DIABETIC RETINOPATHY

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- 1. Epidemiology and risk factors
- 2. *Classification* and *features* of Diabetic retinopathy (DR)
- 3. *Complications* of DR and their *prevention*
- 4. Screening protocol for DR and referral to Ophthalmologist
- 5. *Direct ophthalmoscopy* and identification of *fundus findings*

Epidemiology of DR

RISK of developing DR:

- Type I or IDDM 70%
- Type II or NIDDM 39%

• Type II on insulin – 70%

Prevalence of the type of Diabetes

• Type 2 – in 90% of diabetic patients

Diabetic retinopathy - <u>most common cause</u> of <u>legal blindness</u> between ages 20 and 70 years.

RISK FACTORS:

- 1. Duration of diabetes
- 2. Poor control of Diabetes
- 3. Hypertension
- 4. Nephropathy
- 6. Obesity and hyperlipidemia
- 7. Smoking
- 8. Pregnancy

Pathogenesis

Microangiopathy which has features of both microvascular leakage and occlusion

Larger vessels may also be involved

Microvascular leakage

Loss of pericytes results in distention of weak capillary wall producing microaneurysms which leak.

Blood-retinal barrier breaks down causing plasma constituents to leak into the retina – retinal oedema, hard exudates

Microvascular occlusion

- Basement membrane thickening, endothelial cell damage, deformed RBCs, platelet stickiness and aggregation
- Vascular Endothelial Growth Factor (VEGF) is produced by hypoxic retina
- VEGF stimulates the growth of shunt and new vessels

Classification of DR

- I. Non-proliferative DR (NPDR)
- Mild
- Moderate
- Severe
- Very severe
- II. Proliferative DR (PDR)
- III. Clinically significant macular oedema (CSME)
 - May exist by itself or along with NPDR and PDR

Mild NPDR

- At least one microaneurysm earliest clinically detectable lesion
- Retinal hemorrhages
- Hard or soft exudates



Moderate NPDR

- Microaneurysms and/or dot and blot hemorrhages in at least 1 quadrant
- Soft exudates (Cotton wool spots)
- Venous beading or IRMA (intraretinal microvascular abnormalities)



Mild and Moderate Non- proliferative DR was previously known as <u>Background DR</u>



Severe NPDR

Any one of the following 3 features is present

- Microaneurysms and intraretinal hemorrhages in all 4 quadrants
- Venous beading in 2 or more quadrants
- Moderate IRMA in at least 1 quadrant

Known as the 4-2-1 rule

Very severe NPDR

Any two of the features of the 4-2-1 rule is present

Severe and Very severe Non-proliferative DR was known as the Pre-proliferative DR



Clinically significant Macular Oedema

- Retinal oedema close to fovea
- Hard exudates close to fovea
- Presents with dimness of vision
- By itself or along with NPDR or PDR

CSME – Hard exudates close to fovea and associated retinal thickening



Proliferative DR (PDR)

Characterized by Proliferation of new vessels from retinal veins

- New vessels on the optic disc
- New vessels elsewhere on the retina



Proliferative DR



COMPLICATIONS OF DIABETIC RETINOPATHY

- Vitreous hemorrhage
- Tractional retinal detachment
- Rubeosis Iridis
- Glaucoma
- Blindness

Vitreous Hemorrhage

SUBHYALOID HEMORRHAGE



Tractional retinal detachment



Rubeosis Iridis



Neovascular Glaucoma

- Complication of rubeosis iridis
- New vessels cause angle closure
- Mechanical obstruction to aqueous outflow
- Intra ocular pressure rises
- Pupil gets distorted as iris gets pulled
- Eye becomes painful and red
- Loss of vision

Blindness

- Non-clearing vitreous hemorrhage
- Neovascular glaucoma
- Tractional retinal detachment
- Macular ischemia

PREVENTION OF COMPLICATIONS

- By early institution of appropriate treatment
- This requires early detection of DR in its asymptomatic treatable condition
- By routine fundus examination of all Diabetics (cost effective screening)
- And appropriate referral to ophthalmologist

>Mild and Moderate NPDR

- No specific treatment for retinopathy
- Good <u>metabolic control</u> to delay progression
- Control of associated Hypertension, Anemia and Renal failure

Severe and very severe NPDR

- Close follow up by Ophthalmologist

Clinically significant macular oedema

 Laser photocoagulation to minimise risk of visual loss

>Proliferative DR

 Retinal laser photocoagulation as per the judgment of ophthalmologist (in high risk eyes)

 It converts hypoxic retina (which produces ANGIOGENIC factors) into anoxic retina (which can't)

Screening protocol for Diabetic retinopathy

- 1. Screening once in a 1 year
 - Diabetics with normal fundus
 - Mild NPDR
- 2. Screening once in 6 months
 - Moderate NPDR

Referral to Ophthalmologist

Visual Symptoms

- Diminished visual acuity
- Seeing floaters
- Painful eye

Fundus findings

- Macular oedema/hard exudates close to fovea
- Proliferative DR
- Vitreous hemorrhage
- Moderate to severe and very severe NPDR
- Retinal detachment
- Cataract obscuring fundus view

Referral to Ophthalmologist

- Presence of Risk Factors
- Pregnancy
- Nephropathy

Simulation of defective vision as experienced by a Diabetic whose vision has been affected by Diabetic retinopathy



Normal

DIRECT OPHTHALMOSCOPY

- Examination of the fundus of the eye
- To screen for Diabetic Retinopathy
- After dilatation of both eyes with 0.5% tropicamide

View of the retina through an ophthalmoscope

View of the retina through an ophthalmoscope

Normal fundus views of Right and left eye

Mild NPDR – Microaneurysms, Dot and Blot hemorrhages

Moderate NPDR

Moderate NPDR with CSME

Circinate retinopathy – Hard exudates in a ring around leaking aneurysms

Age related Macular degeneration: Note the drusen. Not to be confused with Hard exudates. There are no microaneurysms or dot/blot hemorrhages.

Severe NPDR

- Cotton wool patches
- Hemorrhages 4 quadrants

With CSME

Very severe NPDR

Cotton-wool patches, venous segmentation

- -Venous beading
- scars of laser spots
- Absorbing hemorrhages

Macular Edema

CSME – in Different Stages of NPDR

Proliferative DR – New vessels elsewhere on the retina along the supero-temporal vessels

PDR – New vessels on disc

Proliferative Diabetic Retinopathy

PDR – New vessels on disc and new vessels elsewhere on retina

PDR – with vitreous hemorrhage

Vitreous Hemorrhage

Tractional retinal detachment

Fibro-vascular proliferation

Thank you!

