The Role Of Optical Coherence Tomography (OCT)In Management Of Diabetic Retinopathy

Essay submitted for partial fulfillment of Master degree in Ophthalmology

Presented By

Soufy Sabry Ahmed Mohamed

(M.B.B.Ch)

Under supervision of

Dr.Ossama Abdel Moneam Abdel Aziz Raslan

Professor of Ophthalmology
Faculty of Medicine Ain Shams University

Dr.Hisham MohamedKhairy Abdel Dayem

Assistant Prof. of Ophthalmology
Faculty of Medicine-Ain Shams University

Faculty of Medicine
Ain Shams University
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﴿قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ﴾

سورة البقرة آية رقم:(32)

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Diabetic retinopathy (DR) remains the leading cause of vision loss and blindness in people of working age, in spite of the fact that current treatments are effective. Vision loss occurs in DR due to the development of maculopathy, especially diabetic macular edema, and due to proliferative diabetic retinopathy.

The traditional gold standard for the diagnosis of DME includes fundus biomicroscopy, fundus stereophotography or both. Fluorescein angiography is also used to evaluate patients with DME; however, leakage on fluorescein angiography does not equate to retinal edema.

Fluorescein angiography may reveal vascular leakage, but does not provide quantitative information**.** Traditional method of evaluatingmacular thickening, including slit lamp biomicroscopy and stereo fundus photography, are relatively insensitive to small changes in retinal thickness. Thus, several new techniques for quantitatively measuring retinal thickness have been explored.

Optical Coherence Tomography (OCT) is one of the most important diagnostic and prognostic tool in the management of DME

It provides a non-invasive high resolution imaging of vitroretinal interface, retina, and subretinal space.

It also allows evaluation of morphologic changes that occur in DME, including compact retinal thickening, intraretinal cystic changes, subretinal fluid, and vitreomacular traction.

OCT parameters have been shown to be only moderately correlated with visual acuity. However, improvements in technology leading to higher resolution, faster acquisition speed, image registration, and three-dimensional imaging that are available with newer spectral domain OCT models may allow future identification of valid OCT-derived surrogate markers for visual function in patients with diabetes.

The improved resolution allows for clear delineation of each retinal layer as distinct entities, like the ability to differentiate inner segment/outer segment (IS/OS) junction from the retinal pigment epithelium and photoreceptor layer details such as the external limiting membrane (ELM).

Photoreceptor outer segment (PROS) length can be quantitatively assessed using Cirrus HD-OCT. The PROS measures may be more directly related to visual function. Photoreceptor outer segment length may be a useful physiologic outcome measure, both clinically and as a direct assessment of treatment effects.

Spectral-domain optical coherence tomography showed that the integrity of the external limiting membrane and inner and outer segments of the photoreceptors was more strongly correlated with best-corrected visual acuity when compared with central subfield thickness in diabetic macular edema.

The response to treatment can be objectively followed up whether performing laser photocoagulation, pharmacologic treatment, or surgery**.** Newer OCT machines allow quantitative measurement of macular thickness and volume and can track changes in response to therapy.

AIM OF THE WORK

This review of literature aims to describe and analyse the role of Optical Coherence Tomography (OCT) in assessment in diagnosing and treatment follow up of maculopathy associated with Diabetic Retinopathy.

ANATOMY OF THE MACULA

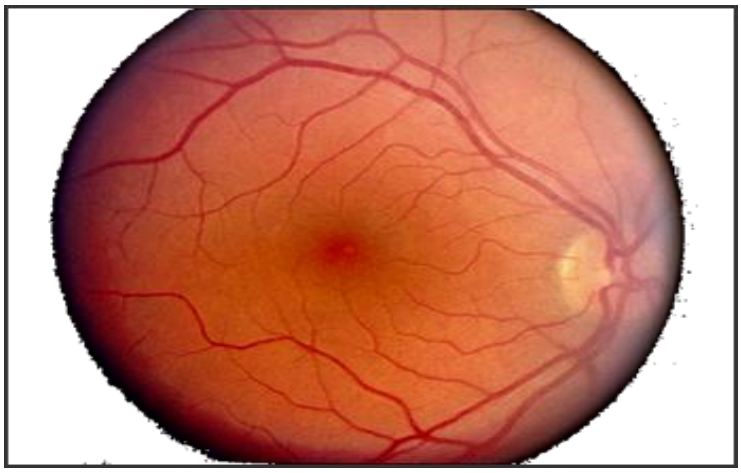

Fig.1: Normal Ophthalmoscopic appearance of the retina to show the macula lutea ***(Quoted from:Yamada., 1982)***

Macroscopic Anatomy:

The terms macula, macula lutea, posterior pole, area centralis, jovea, and foveola have created confusion among anatomists and clinicians ***(Orth et al, 1977).***

The macula is a histologically and clinically distinct area of the retina sometimes referred to as posterior pole or area centralis ***(Anthony et al, 1997)a.***

This region of the retina, located in the posterior fundus temporal to the optic disc, is demarcated approximately by the