E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.31838/ijprt/16.01.654

Original Research Article

Comparitive Evaluation of Choriodal Thickness between Hypertensives and Healthy Controls: An Oct Based Study

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Received: 15.06.26, Revised: 21.06.26, Accepted: 29.06.26

ABSTRACT
Purpose: To compare choroidal thickness in patients with systemic hypertension and age-matched healthy individuals using spectral-domain optical coherence tomography (SD-OCT).
Methods: This prospective cross-sectional comparative study included 70 participants, comprising 35 hypertensive patients and 35 healthy controls aged 40–60 years. Choroidal thickness was measured using enhanced depth imaging SD-OCT at the subfoveal region and at 500 µm nasal and temporal to the fovea. Independent t-test was used for intergroup comparison, and correlation analysis was performed to assess association with blood pressure.
Results: Subfoveal choroidal thickness did not show a statistically significant difference between the two groups. However, nasal and temporal choroidal thickness were significantly reduced in hypertensive patients compared to controls ($p < 0.05$).
Conclusion: Systemic hypertension is associated with regional thinning of the choroid, predominantly in the nasal and temporal regions, while the subfoveal region remains relatively preserved. SD-OCT serves as a useful non-invasive tool for detecting hypertensive choroidal changes.

Keywords: Choroidal Thickness, Hypertension, Optical Coherence Tomography, Sd-Oct, Choroid, Hypertensive Retinopathy.

INTRODUCTION

Systemic hypertension is a major global health concern and is known to cause significant microvascular alterations affecting multiple organs, including the eye. Ocular manifestations include hypertensive retinopathy, optic neuropathy, and choroidopathy.[1]

The choroid plays a crucial role in maintaining outer retinal function by supplying oxygen and nutrients to the retinal pigment epithelium and photoreceptors.[2] Chronic hypertension may lead to vascular sclerosis, reduced perfusion, and structural alterations in the choroidal vasculature.

With the advent of spectral-domain optical coherence tomography (SD-OCT) and enhanced depth imaging, in vivo assessment of choroidal thickness has become possible.[3] Choroidal thickness has emerged as an important biomarker reflecting systemic vascular health.

This study was conducted to evaluate and compare choroidal thickness in hypertensive patients and healthy individuals using SD-OCT.

MATERIALS AND METHODS

This prospective cross-sectional comparative study was conducted in the Department of Ophthalmology, MVJ Medical College and Hospital, over a period of six months.

A total of 70 participants were included and divided into two groups:

- Group 1: 35 patients with systemic hypertension
- Group 2: 35 age-matched healthy controls

Inclusion Criteria

- Age between 40 and 60 years
- Diagnosed essential hypertension (SBP >140 mmHg and DBP >90 mmHg)
- Clear ocular media

Exclusion Criteria

- Diabetes mellitus
- Glaucoma
  Refractive error greater than ±3 diopters
- History of ocular surgery
- Macular pathology

All participants underwent comprehensive ophthalmic examination.

Choroidal thickness was measured using spectral-domain OCT with enhanced depth imaging.

Measurements were taken at:

- Subfoveal region
- 500 µm nasal to fovea
- 500 µm temporal to fovea

Statistical Analysis

Data were analysed using:

- Independent t-test
- Correlation test

P value < 0.05 was considered statistically significant.

RESULTS

The mean subfoveal choroidal thickness did not differ significantly between hypertensive patients and healthy controls ($p > 0.05$).

However, nasal and temporal choroidal thickness were significantly reduced in hypertensive individuals compared to controls ($p < 0.05$).

Pearson correlation analysis demonstrated a negative correlation between blood pressure levels and choroidal thickness.

DISCUSSION

This study demonstrated a significant reduction in nasal and temporal choroidal thickness in hypertensive patients, while subfoveal thickness remained relatively preserved.[1,2,3]

These findings are consistent with previous studies by Akay et al.[4] and Waghamare et al.[5], who reported similar regional thinning of the choroid in systemic hypertension[6]. Similar results have been documented by Esmaeelpour et al.[7] and Mrejen and Spaide,[8] who used OCT-based imaging to demonstrate choroidal structural alterations associated with systemic vascular disease.

The preservation of subfoveal choroidal thickness may be attributed to autoregulatory mechanisms and increased vascular density in the subfoveal region, which help maintain perfusion despite systemic vascular compromise.[9,10] Spaide et al.[11] demonstrated that the subfoveal choroid exhibits unique haemodynamic properties that confer relative resistance to systemic vascular changes.

Chronic hypertension leads to vascular narrowing, sclerosis, and reduced choroidal perfusion, resulting in structural thinning.[12,13] Bhutto and Lutty[14] described histopathological evidence of choroidal vascular loss and fibrosis in hypertensive eyes, further supporting the OCT-based findings observed in this and similar studies.

These findings suggest that choroidal thickness measurement may serve as a useful biomarker for early detection of hypertensive vascular damage.[15,16] Gupta et al.[17] and Nickla and Wallman[18] have highlighted the clinical utility of choroidal imaging in monitoring systemic vascular conditions. Furthermore, Regatieri et al.[19] and Margolis and Spaide[20] emphasised the reproducibility and reliability of enhanced depth imaging SD-OCT in quantifying choroidal thickness across different patient populations.

CONCLUSION

Systemic hypertension causes regional reduction in choroidal thickness, predominantly affecting nasal and temporal regions.

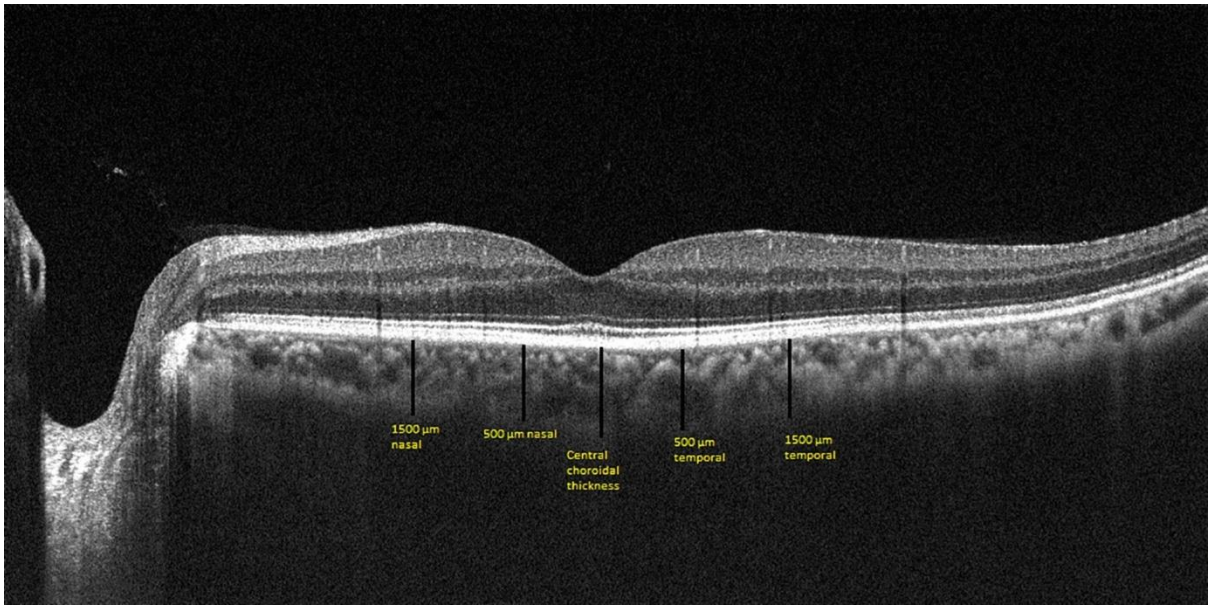
Subfoveal thickness remains relatively preserved.

Spectral-domain OCT is a valuable non-invasive tool for detecting hypertensive choroidal changes.

Table 1: Comparison of Choroidal Thickness

Region	Controls (µm)	Hypertensive (µm)
Subfoveal	295.86	294.02
Nasal	285.34	256.38
Temporal	280.34	269.53

Figure 1



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