar with central chorioretinal atrophy and peripheral retinal pigment epithelial hyperplasia, one involoving the macula and other temporal to the disc*

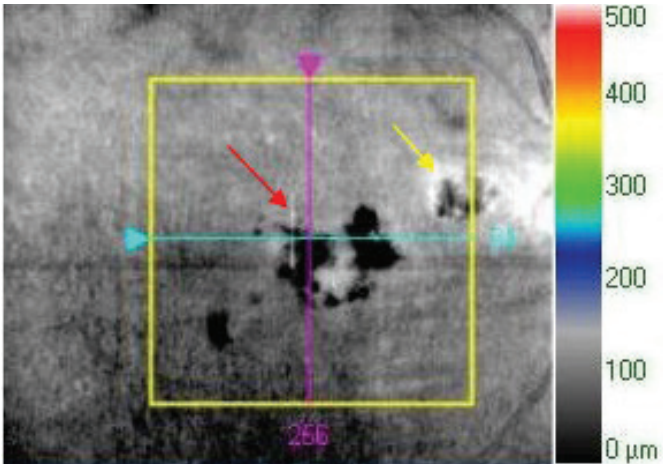

Figure 2: *Optical coherence tomography fundus image overlay map of the right eye showing the two healed toxoplasmosis lesions (red and yellow arrow). This ovelay intersect the large scar at horizontal and vertical plane.*

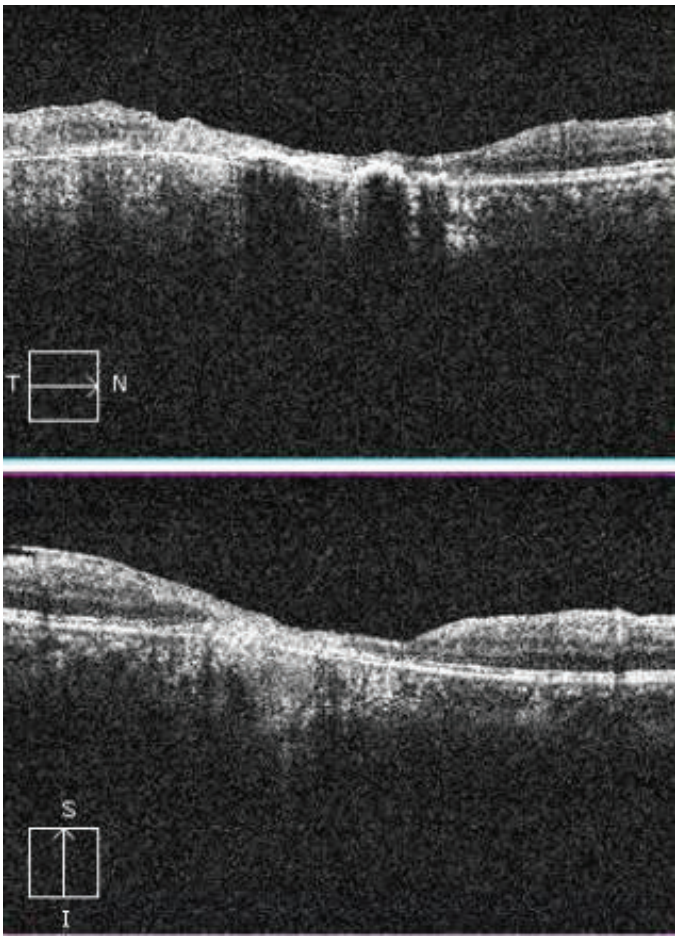

Figure 3: *Spectral domain optical coherence tomography on-line scan through centre of the macular lesion showing atrophic retina and splitting of retinal layers*

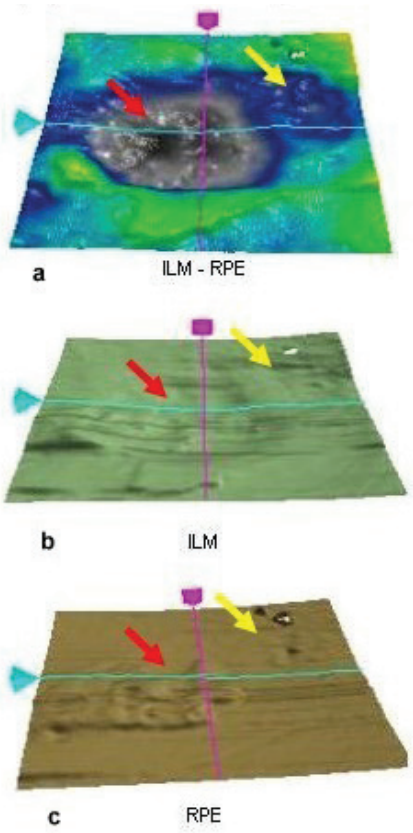

Figure 4: *Three dimensional retinal surface maps a) internal limiting membrane-retinal pigment epithelium thickness map (ILM-RPE), b) ILM surface topography map, c) RPE surface topography map showing the two healed toxoplasma lesions (red and yellow arrow). Spectral domain optical coherence tomography on three dimensional retinal imaging shows a comprehensive view of a scar.*

of the retina involved by the two lesions. There is loss of normal foveal contour. The RPE segmentation map shows surface irregularities. The macular cube analysis of the left eye was within normal limits.

Comments

Acquired ocular toxoplasmosis mostly presents as focal necrotizing retinitis involving the inner retinal layers. Histopathologically, healed retinochoroiditis lesion of toxoplasmosis shows severe destruction in the area of infection and presence of chorioretinal adhesion. The choroid and sclera may become involved secondarily. In healthy patients, the retinitis heals and is replaced with a sharply demarcated atrophic scar with pigmented borders.

SD-OCT can distinguish between active and scarred toxoplasmosis lesions. Optical Coherence Tomography provides quantitative measurements of retinal thickness which could be useful in future prospective studies.[4]

SD-OCT provides safe non-invasive tool for quantitative as well as qualitative imaging of the retina. The retinal microstructure is well represented with identification of subclinical findings. This help in understanding the pathogenesis, selection of treatment modality, follow up and prognosticating the visual outcome.[4] Three dimensional segmentation maps provide a global image of the retinal

topography.[5] This case report highlights for the first time, the role of segmentation maps in characterizing the retinal surface anatomy specifically for areas not picked up on horizontal scans.

References

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Cite This Article as: *Meena M, Meena U, Chauhan A. Three Dimensional Spectral Domain Optical Coherence Topography in Ocular Toxoplasmosis.*

Acknowledgments: Nil

Conflict of interest: None declared

Source of Funding: None

Date of Submission: 14 November 2018
Date of Acceptance: 23 August 2019

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