OCT's diagnostic role in diabetic maculopathy.

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Abstract

Diabetic maculopathy (DM) is one of the major causes of vision impairment in individuals with diabetes. The traditional approach to diagnosis of DM includes fundus ophthalmoscopy and fluorescein angiography. Although very useful clinically, these methods do not contribute much to the evaluation of retinal morphology and its thickness profile. That is why a new technique called optical coherence tomography (OCT) was utilized to perform cross-sectional imaging of the retina. It facilitates measuring the macular thickening, quantification of diabetic macular oedema, and detecting vitreoretinal traction. Thus, OCT may assist in patient selection with DM who can benefit from treatment, identify what treatment is indicated, guide its implementing, and allow precise monitoring of treatment response. It seems to be the technique of choice for the early detection of macular oedema and for the follow-up of DM.

Keywords: Diabetic maculopathy, OCT, Vitreoretinal traction, Macular oedema.

Introduction

Diabetic retinopathy is the name given to the changes in the retina, which develop over a period of time in diabetics. It remains one of the major causes of new-onset visual loss in developed countries. If the central part of the retina (i.e., the macula) is involved, it is referred to as diabetic maculopathy. This is the most common cause of vision impairment in individuals with diabetic retinopathy. The traditional approach to diagnosis of diabetic maculopathy includes fundus ophthalmoscopy and fluorescein angiography (FA) [1]. The Early Treatment Diabetic Retinopathy Study (ETDRS) identified stereoscopic slit-lamp bio microscopy and stereo colour fundus photography as standard methods of macular thickness assessment utilized in order to determine whether the treatment should be commenced as they defined the clinically significant macular oedema. However, these methods are subjective and relatively insensitive to small changes in retinal thickness and, therefore, may be unable to identify mild or localized macular thickening. They also do not provide any data on retinal morphology and blood flow. On the other hand, FA is a highly effective test of evaluating retinal blood vessels, macular perfusion, and pattern of leakage causing the oedema. Although very useful clinically, it also does not contribute much to the evaluation of retinal morphology and its thickness profile [2,3].

Basic OCT Interpretation of Normal Macular Morphology

The analysis of tissue reflectivity is used to interpret OCT images. The physical foundations of the acquired images should be described before analysing the characteristics of the retinal architecture revealed in OCT. The optical characteristics of the imaged tissue are reflected by the OCT. As a result, OCT pictures should not be construed arbitrarily as histologic specimens. The contrast between separate structures in histological investigation is obtained through tissue staining. Distinct stains demonstrate affinity for different morphological features, such as cell nuclei. On the other hand, different colours on an OCT cross-sectional image correlate to varying levels of signal intensity. Despite the foregoing differences, retinal OCT images closely resemble histologic specimens, and OCT is a noncontact investigation [4,5].

Conclusion

OCT can perform micrometre-resolution, cross-sectional imaging of the retina that closely approximates its histological layers. One of the huge advantages of OCT is that patients find this procedure very comfortable because it is noncontact and the measurement time is very short. In patients with diabetic retinopathy OCT can be successfully utilized as an objective monitoring technique of the macular thickening before and after therapy. Thus, it facilitates quantification of retinal oedema. OCT is also very useful for vitreous assessment, showing whether it is attached or detached from the macula. It is helpful in detecting vitreoretinal traction that may not have been identified clinically. To summarize, OCT may assist in patient selection with diabetic maculopathy who can benefit from treatment, identify what treatment is indicated, guide its implementing, and allow precise monitoring of treatment response.

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