Simposio GOAL

Coordinatore e moderatore: D. Mazzacane
Presidente: L. Rossetti

L'avanzamento della diagnosi strutturale nel glaucoma: ruolo dell'angio-OCT

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Disclosure

Consulting Free

- *Carl Zeiss Meditec*
- *Alfa Intes*

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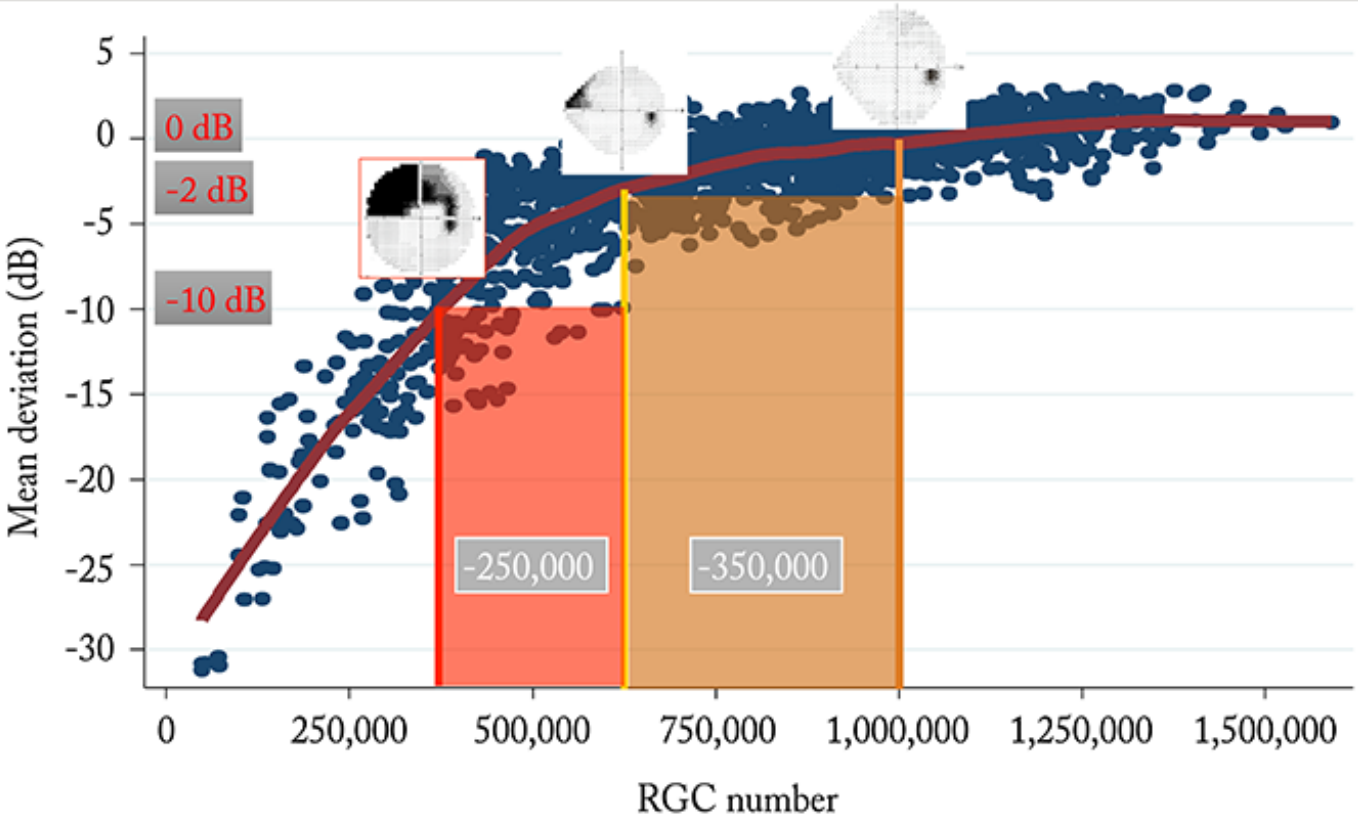


Angio-OCT

Peri-Optic Disc Blood Flow

Optic Disc Blood Flow

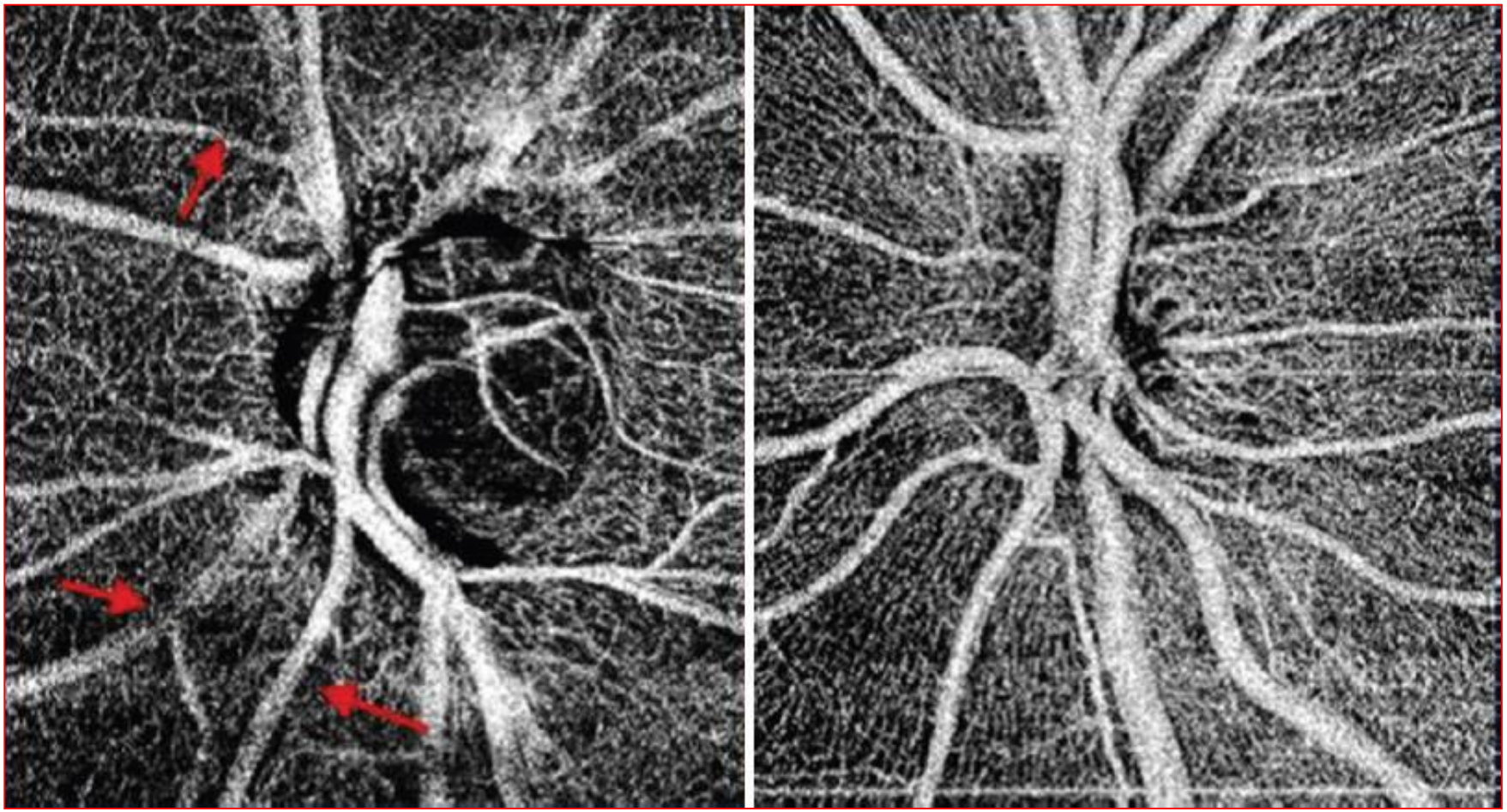
Lamina Cribrosa

Michel Puech
Explore Vision di Parigi

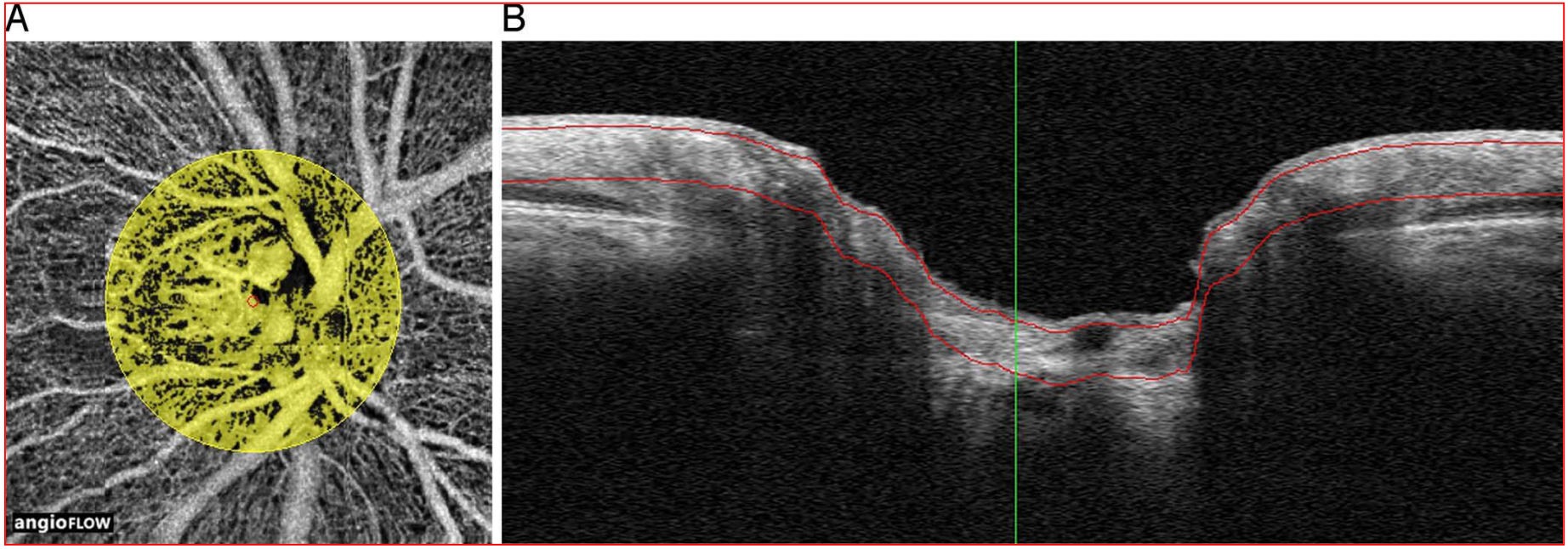
Relationship between **visual field loss** and **RGC numbers.** A normal visual field in a healthy individual has approximately **1 million RGCs**. At a **mean deviation of *-2 dB*,** which equates to an **early field defect**, **RGC number** has decreased by around **350,000 cells**. At ***-10 dB,*** a field defect that can result **in functional impairment** and **quality of life decline**, **RGC number** has **decreased** by **a further 250,000 cells from the RGC number at -2 dB**

by Felipe Medeiros The Ophthalmologist May 2017

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 of the disc and peripapillary microvasculature in the glaucomatous disc, **focal areas** of vascular **attenuation** are visible **(arrows).** **OCTA images can help our understanding of the pathogenesis of ONH diseases.**

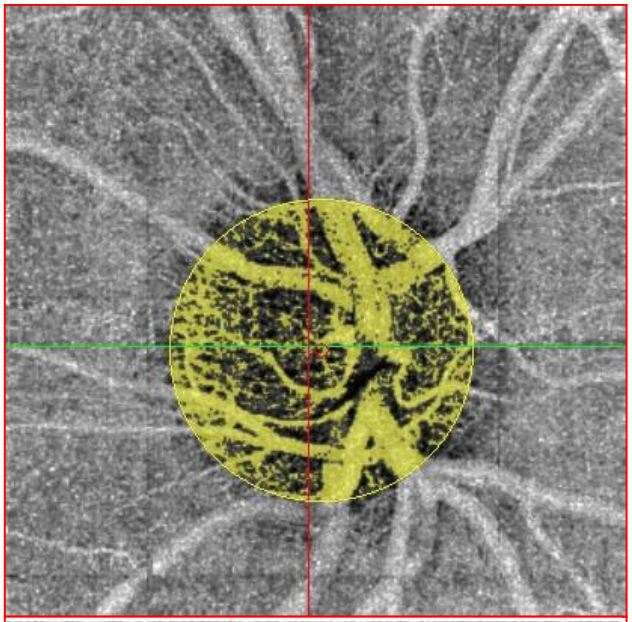


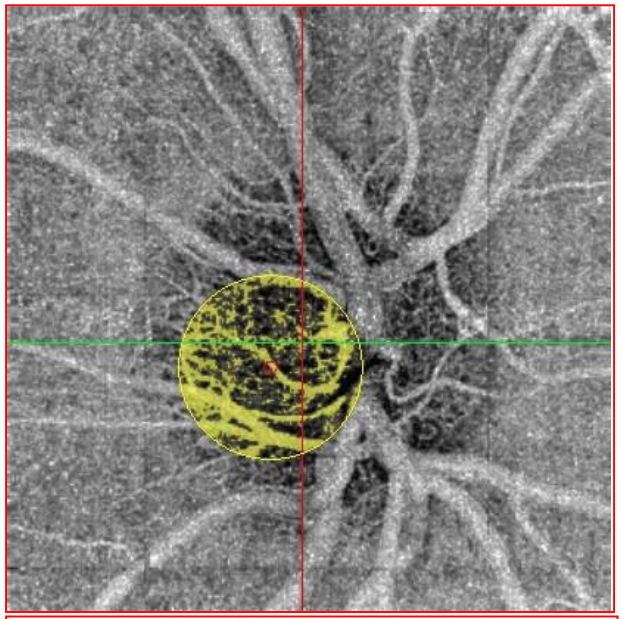
by: Handan Akil © 2017 Journal of Ophthalmic and Vision Research; date of Web Publication 15-Feb-2017

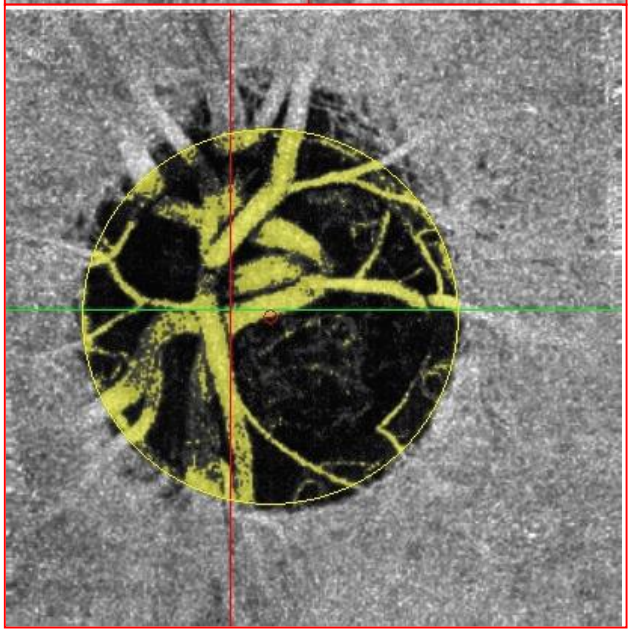


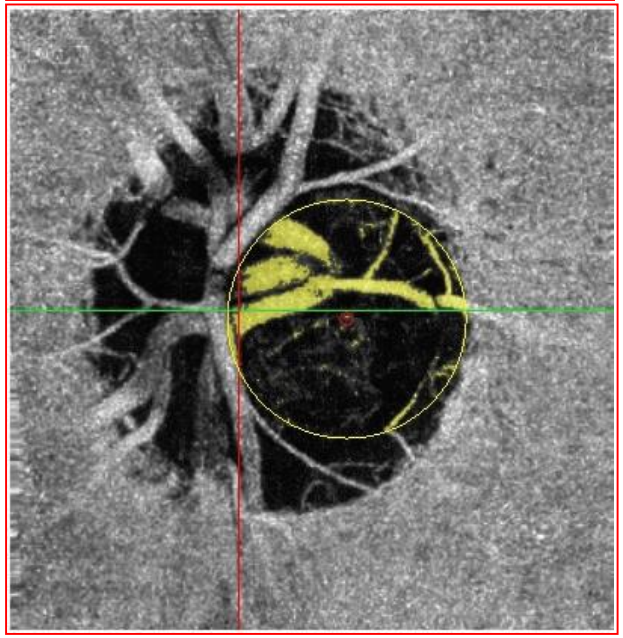
A) An example of highlighted prelaminar vessels in a **normal eye.** The vascular flow index of the prelaminar area is calculated by measuring the **mean decorrelation** in the column between **50 and 250 µm deep within Elschnig's scleral ring.**

B) In the sagittal section image of the same optic **nerve head**, a large part of the prelaminar region is included between the two red lines **50 and 250 µm from the disc surface (size, 3x3mm)**









50 glaucoma patients and 30 normal subjects

In the glaucoma group

- **total ONH vessel density** were reduced by **24.7%** (0.412 versus 0.547; $p < 0.0001$)

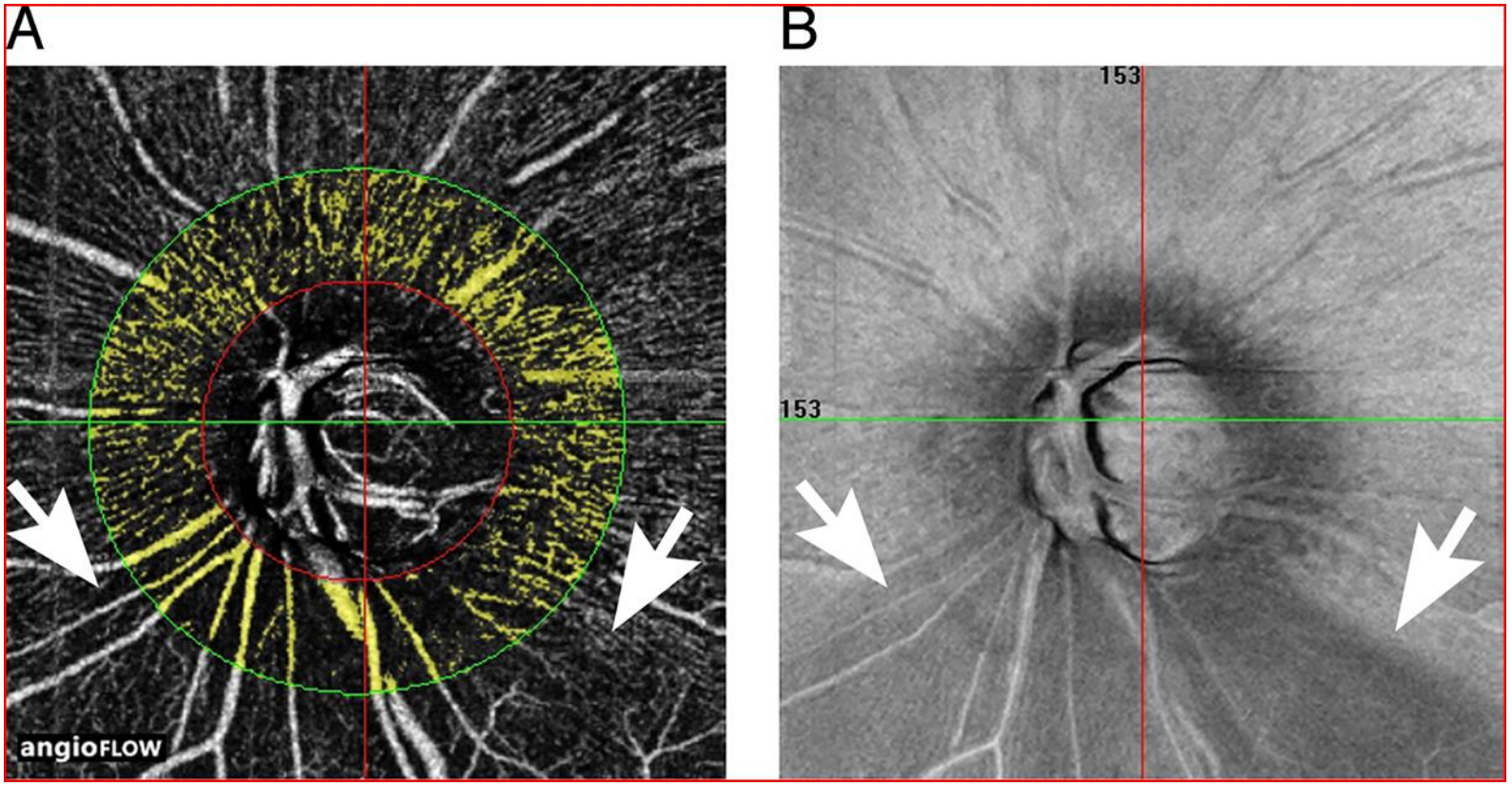
- **temporal ONH vessel density** were reduced by **22.88%** (0.364 versus 0.472; $p = 0.001$).

Significant correlations were found between **temporal and total ONH vessel density and**

- ***RNFL***
- ***GCC***
- ***VF MD*** *mean deviation* -
- ***Visual field index***.

Total **(a)** and temporal **(b)** ONH acquisition in a **normal** patient.
Total **(c)** and temporal **(d)** ONH acquisition in a **glaucoma** patient

by: Pierre-Maxime Lévêque et al. Journal of Ophthalmology 2016



(A) The highlighted RPC **(Radial Peripapillary Capillary)** of the superficial retina
(B) En face image of the retinal nerve fiber layer defects **(between arrows)** in an eye with **POAG.**

In this image, there is a **defective RPC** between the arrows and a **corresponding** retinal nerve fiber layer defect between the arrows. In this case, the tissue depth is between **0 and 80 µm**, and the highlighted **area is 700 µm from the disc margin** **(size, 4.5mm x4.5 mm)**

In summary, **the PLFI/UA** (prelaminar flow index of the optic disc unit area PLFI/UA), and VD (peripapillary vessel density of the superficial retina) **decreased in glaucomatous eyes**. **The discriminatory power** of the **PLFI/UA and VD to differentiate POAG from normal eyes was less than that of the structural parameters;** that is, the **GLV** (global loss volume of the ganglion cell complex) and **cp NFLT**(circumpapillary retinal nerve fiber layer thickness)

Glaucoma

Discriminatory Power of Superficial Vessel Density and Prelaminar Vascular Flow Index in Eyes With Glaucoma and Ocular Hypertension and Normal Eyes

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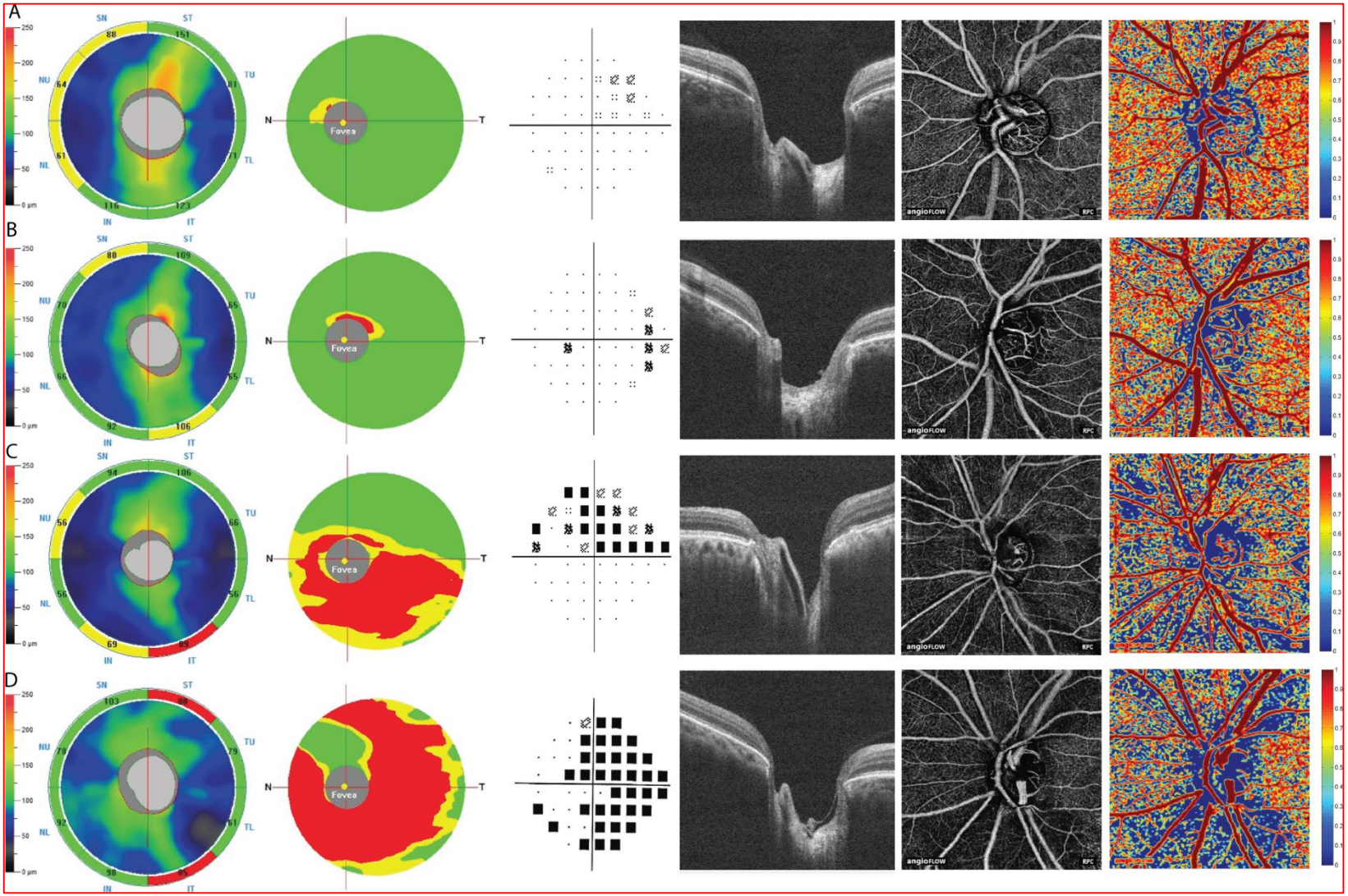
Purpose. We evaluate the ability of optical coherence tomography angiography parameters, such as the peripapillary vessel density of the superficial retina and prelaminar flow index of the optic disc (PLFI), to differentiate primary open-angle glaucoma (POAG) and ocular hypertension (OH) from normal eyes.

Methods. The vessel density, PLFI, mean deviation of the visual field, circumpapillary retinal nerve fiber layer thickness (cpNFLT), and global loss volume of the ganglion cell complex were evaluated in one eye of 105 subjects with POAG and OH and normal eyes. The discriminatory powers of these parameters were evaluated based on the area under the curve (AUC) of the receiver operation characteristic curve and multiple comparisons.

Results. The vessel density ($P < 0.001$) and PLFI/unit area (PLFI/UA; $P = 0.020$) in eyes with POAG were significantly less than in normal eyes. The vessel density in eyes with OH was significantly ($P = 0.018$) reduced, whereas the PLFI/UA, global loss volume and cpNFLT were unaffected. The AUCs of the vessel density to discriminate glaucoma and OH from normal eyes were 0.832 and 0.724, respectively, and were significantly better than the PLFI/UA, in which the AUCs were 0.662 ($P = 0.002$) and 0.569 ($P = 0.038$), respectively. The powers of the vessel density and PLFI/UA to discriminate POAG from normal eyes were inferior to the global loss volume ($P = 0.006$ and <0.0001) and cpNFLT ($P = 0.055$ and $P < 0.0001$, respectively).

Conclusions. The vessel density and PLFI/UA decreased significantly in glaucomatous eyes. The vessel density was more efficient than the PLFI/UA for differentiating glaucoma and OH from normal eyes.

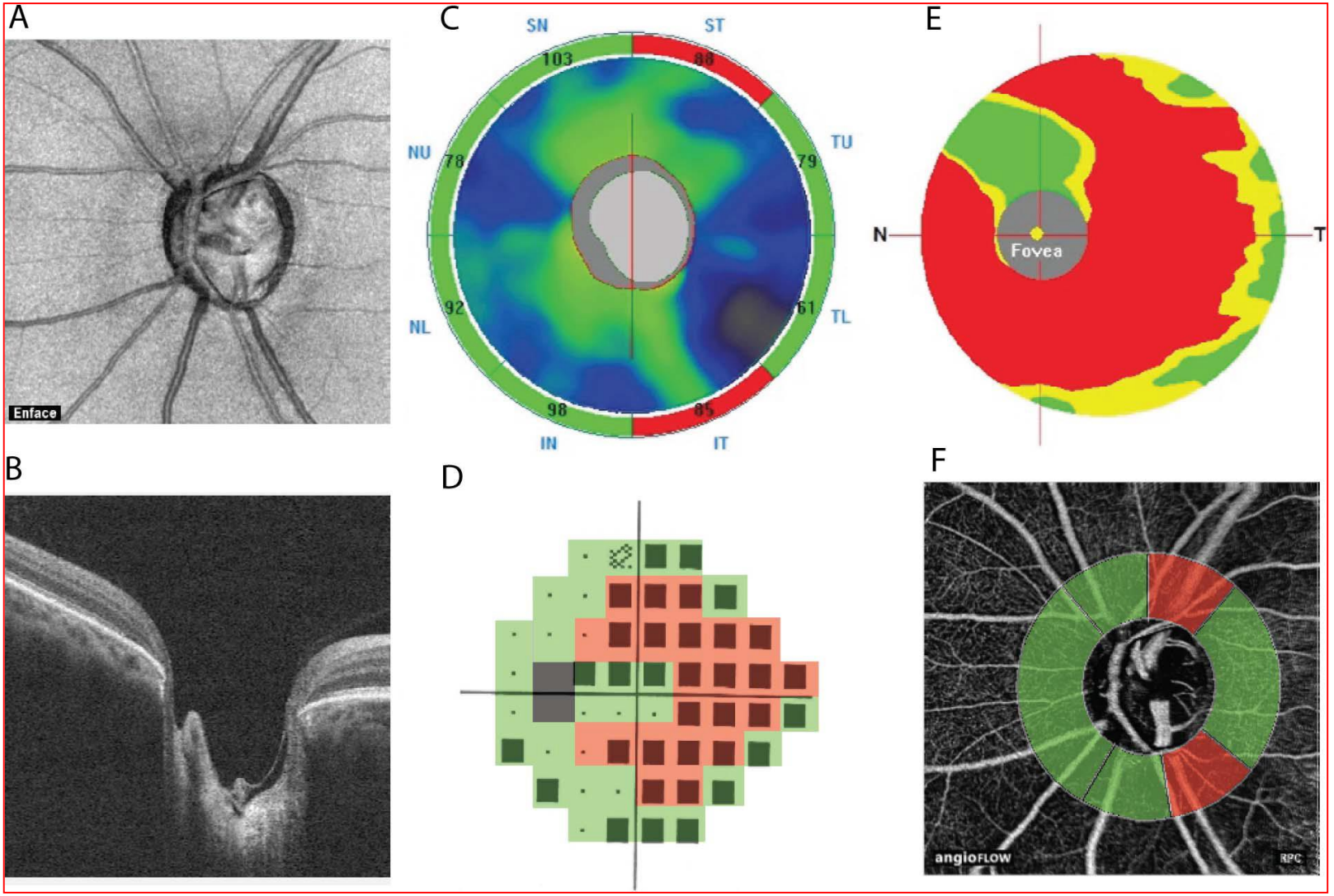
Keywords: OCT angiography, vessel density, vascular flow index, glaucomatous optic neuropathy, autoregulation



Retinal nerve fiber layer thickness map, GCC map, VF pattern deviation map, structural OCT image, original OCTA of RPC layer, and the corresponding contour map derived from OCTA of:

(A) preperimetric, (B) early, (C) moderate, and (D) severe glaucomatous eye

by: Rajesh S. Kumar et al. IOVS j November 2016 j Vol. 57 j No. 14 j 6080



(A) En face OCTA image of the optic disc **(B)** structural OCT (image), **(C)** RNFL thickness map, **(D)** VF pattern deviation map, **(E)** GCC map, and **(F)** the corresponding contour map derived from OCTA of RPC layer of a severe glaucomatous eye with the affected/damaged regions shown in red (C–F)

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CONCLUSIONS. Vascular parameters could be a useful adjunct tool to evaluate/diagnose glaucoma. **Longitudinal studies are needed to determine their use in early detection and prognostication**

by: Rajesh S. Kumar et al. IOVS j November 2016 j Vol. 57 j No. 14 j 6080

Multidisciplinary Ophthalmic Imaging

Discriminant Function of Optical Coherence Tomography Angiography to Determine Disease Severity in Glaucoma

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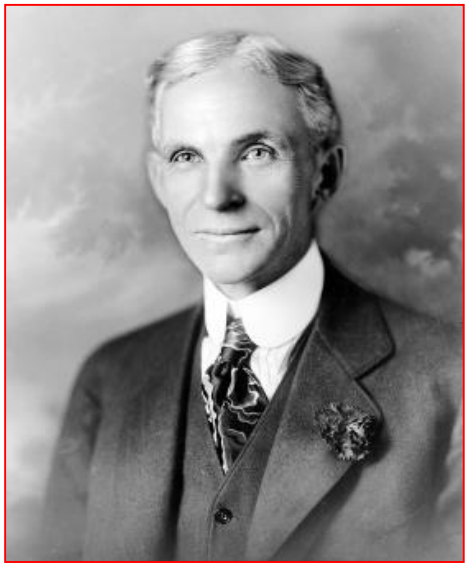
Purpose. To determine the discriminant function of optical coherence tomography angiography (OCTA) by disease severity in glaucoma.

Methods. In this prospective, observational cross-sectional study, all subjects underwent visual fields, retinal nerve fiber layer (RNFL) measurements, and OCTA imaging. Local fractal analysis was applied to OCTA images (radial peripapillary capillaries [RPC] layer). Vessel density en face and inside the disc and spacing between large and small vessels were quantified. Stepwise logistic regression was performed and a glaucoma severity score (range, 0–1: 0, normal; 1, severe glaucoma) was developed by using global and regional (superotemporal [ST], inferotemporal [IT], temporal, superonasal [SN], inferonasal, and nasal) vascular parameters. Glaucoma severity score was compared with visual field and RNFL indices.

Results. One hundred ninety-nine eyes (112 subjects) with glaucoma (28 eyes preperimetric; 83 early, 43 moderate, and 45 severe glaucoma) and 74 normal (54 subjects) eyes were enrolled. Preperimetric and glaucomatous eyes had significantly altered ($P < 0.001$) global vascular parameters as compared to normal; regionally, ST, then SN and IT sectors (in that order) showed more change in glaucomatous eyes. Vascular parameters showed better discriminant ability (area under the curve [AUC], sensitivity, and specificity of 0.70, 69.2%, and 72.9%, respectively) than structural parameters between normal and preperimetric glaucomatous eyes. Vascular parameters had comparable AUC ($P > 0.05$) to visual fields for perimetric glaucoma. Glaucoma severity score identified preperimetric glaucoma and early glaucoma better than did visual fields.

Conclusions. Vascular parameters could be a useful adjunct tool to evaluate/diagnose glaucoma. Longitudinal studies are needed to determine their use in early detection and prognostication.

Keywords: optical coherence tomography, glaucoma, visual field, angiography



Henry Ford 1863-1947

C'è vero progresso solo quando i vantaggi di una nuova tecnologia diventano per tutti

Simposio GOAL
Moderatore: Danilo Mazzacane

Thank you for your kind attention!

dott. A. Lucente
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