Yang et al., J Tradit Med Clin Natur 2018, 7:1
DOI: 10.4172/2573-4555.1000261

Journal of
Traditional Medicine & Clinical Naturopathy

Research Article Open Access

Characterization of Retinal Fundus Opalescent Sheen in the Retinal Nerve Fiber Layer in Relation to Other Visual Assessment Parameters in A 16-Year-Old Teenage Group in Taiwan

Li-Chien Yang[1,2], David Pei-Cheng Lin[3], Han-Hsin Chang[4] and Kwong-Chung Tung[1*]

[1]*Department of Veterinary Medicine, National Chung Hsing University, Taichung, Taiwan*
[2]*Department of Optometry, Hsin Sheng Junior College of Medical Care and Management, Longtan, Taiwan*
[3]*Department of Medical Laboratory and Biotechnology, Chung Shan Medical University, Taiwan*
[4]*Department of Nutrition, Chung Shan Medical University, Taichung, Taiwan*

Abstract

Retinal health plays a pivotal role in vision performance, and fundus retinal imaging is used as a routine procedure for clinical assessment of the retinal health. Presence of prominent opalescent sheen in the retinal nerve fiber layer before adolescence has been regarded as normal, and the retinal nerve fiber layer gradually loses its opalescence as the individual progresses to adulthood. The effects of gradual loss of opalescence on visual performance and clinically-assessed parameters and its relation to eye use habits are largely unknown. This study recruited a total of 32 volunteers aged more than 16 years and assessed their visual acuity, intraocular pressure, spherical and cylindrical refractions, dominant eye, color vision, stereovision, and light flash recovery period, along with fundus photography. A questionnaire was used to assess their habits of eye use. The presence of prominent opalescent sheen was correlated with the assessed parameters. The results revealed that the total area of opalescent sheen in the retinal nerve fiber layer is positively correlated with visual acuity (correlation coefficient at 0.153; p value=0.279), intraocular ocular pressure (correlation coefficient at 0.263; p value=0.059, stereopsis (correlation coefficient at 0.069; p value=0.635). More specifically, when the area of opalescent sheen was sub-divided into center, upper, lower, nasal, and temporal sections, with the macula center as the center of the circle, the area of opalescent sheen in the nasal section was significantly correlated with intraocular ocular pressure (correlation coefficient at 0.312; p value=0.024). The results of this study will provide baseline information for further analysis.

Keywords: Retinal nerve fiber layer; Opalescent sheen; Visual performance; Visual assessment parameters; Eye use habits.

Introduction

Retina plays a pivotal role in visual reception, and the health of retinal fiber layer is one of the major concerns. Clinically, optical coherence tomography (OCT) is used for assessment of retinal nerve fiber layer (RNFL) health. Unhealthy RNFL is an indication of retinal injuries, which will progress to visual nerve degeneration [1]. In normal eyes, the retinal nerve fiber layer (RNFL) is usually best visible in the inferior temporal part of the fundus, followed by the superior temporal region, the nasal superior region and the nasal inferior region. This distribution correlates with the configuration of the neuroretinal rim, the diameter of the retinal arterioles, the location of the foveola, and the lamina cribrosa morphology [2]. Additionally, Jonas and Dichtl summarized advances in the assessment of optic disc changes in early glaucoma [3]. Jonas et al. also analyzed the ranking of optic disc variables for detection of glaucomatous optic nerve damage [4]. Retinal injuries will in turn lead to functional degenerations in contrast sensitivity, dark adaptation, and color vision perception [5]. Moreover, assessments of RNFL thickness have been reported to be indicative of the severity of obstructive sleep apnea/hypopnea syndrome (OSAHSs) [6] and of glaucoma status [7,8].

Presence of prominent opalescent sheen in the retinal nerve fiber layer before adolescence has been regarded as normal, and the retinal nerve fiber layer gradually loses its opalescence as the individual progresses to adulthood. The effects of gradual loss of opalescence on visual performance and clinically-assessed parameters and its relation to eye use habits are largely unknown. This study investigated the correlation of prominent opalescent sheen with clinically-assessed parameters and eye use habits.

Results and Discussion

First, we analyzed the correlation between the presence of prominent opalescent sheen in the retinal nerve fiber layer with spherical equivalent (SE), visual acuity (VA), intraocular pressure (IOP), and stereovision (Stereo). The results are shown in Table 1. The reported correlation coefficient was -0.091 (p value=0.522), 0.153 (p value=0.279), 0.263 (p value=0.059), and 0.069 (p value=0.635) for SE, VA, IOP, and Stereo respectively. Interestingly, IOP appeared to be more significantly correlated with the presence of retinal fundus opalescent sheen. We further subdivided the macula into 4 areas (upper, lower, nasal, and temporal) with their center on the fovea and correlated areas with IOP (Table 2). The results revealed that the correlation coefficient was 0.115 (p value=0.418), 0.210 (p value=0.135), 0.312 (p value=0.024), and 0.033 (p value=0.816) for upper, lower, nasal, and temporal area

	AVERAGE±STDEV	Correlation	P-value
SE	-2.91 ± 3.12	-0.091	0.522
VA	1.0 ± 0.16	0.153	0.279
10P	18.42 ± 3.30	0.263	0.059*
Stereo	93.60 ± 148.27	0.069	0.635
SE = Spherical equivalents, VA = Visual acuity, 10P = intraocular pressure			

Table 1: The correlation between the presence of prominent opalescent sheen in the retinal nerve fiber layer with spherical equivalent (SE), visual acuity (VA), intraocular pressure (IOP), and stereovision (Stereo).

***Corresponding author:** Kwong-Chung Tung, Department of Veterinary Medicine, National Chung Hsing University, Taichung, Taiwan, E-mail: kctung1@dragon.nchu.edu.tw

Received January 04, 2018; **Accepted** January 30, 2018; **Published** February 05, 2018

Citation: Yang LC, Lin DPC, Chang HH, Tung KC (2018) Characterization of Retinal Fundus Opalescent Sheen in the Retinal Nerve Fiber Layer in Relation to Other Visual Assessment Parameters in A 16-Year-Old Teenage Group in Taiwan. J Tradit Med Clin Natur 7: 261. doi: 10.4172/2573-4555.1000261

	AVERAGE±STDEV	Correlation	P-value
Upper	16.56± 13.21	0.115	0.418
Lower	11.46± 9.83	0.21	0.135
Nasal	15.47± 13.44	0.312	0.024*
Ear	4.03± 7.07	0.033	0.816

Table 2: 4 areas.

	AVERAGE±STDEV	Correlation	P-value
SE	-2.91 ± 3.12	-0.341	0.013*
VA	1.0 ± 0.16	0.133	0.348
10P	18.42 ± 3.30	0.312	0.024*
Stereo	93.60 ± 148.27	0.001	0.992
SE = Spherical equivalents, VA = Visual acuity, 10P = intraocular pressure			

Table 3: Summarizes the correlation coefficient was -0.341(p value=0.013), 0.133 (p value=0.348), 0.312 (p value=0.024), and 0.001 (p value=0.992) for SE, VA, IOP, and Stereo respectively.

respectively. Noticeably, the presence of retinal fundus opalescent sheen in the nasal area of macula was found to exhibit significant positive correlation with IOP. Since the nasal area exhibited significant positive correlation with the IOP, we then checked this area again for SE, VA, and Stereo, in addition to IOP (Table 3).

Table 3 summarizes the correlation coefficient was -0.341 (p value=0.013), 0.133 (p value=0.348), 0.312 (p value=0.024), and 0.001 (p value=0.992) for SE, VA, IOP, and Stereo respectively. Interestingly, the p value for both SE and IOP were less than 0.05, indicating that the presence of retinal fundus opalescent sheen in the nasal area of macula may be indicative of SE and IOP.

Conclusion

The present research work is the first reported study to investigate the correlation of retinal fundus opalescent sheen with clinically-assessed parameters. The initial data revealed that IOP was likely to be more correlated with the assessed parameters. We then focused on the distribution of retinal fundus opalescent sheen in the upper, lower, nasal, and temporal areas of the macula and tried to find the significance in correlation with IOP. We found that the presence of retinal fundus opalescent sheen in the nasal area of the macula exhibited significant positive correlation with IOP. The correlation coefficient shifted from 0.263 to 0.312 and p value from 0.059 to 0.024. Additionally, the other 3 macula areas (upper, lower, and temporal) did not show any correlation with IOP in the presence of fundus opalescent sheen. Surprisingly, further analyses revealed that apart from IOP, SE was also positively correlated with the presence of fundus opalescent sheen in the nasal macula area (correlation coefficient at 0.341; p value=0.013). However, VA and stereovision failed to show any correlation with the presence of fundus opalescent sheen in the nasal macular area.

In summary, these data are unavoidably descriptive, and further studies for the clinical significance of the present findings are warranted.

References

1. Bearse MA Jr, Adams AJ, Han Y, Schneck ME, Ng J, et al. (2006) A multifocal electroretinogram model predicting the development of diabetic retinopathy. Prog Retin Eye Res 25: 425-48.
2. Jonas JB, Dichtl A (1996) Evaluation of the retinal nerve fiber layer. Surv Ophthalmol 40: 369-378.
3. Jonas JB, Dichtl A (1995) Advances in the assessment of optic disc changes in early glaucoma. Curr Opin Ophthalmol 6: 61-66.
4. Jonas JB, Bergua A, Schmitz-Valckenberg P, Papastathopoulos KI, Budde WM (2000) Ranking of optic disc variables for detection of glaucomatous optic nerve damage. Invest Ophthalmol Vis Sci 41: 1764-1773.
5. Jackson GR, Scott IU, Quillen DA, Walter LE, Gardner TW (2012) Inner retinal visual dysfunction is a sensitive marker of non-proliferative diabetic retinopathy. Br J Ophthalmol 96: 699-703.
6. Yu JG, Mei ZM, Ye T, Feng YF, Zhao F (2016) Changes in Retinal Nerve Fiber Layer Thickness in Obstructive Sleep Apnea/Hypopnea Syndrome: A Meta-Analysis. Ophthalmic Res 56: 57-67.
7. Lee WJ, Na KI, Kim YK, Jeoung JW, Park KH (2017) Diagnostic Ability of Wide-field Retinal Nerve Fiber Layer Maps Using Swept-Source Optical Coherence Tomography for Detection of Preperimetric and Early Perimetric Glaucoma. J Glaucoma 26: 577-585.
8. Jonas JB, Budde WM, Panda-Jonas S (1999) Ophthalmoscopic evaluation of the optic nerve head. Surv Ophthalmol 43: 293-320.