



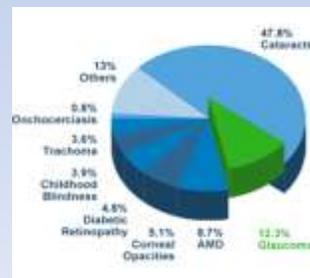
# Role of OCT angiography in primary open angle glaucoma

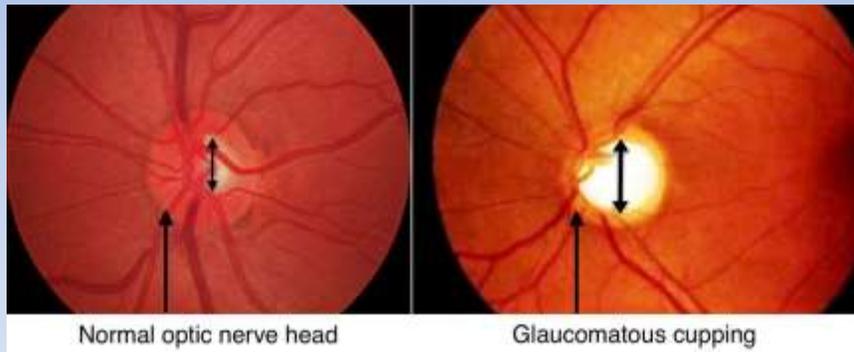
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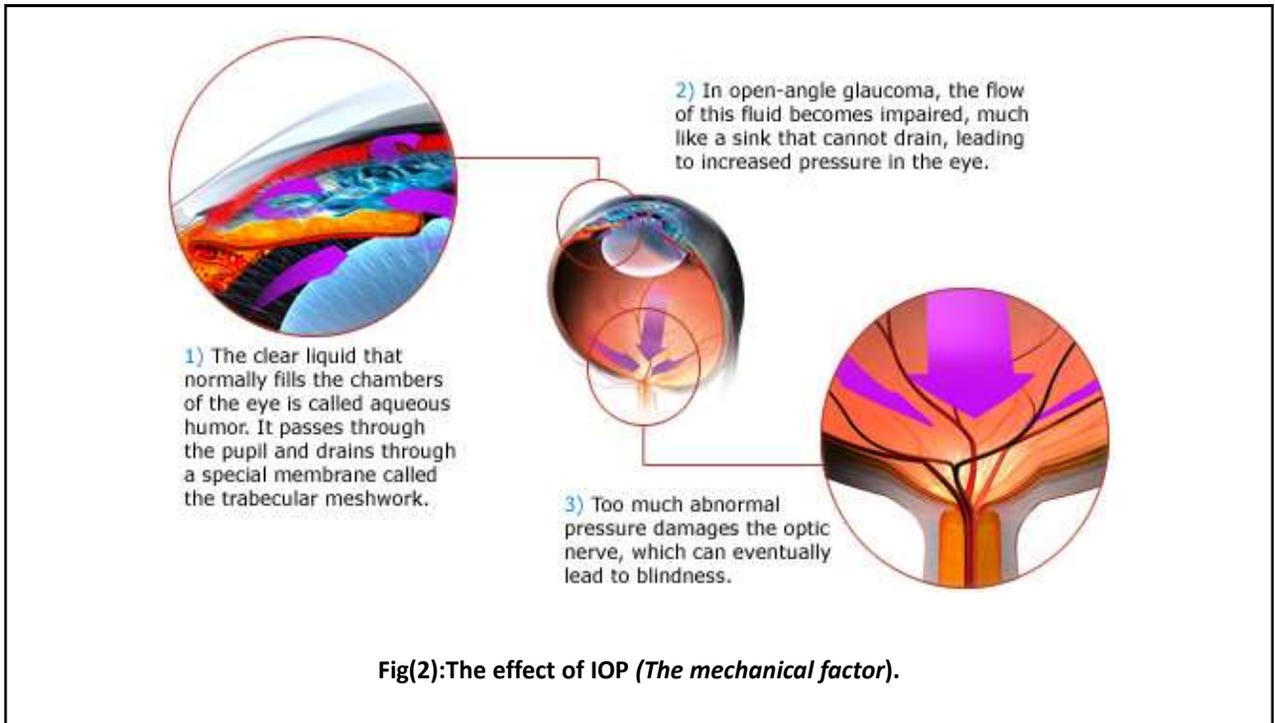
- Glaucoma is a group of eye conditions that damage the optic nerve, This damage is often caused by an abnormally high pressure in the eye.
- It is the main cause of irreversible blindness worldwide, despite it remains asymptomatic until very severe.





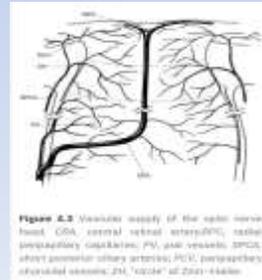
The etiology of POAG is likely to be *multifactorial* but the two main factors:

- Mechanical.
- Vascular .



- Vascular factors also have important role in the pathophysiology of glaucoma.
- Studies have shown that peripapillary retinal blood flow and retinal vessel caliber are reduced in glaucoma patients compared with healthy subjects.
- However, the lack of in vivo quantitative assessment methods has limited the study of ocular perfusion.

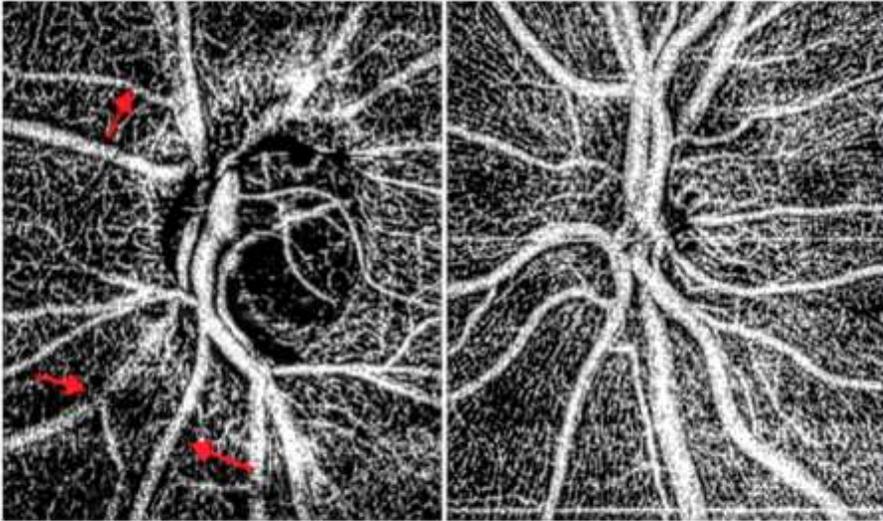
- Recently several studies highlighted the importance of the Radial peripapillary capillaries (RPC) networks in glaucoma.
- (RPCs) comprise a distinct network of capillary beds located within the retinal nerve fiber layer (RNFL) that supply the retinal ganglion cell (RGC) axons.



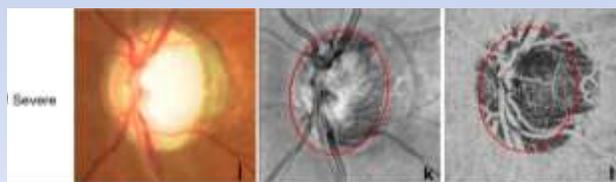
- Optical coherence tomography angiography (OCT-A) is a new imaging modality that can be used to characterize vasculature in different retinal layers.
- It provides quantitative assessment of the microcirculation in the optic nerve head and peripapillary region .



Optical coherence angiography of the optic nerve head of a glaucomatous disc (left) and a healthy disc (right). In addition to the general reduction in the visibility the disc and peripapillary microvasculature in the glaucomatous disc, focal areas of vascular attenuation are visible (arrows).



- OCTA of the peripapillary retina showed reduction in the peripapillary retinal perfusion in glaucomatous eyes which could be visualized as focal defects, decreased vessel density and localized attenuation.



- **The vessel density** is defined as the percentage of the area occupied by vascular pixels (pixels are area with higher flow signal) relative to the nonvascular background. Also, large vessels can be excluded if one wishes to measure capillary density only.

In glaucoma assessment, it is believed that the percentage of vessel density area and capillary density area are the ideal metrics for diagnosis and monitoring of progression.

- OCTA can detect early pre-perimetric glaucoma better than classic OCT. OCTA detects both dysfunctional (sick) and lost (dead) ganglion cells, while classic OCT only detects lost ganglion cells.
- In very early glaucoma dysfunctional ganglion cells have lower metabolism that leads to reduced capillary density. This reduced density is detectable by OCTA, prior to the apoptosis these ganglion cells undergo and the subsequent thinning of NFL and GCL that can be detected by classic OCT.

- Also, OCTA parameters correlate better with visual field parameters than classic OCT parameters. This is due to the decreasing of the “floor effect” with OCTA measurements.
- The floor effect describes the fact that while NFL thickness is correlated with visual field mean deviation in early glaucoma, it reaches a floor value in moderate glaucoma, and then doesn't decrease any more in advanced glaucoma.

- This limits the utility of NFL thickness for monitoring glaucoma progression in the moderate and advanced stages. While vessel density also eventually reaches a floor, it appears to do so only in advanced glaucoma.
- So OCTA has the potential to improve the monitoring of glaucoma progression in the moderate to advanced stages.

## conclusion

OCTA proves to be a valuable diagnostic tool in early detection, monitoring progression and proper management of glaucoma.

**Thank You**