When do you ask Flourescein angiography for optic disc diseases???
The normal optic disc on fluorescein angiography is **fluorescent** due to filling of vessels arising from the posterior ciliary vessels and central retinal artery (superficial layer).
- Neovascularization of the disc
- Optic Atrophy
- Pappilledema

Neovascularization of the disc is defined as the appearance of new vessels on the surface of the disc or within the surrounding one disc area.
The presence of new vessels on the optic disc is indicative of a more extensive and severe retinal ischemia. With rare exceptions, neovascularization of the disc is almost always associated with the presence of concurrent retinal neovascularization.

**Morphologically three types of NVD are:**

- **Epipapillary NVD:** new vessels appearing as small twigs on the optic disc surface
- **Peripapillary NVD:** new vessels growing centrifugally from the optic disc along a shallow detached vitreous phase
- **Papillovitreal NVD:** new vessels proliferating aggressively into the vitreous body along a highly detached posterior hyaloid vitreous phase
Optic atrophy may result from hereditary, compressive, infiltrative, ischemic or metabolic insults to the ganglion cells or its axons.

This atrophy may be descending or an ascending optic atrophy. Though optic atrophy had been traditionally classified into primary, secondary and consecutive optic atrophy.
Disc pallor in optic atrophy may be sectorial, wedge shaped or diffuse.

The genesis of the pallor itself has been attributed to two factors:
1) a reduction in blood supply
2) formation of glial tissue.

However Quingley and Anderson attribute disc pallor to:
1) pacifications of the glial elements (due to loss of axons) :
2) consequent loss of fibreoptic, like reflection of light passing through capillaries as occurs in a normal disc.
Appearance of disc pallor alone is not helpful in identifying the cause of optic atrophy.

presence of retinal arteriolar narrowing and sheathing of retinal vessels may suggest central retinal artery occlusion or ischemic optic neuropathy.

**Fluorescein angiography per se has no role in detecting optic atrophy.**

It may however help to identify the associations such as delayed choroidal or retinal arterial filling.
In optic atrophy, vascular filling defects involving the disc vessels may be seen; however this is not universal.

If the filling defect assumes a characteristic pattern (e.g. wedge like) then it may be a useful indicator to the topographic region of the NFL affected.

**OBLIQUE INSERTION OF THE OPTIC NERVE (TILTED DISC)**

- Oblique insertion of the optic nerve is typically seen as a tilting of the optic disc in an inferior or inferonasal direction.
Drusen of the optic disc are deposits of mucopolysaccharides, nucleic acids and calcium in the disc tissues.
- Optic disc drusen are asymptomatic.
- Rare nerve fiber bundle defects appear in the visual field.
- Fluorescein angiography offers no additional advantage.
- CNV is suspicious.
Swelling or edema of the optic nerve head is the accumulation of fluid within the interstitial spaces and or within the sheath enclosing the optic nerve.

Depending on the time duration and the ophthalmoscopic appearance of the optic nerve head, papilloedema has been categorized into the following:

1) • Early papilloedema
2) • Advanced (established) papilloedema
3) • Chronic papilloedema
4) • Atrophic stage
- hyperemia of the disc,
- blurring of the peripapillary nerve fiber layer and or disc margin,
- peripapillary flame shaped hemorrhages
- and loss of venous pulsations.

In established papilloedema the disc is swollen and elevated, the margins are grossly blurred, retinal veins are dilated and engorged.

there are more numerous peripapillary retinal hemorrhages and the epipapillary capillaries show microaneurysmal dilation.
✓ peripapillary cotton-wool spots,
✓ Paton’s lines
✓ macular hard exudates and hemorrhages (macular star )

When the papilloedema becomes chronic, the disc margins become rounded, peripapillary hemorrhages and exudates start to regress, the optic cup begins to obliterate and the disc color becomes a milky gray.
Ophthalmoscopy using the red free filter shows slit like defects in the nerve fiber layer due to atrophy.

Finally in the atrophic stage, the disc turns pale and the central retinal vessels become narrowed and sheathed.
Fluorescein angiography is indicated in patients with suspected papilloedema for two reasons:

1) To diagnose early papilloedema
2) To rule out pseudo-papilloedema (disc elevation without true swelling; is seen in optic disc drusen, tilted disc, crowded disc and in optic disc infiltration).

It has no role in well established papilloedema.

In early papilloedema, fluorescein angiography reveals dilation of disc capillaries, microaneurysmal dilations and leakage of dye over and beyond the disc margins.
How to DD pappilledema from pseudopappilledema ??
Fluorescein angiography may remain normal in several cases with true early papilloedema. Therefore positive signs may help in establishing the diagnosis while their absence does not rule out the possibility of papilloedema.
C/P:
- swelling of the disc
- severe loss of vision.

The cause of the disc swelling:
- believed to be due to axonal swelling from axoplasmic flow block as a result of demyelination.

During the pre-arterial phase there is some amount of masking of choroidal background fluorescence, around the optic disc. Soon dilated radial peripapillary capillary plexus
The late phase produces a moderate degree of leakage from the optic disc. Seldom does the leak extend to the retina.
NEURORETINITIS

PLEASE NOTE

HOT DISK
In anterior ischemic optic neuropathy:

presenting in the early stages, the disc is swollen with blurred margins and there are peripapillary flame shaped hemorrhages.
The disc swelling (diffuse or focal), (mild or massive) and pale (usually) or hyperemic. Rarely one may see deposition of hard exudates (hemi-star/complete star) and attenuation of the retinal arteries.

- **Cotton-wool spots are never seen in non-arteritic AION.**
- In contrast, the disc usually appears normal in posterior ischemic optic neuropathy.
An optic nerve pit is an excavation of the optic nerve head. They arise from a defective closure of the embryonic fissure because of their frequent association with coloboma of the inferonasal retina, inferior region of the choroid or a large optic nerve head.

Visual field defects
loss of vision
serous detachment of the macula (Kranenburg’s syndrome).
This detachment is thought to result from seepage of fluid vitreous across the pit while schisis within the retinal layers.

Serous detachment of the 40%-50%

The size of the pit may vary from very small to very large (nearly involving the entire disc).
Coloboma is due to non-union of the most posterior part of the embryonic ocular fissure affecting the optic cup and peripapillary retina commonly affecting the inferior temporal part of the optic disc. The retinal blood vessels pass around the edges of the coloboma.
The fluorescein angiogram shows an empty space within the optic disc, which looks dark due to hypofluorescence. The retinal blood vessels emerge from the edges of the optic disc.
Two types of hemangiomas can occur within the substance of the optic nerve head:

- **capillary hemangiomas**

- **cavernous hemangiomas**

  - The former consists of small caliber vessels while the latter of large caliber vessels

Endophytic hemangiomas on the other hand are seen easily (because they lie just beneath the internal limiting membrane) as circular, reddish slightly elevated mass.
Capillary hemangiomas of the disc may be either exophytic or endophytic.

Exophytic hemangiomas are not clearly visible and so should be considered in any patient presenting with blurring and elevation of the disc margin along with a serous detachment of the peripapillary retina and a ring like deposition of hard exudates.

- the optic nerve head is not myelinated.
- Myelination is normal only for that portion of the optic nerve behind the lamina cribrosa.
- myelination may extends beyond the lamina cribrosa and involves the peripapillary region.
- These fibres may disappear once there is an optic atrophy as in glaucoma
• Autofluorescence
• Fuzzy hyperfluorescence overlying the medullation.

Will you ask for FA???
MELANOCYTOMA OF OPTIC DISC

- Rare benign tumor
- Melanocytes of the choroid or optic nerve head.

They appear as a pigmented mass overlying the optic disc.
THANK YOU!