

Cirrus HD OCT in Pediatric Population Measures Retinal Nerve Fiber Layer Thickness and Optic Disc Parameters in Anisometropic Amblyopia Future

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Received Date: November 27 2021

Accepted Date: November 29 2021

Published Date: December 25 2021

Abstract

Background: Cirrus HD Oct. to examine the peripapillary retinal nerve fibre layer (RNFL) thickness associated with blind spot parameters in visual disorder and fellow eyes in medical specialty patients with an isometropic vision defect.

Method: This was a prospective, cross-sectional study that included cardinal subjects with newly diagnosed eye conditions and vision defects. All children had an ophthalmic examination, which included acuity and optical coherence imaging (Cirrus Oct Zeiss, 'Optic Disc Cube 200200' protocol). Each visual disorder and traditional fellow eyes were in deep trouble when measuring the Retinal nerve fibre layer and second cranial nerve head parameters (ONH).

Results: The mean best corrected acuity (log MAR scale) of the conventional and visual disorder eyes was statistically significant. Among the four quadrant and twelve o'clock hour sector analyses, nasal and temporal sectors had significant differences between visual impairment and traditional eyes ($P=0.027$, $P=0.045$, respectively). The common cup-to-disc space quantitative relation and cup volume were lower in the visual impairment eyes than in the fellow eyes among the ONH parameters. None of the opposite ONH parameters were significantly different between the examined eyes.

Conclusion: There was no difference in average RNFL thickness between visual impairment and traditional fellow eye. Several morphological measurements between the visual impairment and fellow eyes in patients with unilateral visual impairment were significantly different.

Keywords

visual impairment eye condition; thickness of the peripapillary retinal fibre layer; optic nerve; head parameters; Cirrus HD Month of the Gregorian calendar

Introduction

Amblyopia is defined as a decrease of sensory system that no causes is detected by the physical examination of the eye, caused by vision deprivation or abnormal binocular interaction [1]. handicap is that the one of the foremost common clarification for visual loss in children moving zero.2% to 1.1% of school going children. The causes of handicap in decreasing order of prevalence area unit strabismic, eye condition, mixed, ametropic, meridional and sensory deprivation handicap [1,2]. A distinction in refractive error between the two eyes (anisometropia) might be a typical clarification for handicap, being gift as a result of the only identifiable amblyogenic suppose thirty seventh of cases and gift concomitantly with abnormality in a very any pure gold of clinical populations [2]. The literature and experimental studies had delineate the pathophysiology structural changes in handicap at fully totally different levels of the visual information science pathway. The anatomical changes square measure delineate at the plant part, lateral body structure and retinal levels [3].

There tinal fiber layer thickness (RNFL) thickness studies with optical coherence picturing (OCT) are wiped out varied ethnic population in paediatric and adult cohort with visual impairment [3-10]. varied studies have delineate changes altogether youngsters regardless of whether or not they were recently diagnosed, persistent or immune to occlusion and refractory medical aid. Changes in peripapillary and region are shown to be inconsistently associated with the visual impairment standing of the attention [11-17]. Studies victimization Gregorian calendar month imaging of the membrane have variable results, some studies have found associate accrued peripapillary RNFL or/and macular thickness in visual impairment eyes, whereas others have found no important variations between visual impairment and healthy eyes [17-24].

There has been scarceness of literature describing the changes in second cranial nerve parameters (ONH) and twelve sector RNFL changes in eye condition amblyopia. Hence, this study was done to judge the changes in thickness of RNFL and optic disk parameters in paediatric patients with recently diagnosed eye condition visual impairment.

Materials and ways

This study was conducted at the Department of medical specialty medicine at Aravind Eye Hospital. This study adhered to the Declaration of Helsingfors and was approved by the institutional review board. consent was taken from folks or guardians. Unilateral visual defect was outlined as a best corrected sight (BCVA) of a minimum of a two-line distinction between the amblyopic and fellow eye. All the patients aged five to seventeen yrs with new diagnosed eye condition visual defect (defined as one D or larger in spherical equivalent, or a 1.5 D or larger distinction in astigmatism between each the eyes within the absence of any measurable heterotropia at distance or near) with traditional showing disc, cup and neuroretinal rim on examination of the second cranial nerve head with + 90D motor-assisted stereoscopic slit - lamp indirect ophthalmoscopes were registered within the study. Patients with abnormal condition, ocular motility disorders, any pathologies of retinal fiber

layer or disc, case history of eye disease or any intraocular surgery or any reasonably optical device medical aid, mentally challenged youngsters, any general diseases touching eye were excluded from study.

All subjects received a full ophthalmic examination together with cycloplegic refraction, assessment of ocular motility, slit-lamp biomicroscopic analysis, expanded structure examination and axial length by IOL master© (Carl Zeiss Meditec, Dublin, CA) (ver. 5.2.1).

Pupils were expanded with tropicamide I Chronicles and cyclopentolate I Chronicles drops, counting on age of the topic. RNFL was measured through expanded pupils employing a third generation optical coherence tomographer (Cirrus OCT©, model HD-OCT 4000, Carl Zeiss Meditec, Dublin, CA) (ver.3.0.0.64). Peripapillary measurements were measured victimization the quick scan protocol (fast RNFL thickness scan). 3 200×200-cube point scans were done in turn, with a complete acquisition time of 1.5 s. the common of the three scans was analyzed. All scans were performed by identical investigator. an interior fixation target was employed in all scans, and also the location of every scan on the tissue layer was monitored on the intrinsic infrared-sensitive video camera. The mean RNFL thicknesses at 256 cubes of the RNFL thickness were recorded and also the average RNFL thicknesses all told quadrants were analyzed.

RNFL thickness (all four quadrants: superior, nasal, inferior and temporal, average, and clock hours), RNFL symmetry, rim area, disc area, average C/D quantitative relation, vertical C/D quantitative relation and cup volume were recorded. For the clock hour RNFL thicknesses, twelve 30° sectors were outlined in dextrorotatory order for the proper and left eyes; in this respect, clock hour one within the right eye corresponded to clock hour eleven within the left eye, clock hour two within the right eye corresponded to clock hour ten within the left eye, 3–9, 4–8, 5–7 severally, etc.

Statistical Analysis

The BCVA was remodeled to exponent of the minimum angle of resolution (log MAR) units for the applied mathematics analysis. Mean (SD) or frequency (percentage) was wont to describe outline information. Paired t-test / Wilcoxon Signed Rank take a look at was wont to take a look at mean distinction of retinal fiber layer thickness and ocular parameters between visual impairment eye and traditional eye. P-value but 0.05 were thought-about as statistically important. All the applied mathematics analysis was performed victimization STATA eleven.1© (Texas, U.S.A).

Results

The mean age of patients was nine.83 ± 3 (5-17 years). there have been nineteen myopic and sixteen farsighted anisometropes. The clinical characteristics of traditional and visual impairment eyes ar delineated in (Table1). the common RNFL thickness within the traditional eye was ninety six.34 ± 9.3 µm (range seventy six – 122 µm) whereas that of the visual impairment eye was 97.94 ± eleven µm (range 77-125 µm) that wasn't important (P= zero.294).

There was a correlation between spherical equivalent and RNFL thickness in visual impairment eye (Correlation constant zero.5123, P =0.0017). There was a correlational statistics between axial length and

RNFL thickness of the visual impairment eye (Correlation constant - zero.5124, P =0.0016) (Figure a & b).

There was a correlation between spherical equivalent and RNFL thickness (P=0.0017) whereas correlational statistics between Axial length and RNFL thickness in ambyloic eyes. (P =0.0016)

The (Table 4) shows relationship between the mean disc space, mean rim space, and mean vertical CD quantitative relation of the traditional eye and also the visual impairment eye to be statistically insignificant (P>0.05). The mean average cup-to-disc space quantitative relation and cup volume was lesser within the visual impairment eyes than within the fellow eyes (P=0.042, P=0.023 respectively).

Discussion

I Jetal. within their meta-analysis of twenty eight clinical trials involving 408 patients discovered that pRNFL thickness within the visual disorder eyes was thicker than in the fellow eyes (P= zero.016) [24]. In our study, mean RNFLT was four.94 µm thicker within the temporal clock hour of visual disorder eye than the guy eye, that was statistically significant (P-value zero.045). Similarly, the mean RNFLT was four.49 µm thicker in nasal quadrant of the visual disorder than the guy eye, the distinction being statistically significant (P–value zero.027). In contrary to our study, studies done by Repka, et al. [8] Dickman, et al. [7] Firat, et al. [15] Kee SY, et al. [5] Bandhopadhy, et al. [12] Huynh, et al. [6] Quoc EB, et al. [9] and Wang, et al. [19] found no significant distinction all told the four quadrants between the visual disorder and fellow eyes. Demircan, et al. [25] found no significant distinction all told four quadrants and also the twelve sectors once on an individual basis compared between eye condition eye and traditional eye.

In gift study the mean RNFL was four.49 µm thicker in nasal quadrant of the visual disorder than the guy eye, the distinction being statistically vital (P =0.027). In contrary to our study, studies done by Repka, et al. Dickman, et al. Firat, et al. Kee SY, et al. Bandhopadhy, et al. Huynh, et al. Quoc EB, et al. and Wang et al found no vital distinction all told the four quadrants between the visual disorder and fellow eyes [5-9,12,14-18]. Ersan, et al. according within the hypermetropic eye condition cluster, temporal

RNFL thickness was diluent in visual disorder eyes (66.32 ± 16.84 µm) compared to their fellow eyes (71.23 ± 15.00 µm) (P=.03), whereas within the myopic eye condition cluster, superior RNFL thickness was considerably diluent within the visual disorder eyes (112.12 ± 18.54 µm) than their fellow eyes (123.12 ± 20.85 µm) (P=.05) [13]. Demircan, et al. found no vital distinction all told four quadrants and also the every six sectors focused on the optic disk (temporal, temporal superior, temporal inferior, nasal, nasal inferior, nasal superior) by Spectralis October between eye condition visual disorder and traditional fellow eye [25].

We didn't notice any studies describing twelve clock hour sector analyses between traditional and eye condition visual disorder eyes. Few studies have taken in account of axial length in visual disorder eyes [3,6,25]. we tend to found a direct correlation between the spherical equivalent and peripapillary RNFL thickness in visual disorder eye, kind of like study by Ersan, et al. WHO found that RNFL measurements showed a major direct correlation with spherical equivalent within the

eye condition cluster (both myopic and hypermetropic) [13]. While Yen, et al. showed that there was no vital correlation between RNFL thickness and spherical equivalence ($P = \text{zero.956}$) among all visual disorder eyes [3]. Repka, et al. conjointly had similar conclusion of no association between RNFL thickness and presbyopic refractive error within the visual disorder eye ($P=0.81$) or sound eye ($P = \text{zero.28}$) [8].

We had correlation between the axial length and RNFL of the vision defect eyes. In contrary to our study, Yen et al. showed that there was no very important correlation between RNFL and axial length ($P = \text{zero.655}$) among all vision defect eyes [3]. Araki S, et al. showed that the variations among the peripapillary RNFL thickness were significantly correlate with the excellence in axial length (P

However our study has few limitations. If a bigger study population had been taken, it might be a lot of useful to assess the changes mentioned higher than. The results will then be reckon to the overall population. we have a tendency to additionally didn't have a bearing cluster of subjects. The variables of the conventional fellow eye will then be compared with the attention of the management subjects. the info obtained from our study applies solely to Cirrus HD-OCT. It can't be compared to it obtained by alternative spectral domain October machine. we have a tendency to didn't embody a correction think about respect to age, axial length, refraction and magnification in RNFL, before subjecting it to additional applied math analysis.

Conclusion

We found no distinction between RNFL thickness in visual defect and traditional fellow eye but nasal quadrant, temporal clock hour sector, average CD quantitative relation, cup volume showed vital variations. therefore a number of the morphological measurements between the visual defect and fellow eyes in patients with unilateral vision defect were considerably completely different. additional studies, together with histopathological and individual retinal layer analysis with a bigger range of patients, ar needed to establish the variations between visual defect and traditional eyes.

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