ophthal Focus
Vol 3| Issue 31 |2022

Dear Doctor,
Greetings from Micro Labs Limited. We are happy to bring you 'Ophthal Focus' which contains latest and interesting news in the field of Ophthalmology.

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Congenital cataract and persisting foetal vasculature: Ocular Development in Children

INTRODUCTION:

In newborns and early children, normal ocular growth is critical for the development of the visual system. Various congenital variables may have an impact on ocular development. [1] Congenital cataract (CC) is one of the most common causes of childhood blindness, and persistent fetal vasculature (PFV) is one of the most common ocular abnormalities that occurs in conjunction with unilateral CC. There are three types of PFV: anterior, posterior, and combined, with 90 % being unilateral and a 45 % incidence rate. [2] Excessive ocular elongation may result from form deprivation induced by CC at the vital stage of visual development. While the hyaloid stalk from the optic disc to the posterior capsule might limit ocular development due to the failure of embryonic hyaloid vasculature regression, notably PFV. However, the ocular growth of unilateral CC and PFV patients is unknown, and these patients continue to have poor visual results. [3]

The ALs of eyes with unilateral CC and PFV are shorter in patients younger than 24mo and longer in those older than 24mo when compared to fellow eyes; the keratometries of eyes with unilateral CC and PFV are steeper in patients older than 24mo and similar in those younger than 24mo when compared to fellow eyes. These findings add to the knowledge of ocular development in both CC and PFV patients.

METHODS:

The objective of this study was to examine the ocular development of unilateral patients with both CC and PFV (focusing on only one type of PFV that has a hyaloid stalk from the optic disc attached to the posterior capsular of the lens without retinal disorders) at different stages of visual development (before and after 24 months) by analyzing their ocular biometric parameters, such as axial length (AL), keratometry, anterior chamber depth (ACD), lens thickness (LT), and vitreous length. Patients with unilateral CC and PFV, as well as those with isolated unilateral CC, were included in this cross-sectional study. The following measurements were taken: axial length, keratometry, anterior chamber depth (ACD), lens thickness, and vitreous length. Patients with CC and PFV had their ocular biometric data compared to fellow eyes and patients with isolated CC. Slit-lamp and B-ultrasound examinations (Figure 1) revealed lens opacity, a hyaloid stalk from the optic disc linked to the posterior capsule with or without a retrolental membrane, and an extended ciliary process in patients with CC and PFV.

RESULTS:

There were 110 patients in total, who were divided into four groups: group 1 (18 patients with CC and PFV, 24 months), group 2 (22 patients with CC and PFV, 24 months), group 3

(35 patients with CC, 24 months), and group 4 (35 patients with CC, 24 months). The ALs of the damaged eyes were significantly shorter than those of the other eyes in group 1. The ALs of the damaged eyes were significantly longer than those of the other eyes in groups 2 and 4. The damaged eyes' keratometries were steeper than those of the other eyes in groups 2 and 4). In all groups, there was no variation in ACDs between the two eyes.

DISCUSSION:

The ALs of the eyes with CC and PFV were shorter in patients younger than 24mo but longer in those older than 24mo, according to the research. A study evaluated at 8 patients with unilateral anterior, posterior, or mixed PFV with or without CC, with an average age of 13.7 months. Both observed that the ALs of the damaged eyes were shorter than those of the other eyes, which matched the findings of this study. [4] The eyeball development of patients with both CC and PFV is influenced by form deprivation in addition to mechanical tension by the hyaloid stalk in the vitreous cavity. [5]

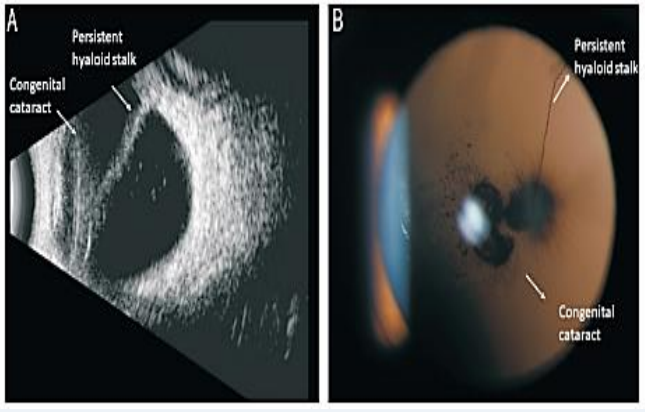

Figure 1 Characteristics of patients with CC and PFV in this study A: Ultrasonography showing congenital cataract combined with a persistent hyaloid stalk extending from the optic disc attached to posterior capsule; B: Slit-lamp image showing congenital cataract combined with a persistent hyaloid stalk.

The combined consequences of form deprivation were stronger than the slight mechanical tension, and older individuals finally developed ocular elongations. Furthermore, among patients with CC and PFV older than 24 months, the afflicted eyes' ACD to AL and vitreous length to AL ratios were equivalent to those of the other eyes, indicating that the anterior and posterior segments of the eyeball developed in a similar fashion.

At a younger age (24mo), there was no difference in the keratometries of the affected eyes between age-matched patients with CC and PFV and those with isolated CC; however, the keratometries of the affected eyes were steeper in patients with CC and PFV at an older age than 24mo, indicating that the PFV may have additional influences on ocular development over time. AL elongation and cornea flattening allow the refractive error to stay largely consistent during ocular development. [6] In this study, ALs and keratometries in the afflicted eyes were longer and steeper than in the other eyes in patients older than 24 months, in both patients with unilateral CC and PFV and those with unilateral CC. Patients with CC and PFV had steeper keratometries in the afflicted eyes than age-matched patients with CC, suggesting that patients with CC and PFV are more prone to develop myopia over

time. As a result, patients with CC and PFV should be monitored closely and treated promptly not only for hyaloid stalk tension but also for the significant risk of myopia.

CONCLUSION:

In conclusion, mechanical traction generated by the hyaloid stalk may limit ocular growth in individuals with CC and moderate PFV during the fast ocular development stage in the first two years of life. However, the long-term consequences of form deprivation produced by CC may be larger than the modest mechanical traction, leading to age-related ocular elongation. Furthermore, the keratometries of the eyes with both CC and PFV were steeper than those of the fellow eyes and those of the eyes with isolated CC in patients older than 24 months, indicating that PFV may have additional impacts on ocular development. As a result, individuals older than 24 months, with longer ALs and steeper keratometries, may be more prone to myopia.

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The impact of neuroticism and perceived stress on quality of life in dry eye disease patients

INTRODUCTION:

Dry eye disease (DED) is one of the most common eye disorders, with a global frequency of 5 to 50%. It is a significant public health issue. [1] Ocular discomfort and suffering associated with DED can have a detrimental impact on physical and psychological processes, and reduced visual performance can limit daily activities including reading, driving, and using a computer or smartphone device. As a result of its negative influence on visual performance, DED might affect overall individual quality of life (QOL) and job productivity. [2] DED can impair a patient's quality of life. When compared to baseline or a control treatment, patient-reported symptoms of DED typically improved after treatment with topical formulations for tear replacement, tear stimulation, or anti-infammatory therapy. [3] However, since patients' subjective experiences are used to assess satisfaction and QOL, other psychological elements associated to emotion should be included. A large-scale investigation in Korea found a link between anxiety/depression and QOL in DED5 patients. Another study discovered a link between sadness and even suicidal intentions. Psychological suffering is undoubtedly linked to QOL. [4]

The study found a significant relationship between perceived stress, neuroticism, and QOL in DED patients. Personality influences both subjective dry eye symptoms and their impact on everyday living, as well as overall health-related QOL.

METHODS:

The diagnostic criteria for DED in this study were as defined by DEWS32, which included (1) the presence of ocular symptoms as measured by the Ocular Surface Disease Index score13, and (2) the presence of one of the dry eye homeostasis markers, such as tear film break-up time (TBUT)5 s or positive corneal fluorescein staining (CFS). Participants were ruled out if they had a best-corrected visual acuity (BCVA) of less than 6/18, ocular surface inflammation or infection, ocular surgery within the last six months, systemic illnesses, or impairments that interfered with everyday activities, such as psychiatric disorders. All of the subjects had a thorough ophthalmic examination of both eyes, which included measuring BCVA and intraocular pressure. Additional dry eye tests were offered, such as corneal fluorescein staining (CSF), tear film break-up time (TBUT), and Schirmer's test. The van Bijsterveld grading system33 was used to assign CSF ratings on a scale of 0 to 3, and TBUT was evaluated using fluorescein staining without anaesthesia. Participants were instructed to blink repeatedly. Three times the delay between the last full blink and the first dry patch on the cornea was measured, with the average value utilised for statistical analysis. Anesthesia was used during Schirmer's test. The Schirmer strip was inserted for 5 minutes at the lateral one-third of the lower fornix after drying the surplus tears. The strip was then removed, and the filter paper's soaking length was measured in millimetres.

RESULTS:

The Dry Eye-Related Quality-of-Life Score (DEQS), a 5-level EQ-5D, the Neuroticism Inventory (NI), and the 10-Item Perceived Stress Scale were all completed by 100 DED participants (PSS). The independent variables' predictive influence was determined using hierarchical linear regression.

The average age of the participants was 50.91 14.3 years, with females accounting for 89.0 percent of the total. The greatest predictor of QOL, whether measured by DEQS or EQ-5D, was DESQ-Ocular symptoms, according to hierarchical linear regression analysis, and its influence was diminished when perceived stress and neuroticism were included to the model. In comparison to the DESQ-Ocular symptoms alone, the final model explained up to 30–39 percent of the variation in QOL. Patients with DED have a lower quality of life not just because of their visual problems, but also because of their perceived stress. Furthermore, among individuals with DED, neuroticism was a major predictor of QOL.

Step	Variable	Impact on daily life			EQ-5D		
		R^2 adj	R^2 change	B (95% CI)	R^2 adj	R^2 change	B (95% CI)
1		0.018	0.028		0.039	0.002	
	Age			−0.258 (−0.561, 0.045)			−0.001 (−0.006, 0.004)
2		0.323	0.308***		0.130	0.128**	
	Age			−0.029 (−0.289, 0.231)			0.002 (−0.003, 0.007)
	DESQ-Ocular Symptoms			2.073*** (1.46, 2.686)			0.024** (0.001, 0.010)
3		0.370	0.052**		0.236	0.133***	
	Age			0.020 (−0.234, 0.273)			0.004 (−0.001, 0.008)
	DESQ-Ocular Symptoms			1.823*** (1.207, 2.440)			0.018*** (0.005, 0.030)
	PSS-10			0.878** (0.268, 1.488)			0.023** (−0.017, 0.007)
4		0.391	0.027*		0.300	0.069*	
	Age			−0.015 (−0.267, 0.236)			0.002 (−0.002, 0.001)
	DESQ-Ocular Symptoms			1.678*** (1.056, 2.300)			0.014* (0.002, 0.026)
	PSS-10			0.582 (−0.081, 1.244)			0.015* (0.002, 0.028)
	NI-15			0.461* (0.022, 0.901)			0.012** (0.004, 0.020)

Hierarchical multiple regression analyses predicting QOL score of DEQS-T and EQ-5D from DEQS-Ocular symptoms, perceived stress, and neuroticism scores. QOL quality of life, DEQS-T Tai version of Dry Eye-related Quality-of-Life Score, EQ-5D EuroQoL-5 dimension, adj adjusted, R coefcient r, R2 adj adjusted R square, B unstandardized Coefcients, PSS Perceived Stress Scale, NI Neuroticism Inventory, *p<0.001.

DISCUSSION:

Regardless of the measures utilised, DED specific or general health related, the study findings revealed a substantial link between perceived stress and neuroticism and QOL. Although dry eye symptoms contributed more to DED-specific QOL since it is disease-specific, dry eye symptoms also had a strong link with general health-related QOL. This emphasises the impact of dry eye symptoms on quality of life. [3,5]

Despite the fact that the DEQS is designed to capture QOL related to dry eye symptoms, the findings revealed that only 32% of the variance in QOL explained the dry eye symptoms. When perceived stress and neuroticism are included in, the variation explained rises to 39 percent. Dry eye symptoms explained 13% of the variation in the EQ-5D, which climbed to 30% when paired with subjective stress and neuroticism. Because the former is more directly tied to anxiety/depression than the latter, psychological issues have a larger effect size on EQ-5D. Individuals report more on the influence on function rather than anxiety/depression in the DEQS, and vice versa in the EQ-5D. That shows how perceived stress remains alongside neuroticism.

Neuroticism is linked to dry eyes and other chronic medical conditions. Individuals with neuroticism are prone to stress and may complain to their doctor in proportion to the results of the objective test. Researchers have shown a link between subjective complaints and feelings of stress

and neuroticism. In addition to perceived stress, neuroticism is linked to anxiety and depression, both of which are associated with an increased risk of developing dry eye symptoms and poor QOL5, but are not considered in this study. [6]

CONCLUSION:

In conclusion, it was discovered a significant relationship between perceived stress, neuroticism, and QOL in DED patients. The current findings imply that the patient's personality, which is the most important psychological element, has an effect on both subjective dry eye symptoms and their influence on daily living, as well as overall health-related QOL.

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Correlation between choroidal blood flow and autonomic dysfunction in individuals with normal tension glaucoma.

INTRODUCTION:

Although high intraocular pressure (IOP) is a key risk factor for the development and advancement of glaucoma, vascular dysregulation and perfusion abnormalities are also critical contributors in glaucoma progression. [1] Blood flow's possible implications in the pathophysiology of glaucoma have been widely researched. Previous studies have found that in glaucoma, ocular blood flow is decreased in the optic nerve head (ONH), retina, choroid, and retrobulbar area. Vascular illnesses, such as low arterial blood pressure (BP) with nocturnal hypotension, migraines, Raynaud's syndrome, and obstructive sleep apnea, have been linked to glaucoma. [2] The measurement of heart rate variability (HRV) is a well-known method for assessing the ANS. HRV allows researchers to investigate the autonomic control of the heart's sympathovagal balance. HRV has previously been used to assess autonomic dysfunction in glaucoma patients. [3,4]

The relationship between ocular blood flow impairment (parapapillary choroidal vascular density) and autonomic dysfunction (LF/HF ratio). This research might help researchers better grasp the role of autonomic dysfunction in the pathophysiology of glaucoma development.

METHODS:

This study comprised 152 individuals with normal tension glaucoma (152 eyes). Ocular blood flow was measured using optical coherence tomography angiography, and autonomic nerve function was examined using heart-rate variability (HRV) parameters. One of the HRV metrics, the low frequency/high frequency (LF/HF) ratio, assessed the degree of sympathovagal balance. This signal may indicate autonomic dysfunction.

RESULTS:

The study also looked at the relationships between VD and ocular factors (Tables 1, 2). Age was associated with a decrease in superficial VD in the macular (R=0.171) and parapapillary (R=0.217) areas. Reduced superficial parapapillary VD was linked to increased axial length (R=0.326) and higher IOP fluctuations (R=0.191). Deep parapapillary VD decrease was related with a larger low frequency (LF) / high frequency (HF) ratio (R=0.243). The other characteristics did not demonstrate any significant relationships with deep macular VD. Regression analysis were used to identify parameters associated with parapapillary choroidal VD. In multivariate analysis, lower parapapillary choroidal VD was related with a larger LF/HF ratio (=0.249). Figure 1 depicts a scatter plot of the negative connection between parapapillary choroidal VD and LF/HF ratio.

DISCUSSION:

The relationship between NTG autonomic dysfunction and poor deep parapapillary vascular density. This study found that autonomic dysfunction has a link with ocular blood flow, rather than systemic blood circulation, as previously stated. Lower parapapillary choroidal VD is a risk factor for glaucoma development. [5] Impaired blood flow is thought to be a major risk factor for glaucoma. Migraine and disc haemorrhage, according to the Collaborative Normal-Tension Glaucoma Study

(CNTGS) and the Early Manifest Glaucoma Trial (EMGT), contribute to the development of VF loss. [6]

	Macular VD (superficial)		Macular VD (deep)	
	R	P value*	R	P value*
Age	**−0.171**	**0.044**	−0.112	0.192
Sex	0.167	0.050	0.062	0.473
Axial length, mm	0.005	0.954	0.008	0.934
CCT	−0.020	0.817	−0.055	0.549
Hypertension	0.001	0.992	−0.147	0.084
Diabetics	−0.044	0.610	−0.023	0.793
Migraine	−0.050	0.559	−0.123	0.151
Disc hemorrhage	0.050	0.559	−0.069	0.420
Mean IOP	0.178	0.198	0.006	0.966
IOP fluctuation	−0.011	0.894	−0.041	0.633
Heart rate variability				
SDNN	−0.070	0.413	−0.045	0.602
LF Norm	−0.070	0.416	0.050	0.560
HF Norm	0.026	0.764	−0.071	0.410
LF/HF ratio	−0.141	0.099	−0.019	0.829

TABLE 1. Correlation coefcients for macular vessel density with ocular parameters and heart rate variability in total subjects. VD=Vessel density; IOP=intraocular pressure; SDNN=Standard deviation of NN-interval; LF=Low frequency; HF=High frequency. R=correlation coefcient.

	Parapapillary VD (superficial)		Parapapillary VD (deep)	
	R	P value*	R	P value*
Age	**−0.217**	**0.009**	0.007	0.934
Sex	0.110	0.188	−0.014	0.863
Axial length	**−0.326**	**<0.001**	0.109	0.214
CCT	0.036	0.693	0.090	0.306
Hypertension	−0.120	0.152	−0.006	0.945
Diabetics	−0.084	0.314	0.001	0.992
Migraine	0.216	0.009	−0.020	0.808
Disc hemorrhage	0.156	0.061	−0.082	0.318
Mean IOP	−0.014	0.914	−0.172	0.178
IOP fluctuation	**−0.191**	**0.021**	−0.069	0.398
Heart rate variability				
SDNN	0.030	0.716	−0.037	0.651
LF Norm	−0.153	0.066	0.041	0.619
HF Norm	0.119	0.155	0.135	0.100
LF/HF ratio	−0.109	0.193	**−0.243**	**0.003**

TABLE 2. Correlation coefcients for parapapillary vessel density(VD) with ocular parameters and heart rate variability in total subjects. VD=Vessel density; IOP=intraocular pressure; SDNN=Standard deviation of NN-interval; LF=Low frequency ; HF=High frequency ; R=correlation coefcient.

The ANS is primarily in charge of blood circulation. Blood pressure that is unstable or variable may be caused by autonomic dysfunction. Ocular blood flow is regulated by both the direct and indirect autoregulatory systems. The optic nerve, choroid, ciliary body, and iris vasculature were all regulated by the direct autonomic system. The retinal blood flow was regulated by an indirect autoregulatory mechanism. An abnormal ANS causes a disruption in the blood flow to the ONH and choroid. Because the choroid contributes to the ONH's prelaminar blood supply, reduced choroidal blood flow may hasten the onset of glaucoma. The parasympathetic and sympathetic nervous systems control choroidal blood flow. The superficial macular layer's vascular plexus is mostly found inside the retinal nerve fibre layer (RNFL), retinal ganglion cell layer (RGC), and inner plexiform layer (IPL). Measuring macular perfusion has the potential to detect decreased metabolic rate and RGC malfunction. RPCs are found in the superficial parapapillary layer, where they form a distinct capillary plexus within the RNFL and provide a vital blood supply to RGC axons.

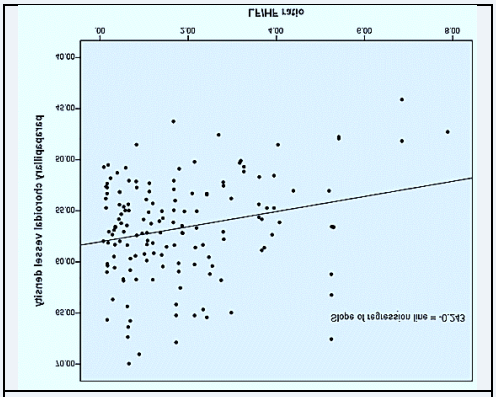

FIG 1. Scatter plot showing the relationships between the parapapillary choroidal vessel density and LF/HF ratio

The superficial macular layer's vascular plexus is mostly found inside the retinal nerve fibre layer (RNFL), retinal ganglion cell layer (RGC), and inner plexiform layer (IPL). Measuring macular perfusion has the potential to detect decreased metabolic rate and RGC malfunction. RPCs are found in the superficial parapapillary layer, where they form a distinct capillary plexus within the RNFL and provide a vital blood supply to RGC axons. Because glaucoma affects RGCs and the RNFL, superficial macular and parapapillary perfusion might be utilised to determine disease severity. [7]

CONCLUSION:

In conclusion, decreased parapapillary choroidal blood flow was linked to autonomic dysfunction. This work backs up the link between glaucomatous damage and autonomic dysfunction, as well as its likely significance in glaucoma development.

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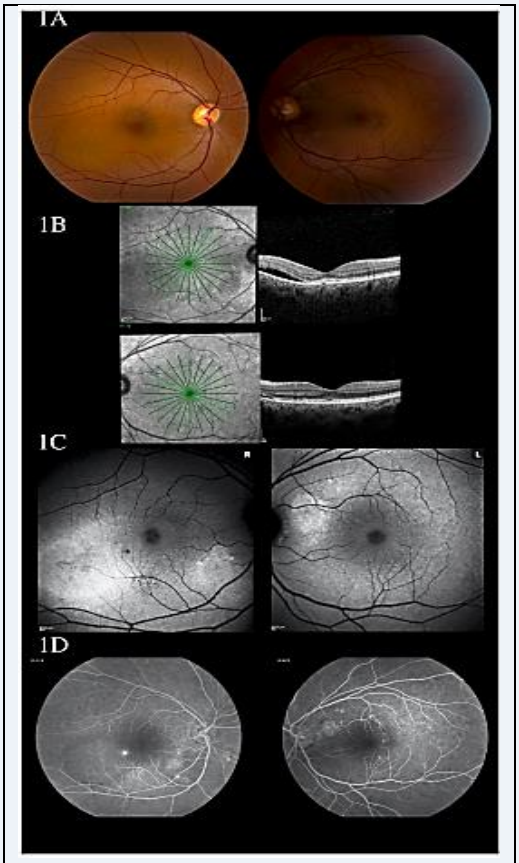
Correlation between chronic central serous chorioretinopathy and subclinical Cushing's syndrome: A Case Reports

INTRODUCTION:

Central serous chorioretinopathy (CSCR) is characterised by fluid buildup in the subretinal or sub-RPE area, which frequently results in visual impairment. Chronic CSCR has been documented as a symptom of Cushing's syndrome hypercortisolism and subclinical hypercortisolism. However, because of its intrinsic subtlety, the latter is frequently under-recognized, and the best therapeutic threshold based on concomitant comorbidities remains unknown. The following case report describes the clinical history of a patient with CSCR caused by subclinical hypercortisolism before and after adrenalectomy. [1]

CASE REPORT:

A 50-year-old woman arrived with blurred, discoloured patches in her right eye for several months. Her previous medical history includes moderate hypertension managed with amlodipine. Previous ocular and family histories were unrelated. On examination, Snellen visual acuity was 20/50 OD and 20/25 OS. Her pupils, intraocular pressure, and anterior segment test were all within normal ranges. A dilated fundus examination revealed bilateral, multifocal regions of subretinal fluid and mottled pigmentary alterations (Fig. 1A). Optical coherence tomography indicated patches of sub-retinal fluid and other areas of outer retinal atrophy (Fig. 1B).



Multimodal imaging of bilateral multifocal central serous chorioretinopathy. Fundus photographs reveal multifocal subretinal fluid and pigmentary changes (Fig. 1A). Optical coherence tomography demonstrates subretinal fluid and outer retinal atrophy (Fig. 1B). Areas of hyperautofluorescence highlight the fundoscopic findings of subretinal fluid (Fig. 1C). Fluorescein angiography showing multiple areas of expansile dot leakage (Fig. 1D).

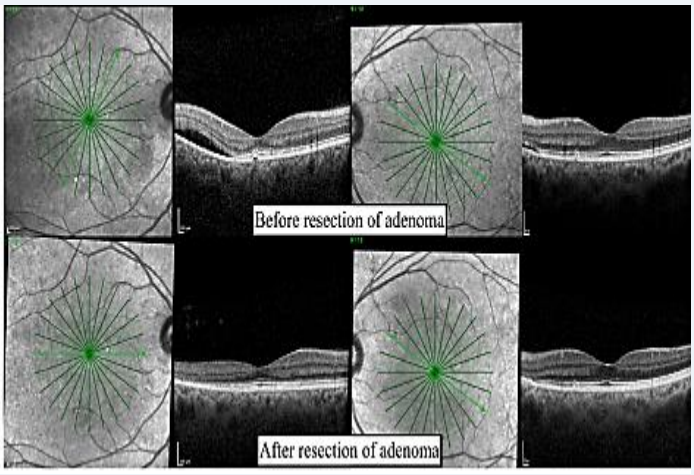
Fundus autofluorescence indicated hyperautofluorescent patches that emphasised the fundoscopic results (Fig. 1C). Fluorescein angiography revealed many foci of expansile dot leakage (Fig. 1D). These results were all compatible with multifocal, persistent CSCR. When the patient underwent imaging for back discomfort, an adrenal incidentaloma (AI) was discovered during additional clinical follow-up. She consulted an endocrinologist after that; she had normal blood cortisol but low ACTH and an abnormal dexamethasone suppression test. This resulted in a diagnosis of subclinical hypercortisolism, which explained her hypertension and persistent CSCR.

Since the blur and relative scotomata were interfering with her daily activities, she chose eplerenone, which had a modest but inadequate therapeutic response at 50 mg daily. While considering photodynamic treatment, the

patient decided to have a minimally invasive adrenalectomy after consulting with her doctor. She was off eplerenone and had no sub-retinal fluid at her latest follow-up, 3 months following surgery and 6 years after her original presentation (Fig. 2).

DISCUSSION:

CSCR has previously been linked to a variety of risk factors, including steroid overuse. A recent study on a nationally representative dataset of 35,000 individuals discovered that patients with CSCR had a greater risk of Cushing's syndrome than those who were exposed to exogenous steroids. In individuals with chronic CSCR, complete medication reconciliation and careful evaluation of co-morbid illnesses are critical. Subclinical Cushing's syndrome (SCS), or modest endogenous hypercortisolism, has been of special interest in the endocrinology literature in recent years since it can be a difficult diagnosis and the most effective therapy remains disputed. [2]



Optical coherence tomography imaging at presentation and at last follow-up 3 months after adrenalectomy. There is a significant improvement in subretinal fluid in both eyes, though outer retinal irregularity remains

SCS may worsen metabolic syndrome and osteoporosis; surgical removal of adrenal incidentalomas has been shown to improve weight, blood pressure, and glucose management. As a result, some experts advocate that people with SCS-related comorbidities be considered for resection. [3]

In these individuals, how visual comorbidity affects intervention is an essential concern. In this patient's instance, the recurring CSCR, hypertension, and elevated risk of metabolic syndrome were adequate reasons to have surgery.

CONCLUSION:

In summary, SCS is a disease characterised by mild cortisol dysregulation that may be an underappreciated risk factor for persistent CSCR. More investigations are necessary the level of visual comorbidity that may impact surgical care.

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