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OCULAR COMPLICATIONS OF DIABETES MELLITUS

DEFINITION

- ✘ Diabetes is a group of metabolic disorders characterized by chronic hyperglycemia secondary to absolute or relative lack or diminished efficacy of endogenous insulin

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- ✘ In symptomatic patients, can be diagnosed on a single plasma glucose measurement
 - Fasting plasma glucose ≥ 7.0 mmol/L or
 - Random plasma glucose > 11.1 mmol/L

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- ✘ Diabetes causes significant morbidity and mortality worldwide
 - ✘ It is associated with long-term damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels.

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- ✘ It is a leading cause of blindness
 - ✘ All ocular structures can be affected

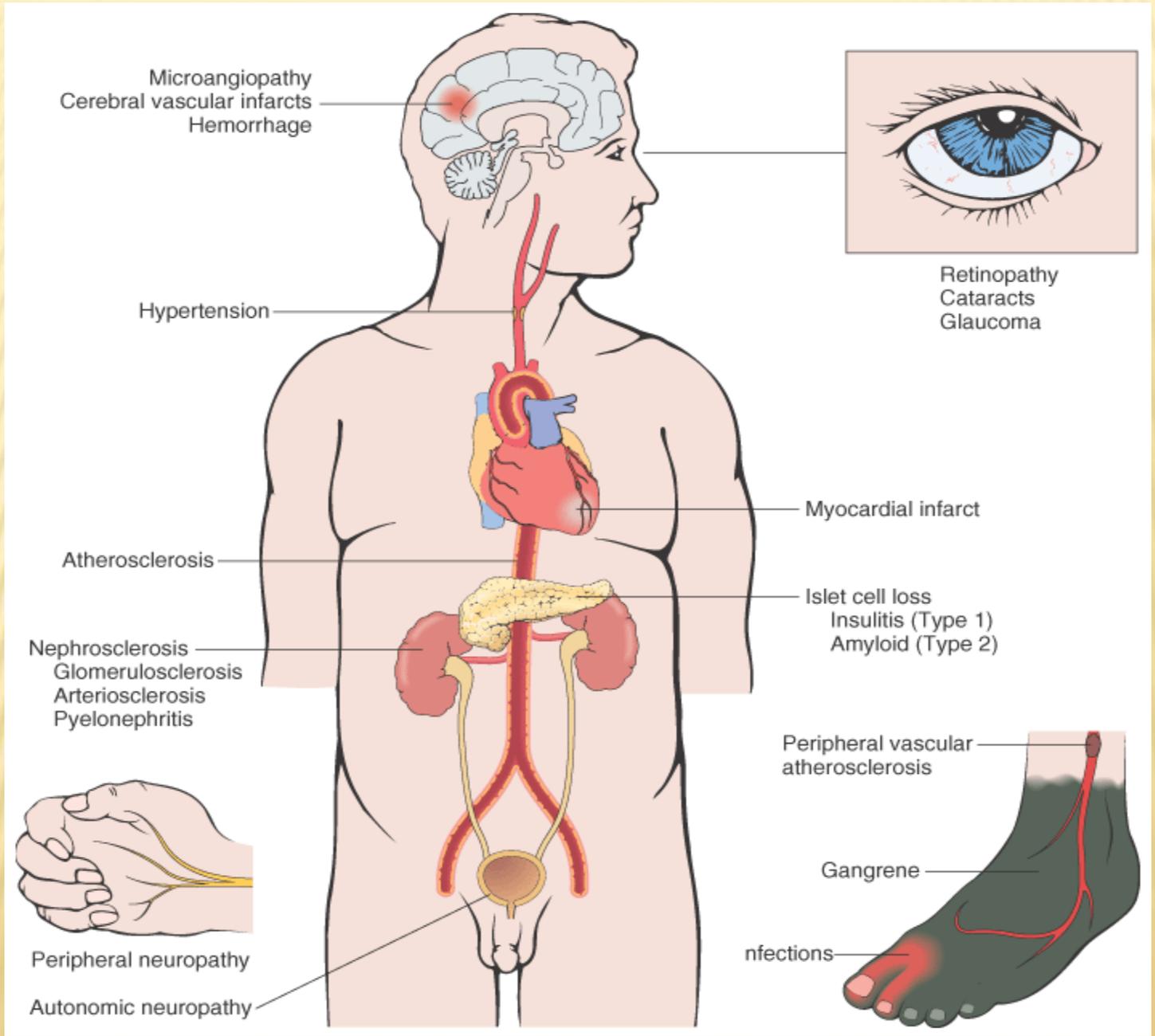
EPIDEMIOLOGY

- ✘ It affect 3-7% of the adult population in the western world.
- ✘ 1.4million adults with Diabetes in the U.K

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- ✘ In USA; 5-7% in Whites, 10% in Black.
 - ✘ In Nigeria, prevalence rate is 2.8%
 - ✘ Diabetes is responsible for 14% of retinal disease and blindness

COMPLICATIONS OF DIABETES MELLITUS

COMPLICATIONS OF DIABETES MELLITUS



Microangiopathy
Cerebral vascular infarcts
Hemorrhage



Retinopathy
Cataracts
Glaucoma

Hypertension

Myocardial infarct

Atherosclerosis

Islet cell loss
Insulinitis (Type 1)
Amyloid (Type 2)

Nephrosclerosis
Glomerulosclerosis
Arteriosclerosis
Pyelonephritis

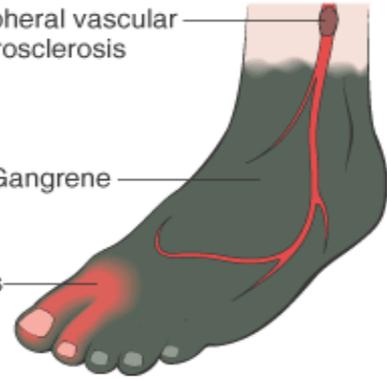


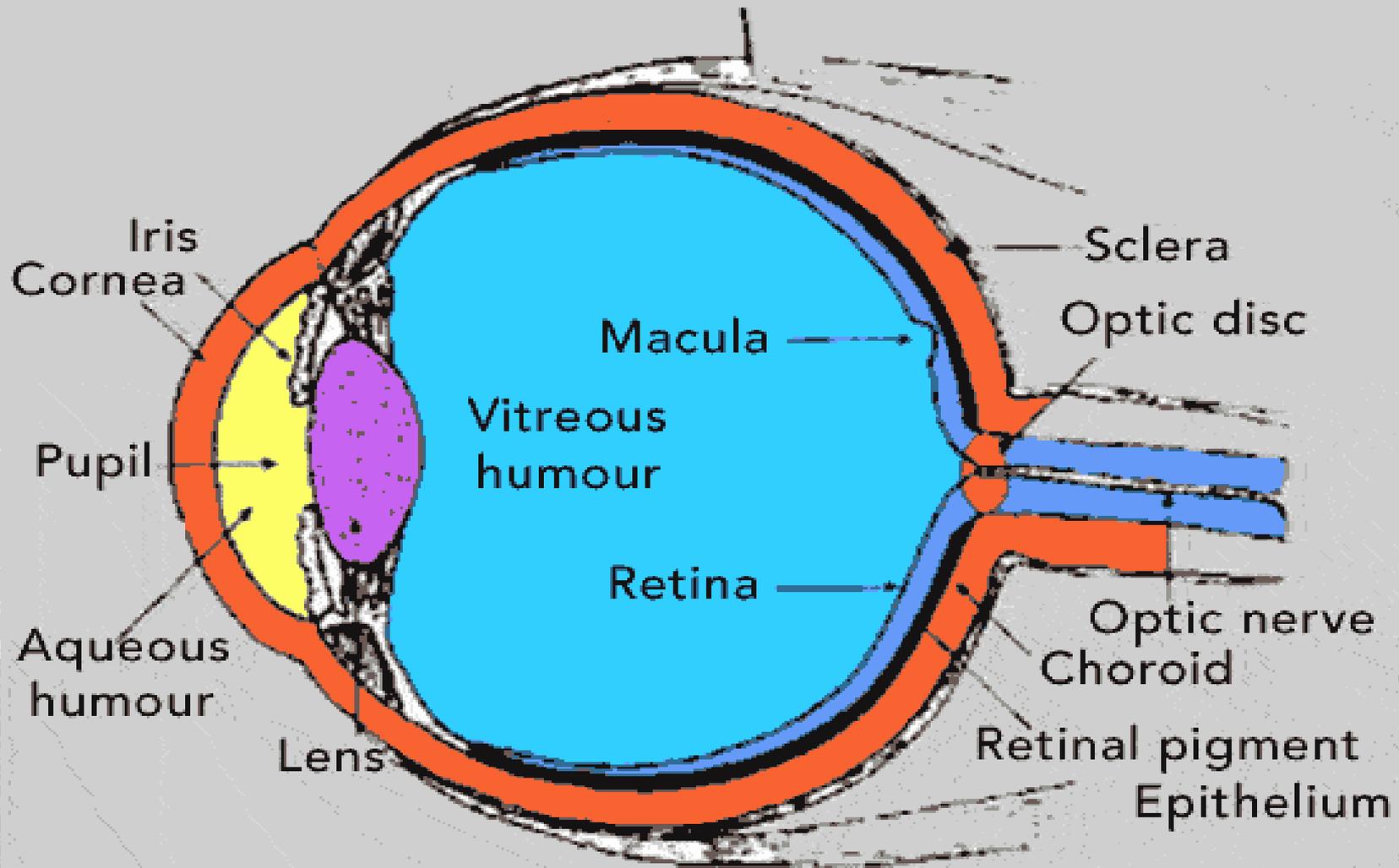
Peripheral neuropathy
Autonomic neuropathy

Peripheral vascular
atherosclerosis

Gangrene

Infections





OCULAR COMPLICATIONS

LIDS- Recurrent Styes

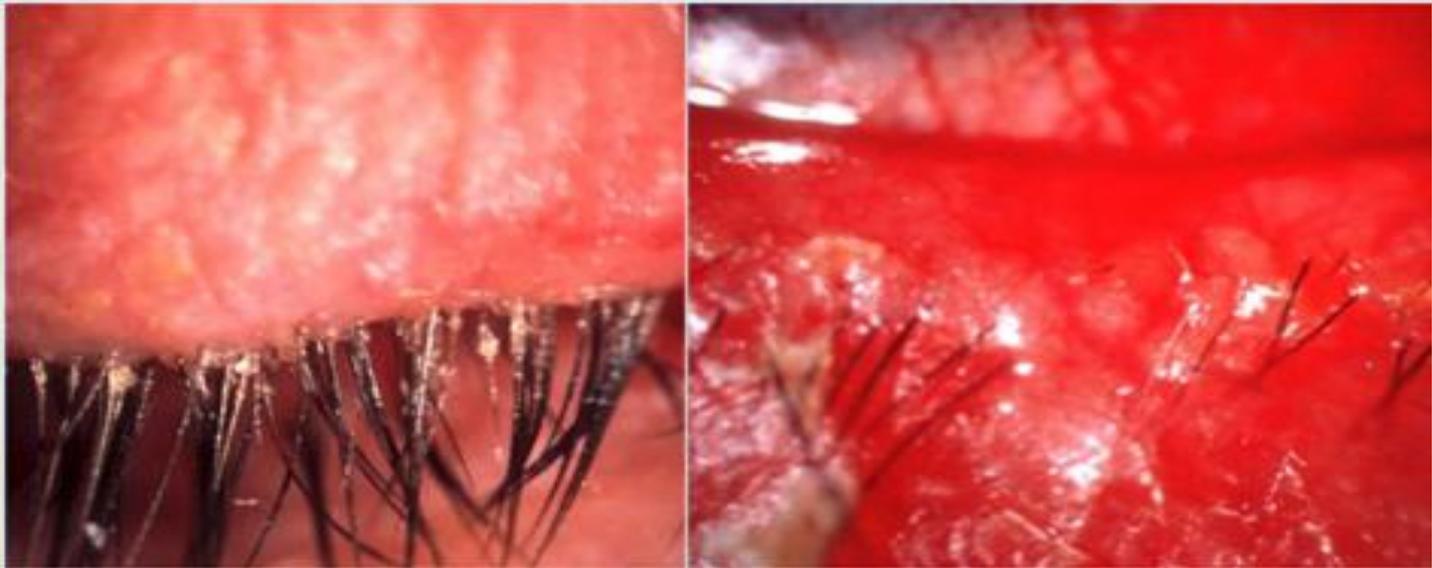
- ✘ Small abscess caused by acute staph infection of a lash follicle.
- ✘ Treatment –hot formentation, topical antibiotics

STYE



BLEPHARITIS

- ✘ This is a chronic staph infection of the lid margin



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- ✘ Treatment - Lid hygiene, Systemic tetracycline

Chalazion

- ✘ Chronic sterile granulomatous inflammatory lesion caused by retained sebaceous secretions
- ✘ Treatment-surgery, injection of steroid, systemic tetracycline

XANTHELASMA

- ✘ These are yellowish subcutaneous plaques of cholesterol and lipid at the medial canthus usually in elderly people

XANTHELASMA



CORNEA

- ✘ Corneal sensation is markedly decreased in diabetic patients, and they are prone to developing spontaneous erosions and corneal ulcers.

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- ✘ Neurotrophic ulcers are a common manifestation of diabetic keratopathy
 - ✘ Increased predisposition to infective cornea ulcers

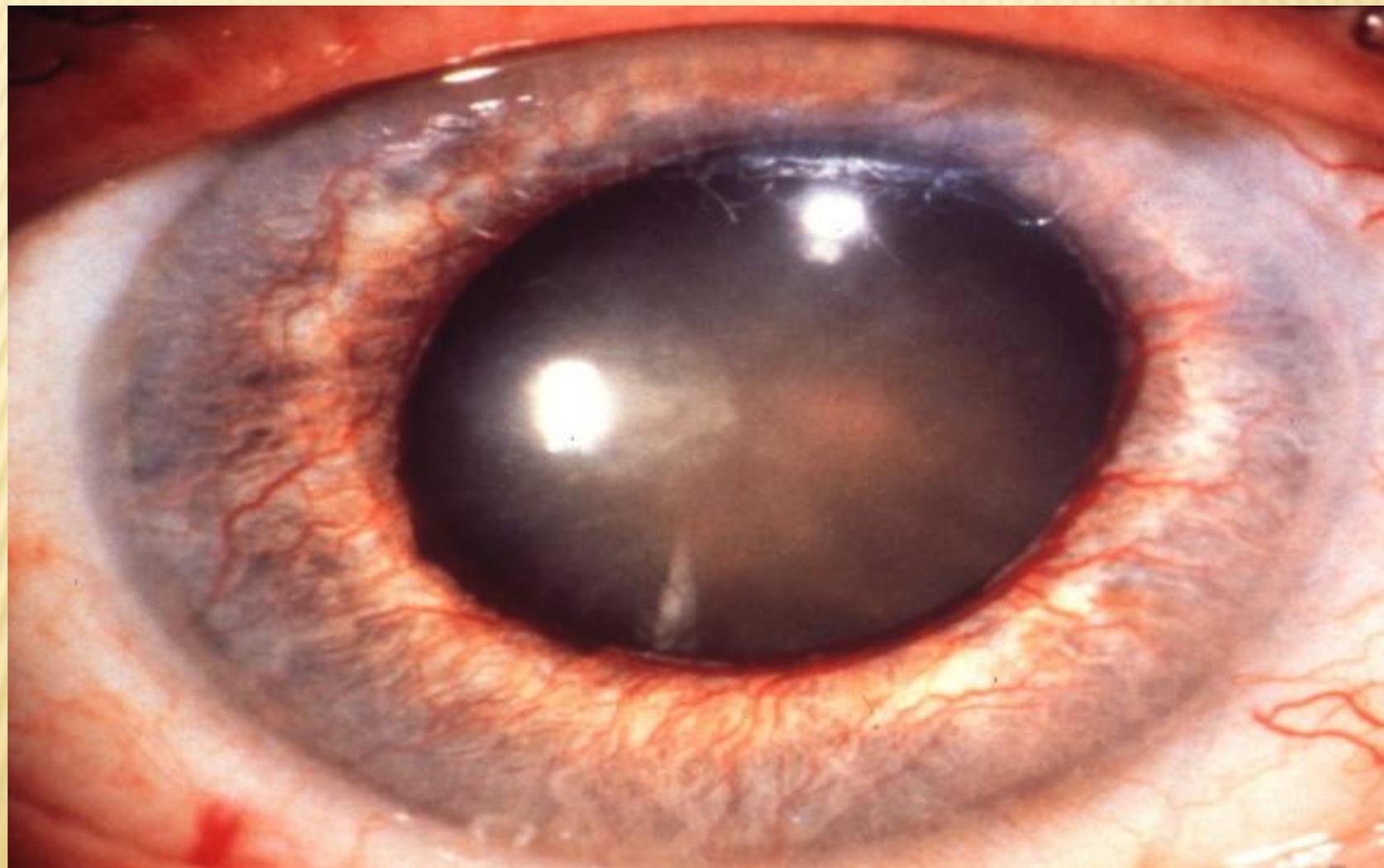
PUPIL

- ✘ The pupils often dilate poorly, and the amount of glycogen in the pigment epithelium may correlate to damage to the dilator muscle

RUBEOSIS IRIDIS

- ✘ Rubeosis iridis is associated most frequently with retinal ischaemia and neovascularization,
- ✘ it indicates the presence of a diffusible vascular proliferative factor secreted by the retina

RUBEOSIS IRIDIS

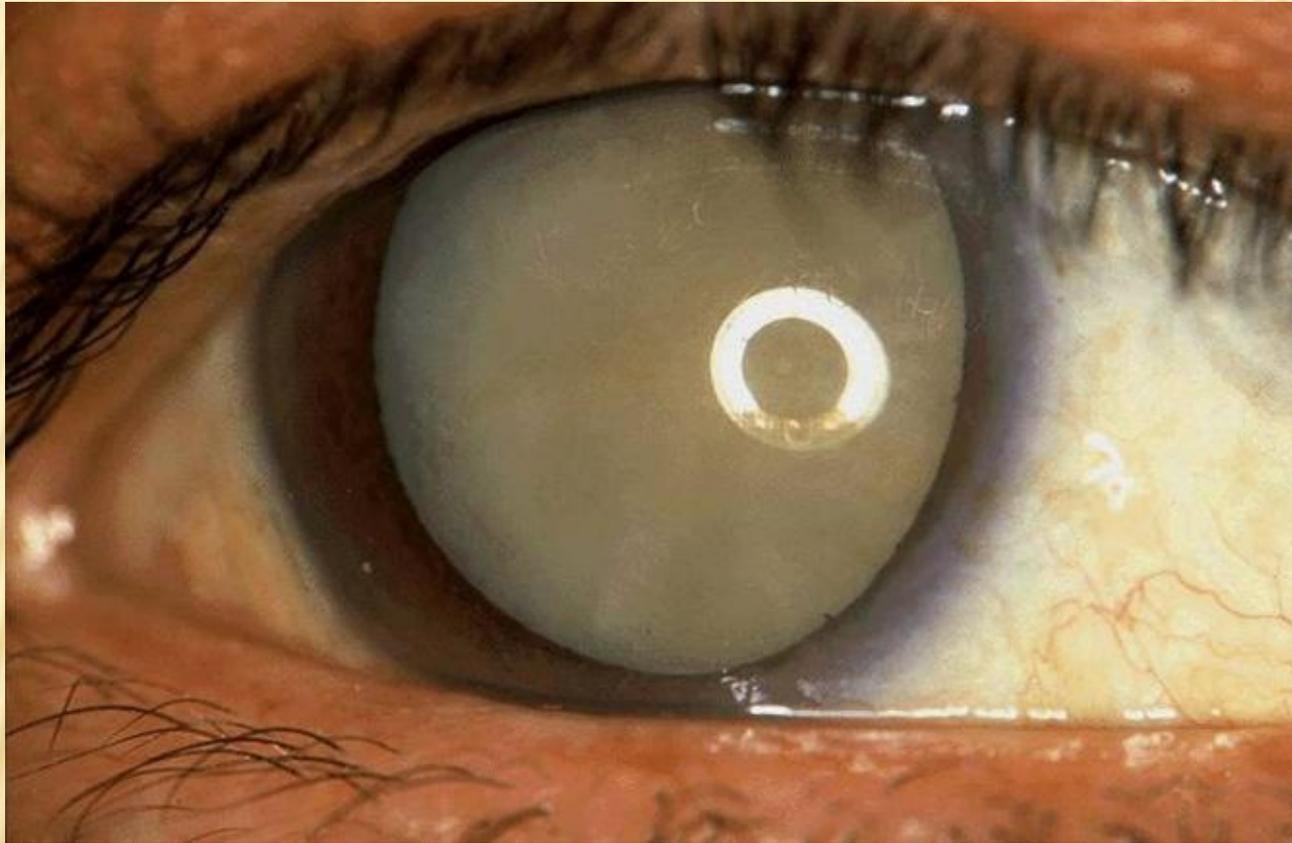


LENS

- ✘ Patients with uncontrolled diabetes present with unstable refractive error because the lens is subjected to changes in osmotic pressure induced by hyperglycemia
- ✘ A hyperopic or a myopic shift, depending on how the size and curvature of the lens is affected

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- ✘ Cataracts are more frequent in patients with diabetes mellitus and may develop at an earlier age
 - ✘ Lens opacities include anterior cortical spokes(snow flake like) and posterior subcapsular plaques.

CATARACT



CATARACT

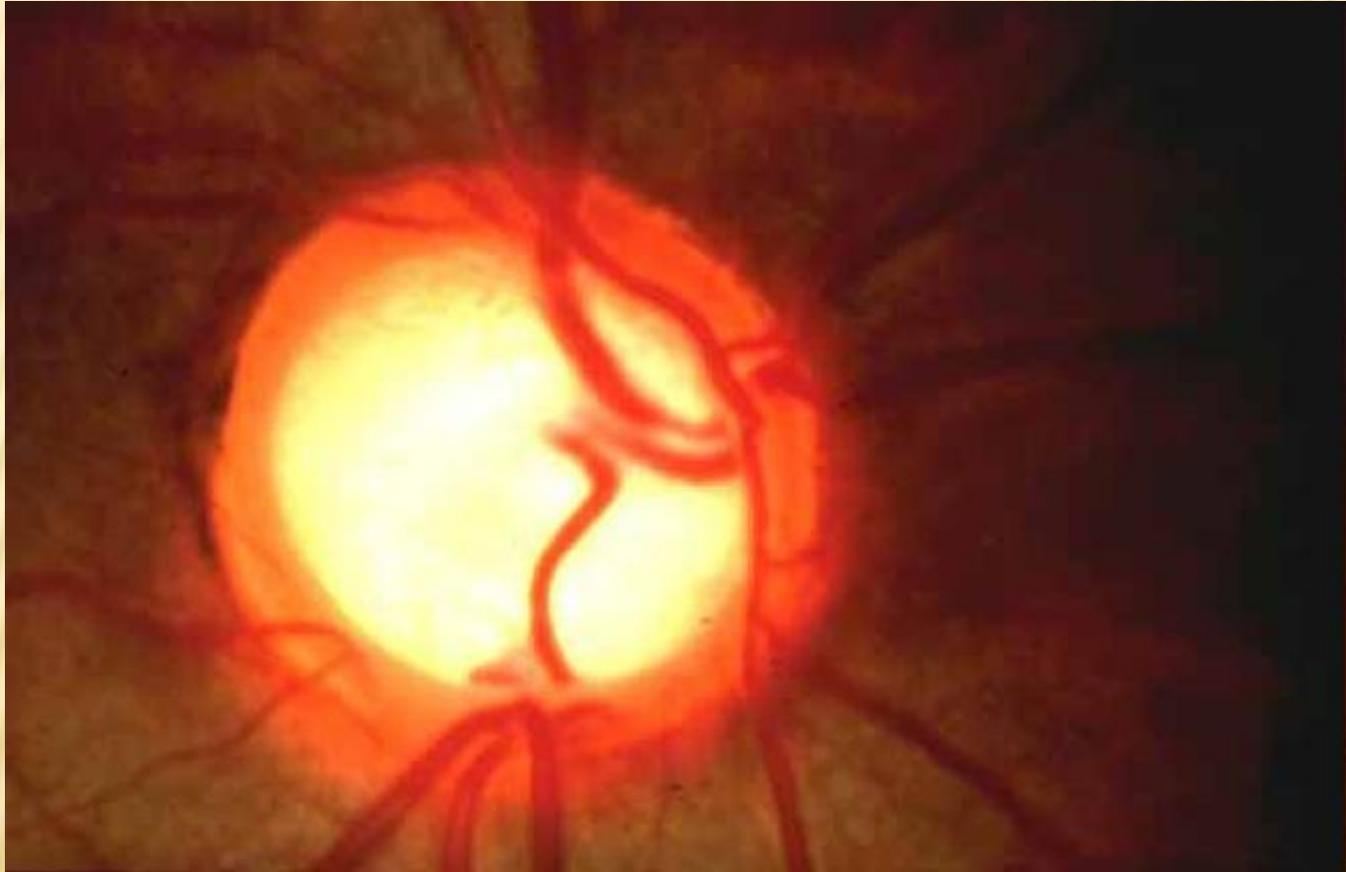


GLAUCOMA

- ✘ Diabetes have a higher prevalence of POAG than non diabetes
- ✘ Conversely, about 10% of patients with POAG have either frank diabetes or an abnormal Glucose tolerance test
- ✘ Use of acetazolamide should be used with caution as it may result in metabolic acidosis

✘ Avoid use of β blocker

GLAUCOMATOUS CUPPING OF THE DISC



NEOVASCULAR GLAUCOMA

- ✘ Diabetes is the 2nd commonest cause of neovascular glaucoma after central retinal vein occlusion
- ✘ It is caused by angle closure due to fibrovascular tissue

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- ✘ The underlying cause is severe retinal Ischaemia, which stimulates production & liberation of angiogenic factors
 - ✘ These can diffuse into the anterior chamber and cause the growth of new vessels on the iris & in the angle

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- ✘ Treatment – panretinal photocoagulation , cyclodestructive procedure, artificial drainage devices, retrobulbar injection of alcohol

VITREOUS

1. Posterior Vitreous Detachment

- ✘ The incidence of posterior vitreous detachment increases with age, and this is more frequent and occurs earlier in diabetic patients, even in those without retinopathy

2. Vitreous Haemorrhage

- ✘ Neovascular fronds grow along the surface of the retina and along the posterior formed vitreous
- ✘ Shifts in the position of the formed vitreous may thus lead to preretinal hemorrhage

3. Asteroid Hyalosis

- ✘ These usually unilateral opacities of the vitreous body (75% of all cases) are not all that infrequent
- ✘ They are thought to be linked to diabetes mellitus and hypercholesterolemia

DIABETIC RETINOPATHY

- ✘ Divided into Non proliferative and Proliferative
- ✘ Nonproliferative changes take place within the sensory retina
- ✘ Proliferative retinopathy is neovascularization and its sequelae; these changes occur internal to the retinal surface.

Risk factor in development of DR

- ✘ Duration of disease-*in type I DM, average of 15-17yrs for development of diabetic retinopathy*
- ✓ 90% after 30yrs

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- ✓ *In type II- after 10yrs*
 - ✗ Degree of control-tight control associated with reduction in primary development and progression of DR
 - ✗ Pregnancy-poor pre-pregnancy control of diabetes, too rapid control during the early stages of pregnancy and the development of preeclampsia and fluid imbalance.

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- ✘ Systemic hypertension-common in type II Diabetes
 - ✘ Anaemia
 - ✘ Renal disease
 - ✘ Obesity - particularly increased body mass and a high waist-to-hip ratio
 - ✘ Hyperlipidaemia

NON-PROLIFERATIVE DIABETIC RETINOPATHY



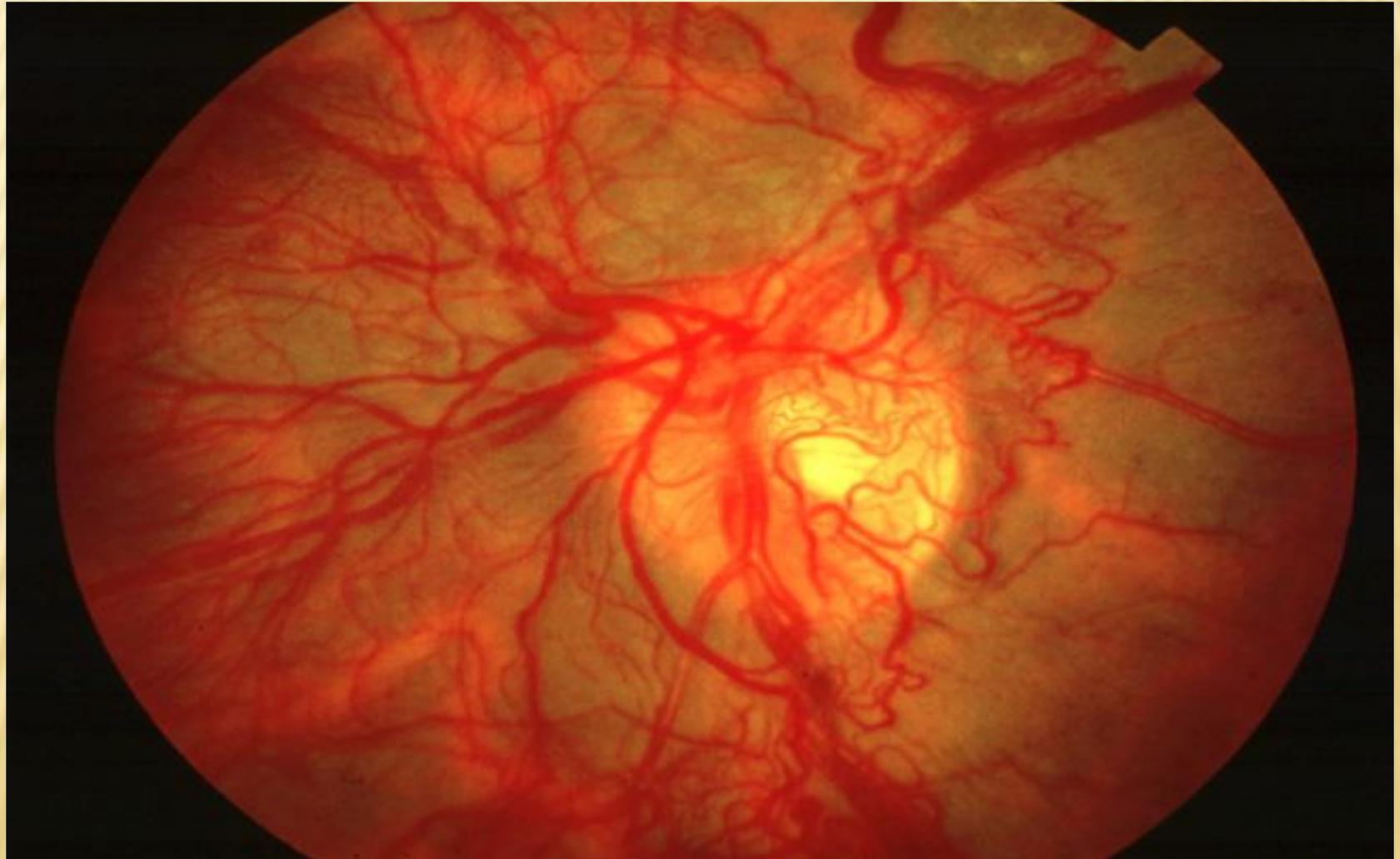
PROLIFERATIVE DIABETIC RETINOPATHY- NVD



PROLIFERATIVE DIABETIC RETINOPATHY- NVE

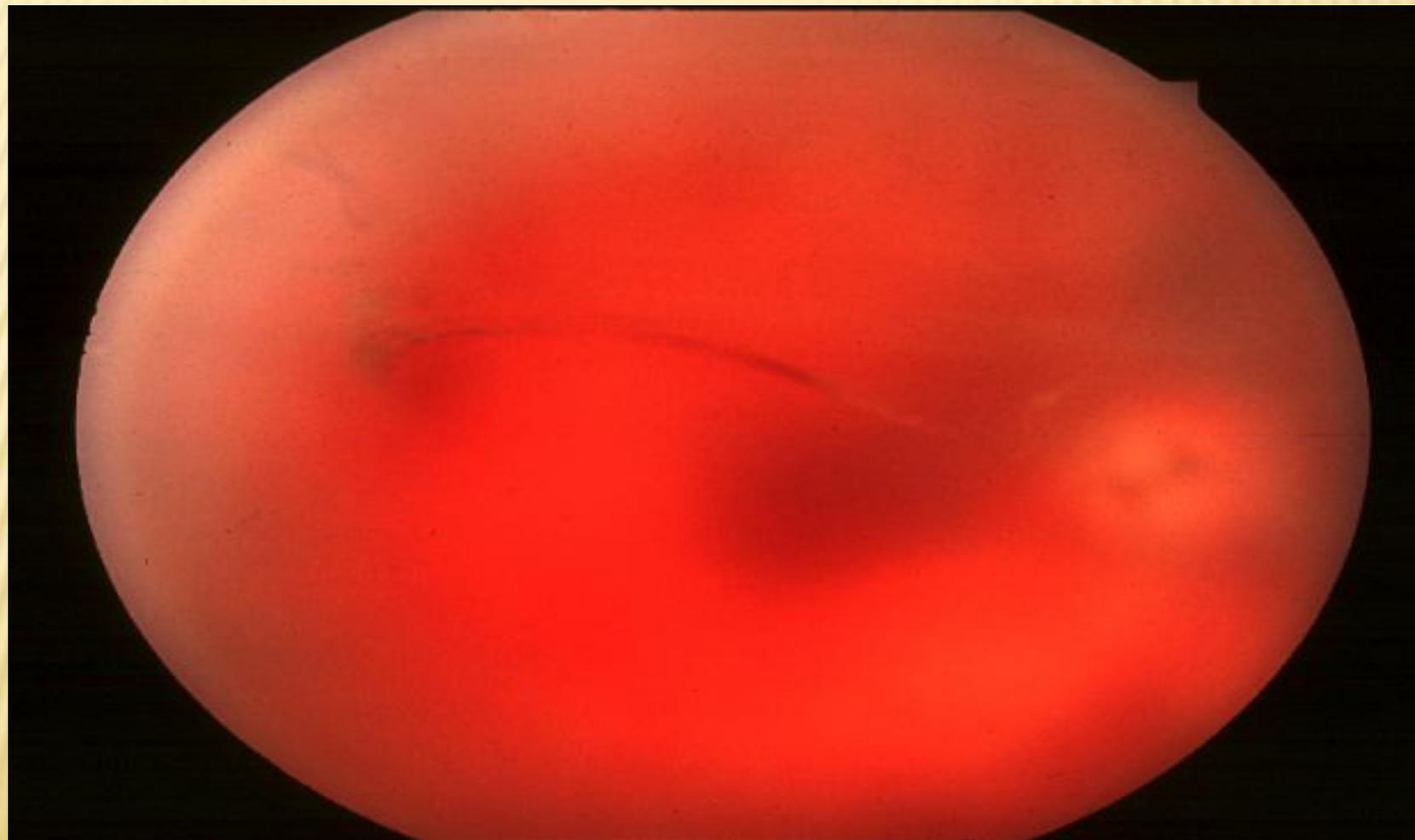


PROLIFERATIVE DIABETIC RETINOPATHY- TRD



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VITREOUS HAEMORRHAGE



DIABETIC MACULOPATHY

- ✘ This is the presence of oedema, hard exudates or ischaemia in the macular
- ✘ This is the most common cause of visual impairment in diabetic patients, particularly those with type 2 diabetes.
- ✘ Could be;
- ✘ Focal
- ✘ Diffuse
- ✘ ischaemic

- ✘ Circumscribed retinal thickening with associated circinate hard exudate



DIABETIC MACULAR OEDEMA

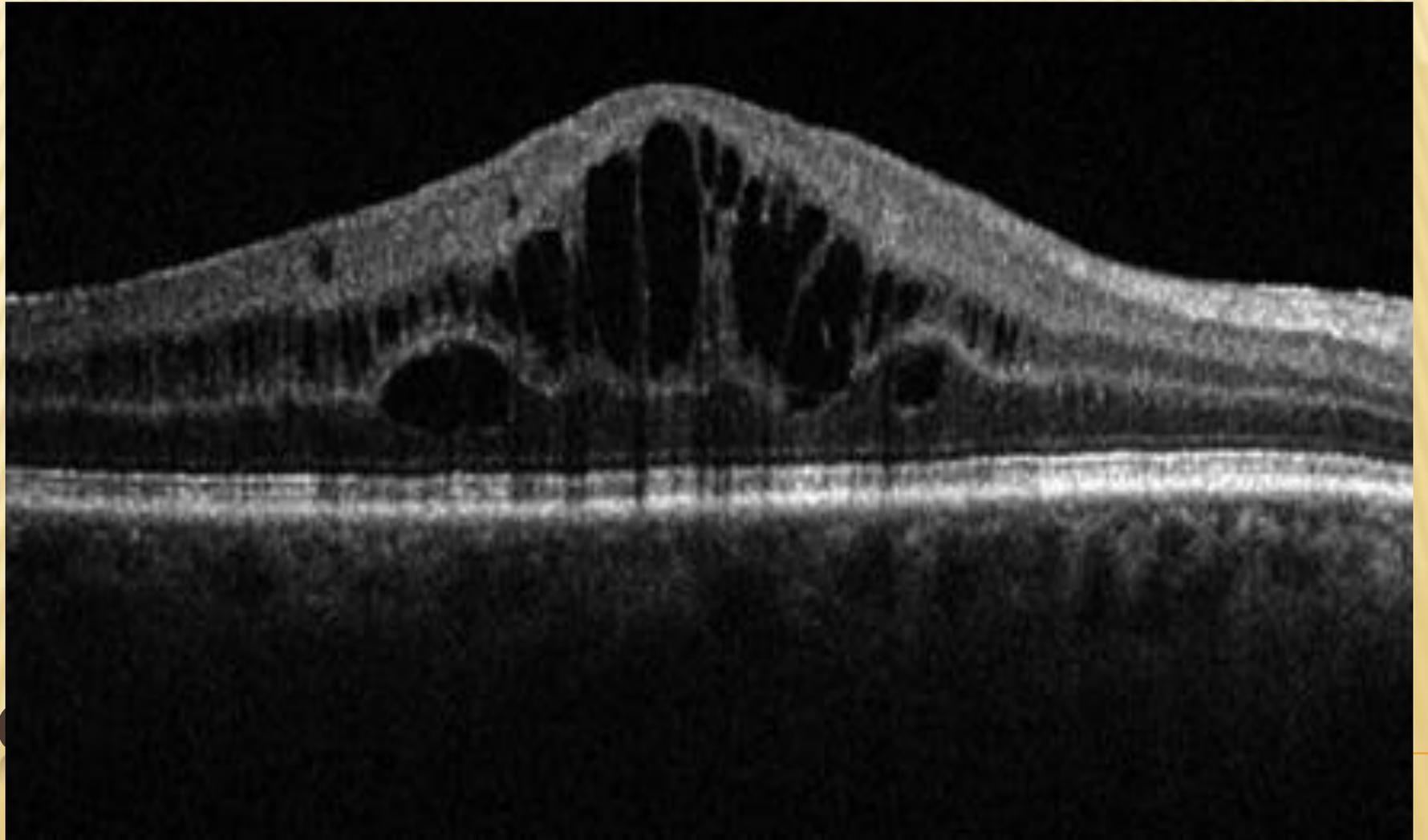


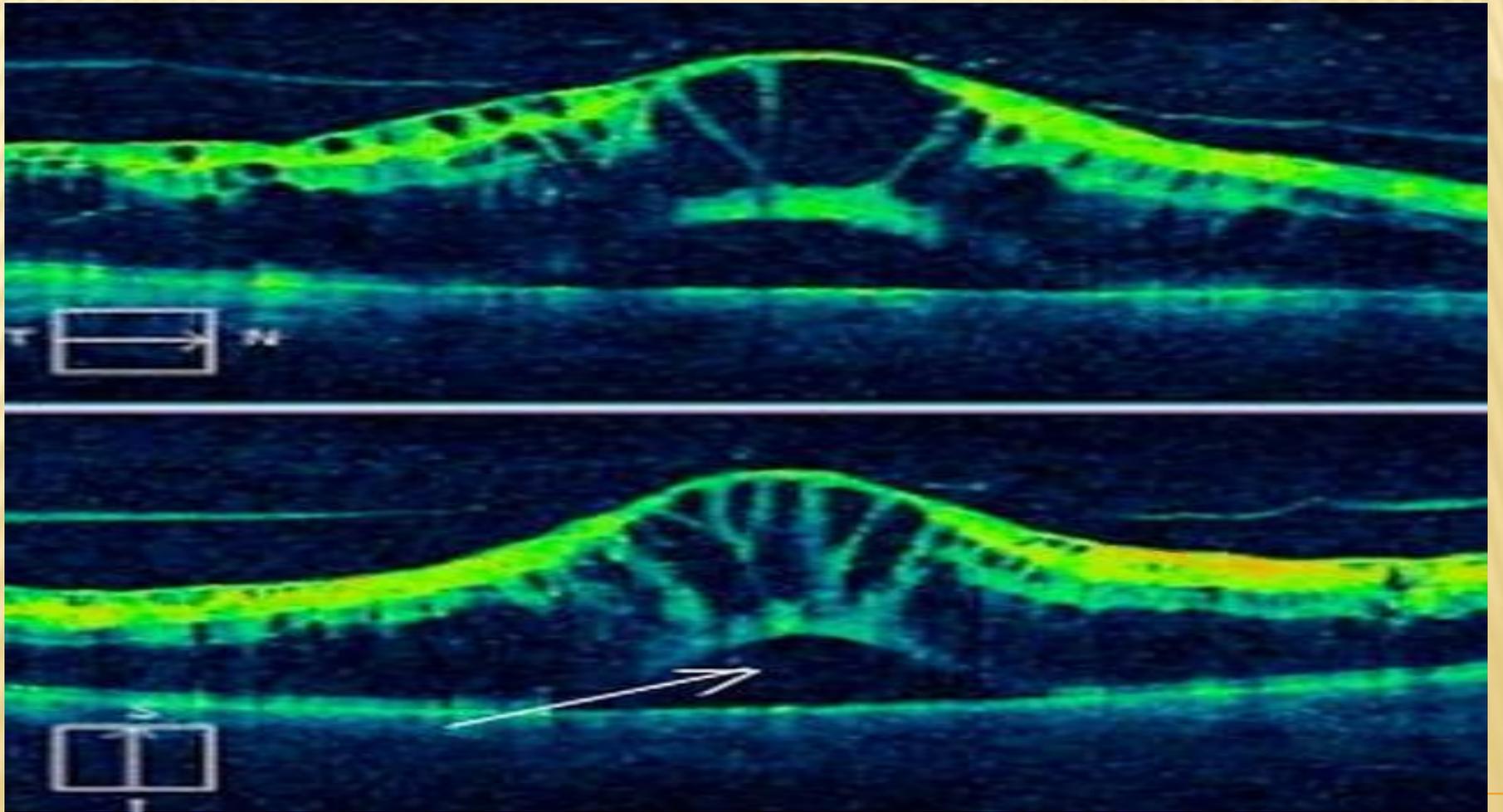
- ✘ Diffuse retinal thickening which may be associated with cystoid changes.

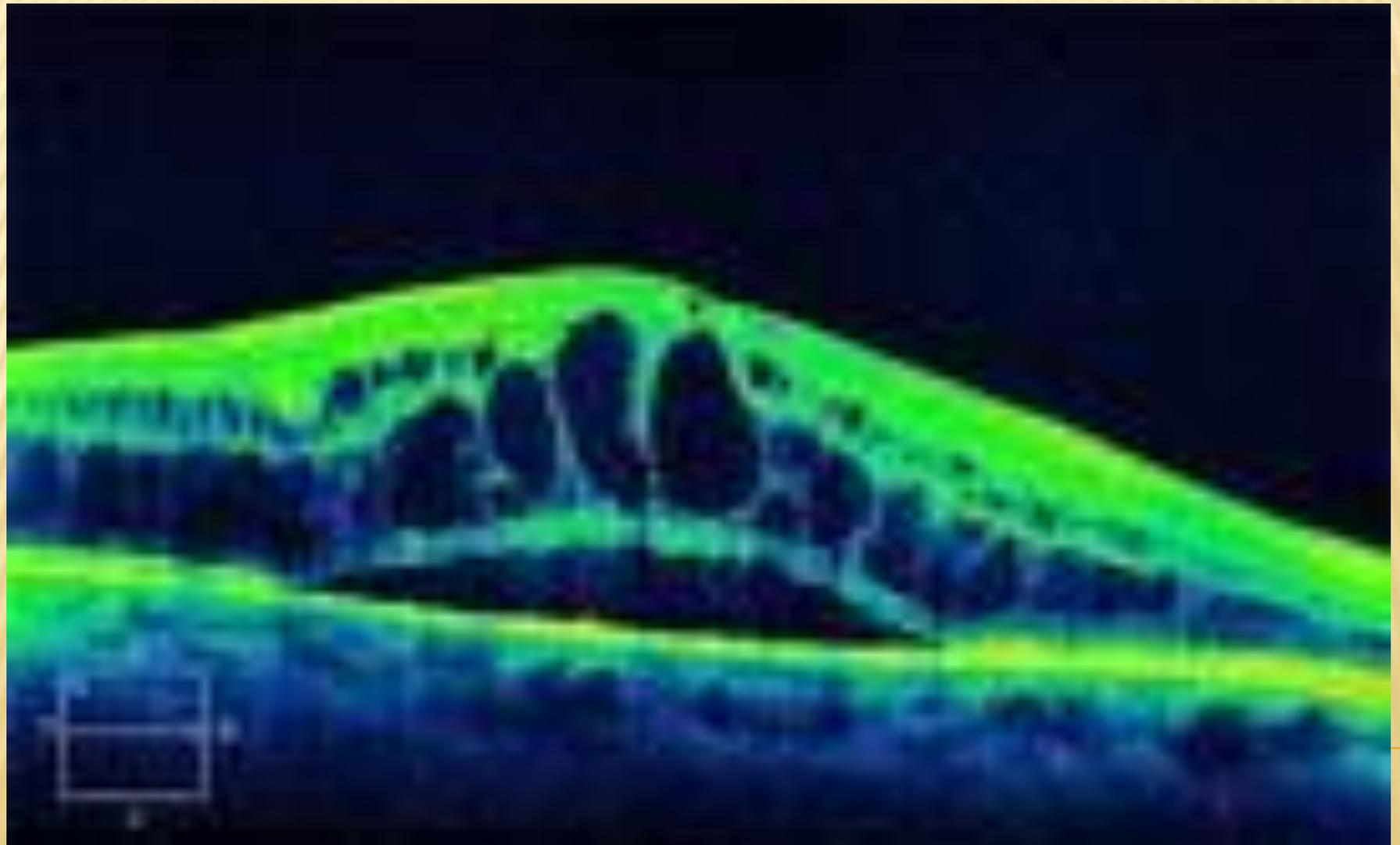
- ✘ The macula may look relatively normal despite reduced visual acuity.

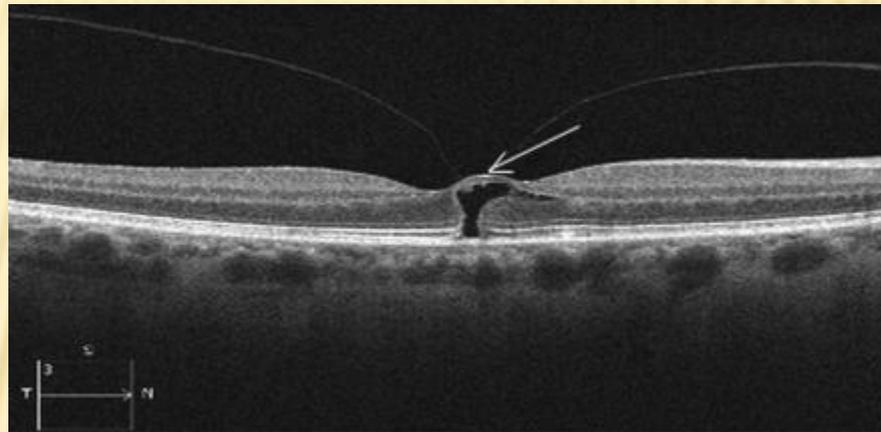


DIABETIC MACULAR OEDEMA









OPTIC NERVE

- ✘ Diabetic papillopathy-characterized by transient visual dysfunction associated with optic disc swelling which may occur in both type 1 and type 2 diabetics
- ✘ Treatment - posterior sub-Tenon injections may be beneficial

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- ✘ Diabetes is a risk factor for anterior ischemic optic neuropathy
 - ✘ the patient experiences a sudden, profound visual loss
 - ✘ Disc oedema and palor, peripapillary splinter shaped haemorrhages

ORBIT

- ✘ Orbital cellulitis
- ✘ Mucormycosis

NEURO-OPHTHALMOLOGY

✘ Cranial nerve palsy

- May be the 1st symptom of type 2 diabetes
- Believed to be due to localized myelinization of nerve secondary to focal ischaemia
- Pain may or may not be present
- Recovery of muscle function takes 1-3 months
- In 3rd cranial nerve palsy, pupillary function is normal

Left third nerve palsy



Severe unilateral ptosis and defective adduction



Normal abduction



Defective elevation



Defective depression

TREATMENT

- ✘ Counselling
- ✘ *Strict metabolic control of blood sugar*
- ✘ *Strict control and monitoring of systemic risk factors*

CONCLUSION

- ✘ Diabetes is a major cause of blindness
- ✘ Successful management of diabetic complications depend on tight glucose control, recognition and treatment of complications, laser treatment and vitrectomy (for retinopathy)
- ✘ Key to sight preservation for diabetic patient is routine examination to detect signs

DRY EYE

- ✘ Occurs when there is inadequate tear volume or function resulting in an unstable tear film and ocular surface disease

DEFINITIONS

- ✘ Keratoconjunctivitis sicca
- ✘ Xerophthalmia
- ✘ Xerosis
- ✘ Sjogren's syndrome

DRY EYE

- × Predisposition:
- × Age
- × Systemic condition like DM, Thyroid-associated diseases, Lupus
- × Trauma
- × Post- ocular surgeries

-
- ✘ Ocular disease like pterygium, pingueculum, blepharitis
 - ✘ Chronic use of eye drops with preservatives like Benzalkonium chloride

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- ✘ Syndromes associated with dry eye e.g Sjogren's syndrome
 - ✘ Medications e.g antihistamines, antidepressants, antihypertensives

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- ✘ Menopause
 - ✘ Indoor environment: A/C, forced air heating systems
 - ✘ Outdoor environment: arid climates. Dry or windy
 - ✘ Frequent flying

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- ✘ Computer use
 - ✘ Contact lens wear

SYMPTOMS

- ✘ Burning sensation
- ✘ Itchy eye
- ✘ Aching sensations
- ✘ Heavy eyes
- ✘ Sore eyes

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- ✘ Photophobia
 - ✘ Redness
 - ✘ Foreign body sensation, grittiness
 - ✘ Watering
 - ✘ Blurred vision

DIAGNOSIS

- ✘ Usually Clinical, considering all the predisposition listed above
- ✘ However we can do:
 - ✘ Tear film BUT
 - ✘ Schirmer test

TREATMENT

- ✘ Control predisposition
- ✘ Use of lubricating eye drops

THANK YOU

THANK YOU

