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Optical Coherence Tomography and Its Application in Prognosis of Disease Through Ayurveda

Madhav Madhukar[1], Pallavi Jagtap[2], Mayur Shiralkar[3], Santosh Rahinj[4], Anand Kale[5]

[1,2,3,4,5] *Dept. Of Shalakya Tantra, Dr. D.Y. Patil College of Ayurved and Research Centre, Dr. D. Y. Patil Vidyapeeth (Deemed to be University) Pune- 411018, Maharashtra, India.*

**Corresponding author's E-mail: bipul840@gmail.com*

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Abstract

A review of OCT as diagnostic tool and its application in ayurved. Optical Coherence Tomography (OCT) is one of the elite diagnostic measures in modern science which not only helps in diagnosing diseases but also in establishing relation between modern science and ancient science. OCT is usually used in diagnosing and managing diseases like Diabetic Macular Edema (DME), Myopia, Diabetic Retinopathy (DR), Central Serous Retinopathy (CSR), Glaucoma, etc. Depending on the disease condition; result of OCT can be co-related with modern aspect as well as ancient aspect. The primary objective of this literary review is concerned with gunas of vataj, pittaj, kaphaj dosha with clinical findings as seen in OCT. Ayurvedic classics state that guna of vata, guna of pitta, guna of pitta, guna of kapha are evident in shrotas and shrotojanya vyadhi. In the present era changes in lifestyle, food habits, uninhibited use of steroids had led to disorders of retina which is visible as changes in normative findings of OCT. Therefore, a proper understanding of doshas and its guna will help in decoding the findings of OCT with ayurvedic perspective.

Keywords: *OCT, Vata dosha, pitta dosha, kapha dosha, CSR, DR.*

1. Introduction

Ophthalmology clinical practice has been completely transformed by optical coherence tomography. The retina, the retinal nerve fiber layer, and the optic nerve head can all be seen in high-resolution cross-sections using this non-invasive imaging technique. The review talks about the OCT's current applications. [1,2] In disease diagnosis, treatment, and interaction with ayurveda.

OCT's initial generation was time domain. It encodes the timing information about the movement of the reflection's position. The spectral domain OCT, which evaluated the frequency spectrum of the interference between the reflected light and reference mirror, was developed in 2001 and dealt with all the information in a single A scan. A variety of ocular diseases, including Diabetic Macular Edema (DME), Glaucoma, Age-Related Macular Degeneration (AMD), Central Serous Retinopathy (CSR), etc., are identified and evaluated using retinal imaging.

Currently, OCT technology is used frequently to image the macula, optic nerve, and RNFL. This technology aids in analyzing the outward signs of various disease states and quantifying changes. For example, automated measurements of retinal thickness made by SD-OCT systems are used in clinical settings to monitor the progression of conditions like wet age-related macular degeneration (AMD) and macular edema from a variety of causes, including diabetes and retinal vein occlusion. The ability to track fluid within the retina and the thickness changes this fluid causes aids in making clinical decisions about treatment. [3] Lamellar and pseudo macular holes can now be differentiated using OCT, greatly simplifying the diagnosis of macular holes. [4] Additionally, following surgical intervention, there is good agreement between functional and anatomic outcomes and the size and placement of macular holes as

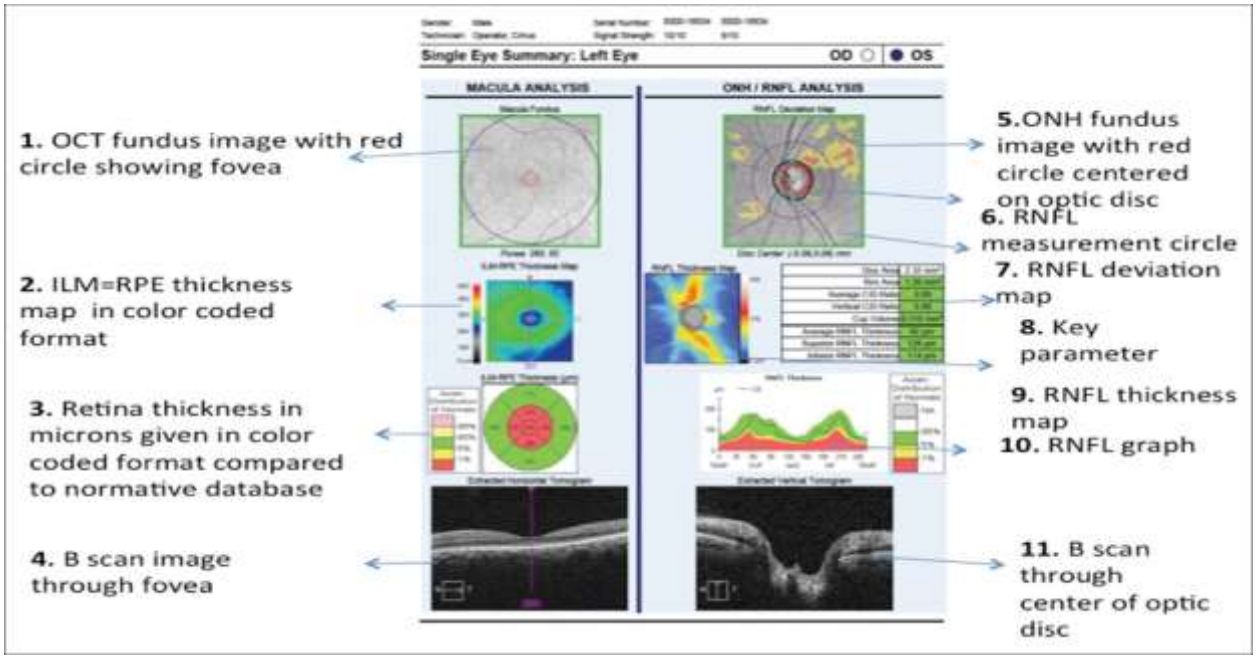
ascertained by OCT. [4-7] OCT evaluation of the vitreoretinal interface is necessary for the diagnosis and treatment of diseases of the vitreomacular interface, such as epiretinal membranes and vitreomacular traction. [8] Furthermore, RNFL thickness measurements and optical disc morphology measurements using OCT assist glaucoma patients in quantitatively evaluating their treatment response. [9,10]

Aims And Objectives:

Aim- To study the correlation of OCT with Ayurveda and its application in ayurveda.

Objectives-

1. To study OCT in detail
2. To study the vata pitta kapha dosha and its correlation with color coding findings of OCT.

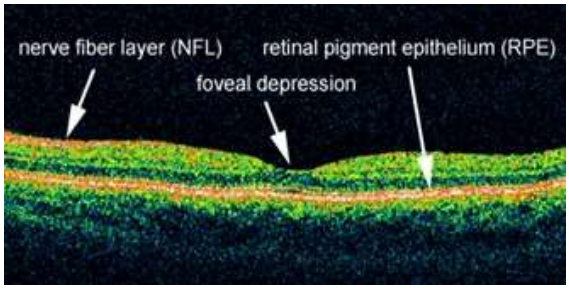


2. Materials And Methods

The study is entirely supported by a close examination of pertinent ayurvedic texts, complete with all necessary annotation and pertinent interpretation. Searches in a few medical databases, including PubMed, Google Scholar, and other natural databases, turned up the description of OCT. Tomography using optical coherence An in vivo optical biopsy has been used to describe OCT images because they closely resemble the macula's histological appearance. The area of darkness at the top of the image is the vitreous. The typical depression serves as a sign of the fovea. Due to their higher levels of reflection compared to the other layers of the retina, NFL & RPE are easily distinguishable layers. OCT image of the retina can be subdivided vertically into four regions.

3. Results and Discussion

1. The Pre-retina
2. The Epi-retina
3. The intra-retina
4. The sub-retina



OCT imaging for qualitative retinal analysis -

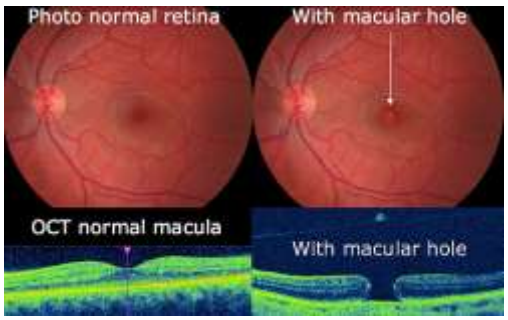
1. The Fast Macular Thickness Scan (FMT'S)
2.The Line Scan
3. The Cross Hair Scan.

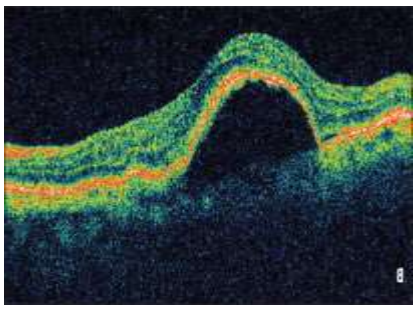
The OCT's capacity to monitor volume over time is one of its most crucial features. In order to image the vitreous as well as the retina, the retina often needs to be in the lower part of the scan window. After a successful course of treatment, the thickness and volume of the retina should decrease. A good OCT has uniformly good reflectance throughout.

The hotter colors (orange, red, white, yelow) are maximized:
Highly reflective structure - Red
Medium reflective structure - Green
Low reflective structure - Blue
Black - Absence of reflective signal.

Limitations of OCT- Corneal opacity, Cataract, Vitreous Haemorrhage, Uncooperative patients.

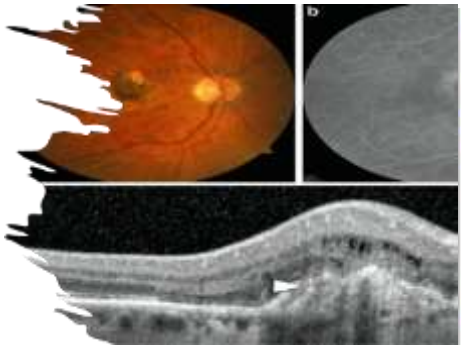
• Doshas and its guna (qualities) which are evident in OCT

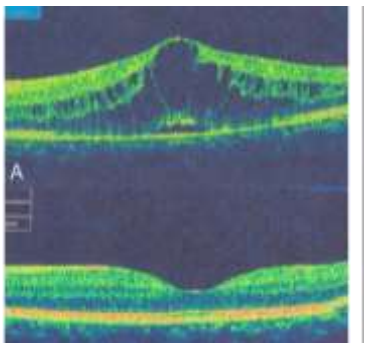




• Vata [11] - Ruksha- Dryness
Laghu- Lightness
Sheeta- Coldness
Khara- Roughness
Sookshma-Minuteness

• The above guna of vata can be compared with pigmented epithelial detachment in ARMD, exudative detachment, macular hole etc.

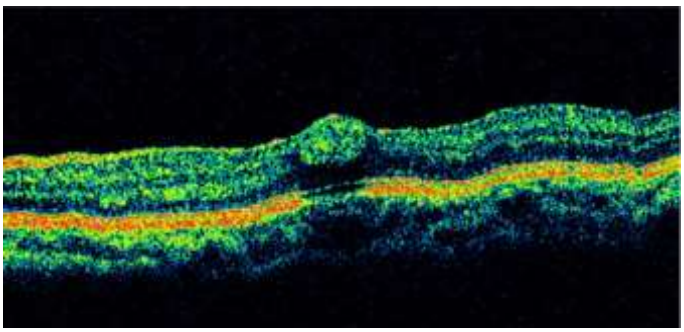




Pitta [11] -
Sasneha-Unctuous
Teekshna-Entering into tissue (Piercing)
Ushna- Hotness (Redness)
Laghu-Lightness

Drava- Liquidity

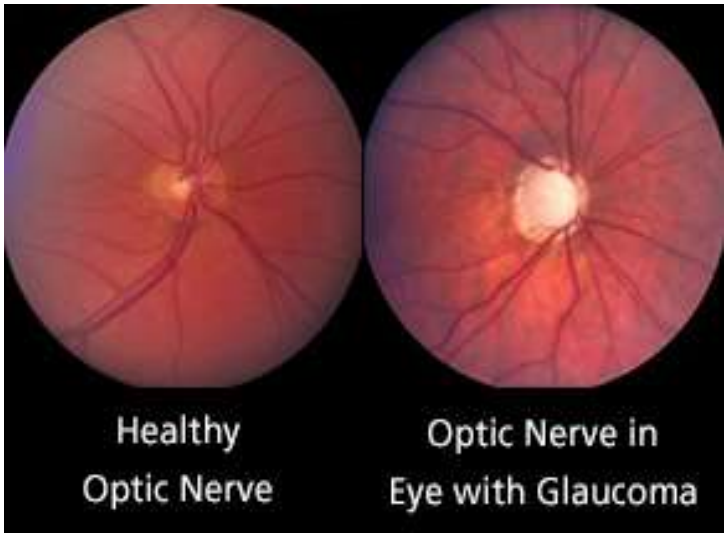
The above guna of Pitta can be compared with Choriodal Neovascularisation, inflamed Macula, Cystoid Macular Edema (Blurred central vision), as we know that Alochaka pitta plays major role in vision. So, its anomaly is a matter of concern which needs to be corrected as soon as possible.



Kapha [11] - Snigdha - Oily
Sheeta- Cold
Guru - Heavy
Manda- Mild Viscous
Slakshna- Smooth, Clear.
Sthira-Immobility

The above guna of Kapha can be compared with slimy viscous fluid, aqueous humor reflections of posterior hyaloid face in a patient with complete posterior vitreous detachment, complete white glow of disc signifies underlying lesions.

For instance, glaucoma instances



Optical cup size has increased (Mansasanrabdha)

⬇

cleanses the underlying nerve fibers once more

⬇

OCT interpretation, the head of the optic nerve, and the cup are closely connected.

⬇

vessels in the pre-laminar area are compressed

⬇

Edema results from anoxia

⬇

reduced blood supply to the ONH

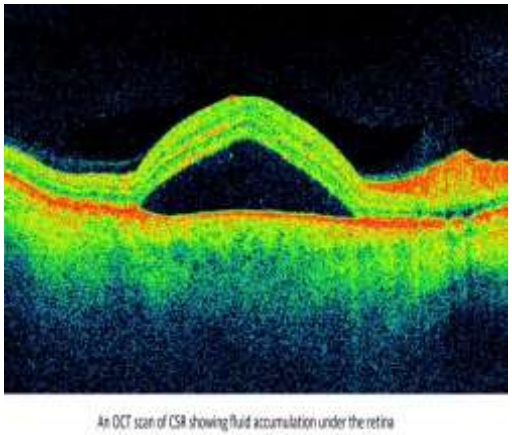
⬇

The axons suffer from irreversible ischemia damage.

⬇

Total glaucoma

Another instance,



An OCT scan of CSR showing fluid accumulation under the retina

If we look at a case with central serous retinal disease

Pittaj sickness Dhoomadarshi may have a connection to CSR.

affects the retina's outer layers

Tvagavadarana (avarana cracking),

Red vesicles (Rakta Visphota),

Rakta pitta (Propensity to bleed)

It is Clear in OCT findings in the form of serous detachment of the neurosensory retina and leakage from the choriocapillaries.

With basic knowledge and proper co-relation, we could do miracles in treating patients by applying integrative approach of modern science and ayurveda.

Haritaki, Vibhitaki, Amalaki, Bhunimba

Are anti-oxidants, neutralizes free radicals

Further causes oxidative stress inhibition

TNF alpha synthesis is supressed which further inhibits the release of pro inflammatory

cytokines like IL-6, IL-8 and chemokines. Proinflammatory enzyme expression that is cyclo-oxygenase 2 (cox-2), the main enzyme

Engaged in prostaglandin production is DOWNREGULATED.

Anti-inflammatory action & Relaxation of vegetative nervous syst

Detoxification, nourishment, and recovery of the tissues.

4. Conclusion

Each of the identified authors made substantial intellectual contributions to the case follow-up, paper design, and bibliographic research. The patient verbally agreed to this publication after being given full disclosure, and anonymity was guaranteed.

Conflicts of interests

There are no competing interests, according to the authors**.**

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