International Journal of Ophthalmology Research 2025; 7(1): 90-98

ISSN Print: 2618-1495
ISSN Online: 2618-1509
IJOR 2025; 7(1): 90-98
www.ophthalmologyjournal.in
Received: 04-08-2025
Accepted: 07-09-2025

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The role of optical coherence tomography in evaluation of optic nerve head changes in patients with idiopathic intracranial hypertension

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DOI: https://www.doi.org/10.33545/26181495.2025.v7.i1b.37

Abstract
Background: Idiopathic Intracranial Hypertension (IIH) is characterized by elevated cerebrospinal fluid (CSF) pressure in the absence of an identifiable intracranial lesion. Increased CSF pressure in the intracranial subarachnoid space (SAS) transmits pressure to the orbital SAS, potentially compressing optic nerve axons and their vascular supply, leading to axoplasmic flow stasis. Optical coherence tomography (OCT) is a non-invasive technique offering structural assessment of the optic nerve head (ONH), retinal nerve fiber layer (RNFL), and macula. OCT provides high-resolution evaluation of optic disc swelling. The aim of this project was to evaluate changes in optic nerve head and peripapillary area using OCT in patients with IIH before and after treatment.

Methods: This is a prospective, longitudinal, case control study included Forty patients newly diagnosed with IIH and twenty age and sex-matched healthy persons were recruited from the Ophthalmology and Neurology departments of Tanta University Hospitals from March 2022 till February 2024. Only left eye was used for analysis for both patients and controls. Diagnosis followed modified Dandy criteria. Exclusion criteria included significant refractive errors, optic disc anomalies, or coexisting optic neuropathies or retinal vasculopathy. Participants underwent baseline neurological and neuro-ophthalmic evaluations and OCT of optic nerve head and macula. Patients were managed in the neurology department medically or surgically based on clinical indications and according to management they were divided into two subgroups; non-surgical subgroup (n=20) and surgical subgroup (n=20), and all were re-evaluated after three months.

Results: IIH patients had significantly higher BMI (mean 34.77 ± 2.89 $p<0.001$) compared to control group (mean 30.84 ± 3.73) and higher CSF opening pressure (mean 37.79 ± 7.32 cm water) compared to normal. Visual function (BCVA, VF MD), optic disc edema (Frisén grade) were significantly worse in IIH patients ($p < 0.05$). OCT analysis revealed significant alteration in Bruch's membrane (BM) configuration, larger disc and rim areas, and thicker RNFL ($p < 0.05$) in IIH group. No significant differences were observed in GCC or PCT between IIH and control groups. However, surgical IIH patients had thinner GCC compared to non-surgical ones ($p = 0.001$). At three-month follow-up, the surgical group showed greater symptom resolution and more reduction in disc edema and RNFL thickness ($p < 0.05$). BM configuration improved significantly only in the surgical group. GCC correlated negatively with BCVA LogMAR and positively with VF MD. No significant changes in PCT were observed over time in either group.

Conclusion: OCT proves to be a valuable tool for structural assessment in IIH, detecting changes in BM configuration and RNFL thickness that reflect intracranial pressure dynamics. While GCC thickness did not differ significantly between groups, its correlation with visual acuity and field performance suggests potential as a biomarker of visual function. OCT may aid not only in diagnosing and monitoring papilledema but also in evaluating retinal ganglion cell integrity and predicting visual outcomes in IIH.

Keywords: Astigmatism, Cyclopegic, Hyperopia, Myopia, Refractive Error, Visual Impairment

Introduction
Idiopathic intracranial hypertension (IIH) is a disorder of unknown etiology that leads to an increase in intracranial pressure. It affects 1:100,000 individuals annually with a 20-fold higher incidence in young, obese females [1-2]. IIH causes varieties of symptoms like headache, pulsatile tinnitus, and visual impairment which can manifest as double vision due

to sixth nerve palsy with or without optic nerve dysfunction. Optic nerve dysfunction may be seen as transient visual obscuration or progressive visual field loss [3-5].

The increase of cerebrospinal fluid (CSF) pressure in subarachnoid space leads to an increase of optic nerve sheath pressure that results in stasis of axonoplasmic flow and elevation of optic nerve head (ONH) with compression on ganglion cell axons and their blood supply. Elevation of ONH due to intracranial hypertension is known as papilledema which is the most reliable clinical sign that confirms the diagnosis in suspected IIH patients [6, 7].

Optical coherence tomography (OCT) is an easy, rapid and non-invasive method which can get *in vivo* images of macula and ONH in high resolution [8].

Patients and Methods

This longitudinal, prospective, observational case-controlled study included forty patients newly diagnosed with IIH and twenty age and sex-matched healthy persons were recruited from the Ophthalmology and Neurology departments of Tanta University Hospitals from March 2022 till February 2024. Only left eye was used for analysis for both patients and controls. The study complied with the Declaration of Helsinki and received approval from the Tanta University Ethics Committee. Written informed consent was obtained from all participants following comprehensive explanation of the study's purpose and potential risks.

Patients newly diagnosed with IIH according to the modified Dandy criteria were enrolled. Diagnostic criteria include symptoms of increased ICP, normal level of consciousness, absence of focal neurological signs, normal neuroimaging studies aside from high ICP indicators, elevated CSF opening pressure (>25cm H2O), with normal CSF analysis.

Participants were excluded if they had: media opacity impeding imaging; refractive error exceeding ±6 diopters spherical equivalent; anomalous optic discs (e.g., tilted or hypoplastic) or other optic neuropathies (e.g., glaucomatous, ischemic, traumatic, compressive).

A detailed history was taken from IIH patients including non-ocular symptoms (headache, tinnitus), ocular symptoms (transient visual obscurations, diplopia), medical and surgical background, medication use (notably oral contraceptives, vitamin A derivatives, tetracycline antibiotics), lifestyle habits (smoking, alcohol, drug use), recent weight changes, as well as body mass index (BMI). Participants underwent comprehensive neurological examination assessing mental status, motor and sensory function, cranial nerves in addition to uncorrected and best-corrected visual acuity (BCVA), ocular motility, pupil, color vision and fundus examination. All IIH patients received MRI and MRV of the brain. Diagnostic lumbar puncture was performed by a neurologist and upon his judgement with documentation of opening CSF pressure and CSF analysis.

Color fundus images capturing the optic disc and macula were obtained using the Solix full-range OCT system (Optovue Inc., Fremont, CA, USA). Static automated perimetry (SAP) was performed using the Humphrey Field Analyzer (HFA II-I, Carl Zeiss Meditec; SITA fast 30-2 protocol). OCT scans using the Solix full-range OCT system (Optovue Inc., Fremont, CA, USA) to give qualitative assessment in the form of Peripapillary Bruch`s membrane configuration and quantitative evaluation of peripapillary retinal nerve fiber layer thickness(RNFL), macular Ganglion cell layer / Inner plexiform layer complex thickness(GCC) and peripapillary choroidal thickness (PCT). PCT was measured by calculating the distance from the posterior border of the RPE to the anterior choroido scleral interface using the OCT manual measurement tool (Figure 1). PCT was measured consecutively at 4 points, with each point being 90° from the previous point, to investigate the temporal, superior, nasal, and inferior PCTs. The measurements were obtained in each of the 4 quadrants at 1-mm intervals along the line of the RPE from each of the different scan patterns, and the horizontal scan with the best image quality was selected for the final evaluation (figure 1).

IIH patients were assigned to two management subgroups per neurologist’s protocol: Group A (medically treated) included 20 eyes of 20 patients treated with weight reduction, low-sodium diet, medical therapy (acetazolamide and/or topiramate), and repeat lumbar puncture as needed; Group B (surgically treated) included 20 eyes of 20 patients who underwent transverse sinus stenting or CSF diversion procedures (ventriculoperitoneal or lumboperitoneal shunts).

Patients in the 2 subgroups were followed in the Ophthalmology department 3 months post treatment. All patients were then subjected to clinical evaluation, neuro-ophthalmic examination, fundus photography, SAP 30-2 and OCT.

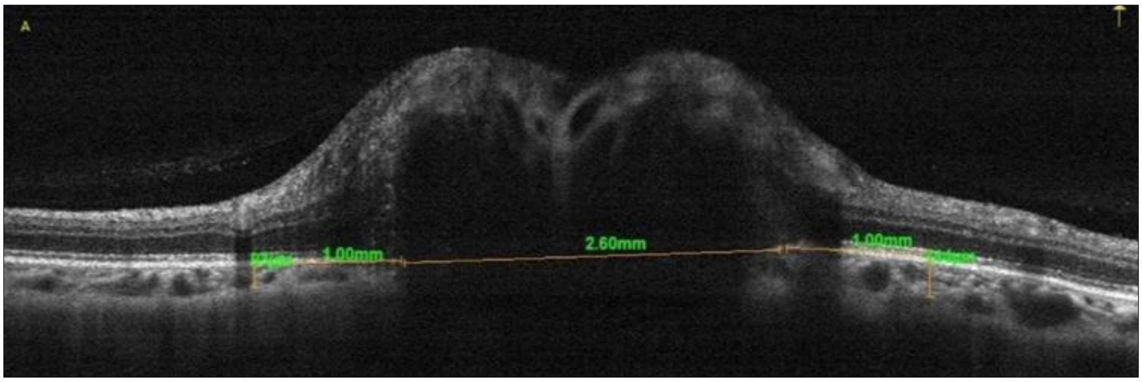


Fig 1: Peripapillary choroidal thickness measurement

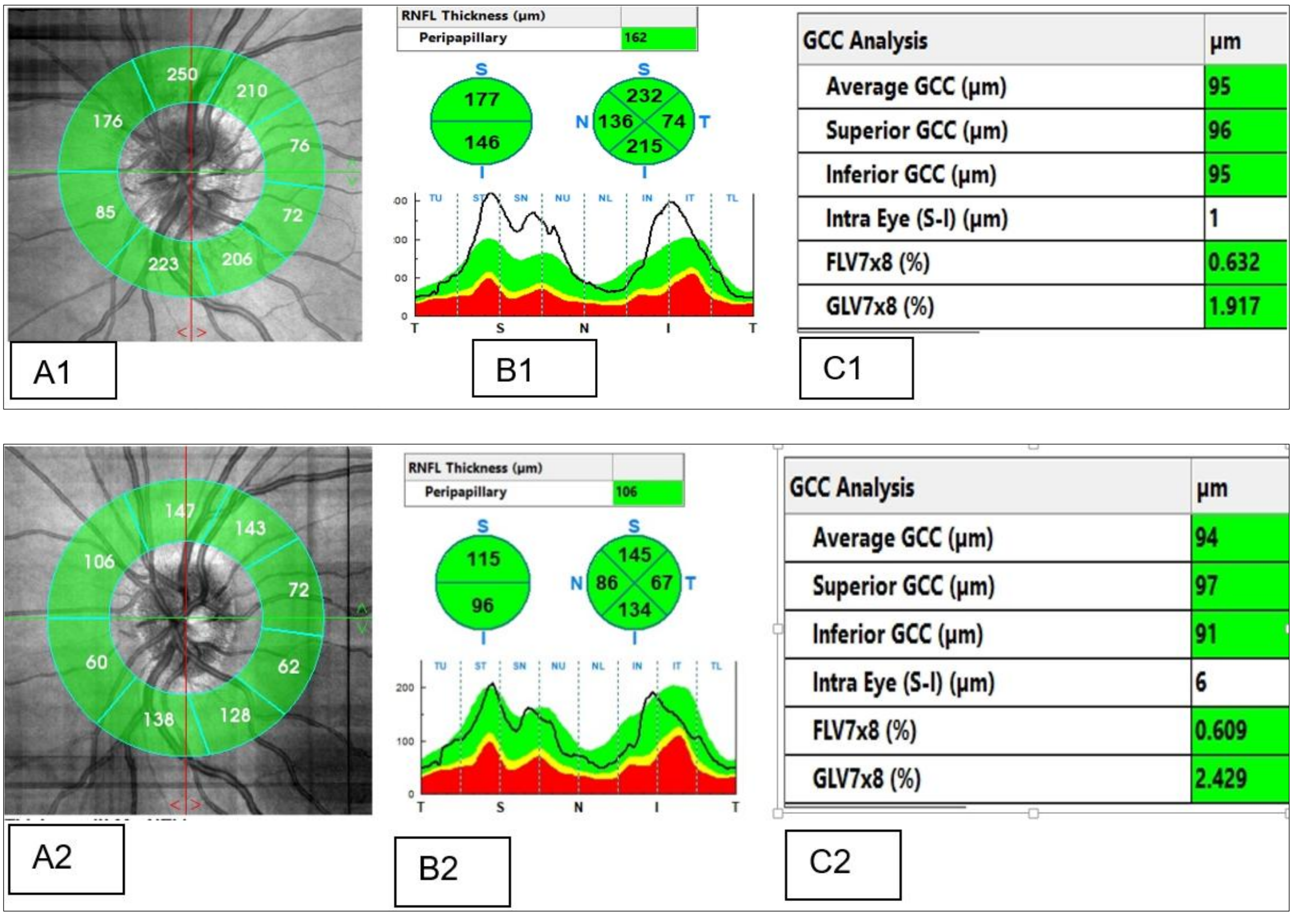
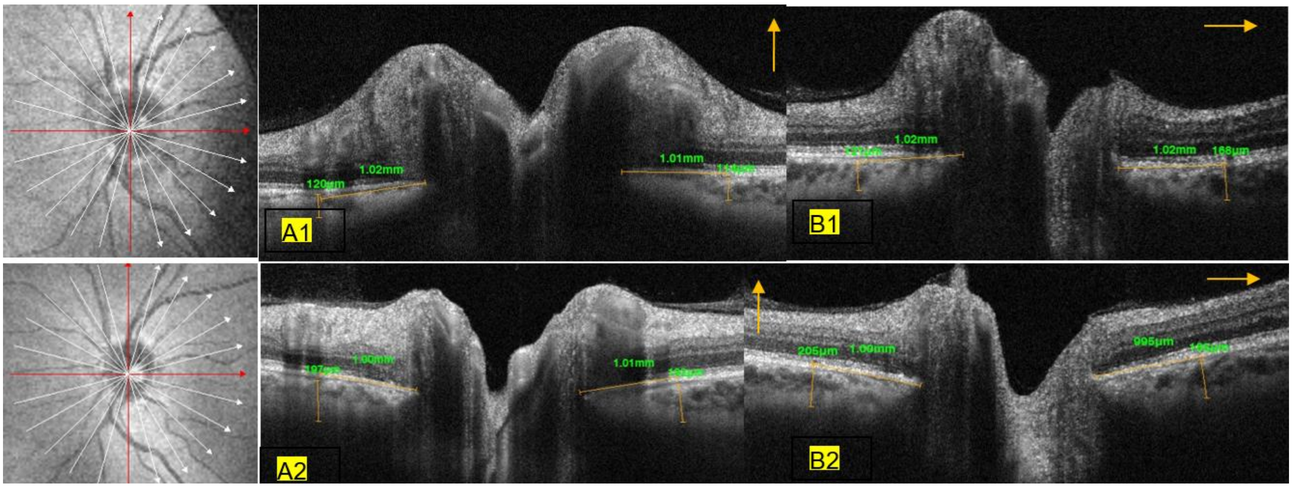


Fig 2: OCT ONH of left disc edema grade II: (A1) SLO disc image at base line with overlying pRNFL thickness (B1) pRNFL thickness at base line (C1) GCC analysis at base line shows within average thickness (A2) SLO disc image at follow up shows reduction in pRNFL thickness (B2) pRNFL thickness at follow up (C2) GCC analysis at follow up shows nearly same thickness



Figu 3: OCT radials scan centered on left disc edema grade II: (A1) Vertical scan at base line shows choroidal thickness at superior(120 u) and inferior (111 u) peripapillary region with nearly flat BM configuration (B1) Horizontal scan at base line shows choroidal thickness at nasal(121 u) and temporal (168 u) peripapillary region with almost inverted V BM configuration (A2) Vertical scan at follow up shows choroidal thickness at superior(197 u) and inferior (192 u) peripapillary region with almost V BM configuration (B2) Horizontal scan at follow up shows choroidal thickness at nasal(205 u) and temporal(196 u) peripapillary region with almost V BM configuration

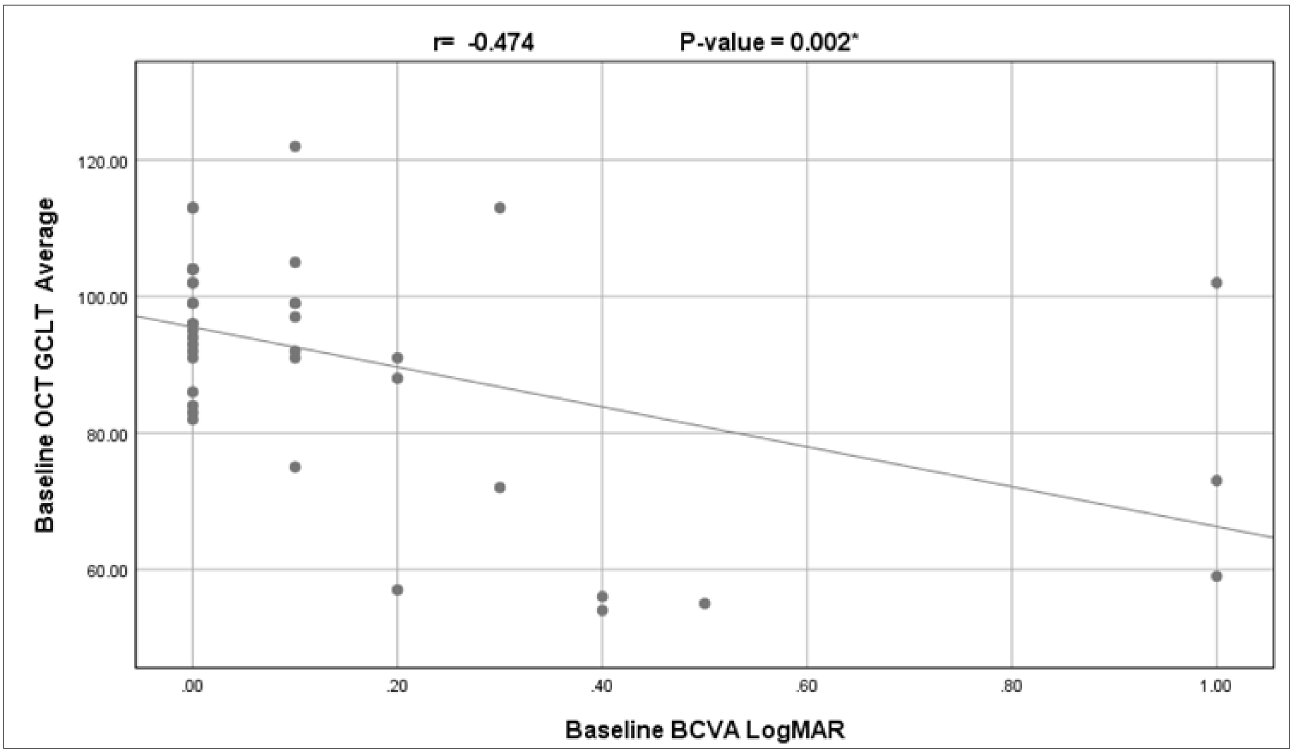


Fig 4: Significant negative correlation between average GCC thickness and BCVA Log Mar

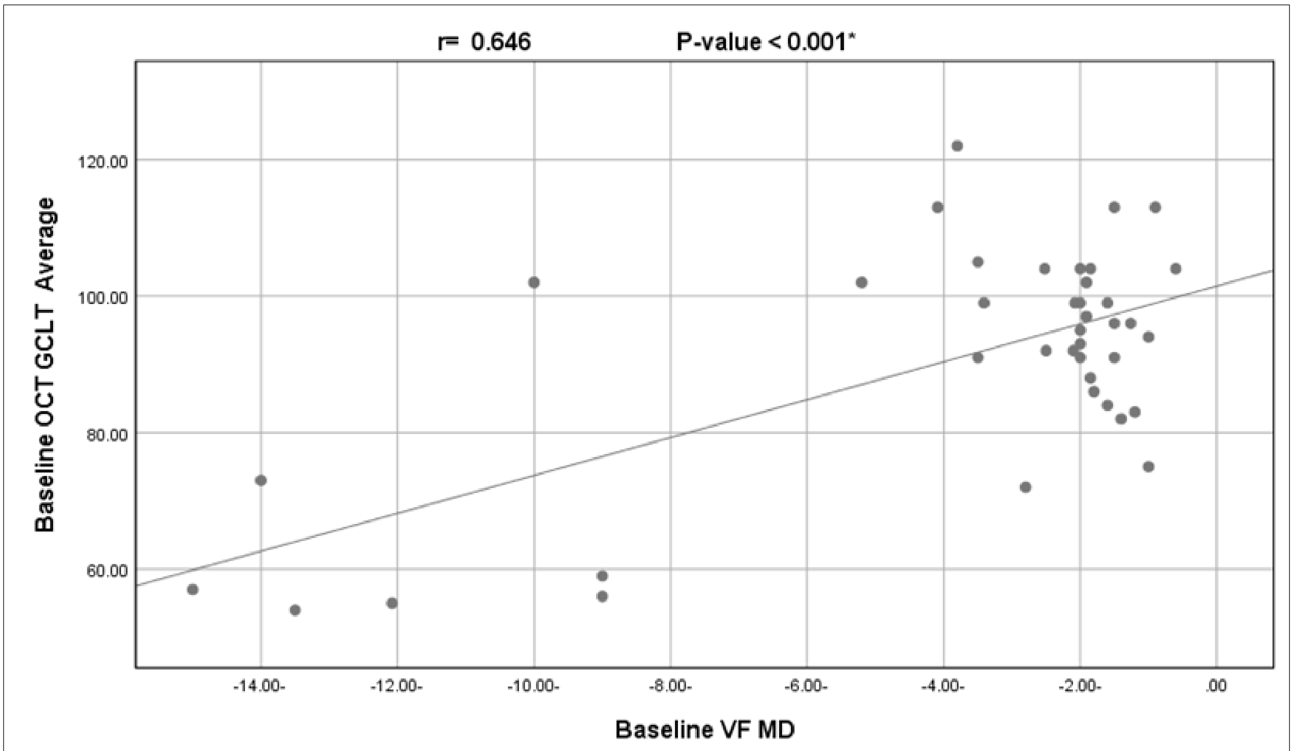


Fig 5: Significant positive correlation between average GCC thickness and VF MD

The primary outcome measures of this study included

1. Comparison of baseline OCT qualitative and quantitative parameters of ONH, GCC between IIH and controls and between medically and surgically treated subgroups of IIH patients.
2. Correlation of OCT ONH parameters (RNFL &GCC) with BMI and visual function (BCVA log MAR, VF MD).
3. Changes in each subgroup's outcomes pre- and post-treatment, and comparison between treatment modalities at three months.

Statistical presentation and analysis of the present study was conducted, using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, USA, 2011). The mean, standard deviation, student t- test, Chi-square, Linear Correlation Coefficient and Analysis of variance were used and P-value was considered significant if ≤ 0.05.

Results

The mean age of the control group was 27.45 ± 5.94 years, and that of the IIH group was 30.15 ± 6.19 years. There were no significant differences in age (p = 0.122) or sex distribution (p = 0.125) between groups. Females represented 90% of the IIH group and 75% of the control group. Four IIH patients were pregnant at the time of evaluation. The mean BMI was significantly higher in the IIH group (34.77 ± 2.89) compared to the control group (30.84 ± 3.73, p < 0.001) (Table 1). Among the IIH subgroups, group B patients had a significantly higher BMI than group A (36.35 ± 2.31 vs. 33.19 ± 2.56; p = 0.003). Among IIH, patients 36 patients (90%) reported headache, 9 patients (22.5%) reported tinnitus, 26 patients (65%) experienced transient visual obscurations (TVOs), and 2 patients (5%) reported diplopia. All patients in the surgical group (20/20, 100%) reported headache, compared to 16 patients (80%) in the non-surgical group, representing a statistically significant difference (p = 0.035).

Neuroimaging of all IIH patients (n = 40, 100%) demonstrated normal brain parenchyma with no evidence of space-occupying lesions. An empty Sella appearance was observed in 22 patients (55%), retrobulbar optic nerve sheath widening in 18 patients (45%), and flattening of the posterior globe in 15 patients (37.5%). Magnetic resonance venography (MRV) revealed transverse sinus stenosis either unilateral or bilateral in 26 patients (65%). No statistically significant differences in neuroimaging findings were observed between the surgical and non-surgical IIH subgroups.

The mean baseline BCVA (Log MAR) was significantly higher in the IIH group (0.16 ± 0.28) compared to control (0.00; p = 0.014), with the difference primarily driven by the group B (p = 0.047 vs. control). Visual field mean deviation (VF MD) was also significantly reduced in IIH patients (-6.81 ± 3.96) compared to controls (-1.74 ± 0.42; *p*< 0.001), with the surgical subgroup showing the greatest impairment (p = 0.04 vs. non-surgical; p < 0.001 vs. control).

Fundus examination of IIH patients showed, 4 patients (10%) who exhibited no disc edema, while 10 patients (25%) had grade I edema, 14 patients (35%) had grade II, 2 patients (5%) had grade III, and 4 patients (10%) presented with grade IV disc edema. Additionally, 6 patients (15%) demonstrated pale optic discs. A statistically significant difference in optic disc edema grading was observed between the non-surgical and surgical IIH groups (p = 0.022).

Regarding the qualitative analysis of OCT, the Bruch's membrane configuration of 5 cases (12.5%) showed Inverted V pattern while 16 cases (40%) showed ordinary V pattern. 19 cases (47.5%) showed nearly flat configuration. There is a significant difference between IIH group and control group (p-value <0.001). (table 2). IIH patients showed wider disc area and wider rim area with subsequently smaller cup area than control (P value 0.036 ,006, <0.001 respectively) with no significant difference between IIH subgroups .RNFL is significantly thicker in IIH group in all quadrants and average thickness in comparison with control group (P value 0.018) (table 3).while there is no difference in RNFL between both IIH subgroups (p value 0.06).There is no significant difference in average Ganglion Cell Complex thickness (GCC) (p value 0.229) (table 4) however the GCC is significantly thinner in IIH surgical subgroup in comparison with IIH non-surgical subgroup (p value 0.001). The average peripapillary choroidal thickness (PCT) shows no significant difference between IIH group and control group (p value 0.89) (table 5). There is also no significant difference between both IIH subgroups (p value 0.75).

Average GCC thickness showed significant negative correlation with BCVA Log MAR (r = -0.47
p = 0.002) (figure 4). While Positive correlations were observed between average GCC thickness with VF MD (r = 0.65 p < 0.001) (figure 5).

At three-month follow-up, Group A demonstrated a statistically significant reduction in both headache and (TVOs) (p = 0.004 and p = 0.011, respectively), with complete resolution of tinnitus and diplopia. Group B showed a significant reduction in headache complaints (p = 0.013). A statistically significant difference was observed between the two subgroups regarding symptom persistence during follow-up. Headache persisted in 6 patients (30%) in group A compared to 13 patients (65%) in group B (p = 0.027). Additionally, none of group A patient's reported tinnitus, whereas 4 patients (20%) in group B continued to experience tinnitus (p = 0.035).

Regarding visual function after three months of treatment, neither group showed statistically significant improvements in BCVA or VF MD. However, group B showed borderline improvement in BCVA (p = 0.056).

Improvement in disc edema was more pronounced in group A, with a higher proportion of patients achieving grade I or no edema. Group B had a higher percentage of pale discs at three month -follow-up visit (25% vs. 10%).

In group A, there is a significant difference in BM configuration between before and after treatment (p-value 0.031) while there is no significant difference in group B between before and after treatment (p-value 1.0) (table 6). Group A shows significant reduction in average RNFL thickness after treatment (p-value=0.026) (table 7) while group B shows reduction in RNFL thickness with no statistical significance (p-value=0.125) (table 8). There is no significant change in average GCC thickness in both IIH groups after three months of treatment (table 7) (p-value 0.11, 0.66). However, group B shows significant thinning in comparison with group A (p-value 0.018). There is no significant difference in average PCT between before and after treatment in IIH groups (p-value 0.469, 0.533 respectively) (table 7, 8). There is also no significant difference in follow up average PCT between the two IIH groups (p-value0.644)

Table 1: The demographic data of IIH group and control group.

		IIH	Control	P-value
Age (years)	Range	18 - 39	20 - 39	0.11
	Mean ±SD	30.15 ± 6.19	27.45 ± 5.94	
Chi-Square		**N**	**N**	**P-value**
Gender	Male	4 (10%)	5(25%)	0.12
	Female	36(90%)	15(75%)	

Table 2: Comparison of Baseline OCT Bruch's Membrane (BM) configuration between IIH group and control.

Baseline OCT RPE/BM shape	IIH N (%)	Control N (%)	P-value
Inverted V	5 (12.50%)	0	<0.001*
Flat	19 (47.50%)	0	
V	16 (40%)	20 (100%).	

Table 3: Comparison of Baseline OCT Peripapillary Retinal Nerve Fiber Layer thickness (RNFL) between IIH group and control.

Baseline OCT RNFLT		IIH	Control	P-value
Superior	Range	35 - 680	113 - 142	0.036*
	Mean ±SD	199.50 ± 169.74	117.65 ± 6.62	
Inferior	Range	36 - 520	128 - 152	0.019*
	Mean ±SD	199.30 ± 127.76	130.25 ± 5.23	
Nasal	Range	35 - 528	73 - 89	0.013*
	Mean ±SD	149.25 ±127.32	76.15 ± 4.12	
Temporal	Range	31 - 284	65 - 77	0.050*
	Mean ±SD	96.70 ± 64.99	67.45 ± 3.28	
Average	Range	35 - 495	95 - 108	0.018*
	Mean ±SD	161.73 ± 120.08	96.25 ± 3.85	

Table 4: Comparison of Baseline OCT Ganglion Cell Complex thickness (GCL) between IIH group and control.

Baseline OCT GCCT		IIH	Control	P-value
Sup	Range	54 - 123	93 - 105	0.229
	Mean ±SD	89.85 ± 17.46	94.65 ± 2.66	
Inf	Range	54 - 122	96 - 101	0.279
	Mean ±SD	92.15 ± 17.08	96.35 ± 1.18	
Average	Range	54 - 122	94 - 102	0.229
	Mean ±SD	90.90 ± 16.99	95.55 ± 2.01	

Table 5: Comparison of Baseline OCT Peripapillary choroidal thickness (PCT) between IIH group and control.

Baseline OCT PCT		IIH	Control	P-value
Sup	Range	100 - 295	200 - 231	0.40
	Mean ±SD	220.70 ± 40.74	228.45 ± 7.11	
Inf	Range	139 - 264	200 - 269	0.71
	Mean ±SD	201.75 ± 29.65	204.40 ± 15.24	
Nasal	Range	157 - 295	198 - 233	0.13
	Mean ±SD	212.70 ± 31.06	201.70 ± 7.87	
Temp	Range	144 - 294	198 - 224	0.56
	Mean ±SD	204.63 ± 31.02	200.85 ± 7.28	
Average	Range	149 - 283.50	207.25 - 236.50	0.87
	Mean ±SD	209.94 ± 29.87	208.85 ± 6.51	

Table 6: Comparison of OCT Bruch's membrane configuration in IIH subgroups before and after treatment:

OCT BM	Non-surgical		surgical		P-value (Follow-up)
	Baseline	Follow up	Baseline	Follow up	
	N (%)	N (%)	N (%)	N (%)	
Inverted V	5 (25%)	0	0	0	0.053*
Flat	4 (20%)	9 (45%)	15(75%)	15(75%)	
V	11 (55%)	11 (55%)	5 (25%)	5 (25%)	
P-value (Base line -follow-up)	0.031*		1.000		

Table 7: Comparison of OCT parameters in IIH non-surgical subgroup before and after treatment:

Follow up OCT		IIH non-surgical		Paired Test
		Baseline	Follow up	P-value
Average RNFLT	Range	49 - 495	44.5 - 362	0.026*
	Mean ±SD	166.25 ± 121.36	133.40 ± 71.92	
Average GCCT	Range	73 - 113	72 - 113	0.110
	Mean ±SD	97.75 ± 10.7	96.25 ± 10.26	
Average PCT	Range	149 - 283.5	145 - 276.5	0.469
	Mean ±SD	207.04 ± 34.07	201.02 ± 31.45	

Table 8: Comparison of OCT parameters in IIH surgical subgroup before and after treatment:

Follow up OCT		IIH Surgical		Paired Test
		Baseline	Follow up	P-value
Average RNFLT	Range	35 - 495	35 - 300	0.125
	Mean ±SD	157.20 ± 121.77	128.45 ± 69.92	
Average GCCT	Range	54 - 122	52 - 122	0.666
	Mean ±SD	84.05 ± 19.47	84.00 ± 19.56	
Average PCT	Range	160.5 - 250.75	150 - 283.5	0.533
	Mean ±SD	212.04 ± 25.39	208.04 ± 27.56	

Discussion

OCT remains an essential investigative tool in the evaluation of patients with IIH. In this study, qualitative assessment revealed that 24 IIH patients exhibited anterior deflection of the peripapillary retinal pigment epithelium/Bruch's membrane (RPE/BM) complex toward the vitreous cavity at baseline, altering the typical V-shaped configuration. These findings align with previous reports by Sibony *et al.* [9], Wang *et al.* [10], Kupersmith M *et al.* [11] who similarly documented anterior displacement of the peripapillary RPE/BM in IIH patients.

At the 3-month follow-up, the non-surgical IIH subgroup demonstrated a significant posterior reorientation of the RPE/BM (p = 0.031), consistent with observations by Sibony *et al.* [9], Wang *et al.* [10], who attributed such changes to reduced intracranial pressure (ICP). This mechanical response likely results from decreased subarachnoid space (SAS) pressure, reducing the anterior vector force on the peripapillary region. Conversely, the surgical subgroup showed no significant change (p = 1.00), diverging from Sibony *et al.* [9] This discrepancy may reflect the small sample size and inclusion of patients with optic atrophy, whose flat RPE/BM configuration remained unchanged over the short follow-up period. Additionally, methodological differences, such as Sibony's use of geometric morphometrics, may account for these inconsistencies.

Quantitative OCT analysis revealed that Peripapillary retinal nerve fiber layer (RNFL) thickness was significantly higher in IIH patients compared to controls (p = 0.018), corroborating previous studies [12-19]. This is likely due to axoplasmic stasis and optic nerve head congestion secondary to elevated ICP. In contrast, Nogueira *et al.* [20] found no significant RNFL changes, possibly due to their smaller sample size (22 patients) and undefined papilledema grading.

At 3-month follow-up, RNFL thickness significantly decreased in the non-surgical group (p = 0.026), consistent with findings by Auinger *et al.* [21] and Rebolleda *et al.* [22]. No significant change occurred in the surgical subgroup (p = 0.125), potentially due to inclusion of patients with optic atrophy, limited sample size, and the short duration of follow-up.

No significant differences were observed in average ganglion cell complex (GCC) thickness between IIH patients and controls (p = 0.229. These findings align with kaya *et al.* [23] and Fard *et al.* [24] but differ from Labib *et al.* [25] and Nogueira *et al*., [20] who reported significant thinning in IIH patients.

At follow-up, there were no significant changes in GCC thickness in either subgroup (p = 0.11 and 0.66). However, GCC remained significantly thinner in the surgical compared to the non-surgical group (p = 0.018). These results are consistent with Huang-Link *et al.* [26], who reported no change in GCC thickness over 12 months, regardless of treatment modality. In contrast, Shemesh *et al.* [27] found significant GCC thickening, which may be explained by their larger sample size and longer follow-up period (99 patients, 40 months).

No significant differences were observed in peripapillary choroidal thickness (PCT) between IIH patients and controls (p = 0.87), or within either IIH subgroup (p = 0.75). Follow-up assessments also showed no significant changes in PCT (p = 0.47 and p = 0.53, respectively). These results differ from Kaya *et al.* [28], who reported PCT reduction, and Ozdemir *et al.* [12], who observed increased subfoveal choroidal thickness. Such inconsistencies may be attributed to the complexity of choroidal anatomy, measurement variability, and methodological differences. Manual PCT measurements are particularly susceptible to inter-operator variation, and severe papilledema may obscure scleral canal boundaries, introducing additional measurement error.

Average GCC thickness showed a statistically significant negative correlation with best-corrected visual acuity (BCVA) measured in Log MAR units (r = -0.47, p = 0.002) this coincides with results of Shemesh *et al.* [27] and supporting results of Nogueira *et al.* [20] who found that decreased GCC thickness in IIH was associated with reduced BCVA and optic disc pallor BCVA .Furthermore , average GCC thickness showed positive correlation with visual field mean deviation (VF MD) (r = 0.65, p < 0.001) aligning with Khalil *et al.* [28] who stated that initial GCC complex is correlated with final VF MD .

Limitations include a relatively small sample size, short (3-month) follow-up, and some loss to follow-up. Segmentation errors in severe papilledema cases may have affected OCT data. Analysis of one eye per patient limits generalizability.

Conclusion

This study reinforces the utility of optical coherence tomography (OCT) as a valuable tool in the structural assessment of idiopathic intracranial hypertension (IIH). Qualitative analysis revealed anterior deflection of the peripapillary RPE/BM complex in active disease, with significant posterior reorientation observed following medical management, suggesting OCT's sensitivity to changes in intracranial pressure dynamics. Quantitative analysis demonstrated increased RNFL thickness in IIH patients, likely reflecting axoplasmic flow stasis due to elevated intracranial pressure, with partial resolution following treatment in non-surgical cases.

Although average GCC thickness did not significantly differ between IIH patients and controls overall, its correlation with functional parameters highlights its clinical relevance. Specifically, a significant negative correlation between GCC thickness and BCVA, and a positive correlation with visual

field mean deviation (VF MD), suggests that GCC may serve as a structural biomarker of visual dysfunction in IIH.
These findings support the role of OCT not only in diagnosing and monitoring papilledema, but also in evaluating retinal ganglion cell integrity and predicting functional outcomes. Further longitudinal studies with larger sample sizes and longer follow-up periods are warranted to validate these findings and to explore the prognostic value of OCT-derived metrics in various stages of IIH.

References

1. Wall M. Idiopathic intracranial hypertension. Neurologic Clinics. 2010;28(3):593-617.
2. Chen J, Wall M. Epidemiology and risk factors for idiopathic intracranial hypertension. International Ophthalmology Clinics. 2014;54(1):1-11.
3. Friedman DI, Quiros PA, Subramanian PS, *et al*. Headache in idiopathic intracranial hypertension: findings from the Idiopathic Intracranial Hypertension Treatment Trial. Headache. 2017;57(8):1195-1205.
4. Mollan SP, Davies B, Silver NC, *et al*. Idiopathic intracranial hypertension: consensus guidelines on management. Journal of Neurology, Neurosurgery and Psychiatry. 2018;89(10):1088-1100.
5. Wall M, Kupersmith MJ, Kieburtz KD, *et al*. The Idiopathic Intracranial Hypertension Treatment Trial: clinical profile at baseline. JAMA Neurology. 2014;71(6):693-701.
6. Hayreh SS. Pathogenesis of optic disc edema in raised intracranial pressure. Progress in Retinal and Eye Research. 2016;50:108-144.
7. Mallery RM, Friedman DI, Liu GT. Headache and the pseudotumor cerebri syndrome. Current Pain and Headache Reports. 2014;18(6):446-451.
8. Rougier MB, Le Goff M, Korobelnik JF. Optical coherence tomography angiography at the acute phase of optic disc edema. Eye and Vision. 2018;5:15-21.
9. Sibony P, Kupersmith MJ, Rohlf FJ. Shape analysis of the peripapillary RPE layer in papilledema and ischemic optic neuropathy. Investigative Ophthalmology and Visual Science. 2011;52(11):7987-7995.
10. Wang JK, Kardon RH, Ledolter J, Sibony PA, Kupersmith MJ, Garvin MK. Peripapillary retinal pigment epithelium layer shape changes from acetazolamide treatment in the Idiopathic Intracranial Hypertension Treatment Trial. Investigative Ophthalmology and Visual Science. 2017;58(6):2554-2565.
11. Kupersmith MJ, Sibony P, Mandel G, Durbin M, Kardon RH. Optical coherence tomography of the swollen optic nerve head: deformation of the peripapillary retinal pigment epithelium layer in papilledema. Investigative Ophthalmology and Visual Science. 2011;52(9):6558-6564.
12. Ozdemir I, Çevik S. Measurement of choroid thickness using optical coherence tomography to monitor intracranial pressure in an idiopathic cranial hypertension model. Neurology India. 2020;68(3):636-639.
13. Fard MA, Fakhree S, Abdi P, Hassanpoor N, Subramanian PS. Quantification of peripapillary total retinal volume in pseudopapilledema and mild papilledema using spectral-domain optical coherence tomography. American Journal of Ophthalmology. 2014;158(1):136-143.
14. Wang H, Cao L, Kwapong WR, *et al*. Optic nerve head changes measured by swept source optical coherence tomography and angiography in patients with intracranial hypertension. Ophthalmology and Therapy. 2023;12(7):3295-3305.
15. Bingöl Kızıltunç P, Atilla H. A novel biomarker for increased intracranial pressure in idiopathic intracranial hypertension. Japanese Journal of Ophthalmology. 2021;65(3):416-422.
16. Marzoli SB, Ciasca P, Curone M, *et al*. Quantitative analysis of optic nerve damage in idiopathic intracranial hypertension (IIH) at diagnosis. Neurological Sciences. 2013;34(1):143-145.
17. Skau M, Yri H, Sander B, Gerds TA, Milea D, Jensen R. Diagnostic value of optical coherence tomography for intracranial pressure in idiopathic intracranial hypertension. Graefe's Archive for Clinical and Experimental Ophthalmology. 2013;251(2):567-574.
18. Huang-Link Y, Eleftheriou A, Yang G, *et al*. Optical coherence tomography represents a sensitive and reliable tool for routine monitoring of idiopathic intracranial hypertension with and without papilledema. European Journal of Neurology. 2019;26(6):857-864.
19. Srija YN, Pattnaik L, Mishra S, Panigrahi PK. An optical coherence study on optic disc parameters and peripapillary retinal nerve fiber layer thickness in patients with optic disc edema. Indian Journal of Ophthalmology. 2024;72(1):96-100.
20. Nogueira PF, Caiado GC, Gracitelli CPB, *et al*. Association between optical coherence tomography measurements and clinical parameters in idiopathic intracranial hypertension. Journal of Ophthalmology. 2021;2021:1401640.
21. Auinger P, Durbin M, Feldon S, *et al*. Papilledema outcomes from the OCT substudy of the Idiopathic Intracranial Hypertension Treatment Trial. Ophthalmology. 2015;122(9):1939-1949.
22. Rebolleda G, Muñoz-Negrete FJ. Follow-up of mild papilledema in idiopathic intracranial hypertension with optical coherence tomography. Investigative Ophthalmology and Visual Science. 2009;50(11):5197-5200.
23. Kaya FS, Sonbahar O, Açar PA, Özbaş M, Yigit FU. Evaluating peripapillary vessel density in regressed papilledema in idiopathic intracranial hypertension patients. Photodiagnosis and Photodynamic Therapy. 2021;36:102551.
24. Fard MA, Sahraiyan A, Jalili J, *et al*. Optical coherence tomography angiography in papilledema compared with pseudopapilledema. Investigative Ophthalmology and Visual Science. 2019;60(1):168-175.
25. Labib DM, Abdel Raouf DH. Diagnostic value of optical coherence tomography in patients with idiopathic intracranial hypertension. Egyptian Journal of Neurology, Psychiatry and Neurosurgery. 2015;52(4):249-253.
26. Huang-Link YM, Al-Hawasi A, Oberwahrenbrock T, Jin YP. OCT measurements of optic nerve head changes in idiopathic intracranial hypertension. Clinical Neurology and Neurosurgery. 2015;130:122-127.

27. Shemesh R, Frige O, Garmider S, Huna-Baron R. Longitudinal optical coherence tomography indices in idiopathic intracranial hypertension. Scientific Reports. 2024;14:8623-8632.
28. Khalil D, Labib D. Correlation between optical coherence tomography parameters and retinal sensitivity in idiopathic intracranial hypertension. Journal of the Egyptian Ophthalmological Society. 2015;108(2):61-67.