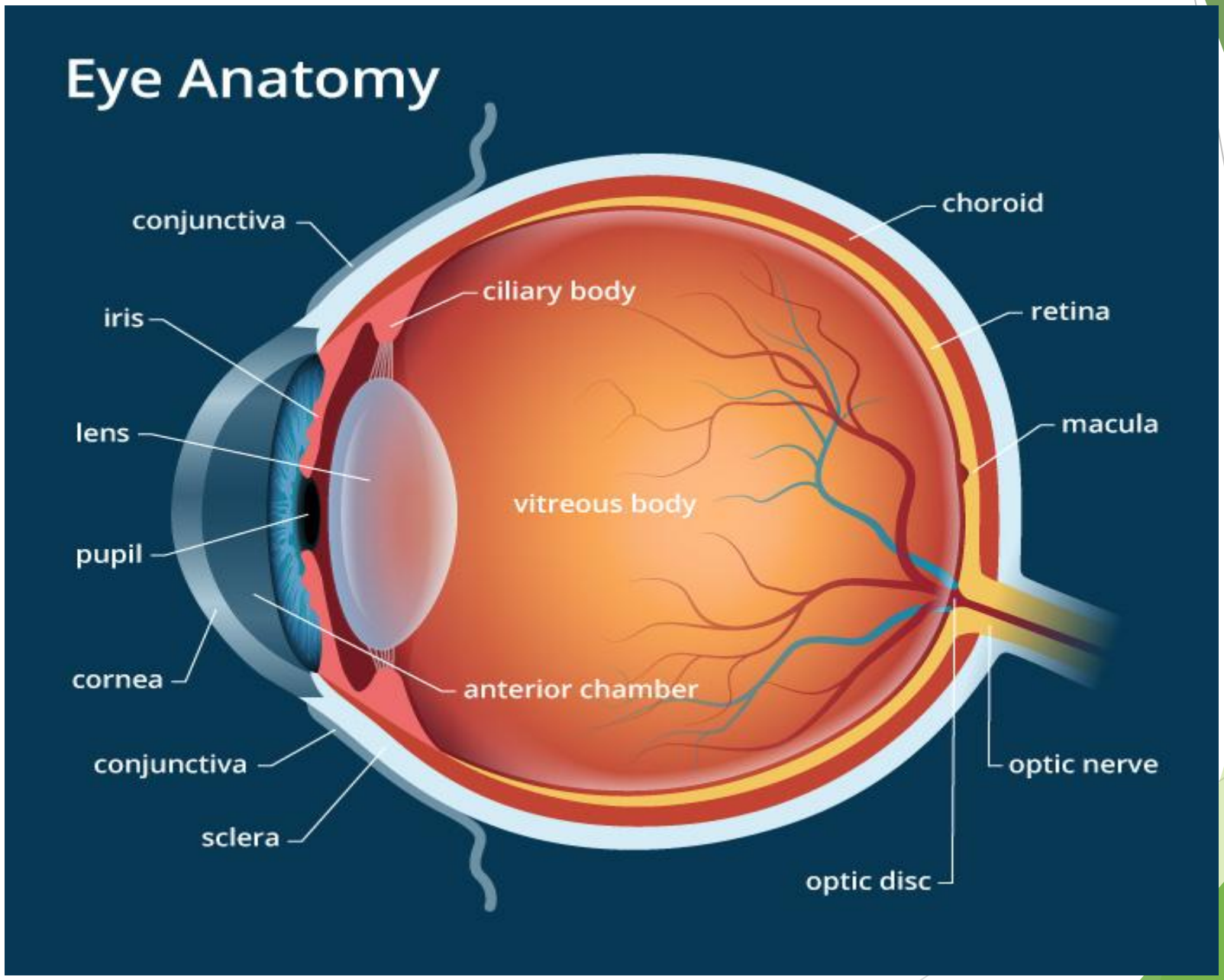

بسم الله الرحمن الرحيم
إنه من سليمان وإنه

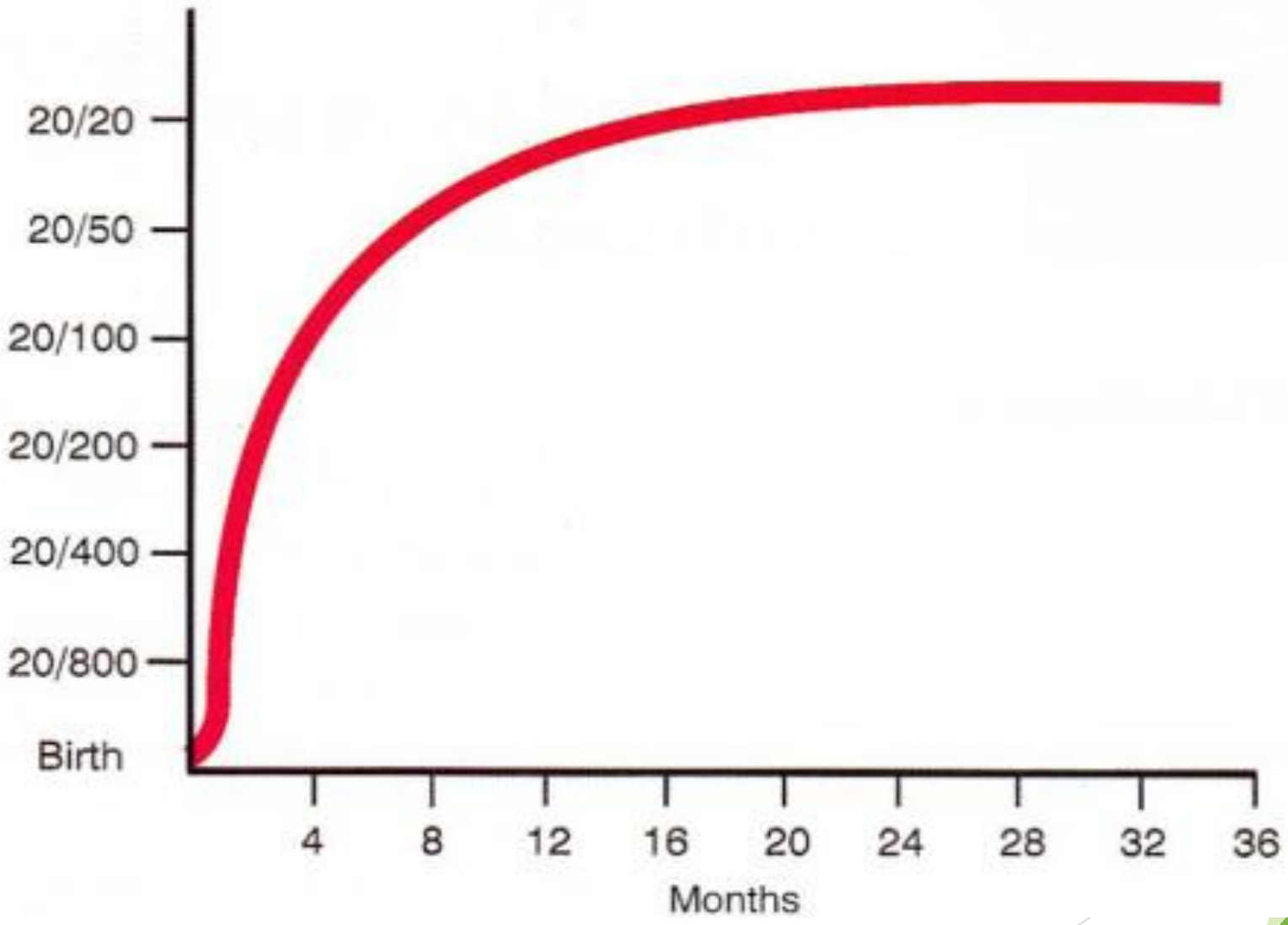
About

decreased Vision


Eye Anatomy
conjunctiva
iris
lens
pupil
cornea
conjunctiva
sclera
ciliary body
vitreous body
anterior chamber
choroid
retina
macula
optic nerve
optic disc

VISUAL IMPAIRMENT(visual loss)

- The eyes and associated structures must be normal in structure & function.
- The neurological **pathways** from the retina to optic nerve to the visual cortex must be intact.
- The **brain** must be capable of interpreting the information received(**Fusion**).


20/20
20/50
20/100
20/200
20/400
20/800
Birth
4
8
12
16
20
24
28
32
36
Months

What does 20/400 mean?

- **Numerator** is distance patient is from chart
- (usually 20 $_{\text{feet}}$=6 meters$_{)}$

- **Denominator** is how far away a person with normal vision can see that letter on the chart.

- About 285 million people are visually impaired world wide, 39.8 million of them are blind.
- Most of the people with visual impairment are **older**, and **females** are more at risk at every age, in every part of the world.
- 90% of people with visual impairments live in **developing countries**.

http://www.who.int/mediacentre/factsheets/fs282/en/index.html

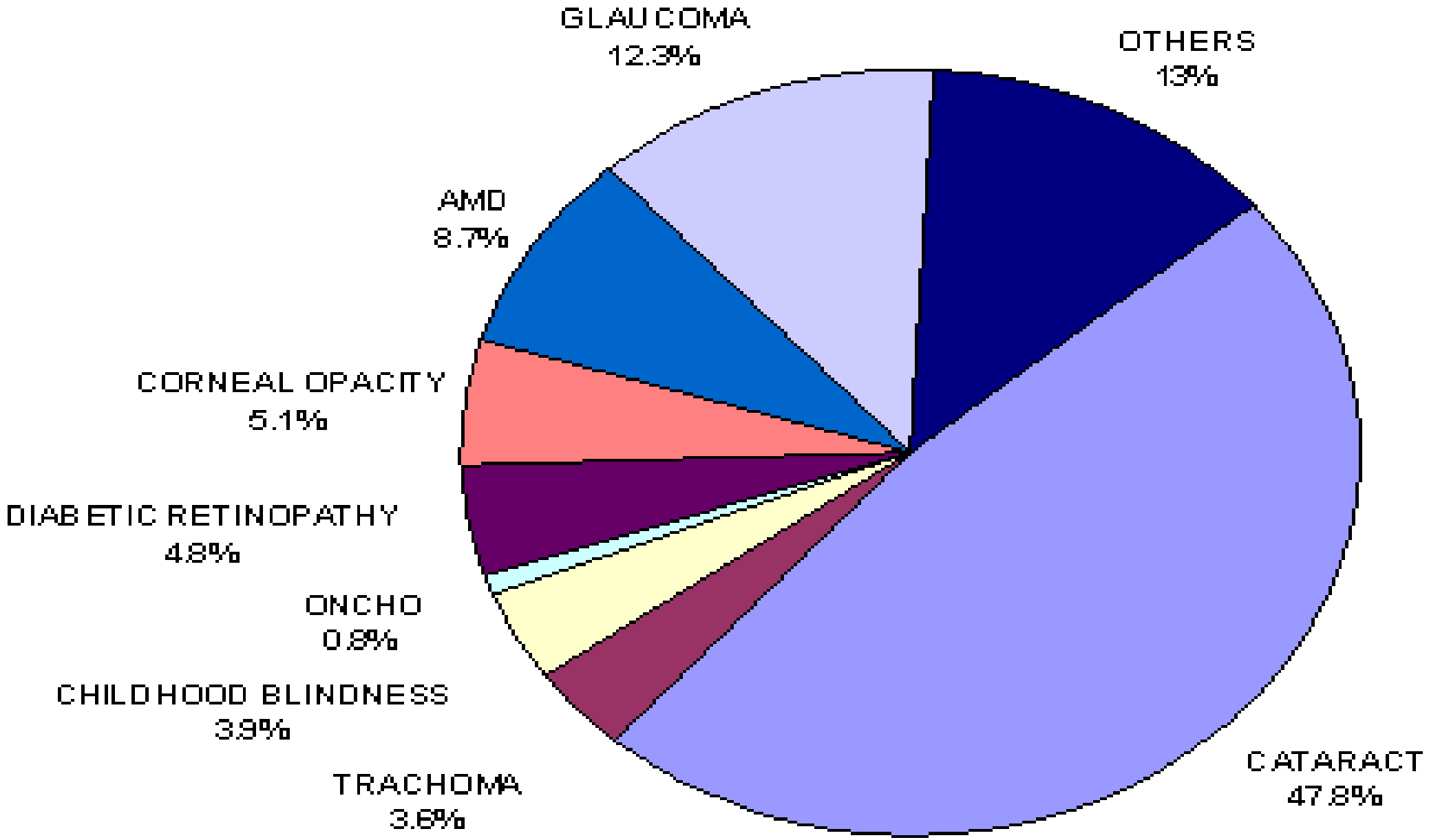
Definition of **Legal Blindness**

- **WHO Definition:** Best-corrected visual acuity of less than <20/400 in the better-seeing eye.

- Peripheral visual field is restricted to 20° or less in the widest meridian of the better eye

Aetiology (History Takeing)

- **Sudden**
  - Retinal
    - Retinal vascular occlusion
    - Wet AMD
  - Neurological
    - AION
    - Neurological visual field loss
  - Trauma
- **Gradual**
  - Cataract
  - Glaucoma
  - Dry AMD
  - Infection


GLAUCOMA
12.3%
OTHERS
13%
AMD
8.7%
CORNEAL OPACITY
5.1%
DIABETIC RETINOPATHY
4.8%
ONCHO
0.8%
CHILDHOOD BLINDNESS
3.9%
TRACHOMA
3.6%
CATARACT
47.8%

Blindness Children (causes)

1.4 million children under age 15 are blind.

The major causes of blindness in children vary widely from region to region and are largely determined by socioeconomic development, the availability of primary health care and **eye care services**.

The available data suggests that, worldwide, **corneal scarring** is the single most important cause of avoidable blindness in childhood, followed by **cataract** and **ROP.**

http://www.vision2020kano.org/wp-content/uploads/2009/07/african-child-blind1-300x204.jpg

Strabismus and Amblyopia

- Defects of the eye muscle system
- Can result in loss of vision in one eye due to lack of use.

- **Classification Of Amblyopia**: Strabismic ,Anisometric , Isoametropic, Depravative

Amblyopia is poor vision caused by abnormal visual stimulation during early visual development. The abnormal visual stimulation disrupts neuro-development of visual centers in the brain. Abnormal stimulation can arise from a blurred retinal image, or strabismus with strong fixation preference for one eye and cortical suppression of the nondominant eye. Children under 8 years of age are capable of strong cortical suppression and hence can eliminate double vision. Children who alternate fixation and use either eye will alternate suppression and do not develop amblyopia. The **vertical prism**

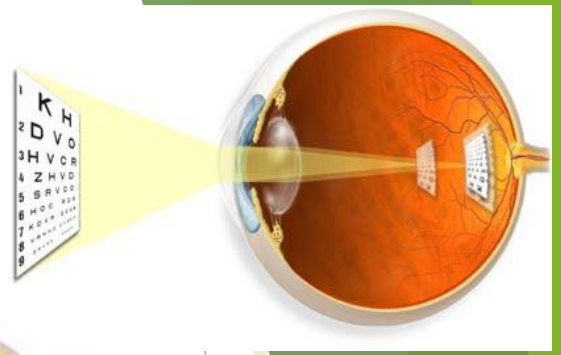
Amblyopia therapy works best when initiated in young children under 3 years of age, however, even older children up to 8 to 9 years of age, can show visual acuity improvement with diligent amblyopia therapy. It is also important to monitor children after strabismus surgery for the development of amblyopia until the ages of 8 to 9 years. The two basic strategies to treat amblyopia are:

1. Provide a clear retinal image.
2. Correct ocular dominance.

TABLE 1.1. When is a refractive error amblyogenic?

Type of Amblyopia	Refractive Error Requiring Correction
Hypermetropic anisometropia	>+1.50 D of anisometropia
Myopic anisometropia	>−4.00 D of anisometropia
Astigmatic anisometropia	>+1.50 D anisometropia
Bilateral hypermetropia	>+5.00 D OU
Bilateral astigmatism	>+2.50 D OU

Corneal Disorders & Diseases



Astigmatism

Myopia- nearsightedness

Nearsighted Eye

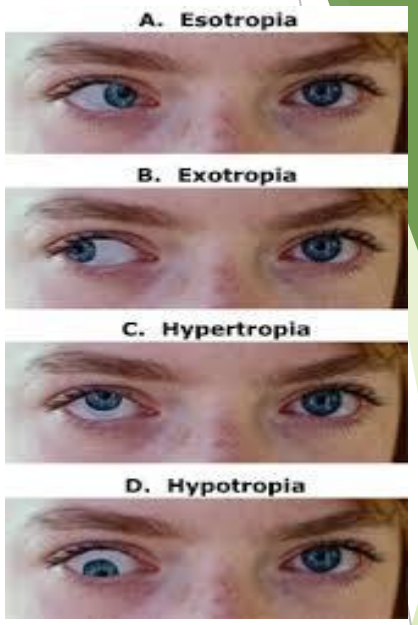
Hyperopia- farsightedness

Farsighted Eye

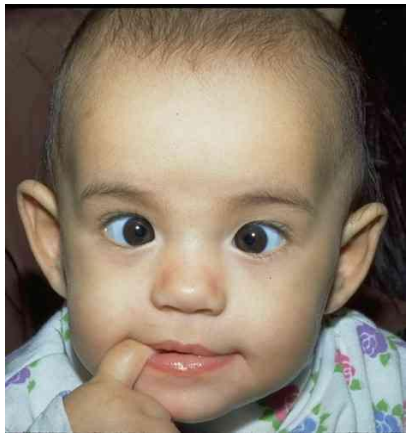
- **Anisometropia**- more than 1 diopter difference in refractive error between both eyes

- **Aniseikonia**- difference in shape or image received by both eyes

- **phoria**- tendency of eye to deviate, particularly when fatigued or fusion broken
- **tropia**- marked deviation of an eye



- **Esotropia**- turning in of one or both eyes
- **Exotropia**- turning out of one or both eyes
- **Hypertropia**- turning up of one or both eyes
- **Hypotropia**- turning down of one or both eyes



Retinoblastoma

- Retinoblastoma is **the most common malignant intraocular tumor** of childhood. incidence of 1:14,000-1:20,000 live births.
- It is equally common in both sexes and has no racial predilection.
  Retinoblastoma is a neuroblastic tumor and is therefore biologically similar to neuroblastoma.
  The tumor can be unilateral or bilateral; **30%-40% of cases are bilateral**.
- Retinoblastoma is typically diagnosed during the first year of life.
  Approximately 90% of cases are diagnosed before 3 years of age.

- The most common initial sign is leukocoria ,which is usually first noticed
- by the family and described as a glow, glint, or cat's-eye appearance. Approximately 25% of cases present with strabismus (esotropia or exotropia).
  Less common presentations include vitreous hemorrhage, hyphema, ocular or periocular inflammation, glaucoma, proptosis,
- And pseudohypopyon

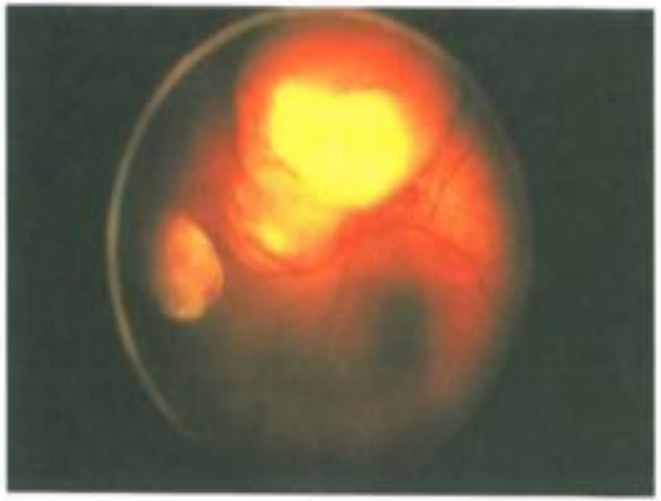


Figure 25-19 Wide-angle fundus photograph showing multiple endophytic retinoblastoma lesions, left eye. *(Courtesy of A. Linn Murphree, MD.)*

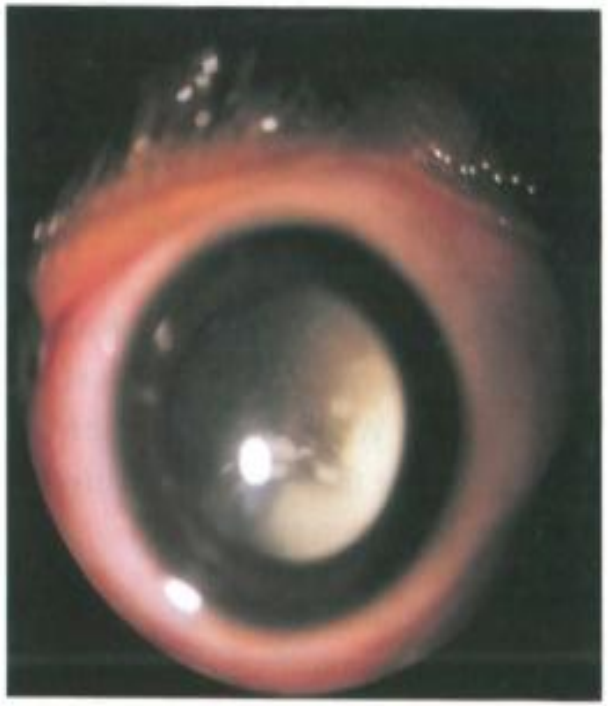


Figure 25-20 Endophytic retinoblastoma with vitreous seeding.

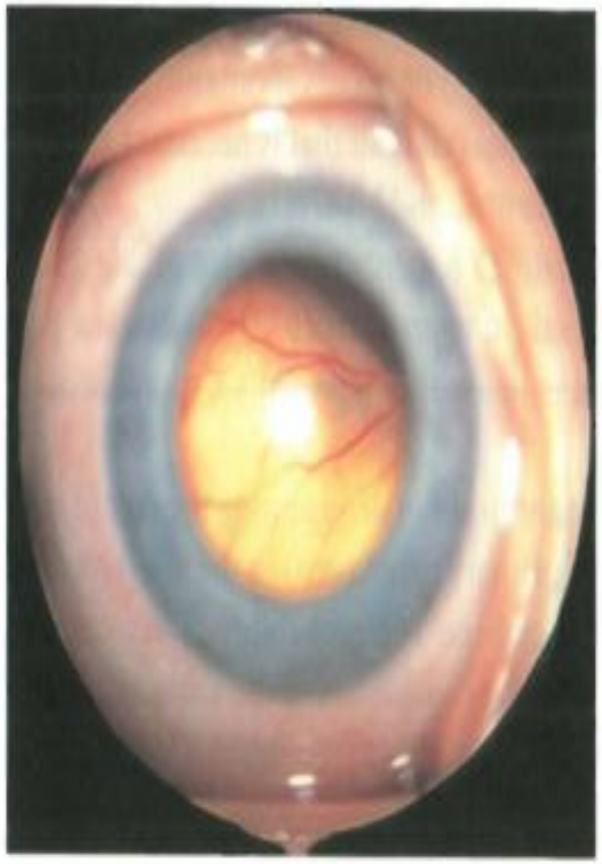


Figure 25-21 Exophytic retinoblastoma with overlying detached retina.

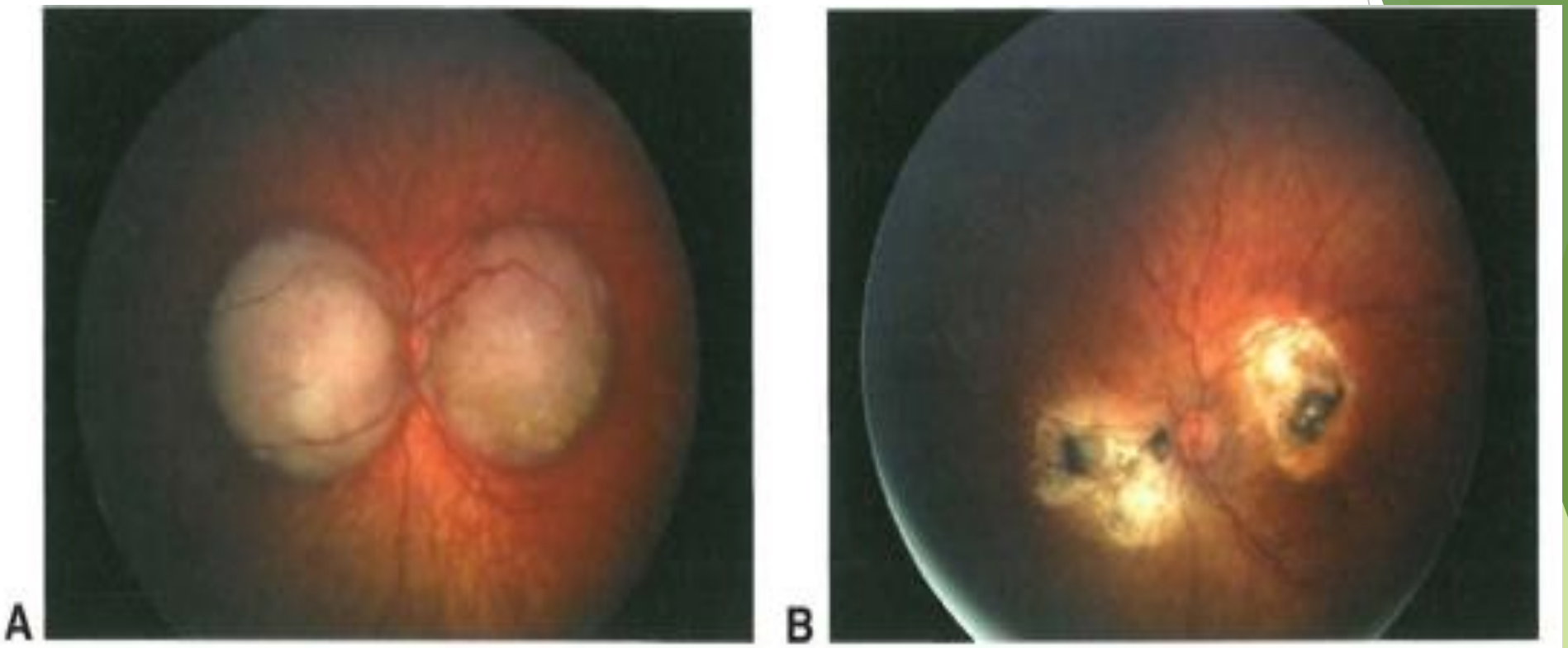
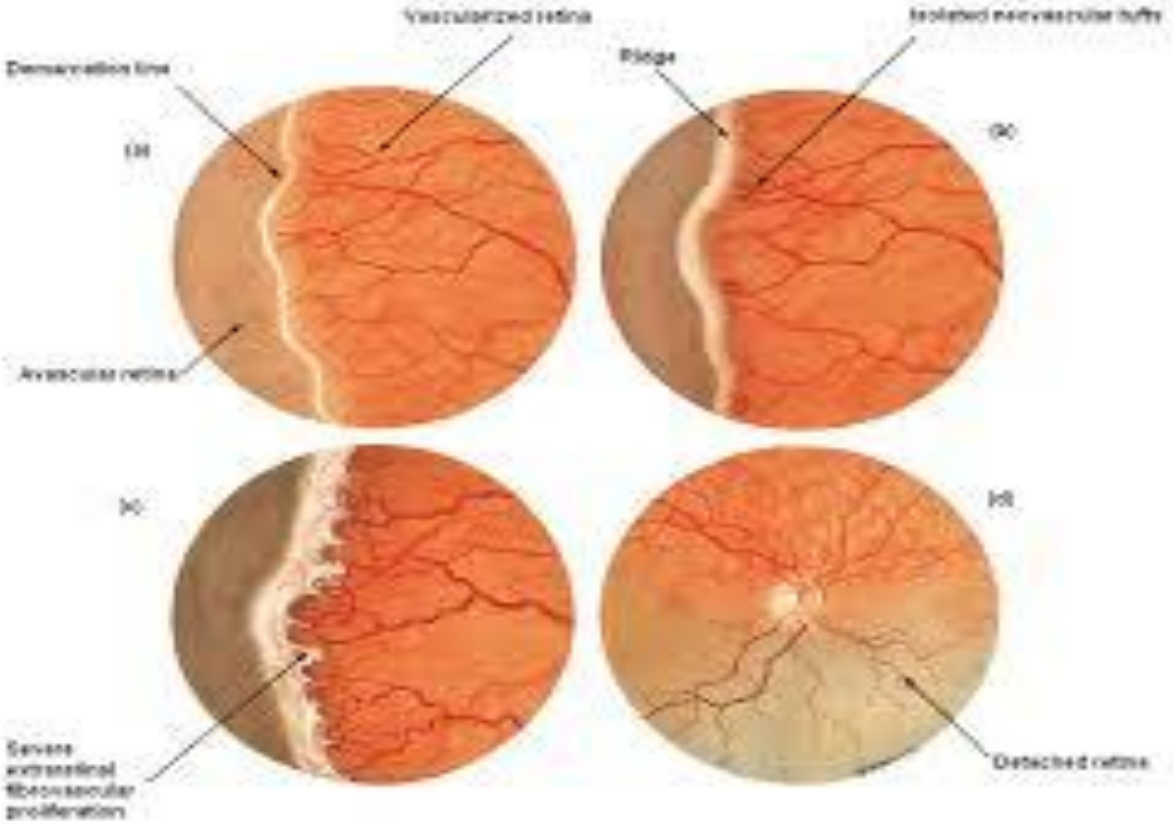


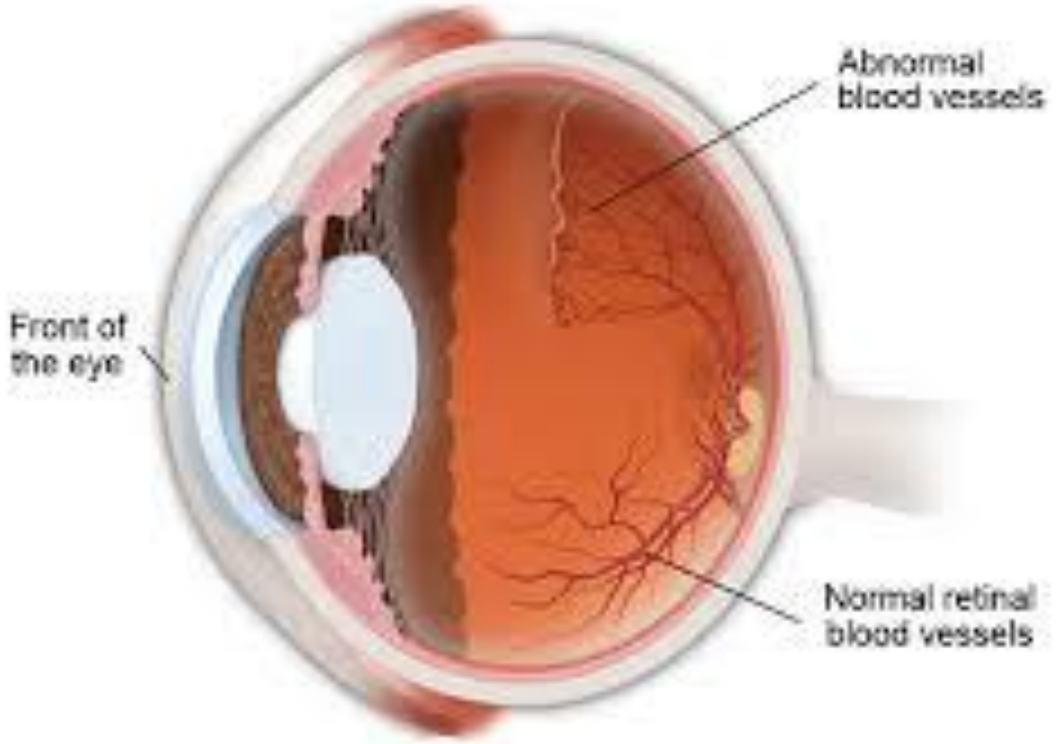
Figure 25-22 **A,** Left eye of infant with bilateral retinoblastoma; 2 tumors straddle the optic nerve. **B,** After chemoreduction and laser consolidation, the tumors are nonviable. The child's visual acuity was 20/25 at age 5 years.

- **Evaluation of a patient with retinoblastoma** requires imaging of the head and orbits, which can confirm the diagnosis and evaluate for extraocular extension and **intracranial disease**.
  In the past, CT was used to facilitate the diagnosis by intraocular calcification.
  However, CT is no longer recommended because of the increased
- risk of secondary tumors in many patients being evaluated for retinoblastoma.
  M. R.I. and ultrasonography, which avoid the use of radiation, are recommended.
  Aspiration of ocular fluids for diagnostic testing should be performed only under the most unusual circumstances because such procedures can disseminate malignant cells.

Retinopathy of Prematurity

- ROP is a vasoproliferative retinal disorder unique to **premature infants**.
  It was first described to save premature infants with high doses of supplemental oxygen.
  Retinal vascular development **begins during week 16** of gestation.
  Mesenchymal tissue grows centrifugally from the optic disc, reaching the nasal ora serrata by 36 weeks' gestation and the temporal ora serrata by 40 weeks' gestation.
  ROP results from abnormal growth of these retinal blood vessels in a premature infant due to a complex interaction between VEGF and insulin-like growth factor- I.


Vascularized retina
Demarcation line
Ridge
Avascular retina
Severe extraretinal fibrovascular proliferation
Detached retina


Abnormal blood vessels
Front of the eye
Normal retinal blood vessels

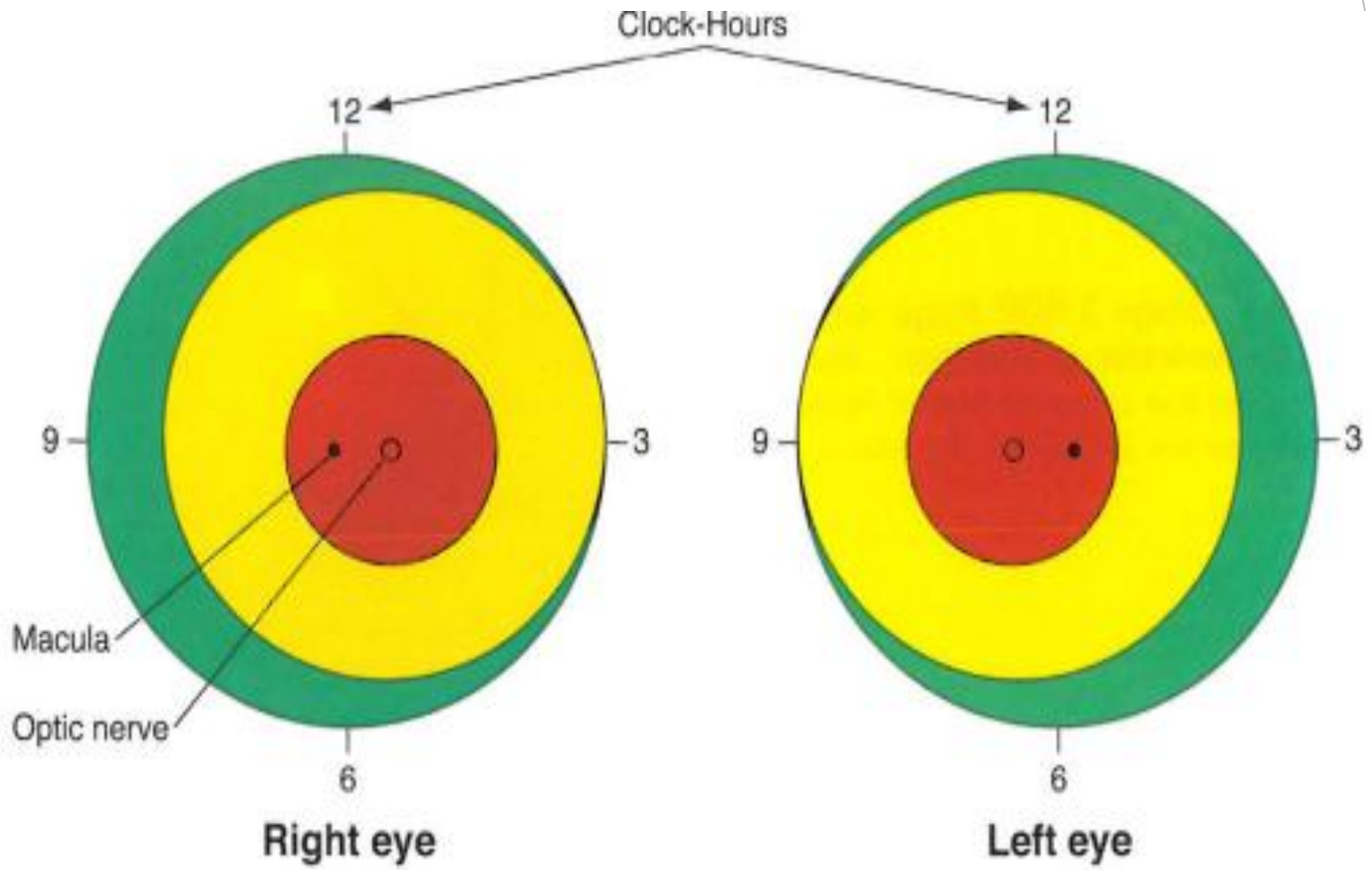


Figure 25-1 Schematic of the retina of the right and left eyes, showing the area of zones I *(red)*, II *(yellow)*, and III *(green)*, as well as clock-hours, which are used to describe the location of retinopathy of prematurity (ROP).

Transient Monocular Visual Loss (Amaurosis Fugax*)

- • Abrupt visual loss affecting one eye that lasts <60 min
- • Sometimes associated with scintillations (photopsias)
- • Caused by reduced perfusion of eye (ocular transient ischemic attack, TIA)
- • **Common causes:**
- • cervical carotid stenosis • systemic hypotension
  • impending retinal or optic nerve infarction
  • papilledema

Ancillary Testing

- • Carotid ultrasound, CT angiography, or M.R.A. to rule out stenosis, dissection, and dysplasia
- • Blood pressure (including orthostatic) testing to rule out hypertension or hypotension
- • Electrocardiography to rule out atrial fibrillation
- • Cardiac echography to rule out cardioembolic source

Fig. 1.2 Cervical carotid stenosis. The critical narrowing of the proximal internal carotid artery (arrow) is the result of arteriosclerosis. This lesion probably gave rise to the Hollenhorst plaque in Fig. 1.1.

Fig. 1.1 Hollenhorst plaque. The refractile yellow dot (arrow) is an impacted platelet–fibrin embolus that traveled from the ipsilateral common carotid artery bifurcation in the

Retinal Migraine (Retinal Vasospasm*)

- Transient monocular visual loss in a young patient
- No other symptoms during episode
- May have history of migraine
- Normal ophthalmologic examination
- No risk factors for arteriosclerosis or evidence of embolic source
- Attributed presumptively to **retinal vasospasm**

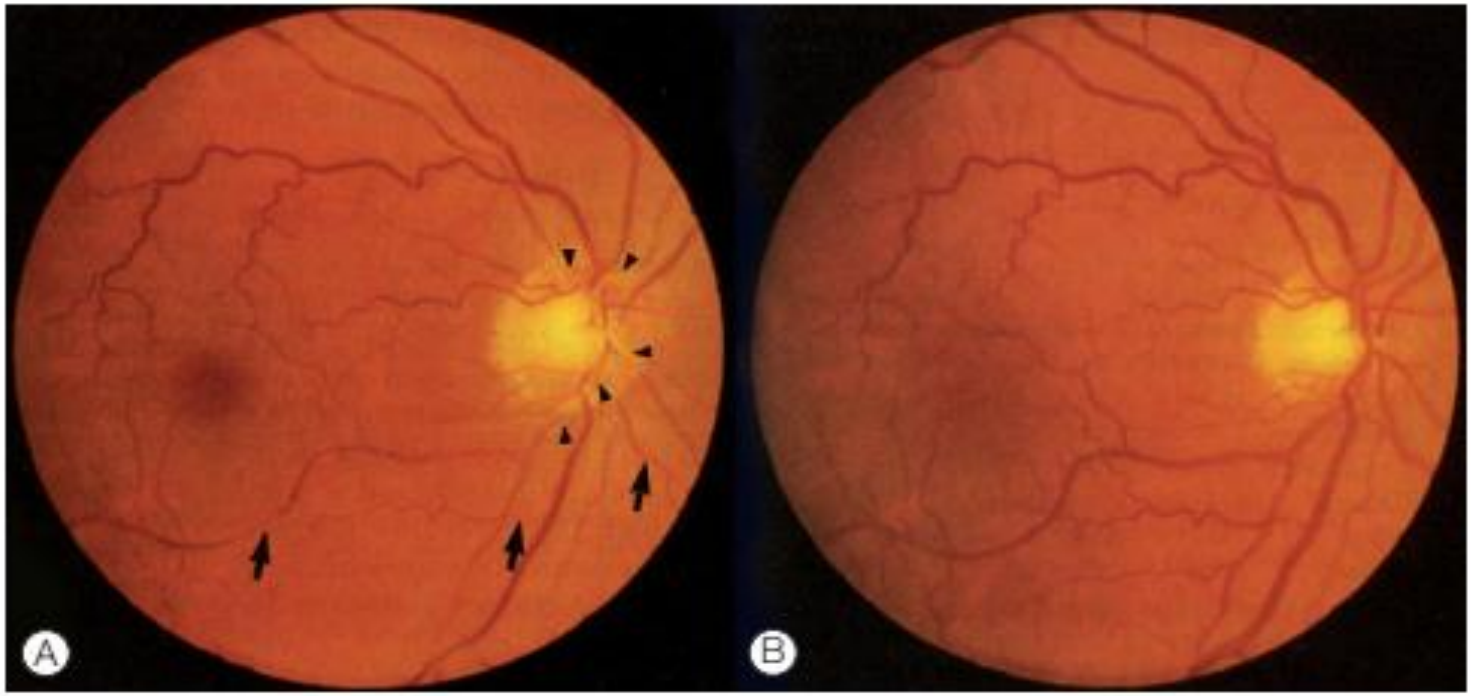
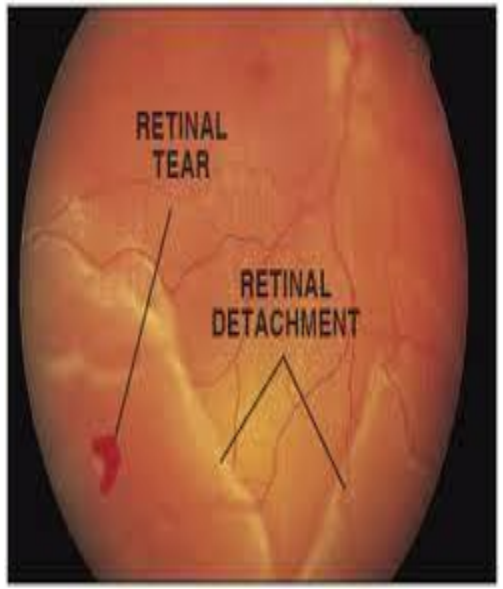
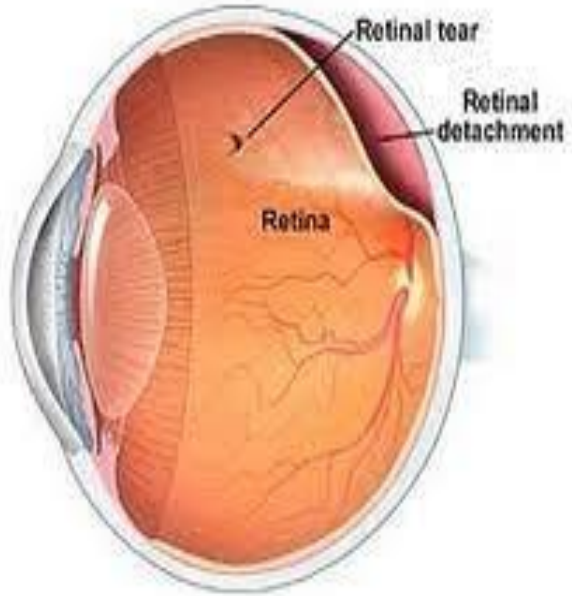


Fig. 1.5 (A) Fundus photograph of a patient during an episode of visual loss in the right eye shows constriction of the central (arrowheads) and peripheral (arrows) arterial branches. (B) When vision returned to normal, the fundus arteries and veins had returned to normal caliber. (After Burger SK et al. N Engl J Med 1991; 325:870–873, with permission.)

Retinal detachments

- High myopia
- Cataract surgery
- Trauma
- Retinopathy of prematurity
- Posterior vitreous detachment
- Lattice degeneration





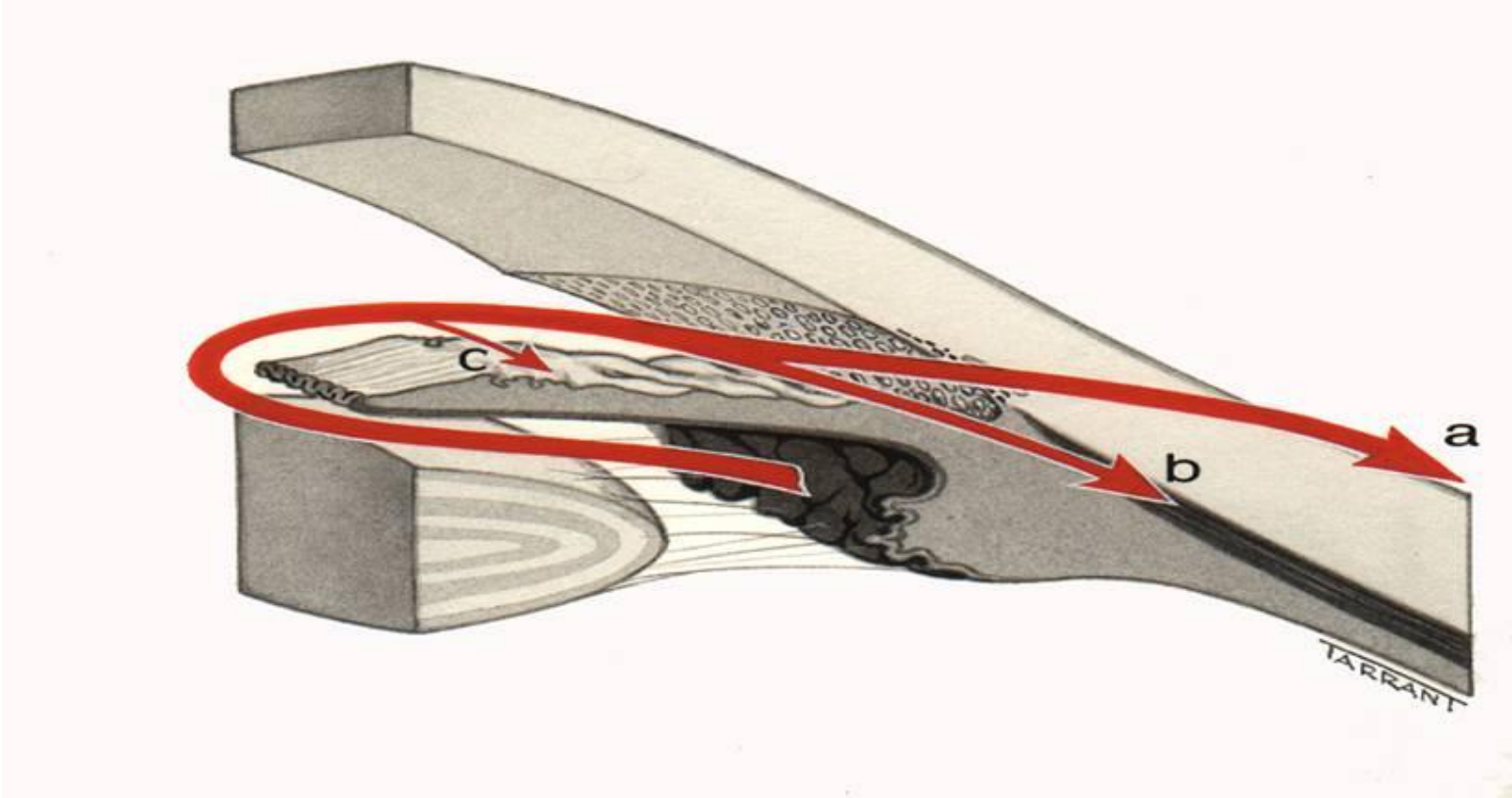
GLAUCOMA

- Glaucoma is a group of diseases which results in progressive damage to the optic nerve.
- Optic nerve damage leads to slow irreversible constriction of peripheral vision and, **if untreated, blindness**.
- Optic nerve damage can be seen as excavation or 'cupping' of the optic nerve head.
- Glaucoma is **often but not always** associated with elevated I.O.P.

Glaucoma

- Primary open angle
  - Reduced outflow and **poor** optic nerve perfusion
- Secondary open angle
  - Ocular disease
    - Ocular inflammation
    - Trauma
    - Intraocular haemorrhage
  - Drugs
    - Steroids

Aqueous Outflow



GLAUCOMA

Author’s clinical photograph

GLAUCOMA

Normal vision

Glaucoma

GLAUCOMA TREATMENT

Glaucoma can be controlled by lowering intraocular pressure using:

- Medication (eye drops)
- Laser therapy
- Surgery

Treatment

MEDICAL

- ß-Blockers(side effects!)
- PG agonist
- α_2 adrenergic agonist
- Parasympathomimetics
- CAIs
- Osmotic agents

SURGICAL

- Trabeculectomy
- Laser

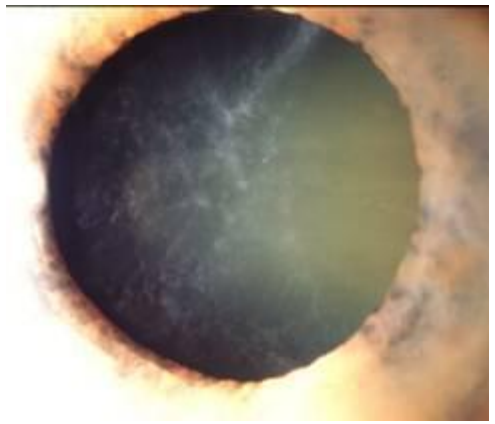
Cataracts

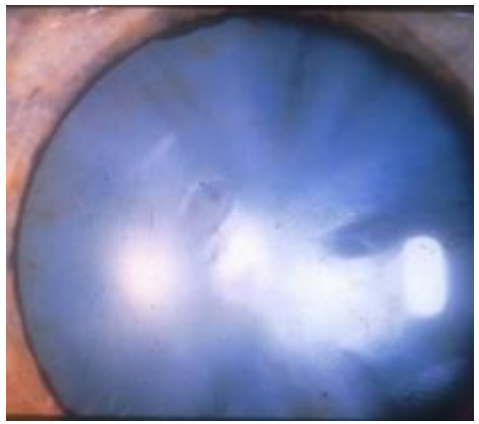
- A cataract is opacity or clouding of the lens that may develop as a result of aging, trauma,, or diabetes
- Cataracts are a normal part of aging
  - Approximately 50% of Americans between 65 and 74 and **70% over age 75 have cataracts**
- Prevalence factors
  - Caucasians are three times as likely as African-Americans to develop cataracts
  - Smokers have a 60% increase
  - Those taking medication for gout are twice as likely to develop cataracts
- The greater the progression of the cataract, the greater the visual impairment from the effects of glare,, and decreased visual acuity

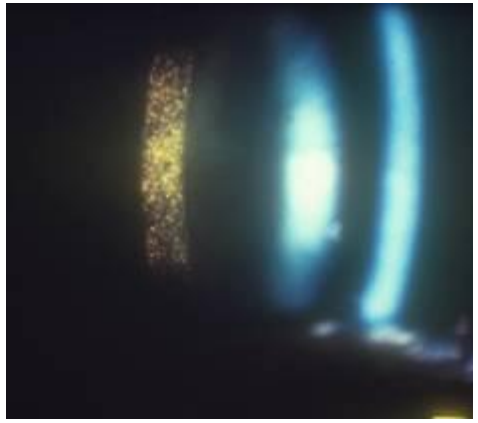
Slow, painless decrease of vision.

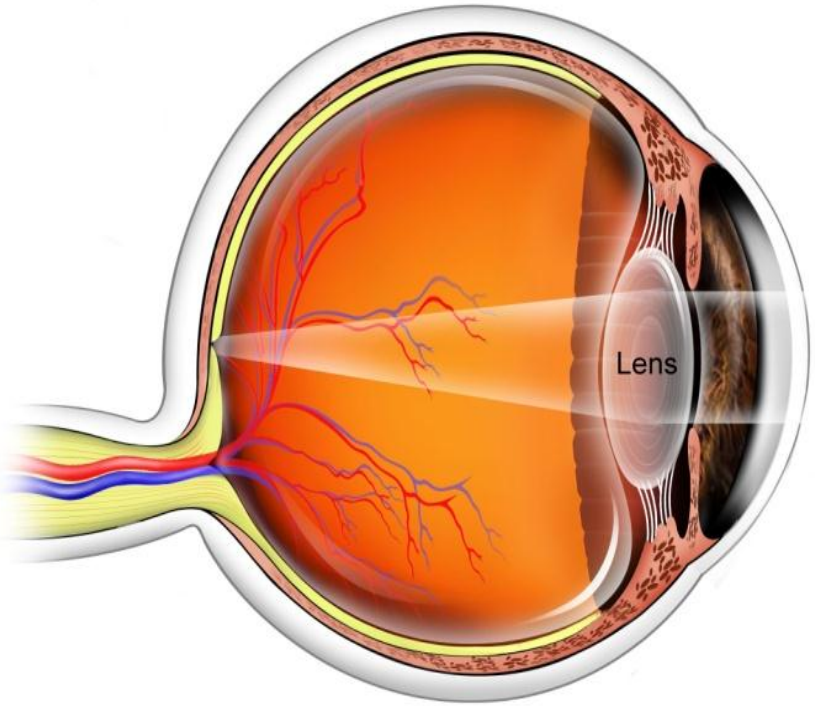
- Occasionally, monocular multiple images
- Normally, cataracts are successfully treated with surgery

Types of Cataract

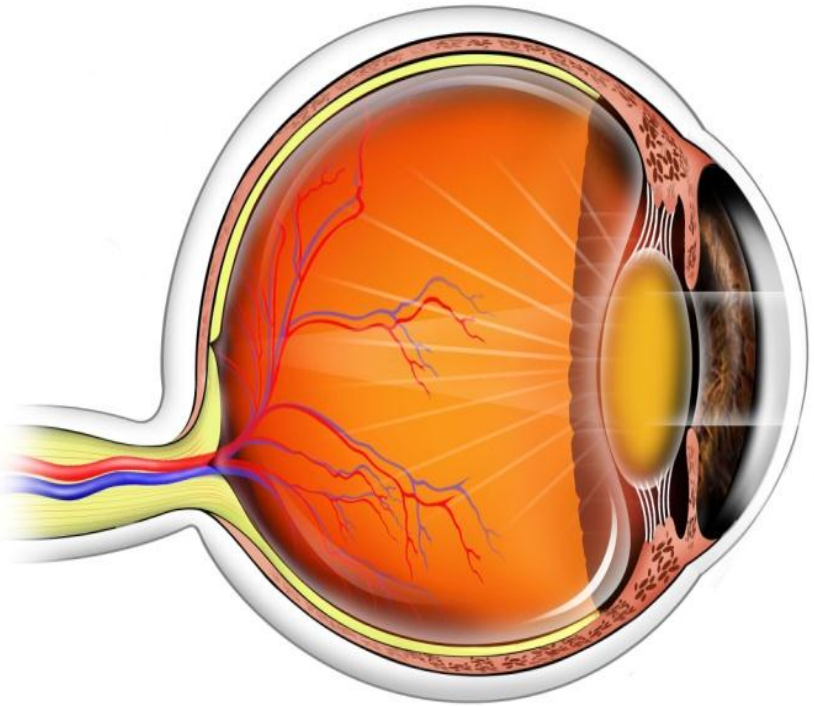








Normal lens
(Clear leans)



Cataract
(Cloudy lens)

angelo Ritty, MD

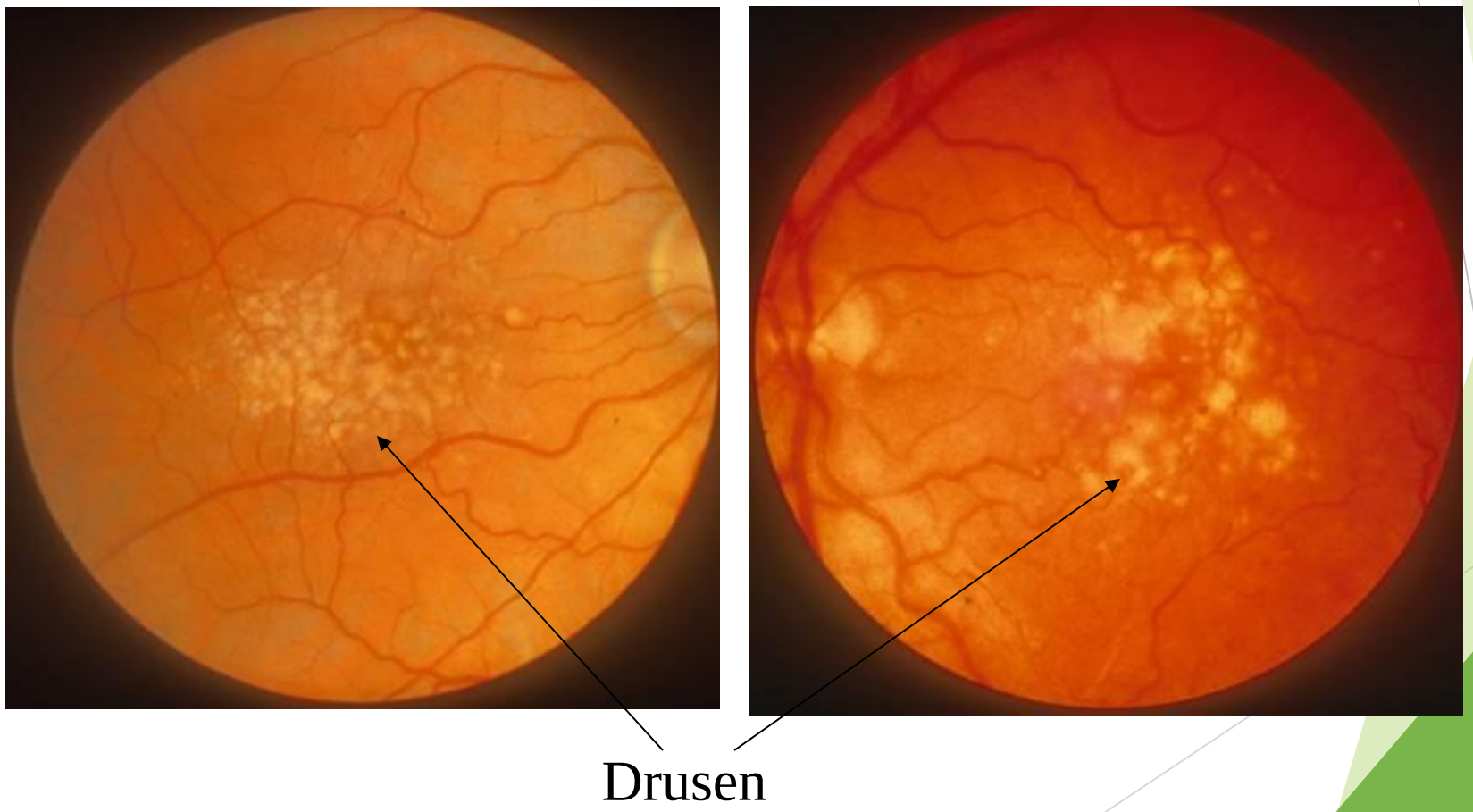
AGE-RELATED MACULAR DEGENERATION

- AMD results in progressive damage to **the macula**, the small area in the retina responsible for sharp and central vision.
- The **major risks** for AMD are age and family history.
- AMD causes central vision loss. Central vision is critical for reading and recognizing faces.
- AMD is the leading cause of irreversible blindness in industrialized countries.

AGE-RELATED MACULAR DEGENERATION

- Dry AMD is characterized by **progressive atrophy** of the RPE, accumulation of retinal metabolic products and loss of retinal photoreceptor function.
- Dry AMD **can be slowed** using a combination of Vit A, Vit E, Vit C, Zinc and Copper.
- Wet AMD is characterized by **bleeding underneath** the retina.
- Wet AMD is treated by injection of anti VEGF antibodies into the eye.

Dry AMD



Exudative AMD

AGE-RELATED MACULAR DEGENERATION

Normal vision

Macular degeneration

DIABETIC RETINOPATHY

- Diabetic retinopathy (DR) is the leading cause of blindness in people of working age in industrialized countries.
- DR can be a complication of diabetes type1 or type 2.
- DR results from damage to the blood vessels of the retina,
- Initially, DR is asymptomatic. If not treated though it can cause low vision and blindness.
- **Risk factors** associated with DR include duration of diabetes and poor blood sugar control.

DIABETIC RETINOPATHY TREATMENT

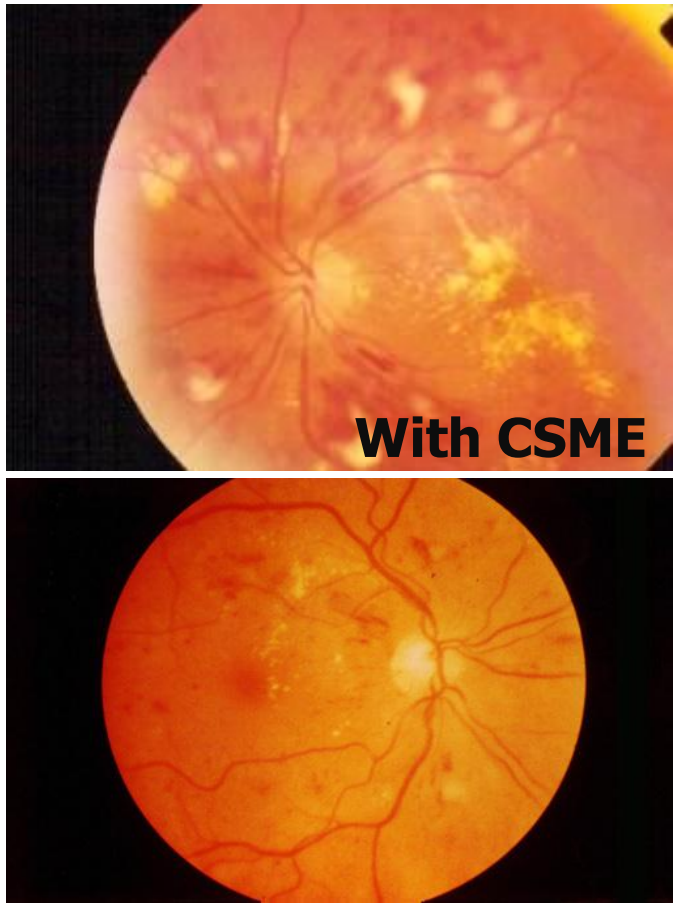
The best treatment for DR is prevention – control of blood sugar

Once DR threatens vision treatments can include:

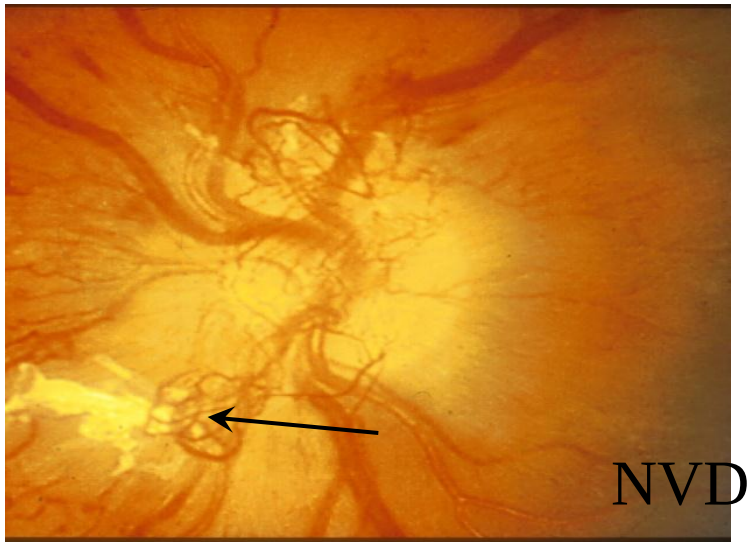
- Laser therapy to **seal leaking blood vessels** (focal laser)
- Laser therapy to reduce retinal oxygen demand (scatter laser)
- **Surgical** removal of blood from the eye (**vitrectomy**)

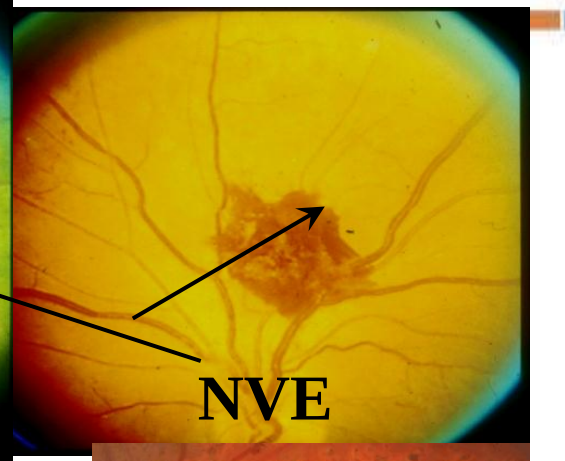
Severe NPDR

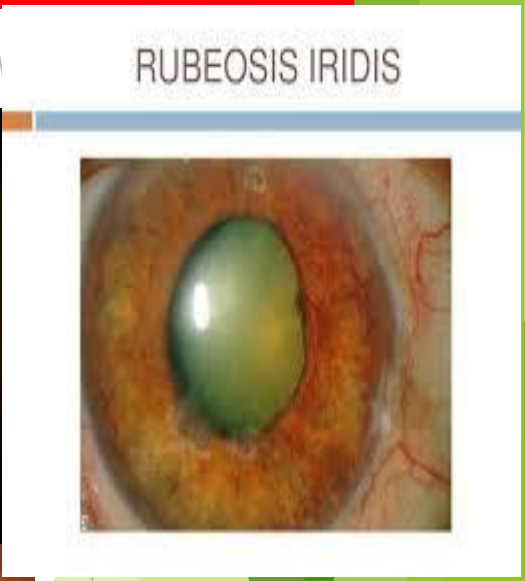
- Cotton wool patches
- Hemorrhages - 4 quadrants



Proliferative retinopathy







Pre-retinal haemorrhage

Laser burn scars

Optic Neuritis

- Inflammation of the optic nerve.
- Eye can be painful on movement.
- Contrast vision generally permanently decreased.
- Highly correlated with M. S.
- Retrobulbar- behind the eye

Optic Neuritis

↳ Demyelinating inflammation of the optic nerve

Clinical
- Sudden loss of monocular partial or complete vision
- Pain with movement of affected eye
- Afferent pupillary defect
- **Loss** of color (**red**) vision
- **Uhthoff's phenomenon**
  Transient worsening of vision with increased body temperature

Etiologies
- **Multiple sclerosis** (most common)
- Infection (Lyme, Herpes, Syphilis)
- Autoimmune (Lupus, Neurosarcoidosis)
- Methanol poisoning
- B12 deficiency
- Diabetes

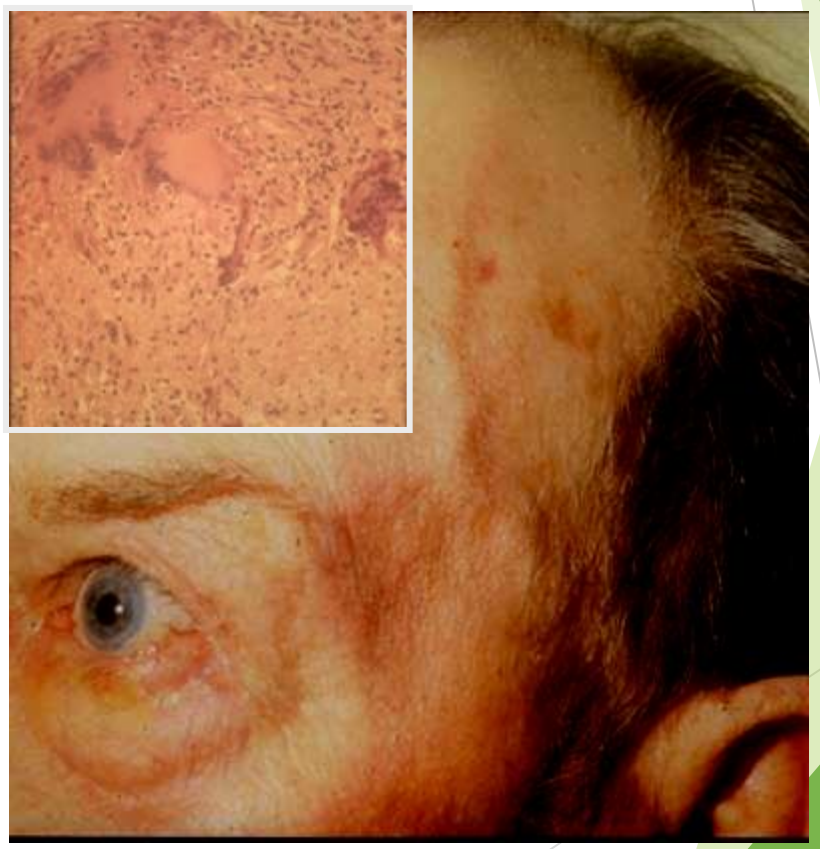
Management
- Corticosteroids (intravenous)

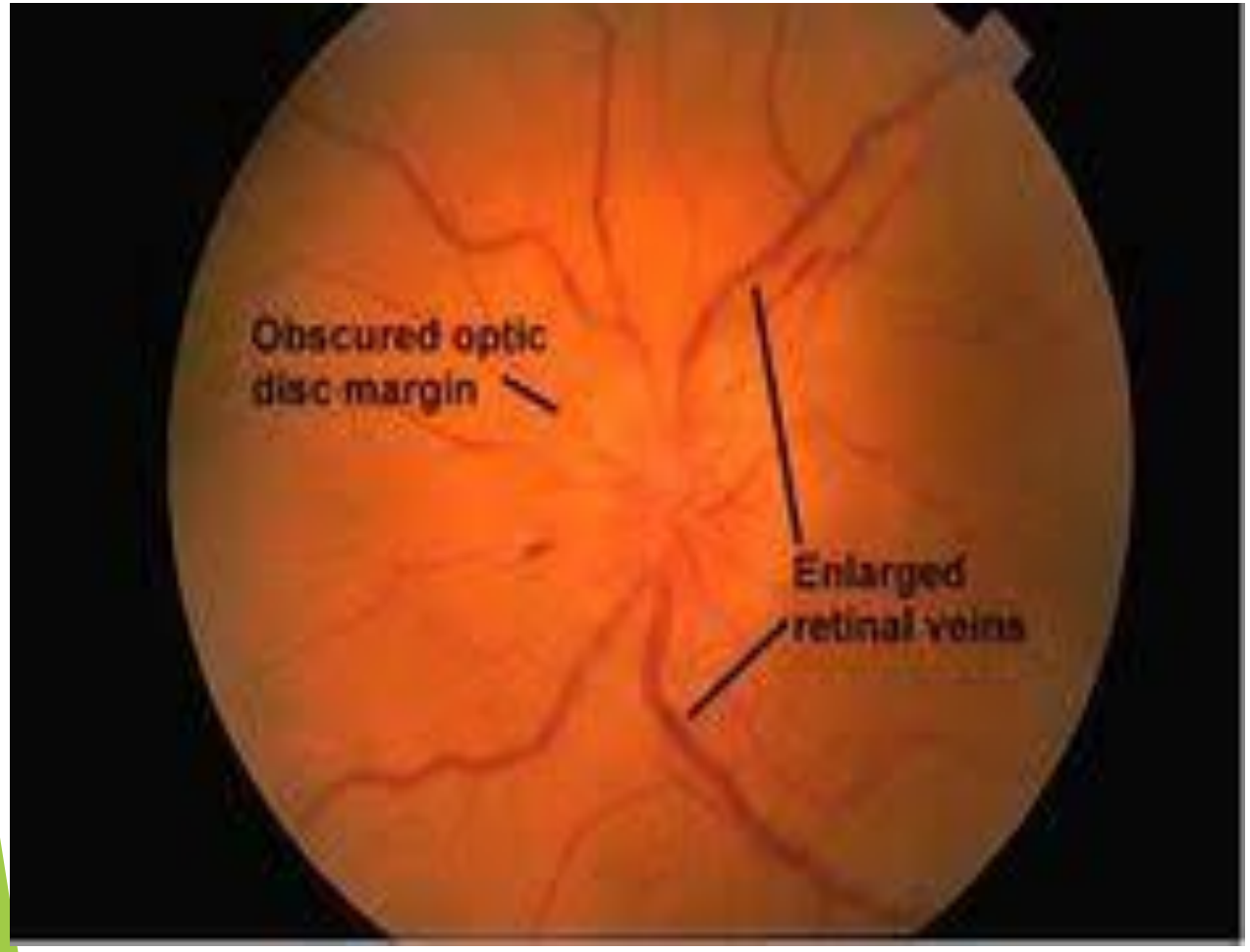
AION

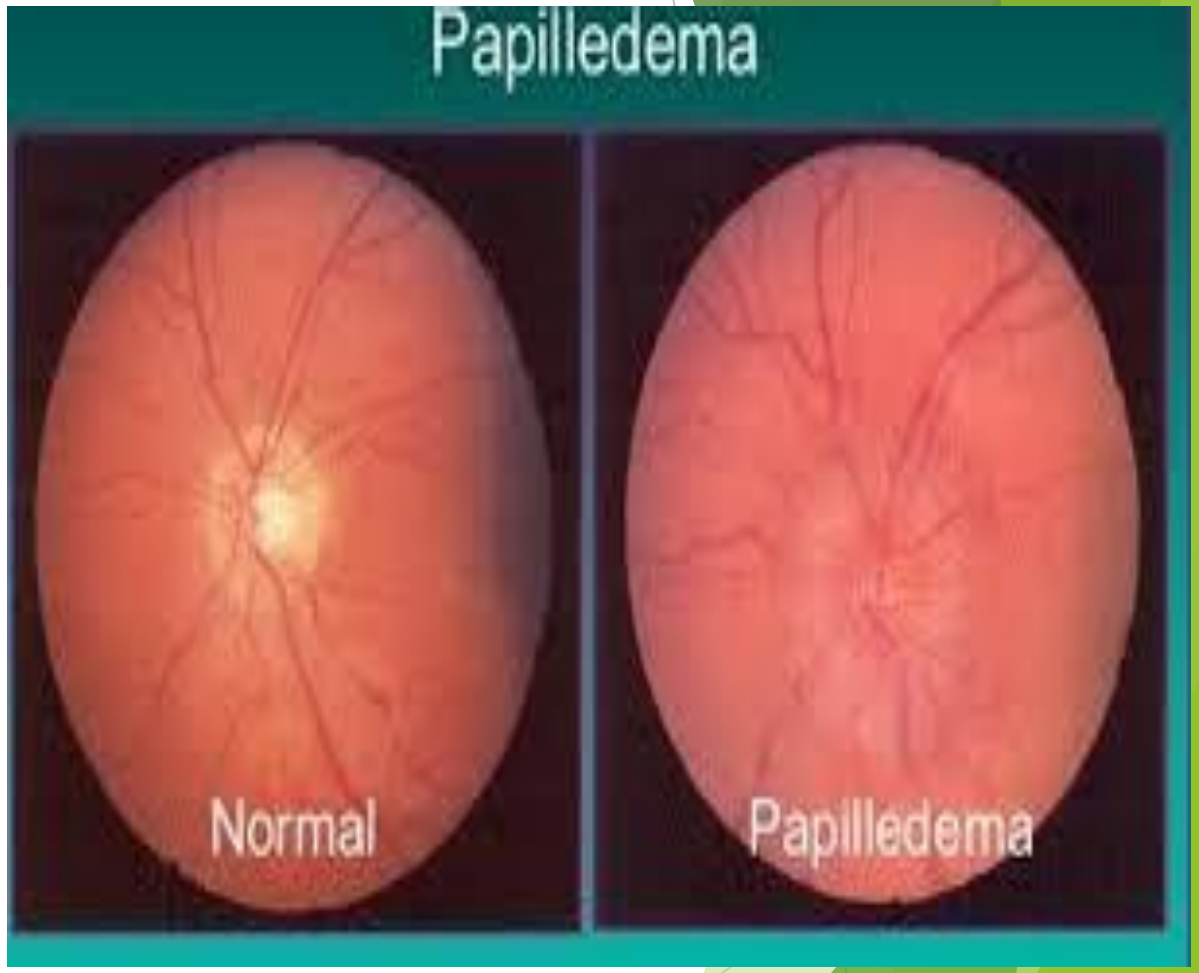
- Arteritic
  - Older patients
  - Second eye involved 75%
  - Polymyalgia Rheumatica
- Non-arteritic
  - Younger
  - HT, DM

Arteritic IAON

- Headache, scalp tenderness
- Thickened temporal artery
- Jaw claudication
- Weight loss, anorexia, fever, night sweats, malaise, depression
- Raised ESR
- CRAO, CN palsy

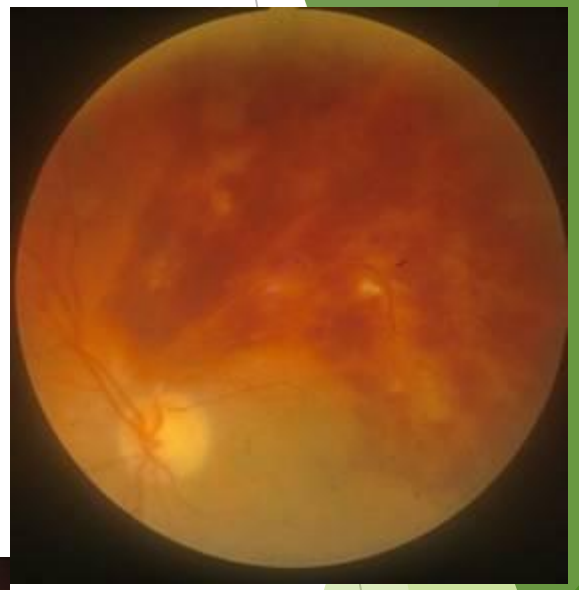


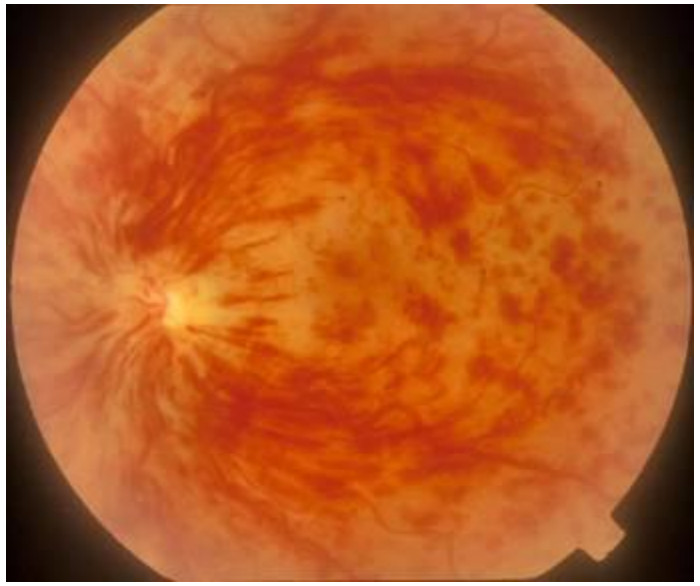

Obscured optic
disc margin
Enlarged
retinal veins

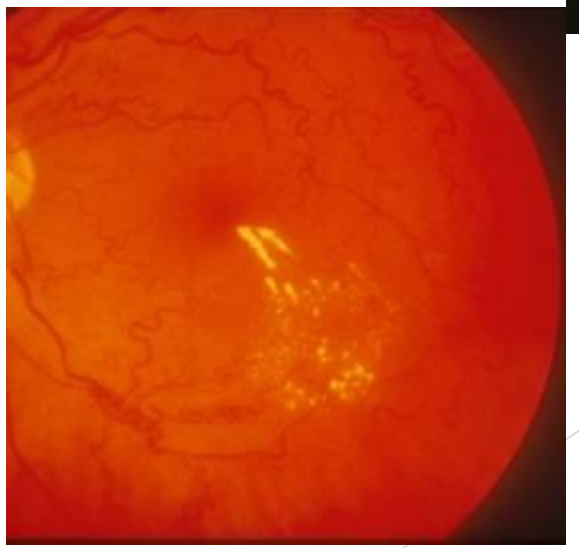

Papilledema
Normal
Papilledema

Retinal **Vein** Occlusion

- Sudden, painless
  - VF defect
  - loss of vision

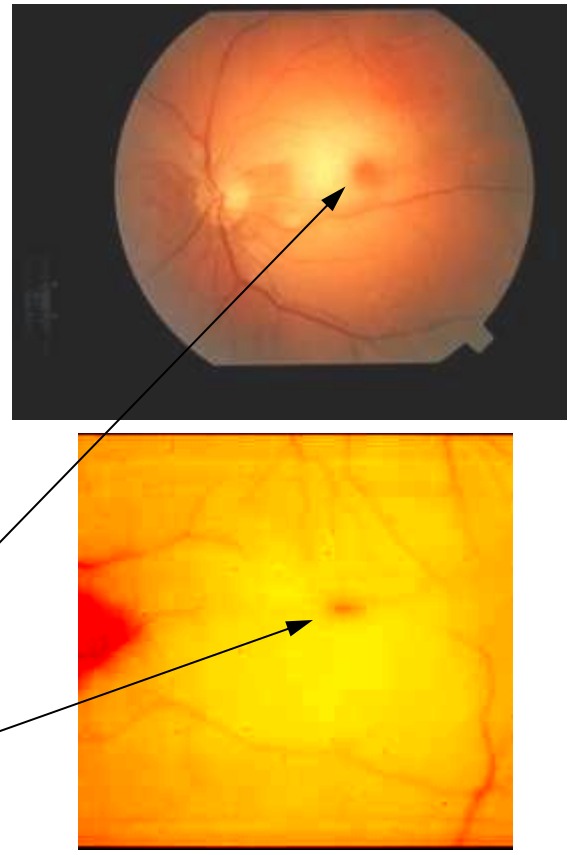




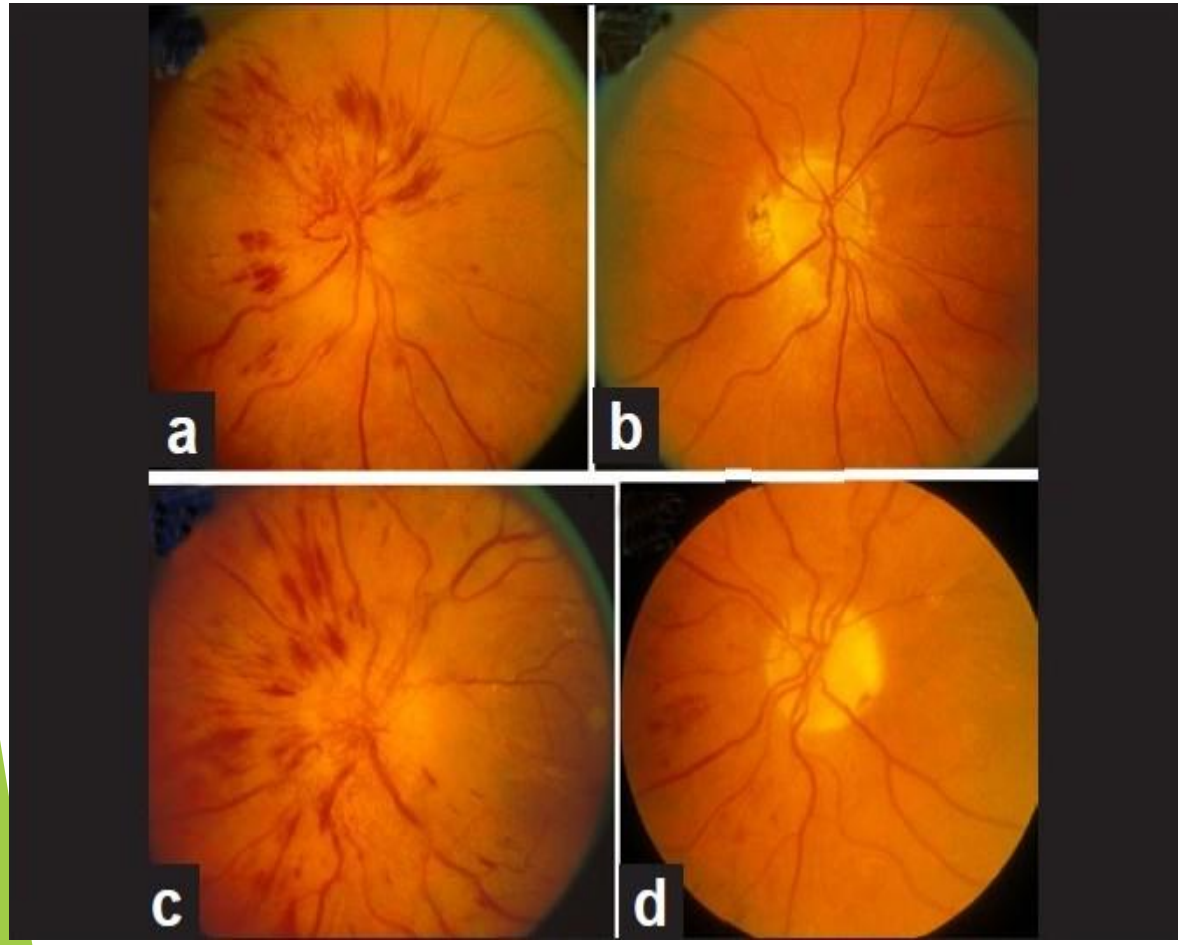


Retinal **Artery** Occlusion

- Sudden, painless
  - VF defect
  - loss of vision
- Amaurosis fugax
- CVA, TIA



Cherry spot

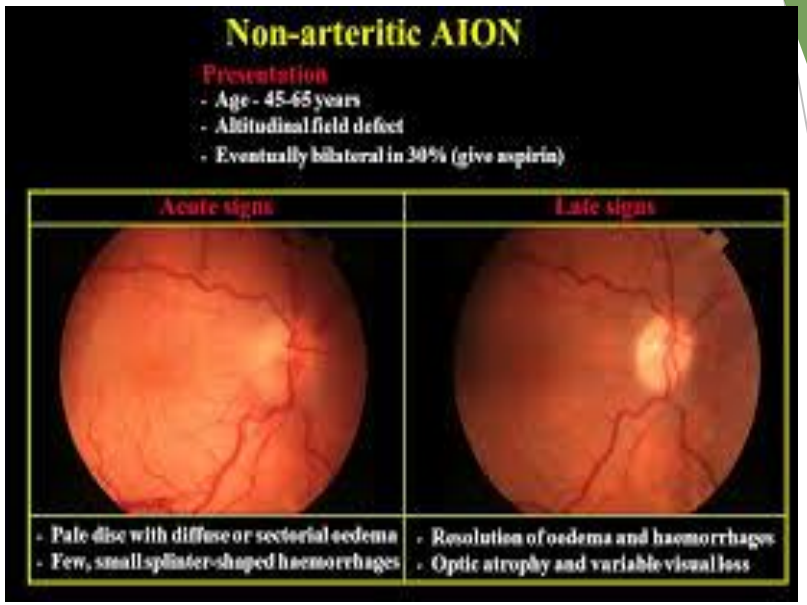

a
b
c
d


NAION
(Nonarteritic Anterior Ischemic Optic Neuropathy)


CLINICAL CLASSIFICATION
Depending upon underlying cause,AION is of two type-
ARTERITIC
Most serious type
Mainly due to gaint cell arteritis
NON-ARTERITIC
Most common
Consist of all other cause than GCA

Anterior Ischemic Optic Neuropathy

- What else besides AION could be number one?
- A-AION ranks as the prime medical emergency in ophthalmology.
- There being no other disease in which prevention of blindness depends so much on prompt recognition and early treatment.




Thanks for your attention