Effect of Intravitreal Injection of Ranibizumab on Choroidal and Macular Thickness in Cases of Diabetic Ischemic versus Non Ischemic Maculopathy

Thesis

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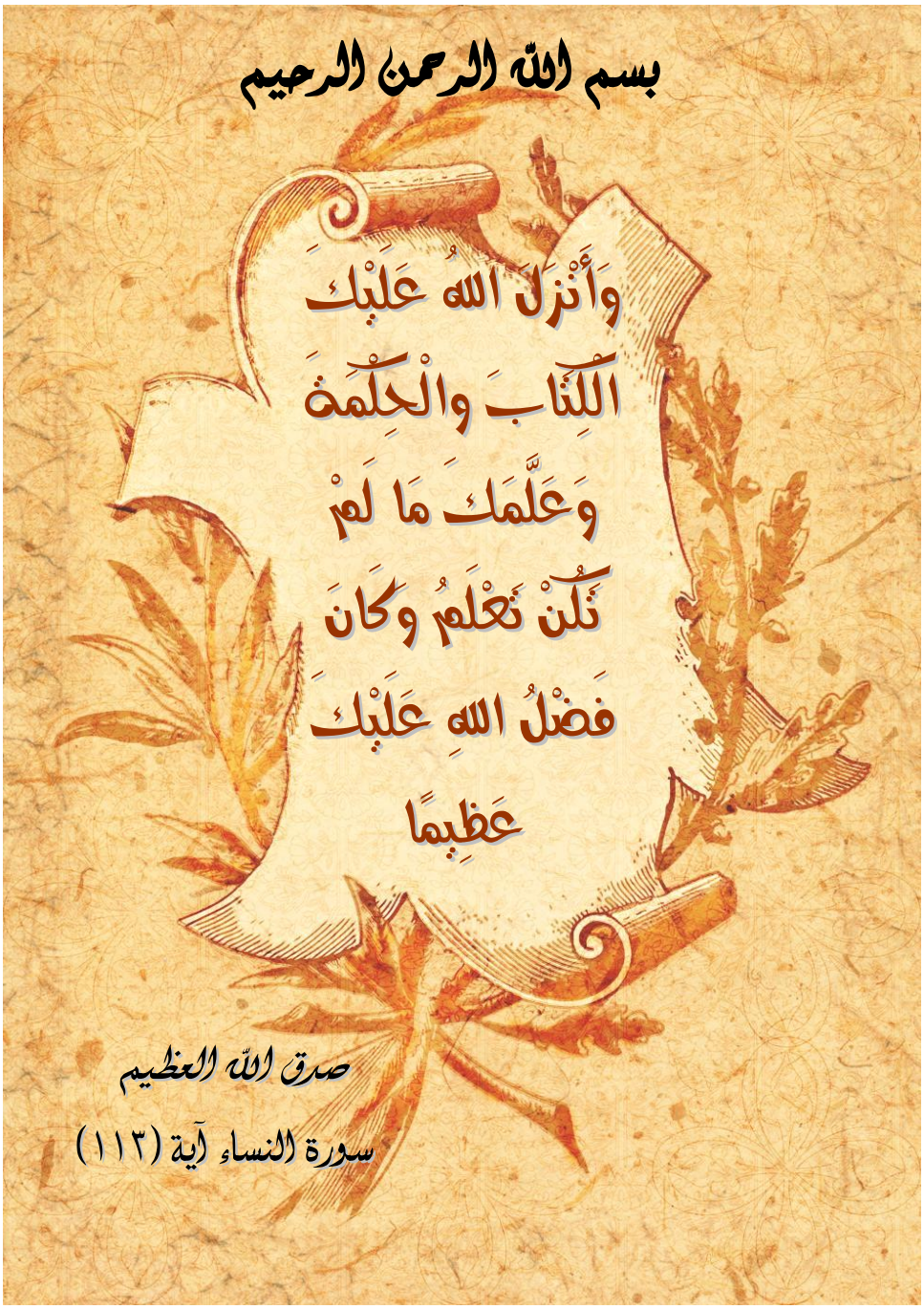
بسم الله الرحمن الرحيم
وَأَنْزَلَ اللهُ عَلَيْكَ
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وَعَلَّمَكَ مَا لَمْ
تَكُنْ تَعْلَمُ وَكَانَ
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List of Abbreviations

Abb.	Full term
3D	*Three dimension*
ACCORD	*Action to Control Cardiovascular Risk in Diabetes*
AGES	*Advanced glycation end products*
Ang	*Angiopoietins*
BCVA	*Best corrected visual acuity*
BOLT'	*A prospective randomized trial of intravitreal bevacizumab or laser therapy in the management of diabetic macular edema*
BRB	*Blood retinal barrier*
CARDS	*Collaborative Atorvastatin diabetis study*
CMT	*Central macular thickness*
CNV	*Choroidal neovascularization.*
CPT	*Central point thickness*
CSLO	*Confocal scanning laser ophthalmoscope*
CSME	*Clinical significant macular edema*
CSMT	*Central subfield mean thickness*
CST	*Central subfield thickness*
DCCT	*Diabetes Control and Complications Trial*
DEX	*Dexamethasone*
DM	*Diabetes Mellitus*
DME	*Diabetic Macular Edema*
DMI	*Diabetic macular ischemia*
DR	*Diabetic Retinopathy*
DRCR	*Diabetic Retinopathy Clinical Research*
DRS	*Diabetic Retinopathy Study*
EDI	*Enhanced depth imaging*
ETDRS	*Early Treatment Diabetic Retinopathy Study*

List of Abbreviations cont...

Abb.	Full term
FA	*Fluorescein angiography*
FAZ	*Foveal avascular zone.*
FIELD	*Fenofibrate Intervention and Event Lowering in Diabetes*
FTH	*Foveal thickness*
Hb	*Hemoglobin*
HIF	*Hypoxia inducible factor*
IL	*Interleukin*
ILM	*Internal limiting membrane*
IOP	*Intraocular pressure*
IRMA	*Intraretinal microvascular abnormality.*
IVB	*Intravitreal bevacizumab.*
IVR	*Intravitreal ranibizumab.*
IVTA	*Intravitreal triamcinolone acetonide*
MAP	*Mitogen activated protein*
MCP	*Monocyte chemotatic protein*
MIP	*Macrophage inflammatory protein*
MP	*Molecular partner*
NMDA	*N-methyl-D-aspartate*
NPDR	*Non proliferative diabetic retinopathy*
NSAIDs	*Nonsteroidal anti-inflammatory drugs*
NV	*Neovascularization.*
NVD	*New vessels at the optic disc.*
OCT	*Optical coherence tomography*
OCT-A	*Optical coherence tomography angiography.*
PDR	*Proliferative diabetic retinopathy*
PKC	*Phosphokinase c*
PLA	*Phospholipase A*
PRP	*Pan retinal photocoagulation*
RD	*Retinal detachement*
RPE	*Retinal pigment epithelium*

List of Abbreviations cont...

Abb.	Full term
RT	*Retinal thickness*
SD	*Standard deviation*
SSADA	*Split-spectrum amplitude decorrelation angiography.*
SS-OCT	*Swept-source OCT*
TD	*Time domain*
UKPDS	*United Kingdom Prospective Diabetes Study*
VA	*Visual acuity*
VB	*Venous beading*
VEGF	*Vascular endothelial growth factor*
VEGFR	*Vascular endothelial growth factor receptor*
WHO	*World Health Organization*
ZO	*Zonula occludens*

INTRODUCTION

Diabetes mellitus (DM) is a global epidemic and affects populations in both developing and developed countries, with differing health care and resource levels ***(Wong et al., 2018)***

Diabetes mellitus results in considerable morbidity and mortality, affecting about 180 million people worldwide ***(World Health Organization, 2002).***

The World Health Organization (WHO) estimates the prevalence of diabetes worldwide across all age groups at 4.4% in year 2030 - an increase by about 1.6% from the year 2000. This should amount to an increase from 171 million to about 366 millions in actual numbers ***(Wild et al., 2004).***

Diabetic retinopathy (DR) is a major complication of DM ***(Wong et al., 2018).***

Diabetic retinopathy (more specifically diabetic macular edema, DME) is the most common cause of loss of vision in the working population in developed countries ***(Dervenis et al., 2017).***

Visual impairment as a result of diabetic retinopathy has a significant negative impact on the patient's quality of life ***(Hendrick et al., 2015).***

Reasons for loss of vision are diabetic maculopathy and complications of proliferative diabetic retinopathy (PDR) such as vitreous hemorrhage, tractional retinal detachment, and neovascular glaucoma ***(Shaw et al., 2010).***

Diabetic macular edema (DME) is the swelling of the retina resulting from the exudation and accumulation of extracellular fluid and proteins in the macula due to the breakdown of the blood-retina barrier and an increase in vascular permeability ***(Ciulla et al., 2003; Antcliff and Marshall, 1999).***

Diabetic choroidal angiopathy is related to the degree of severity of retinopathy and presence of macular edema because of a significant decrease in the choroidal thickness in patients with diabetic macular edema or treated PDR. Spectral-domain OCT is a noninvasive technology to assess the choroid and may be a useful tool in the evaluation of chorioretinal vascular changes in diabetic retinopathy ***(Regatieri et al., 2012).***

Optical coherence tomography (OCT) is a modern imaging technique for noninvasive and noncontact in-vivo examination of the retina and the vitreoretinal interface ***(Hee et al., 2008; Shahidi et al., 1991).***

The introduction of OCT allows an objective evaluation of DME with effectiveness in both qualitative and quantitative description of this pathology. That is why it becomes a standard

tool in the management of patients with DME ***(Massin et al., 2006).***

Vision loss from DR can be prevented with broad-level public health strategies, but these need to be tailored to a country's and population's resource setting. Designing DR screening programs, with appropriate and timely referral to facilities with trained eye care professionals, and using cost-effective treatment for vision-threatening levels of DR can prevent vision loss ***(Wong et al., 2018).***

The introduction of Anti-vascular endothelial growth factor (anti-VEGF) has revolutionized the management of DME and is considered by many one of the greatest advances in ophthalmology in the past decade. Anti- VEGF treatments have been hypothesised as an alternative adjunctive treatment for DME ***(Cunningham et al., 2005).***

At present, different types of anti-VEGF are available including pegaptanib (Macugen), ranibizumab (lucentis), bavacizumab (Avastin) and aflibercept (Elyea) ***(Presta et al., 1997).***

The binding of ranibizumab to VEGF prevents the interaction of VEGF with its receptors (VEGFR1 and VEGFR2) on the surface of endothelial cells. This reduces endothelial cell proliferation, vascular leakage, and new blood vessel formation ***(Spitzer et al., 2008).***