A STUDY ON SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY AND FUNDUS AUTOFLUORESCENCE PATTERNS IN CENTRAL SEROUS CHORIORETINOPATHY

CODE : 1005087

Chief Author : Dr Reshma G R ,Postgraduate GREH ,Visakhapatnam

Co Author : Dr G Premalatha ,Assistant Professor ,GREH ,Visakhapatnam

Introduction

- Central serous chorioretinopathy (CSCR) is the fourth most common retinopathy after age-related macular degeneration, diabetic retinopathy and branch retinal vein occlusion.[1]
- CSCR is thought to occur due to hyper-permeable choroidal capillaries, which, in association with retinal pigment dysfunction, cause a serous detachment of the neurosensory retina.
- CSCR typically occurs in males in their 20s to 50s who exhibit acute or sub-acute central vision loss or distortion. Other common complaints include micropsia, metamorphopsia, hyperopic (most common) or myopic shift, central scotoma, and reduced contrast sensitivity and color saturation.

Aims And Objectives

- To evaluate the patterns of fundus autofluorescence (FAF) abnormalities in patients with central serous chorioretinopathy (CSC).
- To evaluate the status of Ellipsoidal zone by SD OCT
- To assess the risk factors in patients with CSR

Materials and methods :

- Hospital based cross sectional observational study
- Study period : July – September 2021
- Sample size : 20 eyes of 18 patients
- Study population : Patients attending the retina clinic of Government Regional Eye Hospital ,Visakhapatnam.

Inclusion Criteria :

- All patients diagnosed with CSC were included .
- Diagnosis was made when serous detachment of the neurosensory retina, including the macula, was confirmed by SD-OCT.
- Eyes with bilateral involvement were analyzed individually

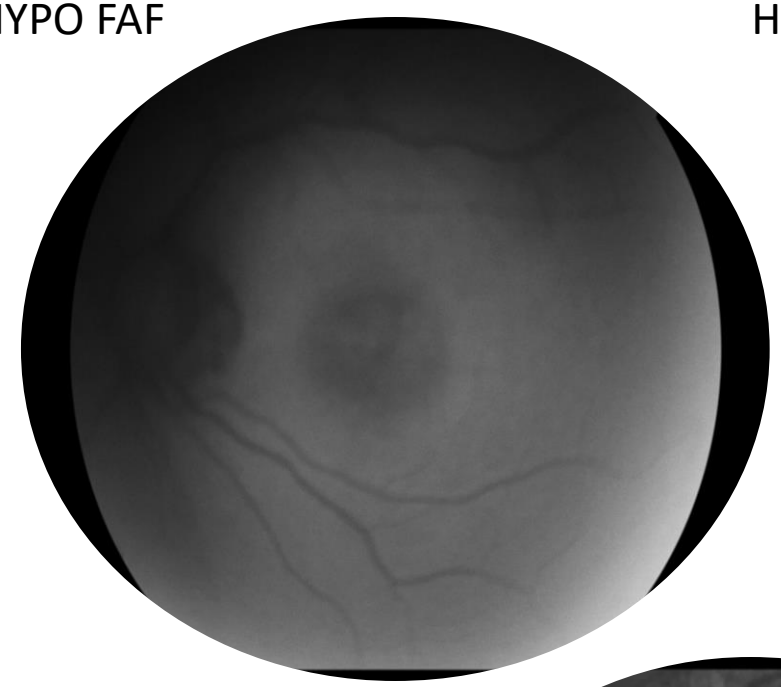
Exclusion Criteria :

- Patients with neovascular maculopathy such as age-related macular degeneration, polypoidal choroidal vasculopathy, idiopathic choroidal neovascularization, or retinal vascular diseases were excluded from the study
- Patients with intraocular inflammation, or posterior segmental tumor were excluded.
- Patients who had undergone laser photocoagulation or photodynamic therapy for CSC were excluded from the study

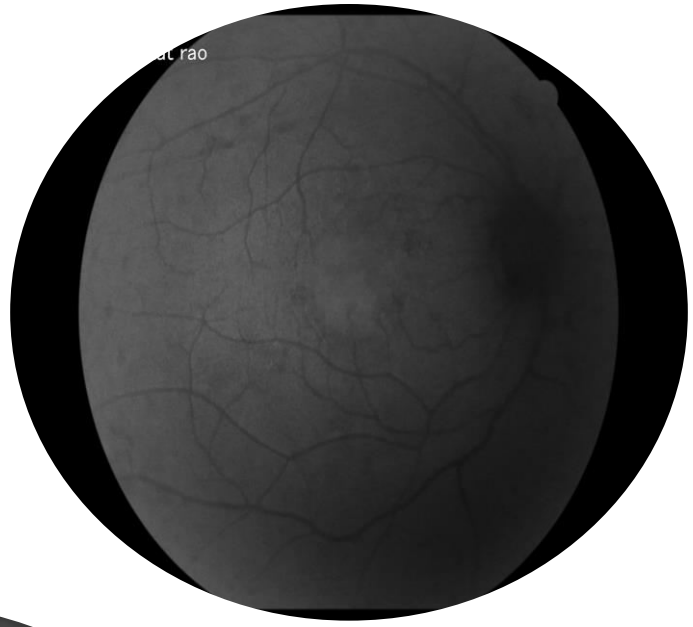
- All patients underwent a complete ophthalmologic examination including best-corrected visual acuity (BCVA), slit-lamp biomicroscopy, fundus photography, SD-OCT, and FAF imaging
- The status of the foveal ellipsoid zone (EZ) on the SD-OCT images was judged to be either intact or disrupted.
- Analysis was done using SPSS Software version 18
- the correlation between the FAF patterns, BCVA, and the SD-OCT findings were determined and p value < 0.05 were considered as statistically significant .
- Abnormal FAF was then further sorted out into five categories

- Blocked /Hypofluorescence FAF if there were decreased autofluorescence where subretinal fluids existed
- Mottled FAF showed a grainy or coarse region of increased FAF when compared with the normal surrounding background fluorescence
- Hyper FAF showed an increased FAF signal when compared with that outside the lesion
- Hyper/hypo FAF was characterized by a mixed form of hyperautofluorescence and hypoautofluorescence
- Descending tract exhibited a downward leading swathe of decreased autofluorescence originating from the posterior pole to extend below the level of the inferior arcade

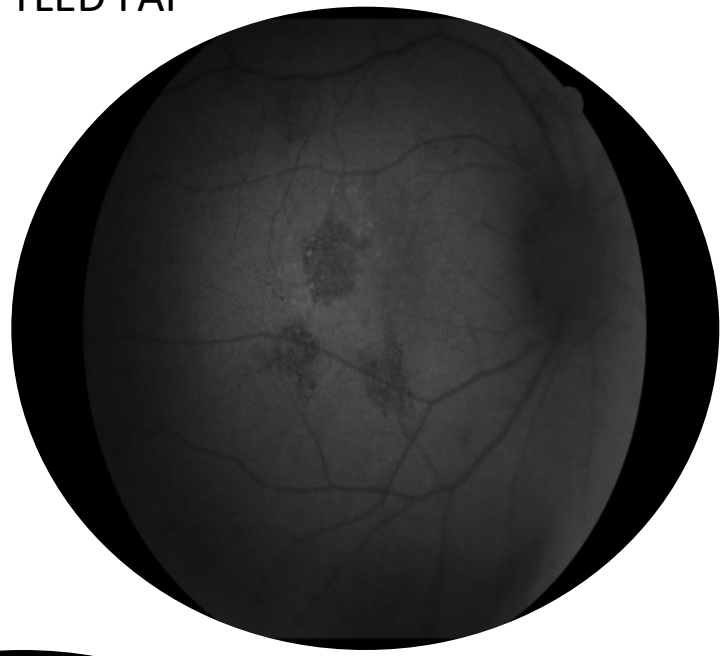
HYPO FAF



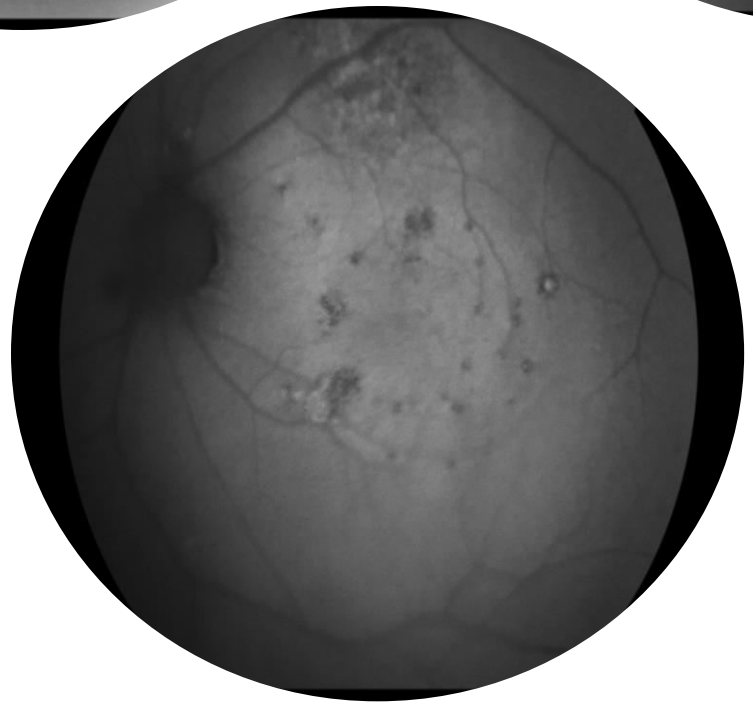
HYPER FAF

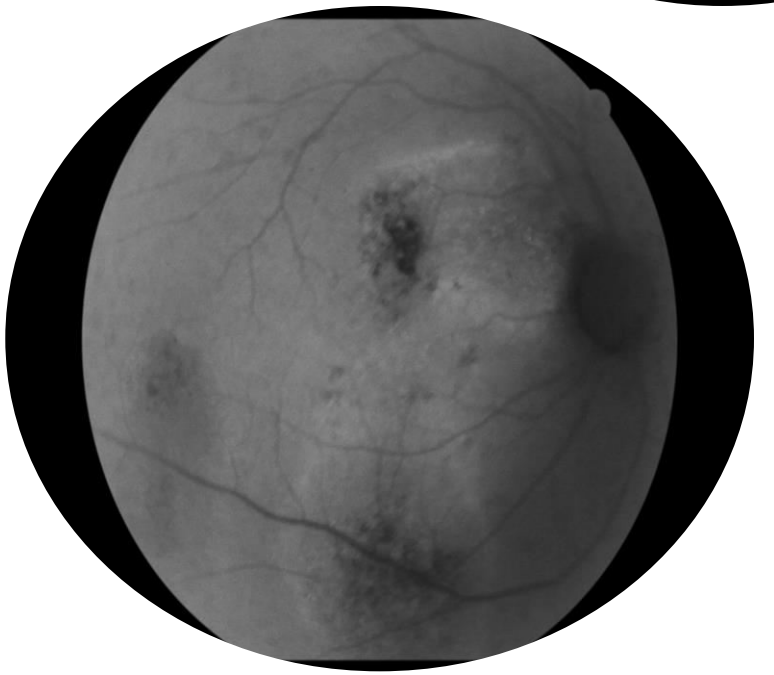


MOTTLED FAF



HYPO/HYPER FAF



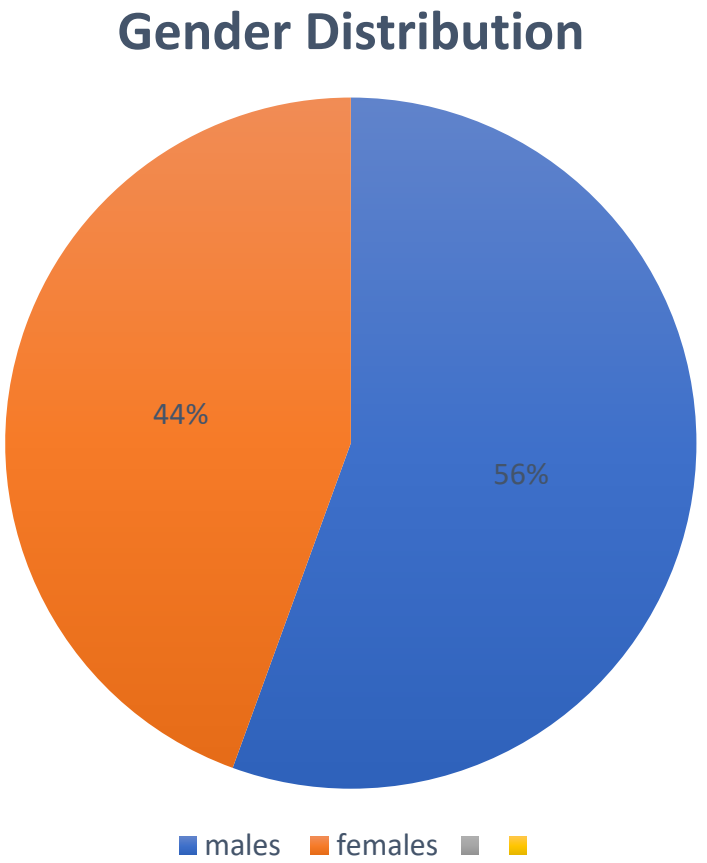


DESCENDING TRACT

RESULTS

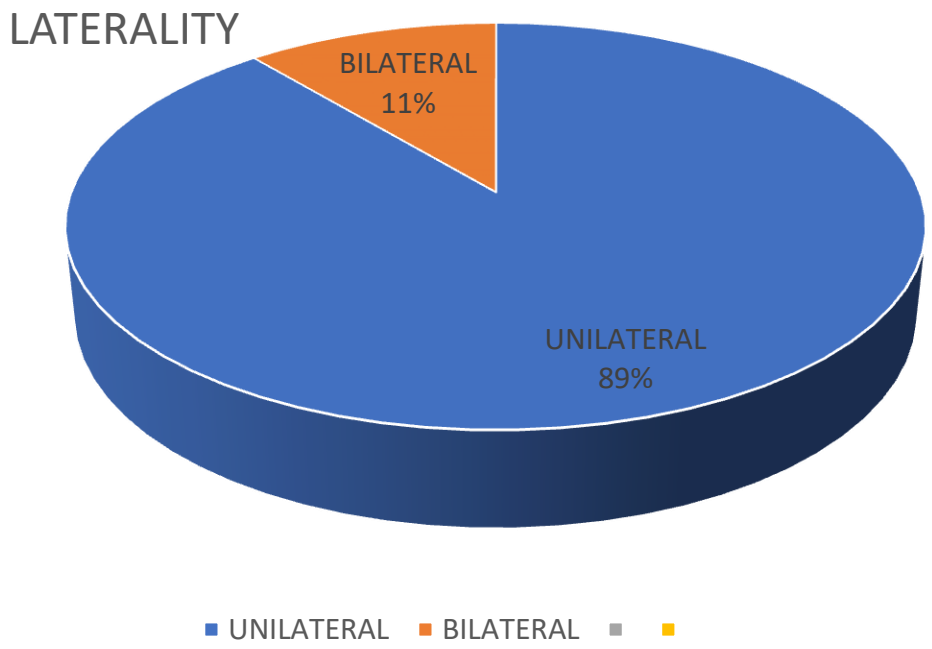
Total number of patients included : 18
Total number of eyes studied : 20
Mean age : 45.2 ± 14.72

	NUMBER	PERCENTAGE
MALES	10	56 %
FEMALES	8	44 %

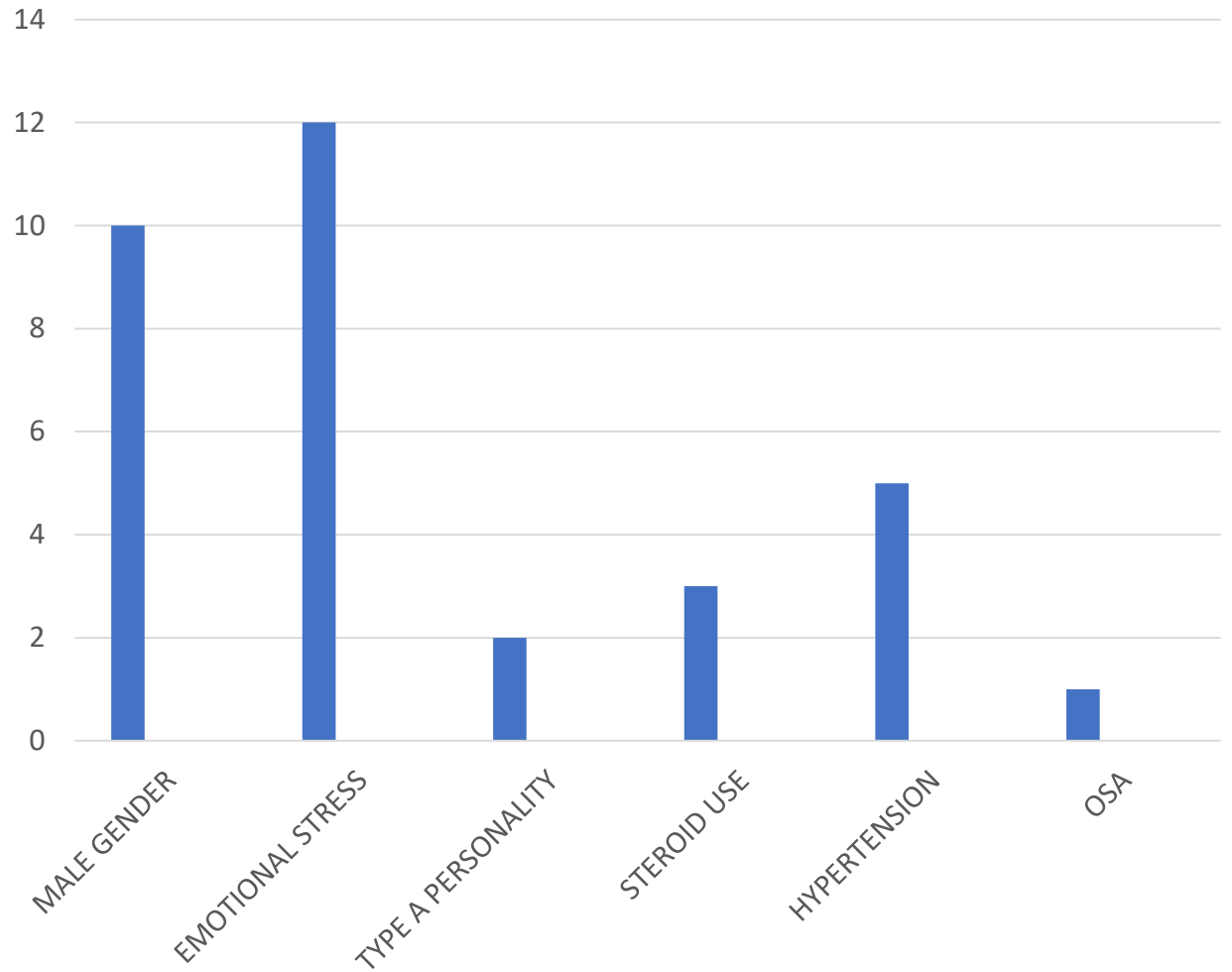


LATERALITY

LATERALITY	NUMBER	PERCENTAGE
UNILATERAL	16	89 %
BILATERAL	2	11 %

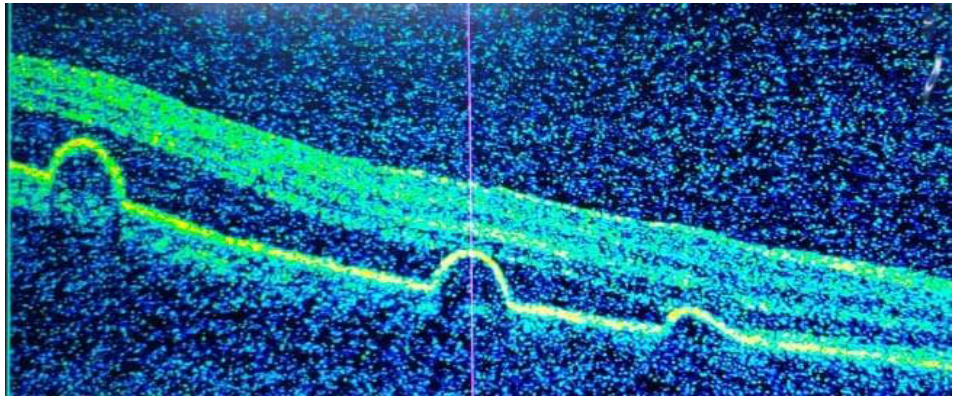


Risk factors	Number	Percentage
Male	10	50%
Emotional stress	12	60%
Type A personality	2	10%
Steroid Use	3	15%
Hypertension	5	25%
Obstructive Sleep Apnoea	1	5%

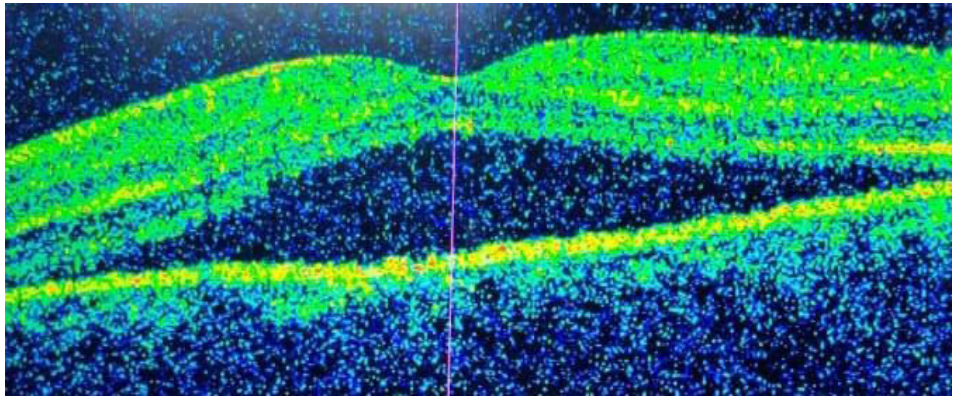


- Mean Central macular thickness : 416.85 microns ± 89.29

	NUMBER	PERCENTAGE
PED	10	50%
SUB RETINAL DEPOSITS	2	10%



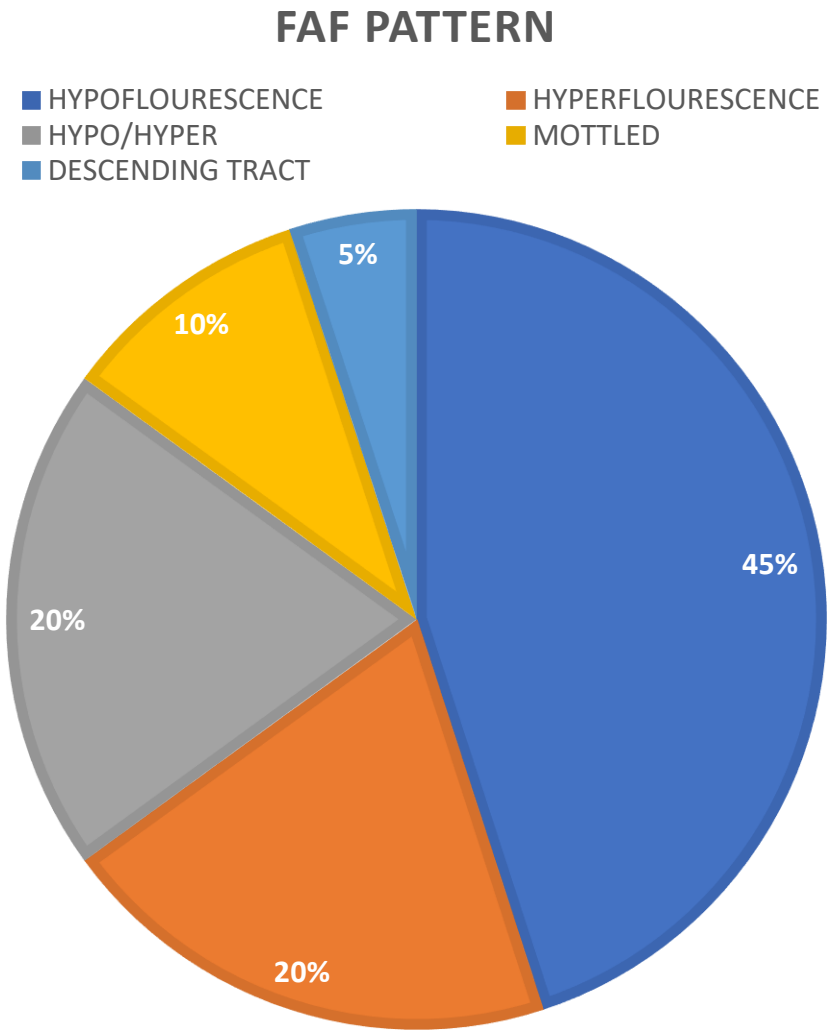
SD OCT image showing multiple PED



SD OCT image showing serous detachment with intact EZ

FAF Pattern

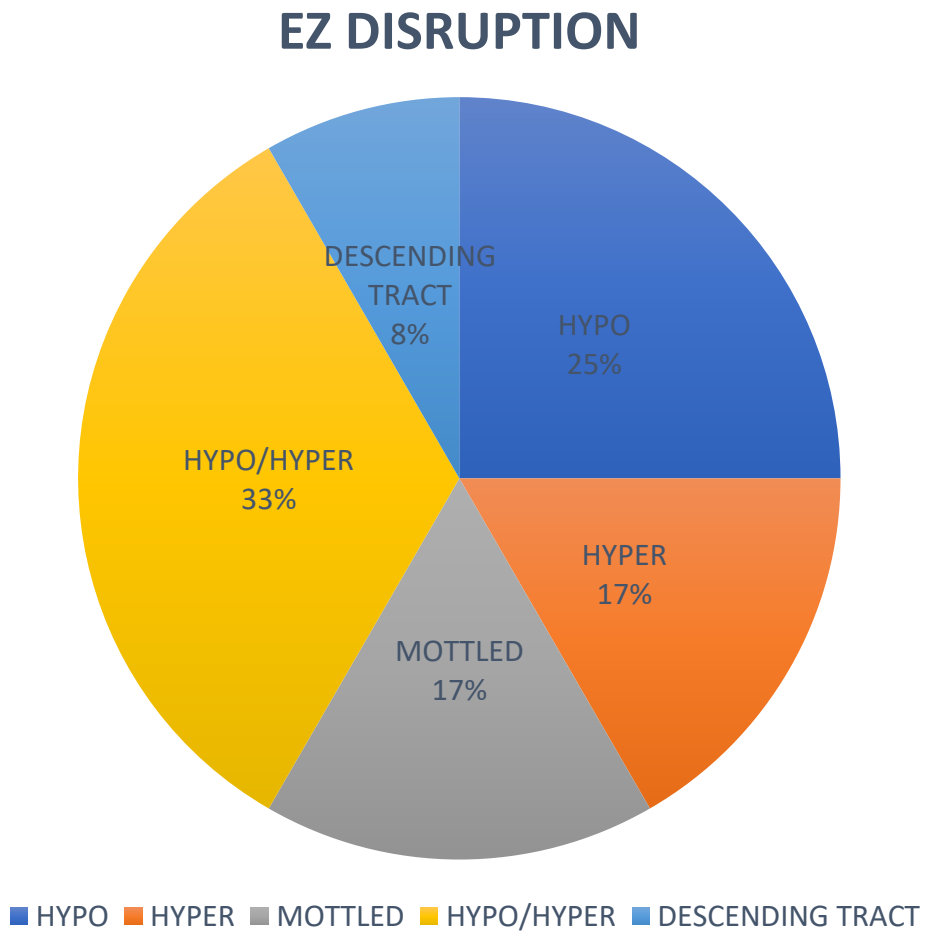
FAF PATTERN	NUMBER OF EYES	PERCENTAGE
HYPOFLUORESCENCE	9	45%
MOTTLED	2	10%
HYPER/HYPO	4	20%
HYPERFLUORESCENCE	4	20%
DESCENDING TRACT	1	5%



- Average visual acuity : logMAR 0.35 ±-0.31

FAF PATTERN	AVERAGE VISUAL ACUITY
HYPOFLUORESCENCE	0.1 ±0.12
HYPERFLOURESCENCE	0.35 ±0.1
MOTTLED	0.45 ±0.21
HYPO/HYPER	0.6 ±0.0
DESCENDING TRACT	1.0 ±0.0

FAF PATTERN	ELLIPSOIDAL LAYER DISRUPTION	PERCENTAGE
HYPOFLUORESCENCE	3	25%
HYPERFLUORESCENCE	2	17%
MOTTLED	2	17%
HYPO/HYPER	4	33%
DESCENDING TRACT	1	8%



FAF PATTERN	AVERAGE DURATION OF SYMPTOMS
HYPOFLUORESCENCE	11.66 ± 4.41
HYPERFLUORESCENCE	19 ± 2.71
MOTTLED	19 ± 1.41
HYPO/HYPER	48.75 ± 14.4
DESCENDING TRACT	60 ± 0.0

Discussion

- Fundus autofluorescence imaging is an imaging method that allows topographic mapping of lipofuscin distribution in the RPE as well as of other fluorophores that may occur with the disease of the outer retina and the subneurosensory retinal space [2]
- In the study by Han et al ,most observed FAF pattern was blocked /Hypo FAF 38.9% followed by hyperfluorescence 30% [3], which is comparable with our study where hypoFAF was seen in 45% followed by HyperFAF in 20%
- There was a difference in the duration of symptoms according to the FAF patterns. The blocked FAF (7.8 ± 20.4 days) showed the shortest duration of symptoms and descending tract (163.8 ± 183.5 days) ($P<0.05$).

- In our study also hypoautoflourescence had least duration of symptoms with average being 11.66 ± 4.41 days and descending tract had maximum duration with average being 60 days
- Lee et al reported FAF patterns in CSC according to the course of the disease. They analyzed the FAF findings by dividing the patients with CSC into acute, chronic, and sequela. They observed hyper FAF, hypo FAF, or minimal changes at acute CSC and discrete hyper FAF dots or descending tract at chronic CSC.[4]

- Similarly intact EZ of the SD-OCT images seemed to be more pronounced with the blocked, and hyper FAF than mottled ,hyper/hypo FAF and descending tract (P <0.05)

- In this study better visual acuity was seen among blocked FAF ,probably due to intact EZ and shorter duration of symptoms
- Least visual prognosis was seen in patients with Hypo/hyper and descending tract FAF probably due to Long duration and disrupted EZ.
- Similar results were obtained in the study conducted by results were reported by Imamura et al where intact EZ of the SD-OCT images seemed to be more pronounced with the blocked, and hyper FAF than mottled ,hyper/hypo FAF and descending tract ($P < 0.05$)[5]
- Limitations of this study includes the smaller sample size
- And the duration of symptoms were entirely based on the recall capacity of the patient
- Being a cross sectional study the evolution of FAF patterns with the disease progression could not be evaluated

Conclusion

- Fundus Autofluorescence imaging can be used as a supplementary non invasive tool to investigate patients with Central serous chorioretinopathy ,to evaluate the chronicity and further treatment plan
- This study showed that the FAF patterns corresponded to the integrity of EZ and correlated with chronicity and visual acuity.
- Further prospective studies with a large sample size will be beneficial

References

1. Wang M, Munch IC, Hasler PW, Prünte C, Larsen M. Central serous chorioretinopathy. Acta Ophthalmol (Copenh). 2008;86(2):126-145.
2. Liew G, Quin G, Gillies M, Fraser-Bell S. Central serous chorioretinopathy: a review of epidemiology and pathophysiology. Clin Experiment Ophthalmol. 2013;41(2):201-214.
3. Han J, Cho N S, Kiyoung K, Eung S K, Dog K, Joon M K,Seung Y Y, Patterns in Central Serous Chorioretinopathy, Retina :The Journal Of Retinal And Vitreous Diseases ,2020; 40:1387–1394.
4. Lee WJ, Lee JH, Lee BR. Fundus autofluorescence imaging patterns in central serous chorioretinopathy according to chronicity. Eye (Lond) 2016;30:1336–1342.
5. Imamura Y, Fujiwara T, Spaide RF. Fundus autofluorescence and visual acuity in central serous chorioretinopathy. Ophthalmology 2011;118:700–705.

6. Wang M, Munch IC, Hasler PW, et al. Central serous chorioretinopathy,Acta Ophthalmol 2008;86:126–145.

7. Ho IV, Yannuzzi L. Chronic central serous chorioretinopathy and fundus autofluorescence. Retin Cases Brief Rep 2008;2:1–5.