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Discrepancy in subfoveal choroidal thickness in healthy adults with isometropia:

A paired eye study by using spectral domain optical coherence tomography with enhanced depth imaging modality

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Discrepancy in subfoveal choroidal thickness in healthy adults with isometropia:

A paired eye study by using spectral domain optical coherence tomography with enhanced depth imaging modality

Directed by Professor Hyoung Jun Koh

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ABSTRACT

Discrepancy in subfoveal choroidal thickness in healthy adults with isometropia:

A paired eye study by using spectral domain optical coherence tomography with enhanced depth imaging modality

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(Directed by Professor Hyoung Jun Koh)

Purpose: To investigate interocular discrepancies of subfoveal choroidal thicknesses in the healthy adult population with isometropia.

Design: Prospective, cross-sectional, interventional study.

Participants: One-hundred healthy subjects (200 eyes) were enrolled in the study.

Methods: The choroid thickness was measured using spectral domain optical coherence tomography with the enhanced depth imaging modality. After collecting baseline data, the correlation factor was statistically analyzed by multiple regression analysis. The estimated difference of subfoveal choroidal thickness by paired-eye comparison was calculated as follows: calculated correlation factor of the axial length with subfoveal choroidal thickness (μm/mm) × difference of the axial length (mm). We defined the presence and absence of a discrepancy as following: if the gap between the estimated and measured difference of subfoveal choroidal thickness was larger than 10 μm, and absence of a discrepancy if the gap was less than 10 μm.

Main Outcome Measures: Presence of a discrepancy in subchoroidal thicknesses.

Results: Axial length was the only significant factor correlated with subfoveal choroidal thickness (B = -32.2, $P < 0.001$). Seventy-three subjects (73.0%) showed a discrepancy in subfoveal choroidal thickness (mean 51.7±48.5 μm), and among them, 20 subjects (20.0%) showed a difference of more than 50 μm. There was no significant difference between baseline values, including age, gender, and even axial lengths between the discrepancy group and the non-discrepancy group.

Conclusions: There was a discrepancy in subfoveal choroidal thickness as assessed by the paired-eye comparison in the healthy adult population. Further investigation is necessary to define the clinical significance of this discrepancy.

Key Words : Choroid, Subfoveal choroidal thickness

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I. INTRODUCTION

The choroid is a highly vascularized and pigment tissue extending from the ora serrata to optic nerve.[1-4] The choroidal circulation is derived from the long and short ciliary arteries, and accounts for most of the ocular blood flow.[1-5] Because the choroid blood flow is the major source of oxygen and nutrients for the choroid and overlying outer retina, the choroid is vital for maintaining outer retinal function.[1]

Because of its importance in maintaining vision, there have been numerous attempts investigating on the choroid and its circulation. Indocyanine green (ICG) angiography and enhanced depth imaging optical coherence tomography (EDI OCT) are the two most applicable method for investigating choroidal status. ICG angiography provides vasculature and its circulatory status of the choroid,[6-8] and has been useful in diagnosis of various chorioretinal diseases such as choroidal neovascularization in age-related macular degeneration (AMD).[9-11] EDI OCT does enhanced characterization of microstructure of the choroid and choroidal thickness.[12-14]

Because EDI OCT is a noninvasive and relatively quicker than ICG angiography, various studies have characterized both the choroid and various factors affecting the choroid. Physiologic factors include age, sex, axial length, and diurnal variation.[15-24] Axial length is the most representative factor, which has been negatively correlated with choroidal thickness, showing correlation efficient ranging from 22.4 μm/mm to 58.2 μm/mm. Aging is another factor affecting choroidal thickness, with a thinner choroid found in the advanced age population.[15,17,21]

Although there have been numerous investigations on choroid and its thickness, there has been a few study investigating interocular difference of

choroidal thickness. Previous studies showed interocular symmetry of choroidal thickness, and interocular difference in subfoveal choroidal thickness seems to be correlated with interocular difference of axial length in adult population.[12,25] Recent study also showed interocular symmetry of choroidal thickness in children.[26] In myopic anisometropic eyes, more myopic eyes showed significantly thinner choroidal thickness than less myopic eyes, and the difference of choroidal thickness was also correlated with difference of axial length beween eyes.[27]

However, in our clinical setting, interocular differences of choroidal thicknesses are larger in some individuals although they do not have definite anisometropia. This asymmetry of subfoveal choroidal thickness between the two eyes in the same individual may be a natural variation. the interocular difference of choroidal thickness may reflect asymmetry of choroidal circulation, leading to pathogenesis and unilateral development of further retinal diseases. Although we cannot tell its clinical significance, interocular asymmetry of choroidal thickness has not been investigated.

Thus, we investigated the interocular discrepancy of subfoveal choroidal thickness in the normal adult population with isometropia in this study. We also investigated the diameters and intimal thickness of carotid arteries to elucidate the possible effects on subfoveal choroidal thickness by usning human cadaver and carotid ultrasonography.

II. MATERIALS AND METHODS

Subject Enrollment

This prospective study included 100 healthy volunteers between 20−50 years of age. Included criteria were as follows: 1) no previous intraocular surgery such as pars plana vitrectomy, scleral buckling, or intravitreal injections, 2) no history of vitreoretinal diseases such as retinal detachment or choroidal neovascularization, and 3) no systemic diseases such as diabetes or hypertension. Excluded were as follows: 1) anisometropia showing interocular difference in spherical equivalent refraction more than 1.00 diopters, 2) Axial length more than 26.5 mm, 3) the eyes with any sign of pathologic myopia such as fundus changes indicative of pathologic myopia including lacquer cracks, atrophic patches, or chorioretinal atrophy.[28-30] The study protocol was approved by the Institutional Review Board of the International
St. Mary's Hospital, Catholic Kwandong University College of Medicine (IS14OISI0018), and adhered to the tenets of the Declaration of Helsinki. Informed consent was obtained from all participants.

Examinations

Baseline examination included a slit lamp examination, an intraocular pressure measurement using a non-contact tonometer, and a fundus examination. Refractive errors were measured using an autorefractor, and then converted to spherical equivalents (diopters [D]). The axial length of each eye was measured using partial coherence interferometry (IOLMaster; Carl Zeiss, Dublin, CA, USA).

The choroid thickness was measured using spectral domain OCT (Spectralis; Heidelberg Engineering, Dossenheim, Germany) with the EDI modality. As previously described,[12] EDI OCT imaging was performed by positioning the objective lens of the Spectralis OCT scanner close enough to invert the image. At least two good quality horizontal and vertical scans across the fovea for each eye were obtained. And we also obtained 6-radial macular scans with EDI mode. The OCT images saved after 100 frames were averaged using the automatic averaging and eye tracking system of the Spectralis OCT. Choroidal thickness was defined as the distance from the outer border of the hyperreflective line, corresponding to the RPE perpendicular to the chorioscleral interface. Using digital calipers provided by the Heidelberg Spectralis OCT software, the choroidal thickness was measured at the subfoveal region in each trans-sectional image of the horizontal, vertical, and 6-radial macular scan and then averaged. One independent observers, who was blinded to the clinical data of each patient (HMK), measured subfoveal choroidal thickness.

Estimated differences of subfoveal choroidal thickness by paired-eye comparisons were calculated as follows: calculated correlation factor of axial length with subfoveal choroidal thickness (μm/mm) × difference of axial length (mm). We also defined the presence and absence of discrepancies in subfoveal choroidal thicknesses by paired-eye comparisons as follows: presence of a discrepancy if the gap between the estimated and measured difference of subfoveal choroidal thickness was larger than 10 μm, and absence if the gap was less than 10 μm. After calculating the difference between the estimated and real difference of subfoveal choroidal thickness using the paired-eye comparison, the real difference of subfoveal choroidal thickness was classified as follows: difference under 10 μm as group 1, difference over 10 μm and under 20 μm as group 2, difference over 20 μm and under 30 μm as group 3, difference over 30 μm and under 40 μm as group 4, difference over 40 μm and under 50 μm as group 5, and difference over 50 μm as group 6.

We also evaluated the carotid arteries. We measured the mean intima-medial thickness of the each carotid artery by carotid unltrasonography in the study population. Additionally we measured the calibers of each carotid artery of the four cadavers which were provided by Department of Anatomy, Catholic Kwandong University College of Medicine.

Statistical Analysis

IBM SPSS Statistics Version 18.0 software for Windows (IBM Corporation, Somers, NY, USA) was used for the statistical analyses. Mauchly's test of sphericity and Kolmogorov-Smirnov analyses were used to confirm statistical validity. Student's *t* test was performed for continuous variables, and the chi-square independent test was used for categorical variables. For comparison among 6 groups according to discrepancy in subfoveal choroiodal thickness, Kruskal-Wallis teset was performed. Stepwise multiple regression analysis was used for analysis of correlations between baseline factors and subfoveal choroidal thickness. Results with $P < 0.05$ were considered statistically significant.

III. RESULTS

Baseline Characteristics

A total of 100 volunteers (200 eyes) participated in this study. Among these volunteers, 42 subjects (42.0%) were male, and 58 subjects (58.0%) were female. Mean age at the time of the study was 31.3 ± 8.4 years (range, 20~49 years). Mean axial length was 24.7 ± 1.2 mm (range, 22.0~26.5 mm) in the right eye, and 24.6 ± 1.2 mm (range, 22.0~26.5 mm) in the left eye. Baseline characteristics of the study subjects are summarized in Table 1.

Table 1. Baseline Characteristics of 100 Subjects Enrolled in This Study

Baseline characteristics (SD, standard deviation)	
Age (years, mean±SD)	35.4±11.2 (20~59)
Sex	
Male	42 (42.0%)
Female	58 (58.0%)
Refractive errors (spherical equivalent [diopters, mean±SD])	-2.0±2.3 (-6.3~1.0)
Right eye	-1.9±2.2 (-6.5~1.0)
Left eye	
Axial lengths (mm, mean±SD)	
Right eye	24.7±1.2 (22.0~26.5)
Left eye	24.6±1.2 (22.0~26.5)
Mean subfoveal choroidal thickness (μm, mean±SD)	301.6±89.3 (89.0~473.0)

Right eye	307.4±95.7 (81.0~486.5)
Left eye	
Mean difference of axial length (mm, mean±SD)	0.3±0.6 (0~4.92)
Mean difference of subfoveal choroidal thickness (µm, mean±SD)	42.0±45.6 (2.0~311.5)
Mean estimated difference of subfoveal choroidal thickness (µm, mean±SD)	8.0±16.0 (0~136.8)
Mean discrepancy between the estimated and real difference of subfoveal choroidal thickness (µm, mean±SD)	35.0±36.0 (0.2~198.5)

Correlation of Axial Length and Subfoveal Choroidal Thickness

Baseline factors including axial length, gender, and age were used for correlation analyses with subfoveal choroidal thickness by stepwise multiple regression analysis. Among the factors, axial length thickness (B = -32.2, $P < 0.001$) and sex (B=-45.4, P=0.019) were significant factors correlated with subfoveal choroidal thickness, suggesting the eyes with longer axial length and female show thinner subfoveal choroidal thickness. Estimated difference of subfoveal choroidal thickness was calculated using these coefficient constants.

Paired-Eye Comparison of Subfoveal Choroidal Thickness

Among 100 subjects, 73 subjects (73.0%) showed a discrepancy in subfoveal choroidal thickness between the two eyes when compared with the estimated difference.

After classification, we compared the baseline values between the discrepancy group and the non-discrepancy group. There was no significant difference between baseline values including age, gender, and even axial lengths between the two groups as shown in Table 2.

When comparing the mean difference of subfoveal choroidal thicknesses, the discrepancy group showed significantly larger differences in subfoveal choroidal thickness using the paired-eye comparison (*P* = 0.001, Student's *t* test). We determined the estimated difference of subfoveal choroidal thickness according to the correlation factor. When compared with the estimated difference, there was a significantly larger difference in subfoveal choroidal thickness in the discrepancy group than the non-discrepancy group (*P* < 0.001, Student's *t* test).

Table 2. Comparison of Baseline Characteristics Between the Discrepancy Group and the Non-Discrepancy Group

	Discrepancy group (N=73)	**Non-discrepancy group (N=27)**	***P* value***
Age	31.2±8.4	31.4±8.7	0.434
Sex			0.201
Male	33 (45.2%)	9 (33.3%)	
Female	40 (54.8%)	18 (33.7%)	
Axial length (mm, mean±SD)			
Right	24.7±1.1	24.7±1.1	0.916
Left	24.6±1.3	24.5±1.2	0.621

Refractive errors (spherical equivalent [diopters, mean±SD])			
Right	-1.9±2.3	-2.0±2.3	0.833
Left	-1.9±2.3	-1.8±2.1	0.822
Mean subfoveal choroidal thickness (µm, mean±SD)	317.7±85.3	322.8±97.0	0.818
Right eye	320.7±83.4	323.0±100.3	0.921
Left eye			
Mean difference of axial length (mm, mean±SD)	0.3±0.6	0.3±0.5	0.556
Mean difference of subfoveal choroidal thickness (µm, mean±SD)	51.7±48.5	13.5±13.7	0.001
Estimated difference of subfoveal choroidal thickness (µm, mean±SD)	7.4±16.9	9.6±13.1	0.555
Gap of estimated difference and real difference of subfoveal choroidal thickness (µm, mean±SD)	44.3±37.1	7.7±8.3	<0.001

*Student's *t*-tests were used to compare the continuous variables, and the chi-square test was used for the categorical variables. *P* values <0.05 were considered statistically significant. *SD = standard deviation.

Interpersonal Comparison of Discrepancies of Subfoveal Choroidal Thicknesses Using the Paired-Eye Comparison

Discrepancies of subfoveal choroidal thicknesses were classified as previously described using 10 μm intervals. Because we defined non-discrepancy as within a 10 μm difference between the estimated difference and the real difference of subfoveal choroidal thickness, group 1 was the same as the non-discrepancy group (27 patients, 27.0%). After classification, 20 subjects (20.0%) showed a difference more than 50 μm, and the other subjects also showed various differences more than 10 μm (Figure 1). Comparison among the 6 groups showed that there were no significant differences in estimated differences of subfoveal choroidal thickness ($P = 0.330$, Kruskal-Wallis test), and axial length ($P = 0.329$, Kruskal-Wallis test). However, the real difference of subfoveal choroidal thickness was significantly different among the groups ($P < 0.001$, Kruskal-Wallis test), as well as the gap between estimated and real subfoveal choroidal thickness ($P < 0.001$, Kruskal-Wallis test).

Representative figures are shown in Figure 2 and Figure 3.

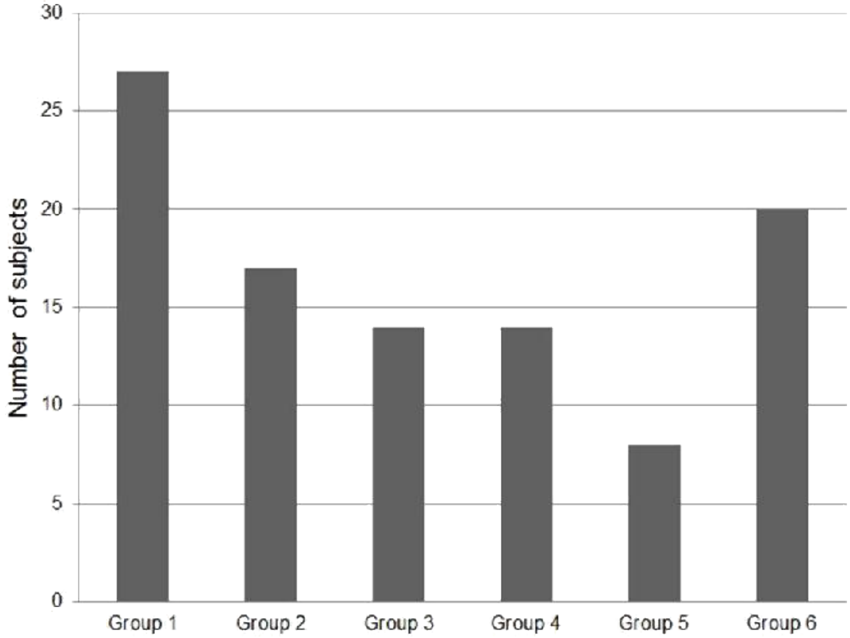

Figure 1. By paired-eye comparison, the measured difference of subfoveal choroidal thickness was classified as follows: difference under 10 μm as group 1, difference over 10 μm and under 20 μm as group 2, difference over 20 μm and under 30 μm as group 3, difference over 30 μm and under 40 μm as group 4, difference over 40 μm and under 50 μm as group 5, and difference over 50 μm as group 6.

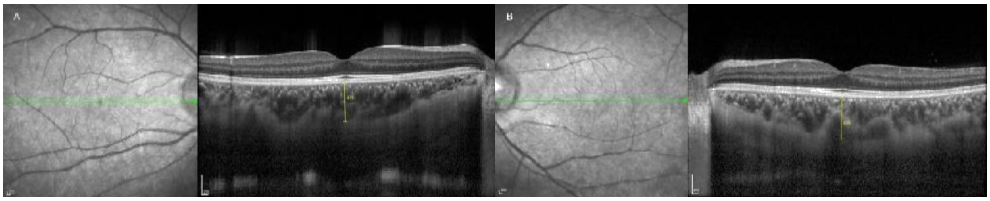

Figure 2. Representative figure of discrepancy in subfoveal choroidal thickness. This 23-year-old female had refractive errors as -0.75 diopters in the right eye, and emmetropia in the left eye. Axial length was 23.58 mm in both eyes. The subfoveal choroidal thickness on horizontal scan was 375.0 µm in the right eye (A), and 434 µm in the left eye (B). Mean subfoveal choroidal thickness was 372.5 µm in the right eye, and 437.5 µm in the left eye, showing 65 µm difference between the eyes.

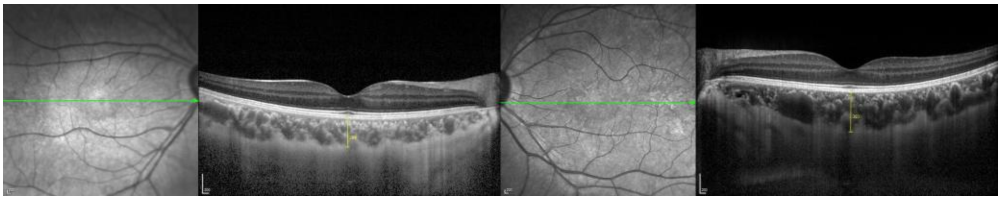

Figure 3. Representative figure of discrepancy in subfoveal choroidal thickness. This 27-year-old female had refractive errors as -5.25 diopters in the both eyes. Axial length was 26.32 mm in the right eye, and 26.45 in the left eye. The subfoveal choroidal thickness on horizontal scan was 284.0 µm in the right eye (A), and 393.0 µm in the left eye (B). Mean subfoveal choroidal thickness was 284.5 µm in the right eye, and 381.5 µm in the left eye, showing 97.0 µm difference between the eyes.

Factors Affecting the Differences of Subfoveal Choroidal Thicknesses Using the Paired-Eye Comparison

After analysis of differences in subfoveal choroidal thicknesses using the paired-eye comparison, stepwise multiple regression analysis was performed to evaluate factors affecting the differences of subfoveal choroidal thicknesses. Baseline values including age, sex, and mean difference of axial length using the paired-eye comparison were analyzed. However, the stepwise multiple regression analyses showed that difference of axial length between eyes was correlated with difference of subfoveal choroidal thickness between eyes (B=37.223, β=0.326; *P*=0.004). Binary logistic regression analysis showed that no baseline factors were significantly correlated with presence of discrepancy in subfoveal choroidal thickness between the eyes.

We additionally investigated the carotid arteries. We measured the calibers of each carotid artery of the cadavers which were provided by Department of Anatomy, Catholic Kwandong University College of Medicine (Figure 4). Comparison showed that there was difference in the diameter of carotid arteries in the same cadaver (Table 3).

Figure 4. The representative figure of the right carotid artery. After transverse dissection, the internal calibers of each carotid artery was measured at the bifurcation site.

Table 3. Comparison of the calibers of the carotid arteries in the cadavers.

Cadaver Code		Sex/Age	SIDE	CCA	ECA	ICA
CKU2016-	185	M/63	Left	7.75	4.8	9.88
			Right	8.01	5.61	9.95
CKU2016-	186	F/40	Left	7.15	5.68	6.23
			Right	7.99	6.07	6.83
CKU2016-	187	M/78	Left	9.78	6.71	8.55
			Right	11.15	7.9	10.34
CKU2016-	188	F/94	Left	9.65	7.17	10.32
			Right	9.89	6.29	10.06

Because the diameter of carotid artery itself is not presentative for carotid artery flow, we investigated the intima-media thickness of carotid artery by using ultrasonography (Figure 5). Intimal thickness is considered as an indirect indicator for blood flow of carotid artery. Intra-personal comparison of the mean intima-media thickness of the common carotid arteries was not significantly different in the healthy adult population age from 20 to 40 years. (P=0.819).

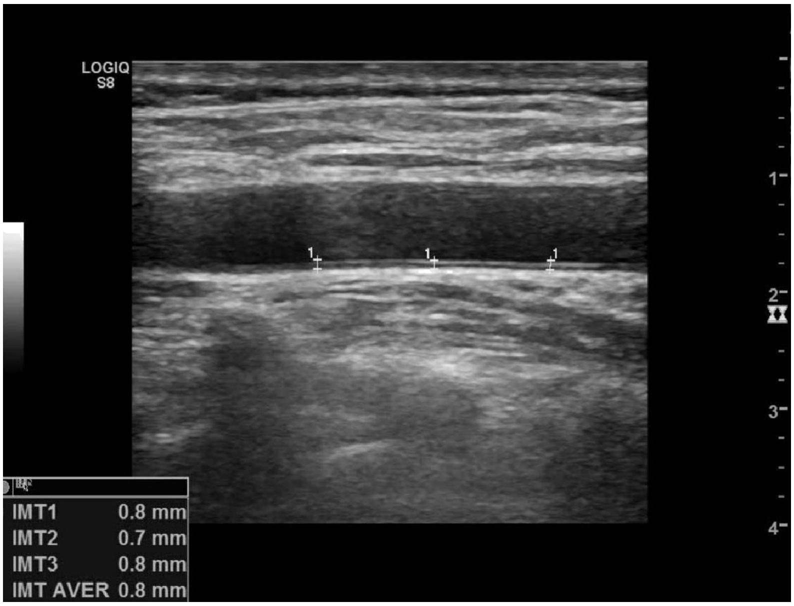

Figure 5. The representative figure of the intima-media thickness by ultrasonography.

IV. DISCUSSION

In addition to various physiologic factors affecting choroidal thickness, various chorioretinal diseases also affect choroidal thickness. For example, polypoidal choroidal vasculopathy (PCV) and central serous chorioretinopathy (CSR) tend to show thicker choroid, especially in the presence of choroidal hyperpermeability on ICG angiography.[31-35] In unilateral cases, affected eyes shows significantly thickenr choroidal thickness than unaffected eyes in paired-eye comparison.[31-35] Whereas PCV and CSR show thickened choroid, drusen load has been suggested to have negative correlation with choroidal thickness.[36] Retinal angiomatous proliferation also has thinner choroid.[37] From these studies, we could assume that presence of chorioretinal diseases can lead to interocular discrepancy in subfoveal choroidal thickness.

However, we sometimes encounter some individuals who show discrepancy in subfoveal choroidal thickness although they do not have any underlying systemic and ocular diseases. Interocular comparison of choroidal thickness has not been much investigated. In healthy individuals, a few studies investigated interocular difference in subfoveal choroidal thickness in both adults and children.[12,25-27] One study showed the similar choroidal thickness between eyes by paired-eye comparison, and most of study population showed isometropia.[25]

Although it lacks detailed information on refractive errors and axial lengths, another study also showed similar subfoveal choroidal thickness between the eyes.[12]

Investigation on the children also showed similar choroidal thickness by paired-eye comparison.[26] In accordance with these studies, the study with myopic anisometropic eyes showed significantly thinner choroidal thickness in more myopic eyes, which was correlated with difference of axial length.[27]

In this study, we investigated if there was discrepancy in the subfoveal choroidal thickness by paired-eye comparison, and if present, the percentage of discrepancy in healthy adult population. Among 100 subjects, 73 participants (73.0%) showed a discrepancy in the subfoveal choroidal thickness when compared measured subfoveal choroidal thickness with estimated subfoveal choroidal thickness. Although the difference of axial lengths was not significant between the discrepancy group and non-discrepancy group, the difference of the subfoveal choroidal thickness was significant between the two groups: 51.7±48.5 μm in the discrepancy group and 13.5±13.7 μm in the non-discrepancy group. Furthermore, there was no significant difference in age, gender, axial length, and refractive error between the two groups. Although stepwise multiple regression analysis showed significant correlation between the difference of axial length and difference of subfoveal choroidal thickness, the gap between measured and estimated subfoveal choroidal thickness was significantly greater in the discrepancy group than the non-discrepancy group. From these results, we could assume that the eyes in this study also shows similar tendency between difference of axial length and difference of subfoveal choroidal thickness between the eyes.[25-27] However, this cannot explain significant discrepancy in subfoveal choroidal thickness in the discrepancy group which was significantly greater than estimated difference. In addition, binary logistic regression analysis showed no significant correlation of baseline factors and presence of discrepancy.

The discrepancies in subfoveal choroidal thicknesses in this study may be one of physiologic features of the choroid. It also could have reflected bilateral discrepancy in choroidal circulation and choroidal capillary networks in the same individual. Because choroidal circulation is driven from long and short ciliary arteries with some contribution from the anterior ciliary arteries, this discrepancy of subfoveal choroidal thickness may reflect difference in these supplying vasculature.[38] Because the main supply of ocular circulation is derived from carotid artery, it may also reflect discrepancy in blood flow of carotid artery. Ocular ischemic syndrome is the representative disease which is associated with severe stenosis or occlusion of carotid artery, leading to chronic ischemia of choroid and overlying retina.[39] For example, the eyes affected by ocular ischemic syndrome showed significantly thinner choroidal thickness than unaffected contralateral eyes.[40] As the eyes with PCV or CSR have more thickened choroid than unaffected contralateral eyes, the eyes with discrepancy of subfoveal choroidal thickness may have tendency for asymmetric development of chorioretinal diseases.[31-35] However, we could not conclude the exact mechanism and clinical significance of this discrepancy in subfoveal choroidal thickness. Further study would be needed to answer these questions.

This study has several limitations. It did not include angiographic evaluations such as ICG angiography, which may reveal angiographic characteristics between the eyes. Based on the study results, we recommend further studies including angiographic evaluations, which may reveal the exact causes of individual discrepancies in choroidal thicknesses. In addition, longitudinal studies may be helpful in determining the significance of these discrepancies in subfoveal choroidal thicknesses relative to further development of retinal diseases such as

AMD.

Despite this study has some weakness and limitations, we identified that some individuals have discrepancy in subfoveal choroidal thickness by paired-eye comparison. Because previous studies showed interocular symmetry of subfoveal choroidal thickness, we believe our findings are meaningful. Although we could not identify the exact mechanisms for the discrepancies in subfoveal choroidal thickness, we believe that our study can lead to further investigations of the possible role of individual choroidal discrepancies in various diseases. Individual discrepancies of subfoveal choroidal thickness may be just a variance of normal phenomenon. In contrast, in some patients, it may be an underlying causative factor for some diseases. We believe further investigations with long-term follow-up may answer these important questions.

In conclusion, we found a discrepancy of subfoveal choroidal thicknesses using the paired-eye comparison in the healthy adult population. The difference of subfoveal choroidal thickness was larger than the estimated difference, and was not significantly correlated with baseline factors, including age, gender, and axial length differences.

V. CONCLUSION

1. There is discrepancy in the subfoveal choroidal thickness in healthy adults with isometropia.

2. Ocular factors including age, sex, and mean difference of axial length, which are related with choroidal thickness, are not significantly correlated with the discrepancy in the subfoveal choroidal thickness.

3. Discrepancy in the subfoveal choroidal thickness may be one of physiologic features of the choroid.

4. Discrepancy in the subfoveal choroidal thickness may be an underlying causative factor for retinochoroidal diseases.

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ABSTRACT(IN KOREAN)

동등시를 가진 정상 성인에서 양안 비교시 관찰되는
황반하 맥락막 두께의 차이에 대한 고찰

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목적: 동등시를 가진 정상 성인군에서 양안 비교시 황반하 맥락막 두께의 차이에 대해서 연구해 보고자 한다.

방법: 본 연구는 전향적, 단면 연구로 진행되었으며 100 명의 정상 성인 200 안을 대상으로 진행하였다. 맥락막의 두께는 enhanced depth imaging modality 를 사용한 spectral domain optical coherence tomography 를 이용해서 촬영하여 측정하였으며, 동일인에서 양안 황반하 맥락막 두께의 차이를 비교하였다. 또한 성별, 안축장, 연령 등의 인자들과 향안 황반하 맥락막 두께 차이의 여부와의 관련성을 회귀분석을 이용하여 알아보고자 하였다.

예측되는 양안 황반하 두께 차이는 다음과 같이 계산하였다.

[예측되는 양안 황반하 두께 차이 = 본 연구에서 계산된 안축장과 황반하 맥락막 두께 사이의 상수 (㎛/mm) x 양안 안축장의 차이 (mm)]

양안 황반하 두께 차이가 존재하는 경우는 예측되는 양안 황반하 두께

차이와 실제 측정된 양안 황반하 두께 차이가 10㎛ 초과인 경우로

정의하였으며, 그렇지 않은 경우에는 양안 황반하 두께 차이가 존재하지 않는 것으로 정의하였다.

결과: 본 연구에서 황반하 맥락막의 두께와 유의하게 연관되는 기본 인자는 안축장이었다 ((B = -32.2, P < 0.001). 100 명의 대상자 중에서 73 명 (73.0%) 가 황반하 맥락막 두께의 차이가 있었으며, 양안 황반하 맥락막 두께의 평균 차이는 51.7±48.5 μm 였다. 이 73 명 중 20 명 (20.0%) 은

양안 황반하 맥락막 두께의 차이가 50 ㎛ 이상이었다. 나이, 성별, 안축장 등 기본 인자들은 양안 황반하 맥락막 두께 차이의 여부와 유의한 상관관계를 보이지 않았다.

결론: 지금까지는 양안 동등시에서 양안 황반하 맥락막 두께는 유의한 차이가 없는 것으로 알려져 있었으나, 본 연구를 통해서는 양안 동등시이며 안축장에 유의한 차이가 없는 정상인에서도 유의한 황반하 맥락막 두께 차이가 나타날 수 있음을 알 수 있었다. 이러한 황반하 맥락막 두께의 차이는 정상 범주의 한 변이일 수도 있으나, 한편으로는 맥락망막병변의 선행 인자일 수도 있다. 본 연구를 토대로 향후 황반하 맥락막 두께의 차이가 가지는 임상적인 의미에 대해서 추가적인 연구를 시행할 수 있을 것으로 사료된다.

핵심되는 말 : 맥락막, 황반하 맥락막 두께

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