Assessment Of Choroidal And Retinal Changes In Cases Of Central Serous Chorioretinopathy Treated With Oral Eplerenone

Thesis

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By

Nourhan Alaa Eldin Abdelaziz
M.B.B.Ch
Faculty of Medicine Cairo University

Supervised by

Prof. Dr. Tarek Mohamed Abdalla
Professor of Ophthalmology Ain Shams University

Dr. Yousra Ahmed Thabet Farweez
Assistant Professor of Ophthalmology Ain Shams University

Dr. Samah Mahmmoud Fawzy
Lecturer of Ophthalmology Ain Shams University

Faculty of Medicine,
Ain Shams University
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List of Abbreviations

Abb.	Meaning
ARMD	Age related macular diseases
BCVA	Best corrected visual acuity
CMT	Central macular thickness
CNV	Choroidal neovascularization
CS	Contrast sensitivity
CSCR	Central serous Chorioretinopathy
CST	Central sub field thickness
DD	Disc diopter
EDI-OCT	Enhanced depth imaging optical coherence tomography
FFA	Fundus flourescin angiography
GERD	Gastroesophogeal reflux disorder
HD-OCT	High definition optical coherence tomography
ICGA	Indocyanine green angiography
ILM	Inner limiting membrane
Log-MAR	Logarithm of minimum angle of resolution
MPD	Micro pulse diode
MR	Mineralocorticoid receptor

List of Abbreviations

Abb.	Meaning
OCT	Optical coherence tomography
PCRD	Posterior cystoid retinal degeneration
PCV	Polypoidal choroidal vasculopathy
PED	Pigment epithelium detachment
PTD	Photodynamic therapy
RPE	Retinal pigment epithelium
SARA	Selective aldosterone receptor antagonist
SD-OCT	Spectral domain optical coherence tomography
SLE	Systemic lupus erthymatous
SRF	Sub retinal fluid
TTT	Transpupillary thermotherapy
VA	Visual acuity
VEGF	Vascular endothelial growth factor

ABSTRACT

Aim of the work: This prospective analysis was planned for patients with chronic central serous retinopathy (CSR) more than three months who receive oral Eplerenone for treatment. It is aimed to reduce &resolve sub retinal fluid with improving anatomical and physiological visual functions. Patient &Methods: sixteen eyes with untreated chronic Central Serous Chorioretinopathy patients who recruited from the ophthalmic clinic. Main intervention is medication by standard dose of Eplerenone, 50mg once daily. Investigated by Optical Coherence Topography at base line, one month after treatment and three months later. Over the course of the study, patients were monitored for side effects, visual and anatomical response to the medication. Results: Significant difference in BCVA is found that was 0.675 ±0.2696 at base line to 0.48125±0.2287 after one month after treatment and to 0.04375±0.07274 three months after treatment ,(p= 0.000). Sub retinal fluid measurements were improved significantly between each two visits as horizontal fluid volume is improved from 2137 ±987.93 at base line to1559.875 ±677.60 after one month after treatment and to 0 three months after treatment . Vertical fluid volume is improved from 203.125 ±118.73 at base line to122±49.876 after one month after treatment and to 0 three months after treatment. Central sub field thickness were improved significantly between each two visits as it is improved from 372.375 ±92.994 at base line to331.8125 ±90.283 after one month after treatment and to 250.25±25.970 three months after treatment. Contrast sensitivity improved significantly between each two visits as it is improved from 8.7625 ±4.029 at base line to 5.1968±3.227after one month after treatment and to 1.4968±0.4750 three months after treatment. Choroidal thickness was improved significantly between each two visits as it was improved from 267.9375 ±67.451 at base line to222±52.262 after one month after treatment and to 174.0625±23.713 three months after treatment. 100% of the patients complained from positive scotoma at base line, Improved to 44% of the patients complained from positive scotoma one month after treatment, improved to 0% three months after treatment.

Conclusion: Eplerenone therapy resulted in significant anatomic and visual improvements in eyes with chronic central serous Chorioretinopathy.

Keywords: Central serous retinopathy, serous detachment, Eplerenone, Optical Coherence Topography.

INTRODUCTION

Central Serous Chorioretinopathy is a sporadic disorder of the outer blood retinal barrier characterized by localized detachment of sensory retina at the macula secondary to focal RPE defect [1] figure 1.

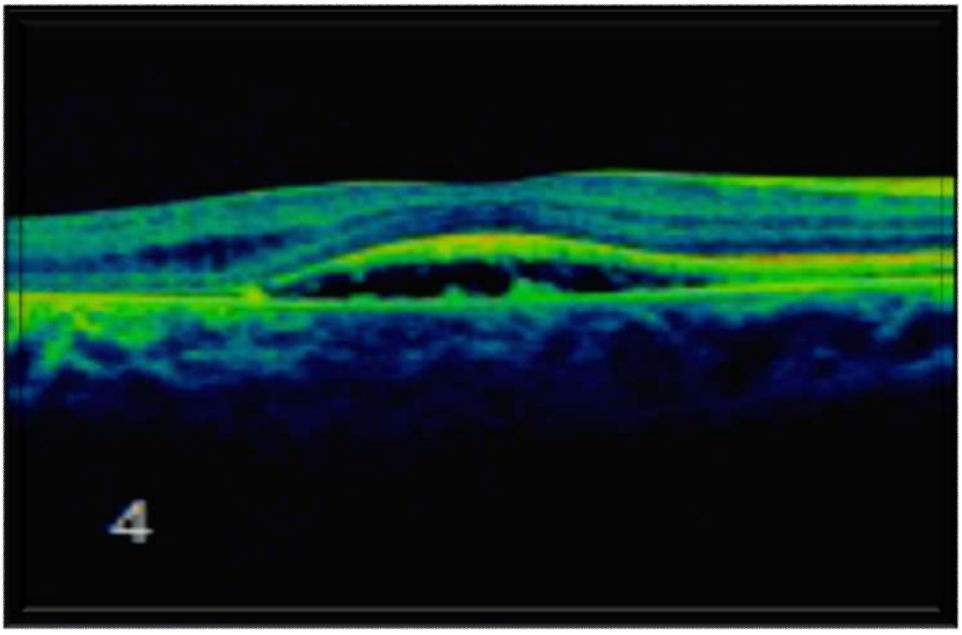

Figure (1): Show central serous Chorioretinopathy imaged by OCT [2] detecting RPE defect, elevation of retinal layer with accumulation of sub retinal fluid.

CSR is a multifactorial disease as it has multiple risk factors [3]. One of these factors is corticosteroids administration as CSR detected with high levels of endogenous corticosteroids as in Cushing syndrome[4]. Pregnancy also is a risk factor as it is accompanied by elevated plasma cortisol levels. Psychotropic medications are other factors as psychological

stresses associated with CSR [5]. Additional associations including GERD, systemic hypertension, alcohol use, type A personality, SLE, organ transplantation.

CSR is divided into two types acute and chronic forms, acute form may be recurrent and resolve spontaneously and has good prognosis [6]. Chronic CSR defined by persistent sub retinal fluid more than three months while other theories suggesting that lasting sub retinal fluid more than four months denoting chronic CSR[7].Other classification is: 1)Typical CSCR characterized by *BCVA 6/60 or better, *Macular detachment more than 3DD ,*Pin point ink blot, smoke stack leakage in FFA ,*Spontaneous resolution. 2) A typical CSCR characterized by *Sensory detachment *RPE detachment *Intermediate in which both are elevated. [8] Presence of longstanding sub retinal fluid causing photoreceptors death so may cause permanent visual loss [9].

Recently there is a new classification dividing CSR into CSCR that has focal RPE disruption or diffuse that has extensive RPE damage &diffuse leakage [10].

A patient with CSR presents with visual acuity in range of 20/20 to20/200, Amsler grid may detect metamorphopsia in eyes with normal visual acuity and normal anterior segment with no evidence of inflammation. Fundus examination is necessary to diagnose CSR, as it appears as well-defined, round serous macular neurosensory detachment, surrounded by halo

light reflex [11]. Other diagnostic tools for CSR diagnosis are OCT, Flourescin Fundus Angiography (figure 2) and ICG also may detect CSR.

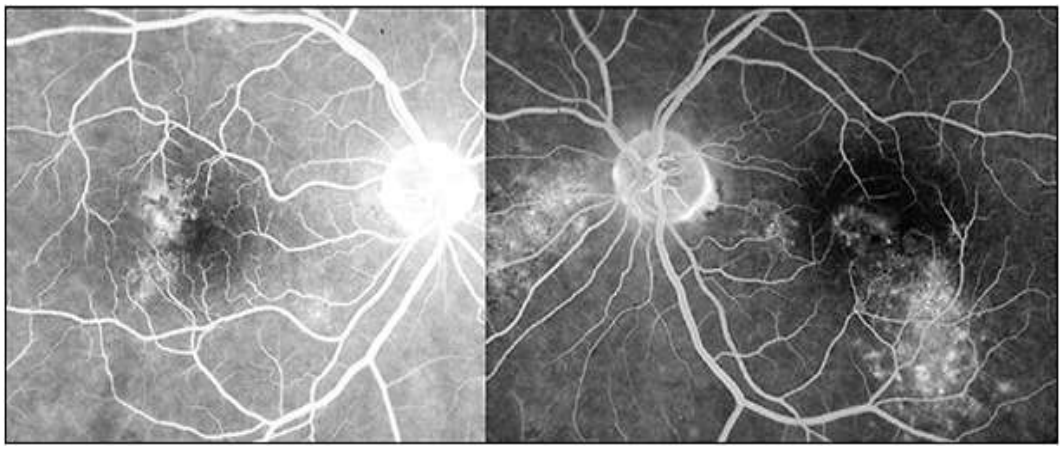

Figure (2): DRPE/chronic CSC (right eye and left eye) in a patient with Cushing syndrome. Note the leaks at the level of the RPE and RPE atrophic tracts ("gutters") indicative of chronic leakage [12].

CSR is associated with choroidal vasculopathy appear in ICG, FFA by areas with mid phase inner choroidal staining, delayed choroidal filling suggesting choroidal ischemia [13]. With EDI OCT the choroid is thickened in CSR, this thickness may be due to choroidal vascular disease. Acute CSR is self limited, as recovery of vision occurs within one to four months with reattachment of neurosensory retina; Recurrence is common in approximity 30-50% of patients within one year[14].

Chronic CSR may develop RPE atrophy; neurosensory retinal changes that causing permanent visual function loss including visual acuity, contrast sensitivity and color vision.

Observation is the initial management in most acute CSR cases. The goal from management of CSR is to induce neurosensory retinal reattachment, preserve or improve visual function and prevent recurrence.

Current treatment options[15] include photodynamic therapy, focal laser photocoagulation, Anti-vascular Endothelial growth factor agents, corticosteroids inhibition and adrenergic receptor inhibition.

Eplerenone is used in treatment of chronic CSR as a steroidal

Antimineralocorticoid of the spirolactone group [16] that selectively binds to recombinant human mineralocorticoid receptors thereby blocks the binding of aldosterone decreasing choroidal vessel vasodilatation, focal leakage and choroidal thickness. Suggesting that it cause improvement in the anatomical and the physiological visual functions.

AIM OF THE WORK

1- To investigate the ability of oral Eplerenone to resolve sub retinal fluid and to restore retinal and choroidal structural integrity in patients with chronic CSCR unresolved for 3 months.

2- To test accompanying improvement of visual functions.

ANATOMY OF RETINA AND CHOROID

The retina is approximately 0.5 mm thick. The optic nerve contains the ganglion cell axons running to the brain and incoming blood vessels that open into the retina to vascularize the retinal layers and neurons (Fig. 3). A radial section of a portion of the retina reveals that the ganglion cells (the output neurons of the retina) lie innermost in the retina closest to the lens and front of the eye, and the photoreceptors (the rods and cones) lie outermost in the retina against the pigment epithelium and choroid [17].

*Layers of the retina[18]:

1. *Inner limiting membrane:* basement membrane elaborated by Müller cells

2. *Nerve fiber layer :* axons of the ganglion cell nuclei.

3. *Ganglion cell layer:* contains nuclei of ganglion cells, the axons of which become the optic nerve fibers for messages and some displaced amacrine cells.

4. *Inner plexiform layer :* contains the synapse between the bipolar cell axons and the dendrites of the ganglion and amacrine cells.

5. *Inner nuclear layer* **:** contains the nuclei and surrounding cell bodies of the amacrine cells, bipolar cells and horizontal cells.

6. *Outer plexiform layer :* projections of rods and cones ending in the rod spherule and cone pedicle, respectively. These make synapses with dendrites of bipolar cells. In the macular region, this is known as the *Fiber layer of Henle*.

7. *Outer nuclear layer***:** cell bodies of rods and cones

8. *External limiting membrane***:** layer that separates the inner segment portions of the photoreceptors from their cell nucleus.

9. *Layer of rods and cones***:** layer of rod cells and cone cells.

10. *Retinal pigment epithelium***:** single layer of cuboidal cells. This is closest to the choroid [(19)].