Recent advances in the treatment of diabetic Macular edema

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AIM OF WORK

The aim of this work is to highlight advantages and disadvantages & differentiate advanced modalities in management of diabetic macular edema

Introduction

Diabetic retinopathy is a microangiopathy affecting the retinal precapillary arterioles, capillaries & venules, however large vessels may also be involved. Retinopathy has features of both microvascular occlusion & leakage.[1]

Diabetic macular edema, the leading cause of visual loss in diabetic retinopathy.DME , whether focal or diffuse can be characterized as a retinal thickening within 2 disc diameters of the center of the macula.Breakdown of the blood–retinal barrier with leakage from microaneurysms,retinal capillaries, and arterioles all contribute toDME. [2]

Poor control of blood sugar, renal disease, systemichypertension, and elevated lipid levels all increase the riskof DME. Current understanding of the epidemiologic featuresand disease burden of DME is limited. [3]

There is still no proven intervention that prevents or reverses visual loss from diabetic macular edema in all patients. A variety of promising new medical & surgical procedure are under investigation, but more research is required to determine there role alone or in combination. [4]

The standard guidelines for focal laser photocoagulation for DME have been provided by the ETDRS. Direct treatment to leaking microaneurysms and grid treatment of diffuse macular edema or non perfused thickened retina have been suggested for mild and moderate NPDR .[5]

Despite timely and appropriate use of laser, some patients continue to experience visual loss. The pathogenesis of PDR and DME is multifactorial involving both angiogenic and inflammatory processes. Recent trials have shown that the anti-inflammatory and anti-angiogenic properties of corticosteroids may provide benefit in treating PDR and DME. [6 7 8]

The clinical outcomes and complications of intravitreal corticosteroid injection have been described in several animal and human studies.Intravitreal triamcinolone acetonide (1--8 mg) has been used to treat DME. The most common ocular side effects attributed to corticosteroids are glaucoma and cataract. In addition, endophthalmitis and retinal detachment may complicate intravitreal injections. [9] [10]

VEGF-A is a major mediator of increased retinal permeability.Blockage of VEGF has shown to reduce vascular permeability. VEGF inhibition has been achieved via PKC inhibitors as well as high affinity binding of either aptamers (e.g., protein kinase C inhibitor, pegaptanib) or antibodies (e.g., ranimizumab, bevacizumab) targeted against VEGF-A. Specific drug treatments are likely to become available for macular edema. [11]

There is clinical evidence that both tractional and non-tractional factors at the vitreoretinal interface play an important role in the pathogenesis of macular edema. Many hypotheses exist regarding how vitrectomy may improve DME. Induction of posterior vitreous detachment, removal of taut posterior cortex, removal of ILM, and a complete pars plana vitrectomy have been reported to resolve DME. [12] [13]

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List of Abbreviations:

AII Angiotensine II

AGEs	Advanced Glucation End Products
b-FGF	Basic fibroblast growth factor
BRB	Blood Retinal Barrier
CAI	Carbonic anhydrase inhibitors
CME	Cystoid Macular Edema
CSME	Clinical Significant Macular Edema
DAG	Diacylglycerol
DCCT	Diabetic control and complication s trial
DIRECT	Diabetic retinopathy candesartan trials
DME	Diabetic Macular Edema
DRCR	Diabetic Retinopathy Clinical Research Network
ET-1	Endothelin
ETDRS	Early treatment diabetic retinopathy study
ELM	External Limiting Membrane
FA	Fluocinoloneacetonid
FAME	Fluocinolone medical evaluation
FAZ	Foveal A vascular Zone
FDA	Food and Drug Administration
FFA	Flourosine Angiography
FGF-2	Fibroblast growth factor-2
GCL	Gangelion cell layer
GDNF	Glial cell derived neurotropic factor
GFAP	Glial fibrillary acidic protein
ICAM-1	Intra cellular adhesion molecule-1
IGF	Insulin Growth Factor
IL-1	Inter leukin-1

ILM	Internal Limiting Membrane
INL	Inner Nuclear Layer
IOP	Intra Ocular Pressure
IRMA	Intra retinal micro vascular abnormalities
IVTA	Intra vitrealtriamicolone
MAPK	Mitogen activated protein kinase
mm	Millimeter
MMPS	Matrix metallprotinase
µs	Microsecond
mw	Milli watt
NFL	Nerve fibre layer
nm	Nanometer
NSAIDs	Non Steroidal Anti-Inflammatory Drugs
OCT	Ocular Coherence Tomography
ONL	Outer Nuclear Layer
OPL	Outer plexiform Layer
PC	Phosphatidylcholine
PDGF	Platelet derived growth factor
PDR	Proliferative diabetic retinopathy
PEDF	Pigment epithelium derived factor
PKC	Protein Kinase c
PPV	Pars plana vitrectomy
PPVP	Posterior precortical vitrous pocket
PST	Posterior subtenon
PVD	Posterior vitreous detachment
RAS	Renin angiotensin system