OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY STUDYING VISUAL RECOVERY AFTER TREATMENT OF MACULA-OFF RETINAL DETACHMENT

Thesis

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List of Abbreviations

	Full term
BM	Bruch's membrane
DCP	Deep Capillary Plexus
CFT	Central Foveal Thickness
CMT	Central Macular Thickness
CRT	Central Retinal Thickness
ELM	External Limiting Membrane
ERM	Epi-retinal membrane
EZ	Ellipsoid Zone
FAZ	Fovea avascular zone
FFA	Fundus Fluorescein Angiography
G	Gauge
GCL	Ganglion Cell Layer
HFL	Henle Fiber Layer
ICCs	Intraclass correlation coefficients
ILM	Internal Limiting Membrane
INL	Inner Nuclear Layer

IOP	Intra-ocular Pressure
IPL	Inner Plexiform Layer
IS	Inner Segment
IZ	Interdigitation Zone
LogMAR	Logarithm of Minimal Angle of Resolution
ME	Macular Edema
CME	Cystoid Macular Edema
MP	Macular Pucker
OCT	Optical Coherence Tomography
OCTA	Ocular Coherence Tomography Angiography
FD-OCT	Fourier Domain OCT
TD-OCT	Time Domain OCT
SD-OCT	Spectral Domain OCT
ONL	Outer Nuclear Layer
OPL	Outer Plexiform Layer
ORC	Outer Retinal Corrugation
OS	Outer Segment
PFCL	Perfluorocarbon Liquids
PFO	Perfluoro-Octane

PPV	Pars Plana Vitrectomy
PVD	Posterior Vitreous Detachment
PVR	Proliferative Vitreo-retinopathy
RD	Retinal Detachment
RRD	Rhegmatogenous Retinal Detachment
RNFL	Retinal Nerve Fiber Layer
RPE	Retinal Pigment Epithelium
SB	Scleral Buckling
SCP	Superficial Capillary Plexus
SLO	Scanning Laser Ophthalmoscope
cSLOC	Confocal Scanning Laser Ophthalmoscope
SO	Silicone Oil
SPCFT	Single Point Central Foveal Thickness
SRF	Sub- retinal fluid
SSADA	Split Spectrum Amplitude: Decorrelation Angiography
PSF	Persistent sub-retinal fluid
SRS	Sub-retinal Space
VA	Visual Acuity
BCVA	Best Corrected Visual Acuity

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INTRODUCTION

Rhegmatogenous retinal detachment (RRD) is a serious cause of visual impairment, and it is not relatively uncommon. Despite the marked surgical and technical improvement noticed in the reattachment surgeries, post-operative visual outcome leaves a lot to be desired. Many studies have been designed to analyze the discrepancy between successful anatomical retina reattachment and incomplete visual recovery. (1)

The introduction of the Ocular Coherence Tomography (OCT) to our daily practice had extended our horizons to understand the histological changes occurs at the different layers of a detached retina (2) and monitor the recovery process effect on the ultrastructural level after successful reattachment (3) and analyze the correlation between these changes and the visual recovery.

Ocular Coherence Tomography Angiography (OCTA) is a new noninvasive imaging modality that is considered as a breakthrough in ophthalmology. Based on the principle of motion detection, it is capable of providing high

resolution imaging of retinal and choroidal blood flow. [4] Furthermore, it enables the visualization of the vascular tree of the retina and the choroid in different planes and angiographic slabs. Among the slabs which can be visualized are the superficial capillary plexus (SCP) present in the superficial part of the inner retinal layer extending from the internal limiting membrane (ILM) to the outer boundary of inner plexiform layer (IPL), and deep capillary plexus (DCP) present in the deeper part of the inner retinal layer extending from the outer boundary of (IPL) to the outer boundary of the outer plexiform layer (OPL). [5]

Fovea avascular zone (FAZ) is an area devoid of capillaries at the center of the fovea that can be assessed and measured by various techniques. OCTA is a unique technology that enables the visualization and measurement of FAZ in different vascular planes as in SCP and DCP. [7] Different studies have reported that the FAZ area is correlated with central retinal thickness (CRT) and visual acuity in normal healthy population. [7]

Many studies have been designed to analyze the correlation between the anatomic healing after retinal reattachment and visual recovery. It has been reported that

incomplete visual recovery is not relatively uncommon post-operative in spite of clinically apparent successful reattachment. [8]

By using OCT to study this issue we become able to recognize that residual sub-foveal fluid which is not visible by clinical ophthalmoscopy is a common cause for delayed and incomplete visual recovery [9] Distortion of outer retinal layers post-operative and its healing process have been also studied and correlated with visual acuity. [3] The emergence of the new OCTA technology gave us the opportunity to address this critical topic from another point of view and to detect the healing process effect after successful reattachment of different retinal layers and specifically the vascular component, and to correlate this with post-operative visual recovery.

AIM OF THE WORK

The aim of this work is to correlate anatomical and functional changes that occur at the macular area and evaluate retinal vasculature precisely at the FAZ area at SCP & DCP after successful retinal reattachment surgery, using optical coherence tomography angiography, and correlate this data with visual recovery post-operative.

REVIEW OF LITERATURE

PARS PLANA VITRECTOMY IN THE MANAGEMENT OF RHEGMATOGENOUS RETINAL DETACHMENT

Currently the most two frequent surgical techniques are scleral buckling and Pars Plana Vitrectomy (PPV) with pneumatic retinopexy being reserved for selected cases. [10]

This technique has gained popularity over scleral surgery in recent years, mainly for primary rhegmatogenous retinal detachment. [11] Intra-surgery visualization and identification of retinal tears is broadly regarded as being superior to pre-surgery visualization and identification. Probably this is one of the main reasons for the tendency to use this technique as the first choice for treating primary RRD.