rco2025.0850221

Hyperreflective Foci as a biomarker in Central Serous ChorioRetinopathy (CSCR)

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Background

The exact pathophysiology, natural history and outcomes of central serous chorioretinopathy (CSCR) are poorly understood. There is variable vision improvement with conservative management, while effective treatment options are limited. OCT scans allows identification of various biomarkers, Hyper Reflective Foci (HRF) have been reported in CSCR but their influence on the outcome is not established.

This study evaluates prevalence of HRF and their evolution in patients with CSCR attending routine NHS eye clinics at a large teaching hospital.

Methods:

59 Patients first seen between October 2016 and March 2018 with a diagnosis of CSCR were retrospectively identified by Medisoft Audit suite (Medisoft, UK). Patients with misdiagnoses (3), missing data (1), confounding-pathologies and with less than 12 months follow-up (1) were excluded.

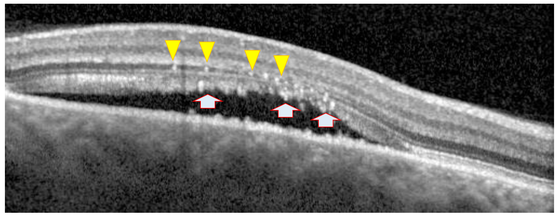
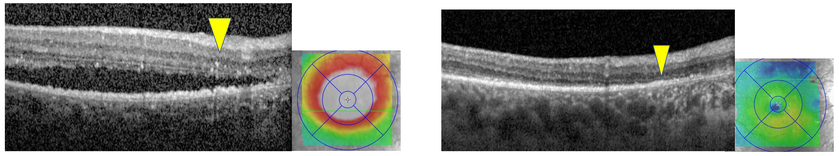


Figure 1: *Hyper reflective foci in inner segments and Outer nuclear layer (arrowheads) around external limiting membrane are distinct to those in the elongated photoreceptors (arrows).*

55 eligible patient's demographic data, habitual visual acuity VA and OCT scans from bassline to final follow up were available for analysis. OCT scans of each patient were assessed for qualitative presence of HRF in the photoreceptor layers, in the inner segment IS and the outer nuclear layer ONL at baseline and at last follow up visit. Presence or absence of outer retinal atrophic changes were recorded and correlated to the areas of HRF on the baseline OCT scan.

Figure 2*: OCT scan of a CSCR patient at base line (left) with HRF (arrowhead) in ONL IS area and OCT scan on follow up (right) showing thinning of outer retinal layers (arrowhead)*



Results:

55 eyes of 55 patients with new presentation of CSCR (M=42, F=13; mean age 48 years) who were managed conservatively at the outset were included in this study. The mean visual acuity for all patients at baseline was 71±18 letters.

There was very good concordance in identification of HRF by two assessors for 49 out of 50 eyes assessed independently.

	Baseline	OR thinning at final FU	No OR thinning at Follow up
HRF	35	32	2
No HRF	19	0	19

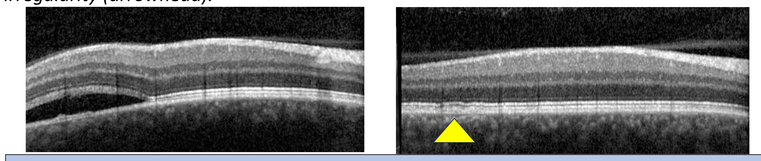
Table 1: *data showing presence or absence of HRF on baseline OCT scan in patients presenting with CSCR, and presence or absence of outer retinal (OR) thinning at follow up. Presence of baseline HRF and association of OR thinning was statistically significant. P<0.0001 Chi Square*

35 eyes (64%) had hyperreflective foci (HRF) in the inner segment zone of the photoreceptors in the vicinity of ELM and ONL, while 19 eyes (36%) had no HRF at baseline at baseline at the base line. HRF had resolved in all 35 eyes at final follow up coinciding with resolution of CSCR.

On follow up OCT scans, in 32 of the 35 eyes (91%) with HRF, Outer retina (OR) thickness- that comprises of the photoreceptors (PR) -was thinned in areas where HRF were noted on baseline. One of these eyes with HRF, had diffuse thinning of the PR layer on resolution of CSCR.

19 eyes without HRF at the baseline had normal photoreceptor layer thickness on follow up OCT scans.

Figure 3. *: OCT scan of a CSCR patient at base line (left) without HRF and OCT scan on follow up (right) showing resolution of CSCR without thinning of outer retinal layers, except minimal RPE irregularity (arrowhead).*



Discussion:

OCT has been invaluable tool in diagnosis and management of CSCR, a number of OCT biomarkers have been well documented [1,2]. Previous reports have looked at predictive features of a number of these with variable results, including SRF volume & duration, Pigment epithelium detachment, etc[1-3]. We observed presence of HRF in the area of retinal IS and ONL was associated with outer retinal atrophy (thinning) at follow up on resolution of fluid, unlike the eyes without HRF at baseline. We hypothesise significant metabolic deregulation resulting in metabolic byproducts (HRF) that lead to apoplectic PR loss on resolution.

Presence of retinal and choroidal HRF have been reported previously[4-6] but to our knowledge this is first report of retinal HRF in CSCR as predictive biomarker for (OR) photoreceptor loss on follow up that can be visually significant. This may open the ways of identifying and managing patients with CSCR and HRF differently than those without it.

Conclusions:

In CSCR, presence of HRF in photoreceptor layers on OCT scans is associated with subsequent atrophy of photoreceptors. The photoreceptor layer HRF can be a useful predictive biomarker in CSCR. Further studies on HRF are needed to confirm its value as a biomarker in CSCR..

References:

1. Vision outcome in patients with central serous chorioretinopathy (CSCR) – a real-life study. Dolly, Hazel , Ghnchi F, Euretinal 2019. Paris
2Central serous chorioretinopathy: A review Fung et al Clin Experiment Ophthalmol. 2023;51:243–270.
3. Correlation between baseline retinal microstructures in spectral-domain optic coherence tomography and need for early intervention in central serous chorioretinopathy .Lai W-Y et alLai W-Y, et al. BMJ Open Ophth 2017;2:e000054.
4. Autofluorescent hyperreflective foci on infrared autofluorescence adaptive optics ophthalmoscopy in central serous chorioretinopathy , Vienola KV et alAmerican Journal of Ophthalmology Case Reports 28 (2022) 101741
5. Choroidal hyperreflective dots in CSC Hanumunthadu, *et al.*: Indian J Ophthalmol 2019;67:1850-4.
6. Kaplan FB et al. Prognosis evaluation with optical coherence tomography in chronic central serous chorioretinopathy. Prognosis evaluation with optical coherence tomography in chronic central serous chorioretinopathy, Photodiagnosis and Photodynamic Therapy, 42, 2023, 103552,