CORRELATION BETWEEN CHOROIDAL THICKNESS MEASUREMENT IN OCT SCANS AND RETINAL THICKENING IN DIABETIC MACULAR EDEMA PATIENTS

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Introduction

Diabetic macular edema (DME) is defined as presence of retinal thickening more than twice the diameter of a major retinal vein at optic disc margin in the area ½- 1 disk diameter (DD) from macular center in eyes with underlying retinopathy.(1)

It is one of the leading causes of blindness among adults, accounting for approximately 5% of global blindness.(2)

The pathogenesis of DME is complex and multifactorial. It occurs mainly as a result of disruption of the blood-retinal barrier (BRB), which leads to increased intraretinal accumulation of fluid. Sustained hyperglycemia causes release of several vasoactive substances that contribute to further BRB damage. In addition, associated vitreoretinal interface abnormalities may exacerbate macular edema by causing mechanical traction.(3)

Usingdifferent imaging modalities is mandatory for proper management of DME. Fundus photography is essential in screening and documentation of diabetic retinopathy. Fluorescein angiography is helpful in diagnosis of macular edema, retinal ischaemia and vascular abnormalities. Optical coherence tomography (OCT) has become a critical tool in diagnosis and treatment of macular edema especially in the current anti-vascular endothelial growth factor (VEGF) era. Newer modalities such as autofluorescence imaging, OCT-Angiography, and adaptive optics are showing promises to improve current practice.(4)

Aim of the work

The aim of this work was to correlate the measures of the choroidal thickness with retinal thickening by OCT scans in eyes with diabetic macular edema.

Subjects and Methods

In this cross-sectional study, 120 eyes of 120 patients with treatment-naïve Ci-DME were studied, and their files reviewed, regarding:

1.Best-corrected visual acuity measurement

2.Complete ophthalmic examination.

3.Spectral domain optical coherence tomography (SD-OCT) using Spectralis HRA+OCT (Heidelberg Engineering, Germany) device, software version 1.9.10.0.

25 OCT macular scans were obtained at ART of 40 frames/ scan line and SNR ³ 20 dB; were used over an area size of 20°x20° spacing, 240 micron each; creating an automated two-dimension macular thickness map.

SD-OCT scans were evaluated in a separate way from clinical status and treatment modality used for each patient, at baseline then at 3, 6 and 12 months of treatment; regrading certain parameters; including

Central subfield thickness (CST): In our study, a CST of at least 300 mm (~2 SD beyond average thickness on Spectralisâ SD-OCT was used as it uses the posterior border of Bruch's membrane as the boundary for retinal thickness measurements.

Pattern of edema: Cystic, spongiform and subretinal fluid collection.

Choroidal thickness: Was measured manually at the center of all the nine subfields of the early treatment diabetic retinopathy study (ETDRS) macular grid in the output thickness map.

Results

Table 1: Chenge in Subfoveal choroidal thickness (SFCT) from baseline to 3rd, 6th and 12th month visit

Subfoveal choroidal thickness	0 month (n=120)	3 month (n=120)	6 month (n=120)	1 year (n=118)#	F	P
Min. - Max.	99.0 - 472.0	99.0 - 421.0	91.0 - 424.0	83.0 -496.0	1.264	0.286
Mean ± SD.	241.1 ± 65.17	234.3 ± 61.95	235.1 ± 65.14	233.7 ± 70.58		
Median (IQR)	244.0 (198.5-285.5)	232.0 (195.5-274.0)	242.5 (192.5-276.0)	242.0 (193.0 - 274.0)		

Table 2: Correlation between subfoveal choroidal thickness (SFCT) and CST (n=120)

CST	Subfoveal choroidal thickness (SFCT)	
	r_s	p
0 month	0.172	0.060
3 month	0.179	0.051
6 month	0.196*	0.032*
1 year	0.368*	<0.001*

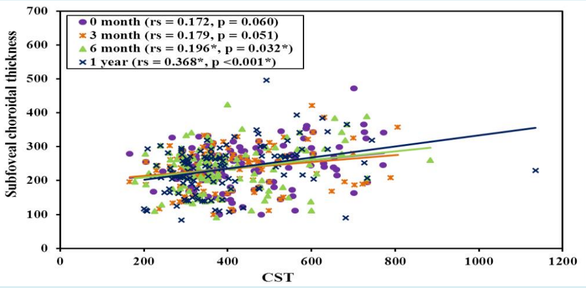

Figure: Correlation between subfoveal choroidal thickness and CST (n=120)

Conclusions

- SFCT is not correlated statistically to grade of diabetic retinopathy, despite increased measures in higher grades on OCT scans.
- Visual acuity (VA) improvement is not correlated significantly with reduction in SFCT in DME patients treated with anti-VEGF.
- Low best corrected visual acuity (BCVA) correlated significantly with thicker CST at base line. VA improvement is correlated significantly with reductions in CST after treatment with anti-VEGF.
- Reduction in SFCT correlated significantly with reduction in CST in cases treated with anti VEGF.

References

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