بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Optical coherence Tomography Angiography versus fundus fluorescein angiography in assessment of clinically undetected neovascularization in severe non-proliferative diabetic retinopathy patients

Thesis

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List of Abbreviations

Abb.	Full term
µm	Micrometer
AMD	Age-Related Macular Degeneration
BMO	Bruch's membrane opening
BRM	Bruch's membrane
CC	Choriocapillaris
CNVM	Choroidal neovascular membranes
CRA	Central Retinal Artery
CRV	Central Retinal Vein
DME	Diabetic Macular Edema
DR	Diabetic Retinopathy
ETDRS	Early Treatment Diabetic Retinopathy Study
FAZ	Foveal Avascular Zone
FFA	Fundus Fluorescein Angiography
ICGA	Indocyanine green angiography
ILM	Internal Limiting Membrane
INL	Inner Nuclear Layer
IPL	Inner Plexiform Layer
IRMA	Intra-retinal Microvascular abnormalities
IS/OS	Inner segment-outer segment junction
mm	Millimeter
mm2	Square Millimeter
NPDR	Non-Proliferative Diabetic Retinopathy
NVD(s)	New Vessel(s) at the Disk
NVE(s)	New Vessel(s) Elsewhere
NVI	New Vessels of the Iris
OCT	Optical Coherence Tomography

List of Abbreviations Cont...

Abb.	Full term
OCTA	Optical Coherence Tomography Angiography
OPL	Outer Plexiform Layer
PAMM	Paracentral Acute Middle Maculopathy
PDR	Proliferative Diabetic Retinopathy
PED	pigment Epithelial detachment
RAP	Retinal Angiomatous Proliferation
RBC(s)	Red Blood Cell(s)
RNFL	Retinal Nerve Fiber Layer
RPCP	Radial peripapillary capillary plexus
RPE	Retinal Pigment Epithelium
SD-OCT	Spectral Domain Optical Coherence Tomography
SSADA	Split-spectrum Amplitude-decorrelation Angiography
VEGF	Vascular Endothelial Growth Factor
VRI	Vitreo-retinal interface
SVP	superficial vascular plexus
DVC	Deep vascular complex
SVC	superficial vascular complex
GCL	ganglion cell layer
ICP	intermediate capillary plexus
DCP	Deep capillary plexus

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INTRODUCTION

Diabetic retinopathy is a microangiopathy of the retina from which nearly all persons with diabetes eventually suffer.[1]

It causes changes in the vascular wall structure and in the rheological properties of the blood. The combination of these factors leads to capillary occlusion and thereby to retinal ischemia and angiographically demonstrable leakage.[2]

Early Treatment Diabetic Retinopathy Study (ETDRS) grading scheme consists of mild and moderate non-proliferative diabetic retinopathy (background diabetic retinopathy), severe non-proliferative retinopathy (pre-proliferative diabetic retinopathy) and non-high-risk and high-risk proliferative diabetic retinopathy (proliferative diabetic retinopathy).[3]

Progressing of Non-proliferative Diabetic retinopathy from mild, moderate to severe depends on the severity of flame shaped and blot haemorrhages, hard exudates, fluctuations of venous calibre (venous beading) and intraretinal microvascular anomalies.[4]

As hypoperfusion in the retinal capillary bed becomes more severe and spreads across the retinal area, proliferative diabetic retinopathy develops in the form of neovascularization arises at the papilla (neovascularization of the disk, NVD), on the retina outside the papilla (neovascularization elsewhere, NVE) and on the iris (neovascularization of the iris, NVI) as an attempt to compensate the ischemia.[5]

For decades, dye-based angiography has been the gold standard clinical imaging modality for evaluating retinal and choroidal vascular pathologies.[6]

The main idea of FFA based on injection of the fluorescein intravenously, exciting the dye with blue light with the aid of a cobalt filter, and photographically recording the fluorescein filling sequence of the retinal vasculature.[7]

One of the clear advantages of fundus fluorescein angiography is their ability to capture a much wider area of the retinal and choroidal vasculature, another advantage is that its images are less liable to show artifacts than other imaging techniques.[6]

Despite its success, fundus fluorescein angiography has some weak points as being invasive and time-consuming, in addition to having the potential for allergic reactions to the dye. Moreover, it is only a two-dimensional study focusing on the superficial retinal circulation, without the ability to visualize the deeper capillary structures.[6,8]

Neovascularization in proliferative diabetic retinopathy is formed by capillaries with very fragile single cell walls and may cause vitreal haemorrhages with ensuing glial proliferation, these new vessels generally appear at the edges of the ischemic areas; initially they can be recognized because they are very irregular and give rise to an intense leakage of the fluorescein. [9,10]