From Malaria to Maculopathy:An Unusual Bilateral CSCR Presentation

Abstract

Introduction

Central Serous Chorioretinopathy (CSCR) is characterized by serous detachment of the neurosensory retina and typically affects young to middle-aged males. It is rarely seen in young females and may follow systemic illnesses such as malaria. Early diagnosis can be difficult when classical fundus changes are absent.

Material and Methodology

A 20 year old female presented to the out patient department of the ophthalmology department of Maharani Laxmi Bai Medical College, Jhansi with the complaint of mild blurring of vision and perception of distorted lines in both eyes since last 10 days.With history of Malaria positive,following the administration of chloroquine,the patient developed macular changes that were subsequently diagnosed as acute Central serous Chorioretinopathy based on optical coherence tomography findings. A detailed ocular and systemic examination was performed.

Conclusion

Central Serous Chorioretinopathy may rarely present atypically in young females following malaria and treatment with quinoline antimalarial drugs such as Chloroquine. Normal early fundus findings may delay diagnosis; therefore, a high index of suspicion and timely OCT evaluation are essential for early detection and monitoring. Associated choroiditis may suggest an inflammatory component, while chloroquine-related retinal toxicity should also be considered in such cases.

Introduction

Chloroquine acts as both an antimalarial and anti-inflammatory agent. Its antimalarial effect results from inhibition of heme detoxification within the food vacuole of the malaria parasite, leading to accumulation of toxic heme and parasite death.[1] Its anti-inflammatory action is mediated through alteration of lysosomal pH, resulting in reduced antigen presentation and decreased inflammatory cytokine activity.[2]

Although generally well tolerated in short-term therapy, chloroquine may produce systemic adverse effects involving the gastrointestinal, cardiovascular, neuromuscular, and central nervous systems, particularly with prolonged or high-dose use.[3]

Ocular toxicity is a significant adverse effect due to the drug's affinity for melanin-containing ocular tissues.[1] Chloroquine retinopathy results from accumulation within retinal pigment epithelial cells, causing disruption of photoreceptor metabolism and progressive retinal

degeneration.[4] Advanced toxicity may manifest as the characteristic "bull's-eye" maculopathy.[1]

Case Presentation

A 20-year-old female presented to the outpatient Department of Ophthalmology at Maharani Laxmi Bai Medical College with complaints of mild blurring of vision and perception of distorted lines in both eyes for the past 10 days.

The patient was apparently asymptomatic 10 days prior to presentation, following which she developed sudden-onset, painless diminution of vision in both eyes, associated with metamorphopsia. There was no history of ocular pain, redness, photophobia, flashes, or floaters. No significant family history or relevant past ocular history was present.

The patient gave a history of psychological stress preceding the onset of symptoms. She had suffered from malaria 15 days prior to presentation and had received antimalarial therapy ie she was immediately treated by a local physician with 2500 mg of chloroquine over 3 days, followed by 15 mg of primaquine daily over 14 day.There was no history of similar ocular complaints in the past.She denied any history of corticosteroid intake, hypertension, hyperlipidemia, diabetes mellitus, coronary artery disease, or ocular trauma. There was also no history of any previous systemic surgical intervention.

On examination ,

	Right eye	Left eye
Visual Acuity	6/6	6/6
Best Corrected Visual Acuity	6/6	6/6
Perception Of Light	Present	Present
Perception Of Rays	Present in all quadrants	Present in all quadrants
Orbital Margins	Intact on Palpation	Intact on Palpation
Ocular Movements	WNL in all directions of gaze	WNL in all directions of gaze
Eyelid /Eyebrows	Within normal limits	Within normal limits
Conjunctiva /sclera	Within normal limit	Within normal limit
Cornea	Clear	Clear
Anterior Chamber	Normal depth	Normal depth
Iris	Normal color / pattern	Normal color / pattern
Pupil	Round /Regular/ Reactive to light	Round /Regular/ Reactive to light
Lens	Greyish Black reflex	Greyish Black reflex
Fundal Glow	Good	Good
Intra ocular pressure	11mmhg	11mmhg

On fundus examination ,

Initially on first visit the fundus examination was normal on 26/06/25 .

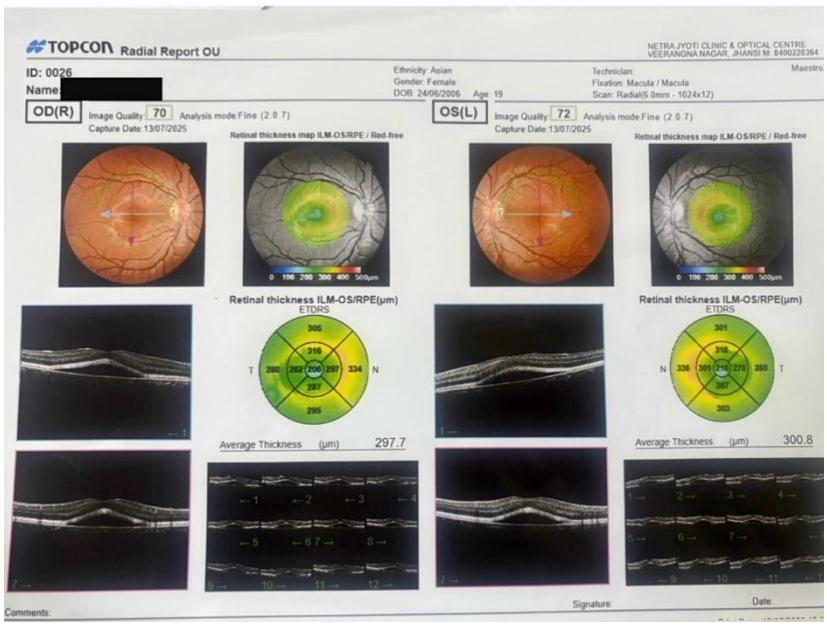
On 1st follow up ,

Fundus examination(Fig1): Both eye disc margin clear with CDR 0.3-0.4 ,withmaculaappears elevated with large choroidotic patch seen superiotemporaly in Left eye with both eye normal blood vessels , rest background , and right eye periphery . Suggestive of both eye CSCR . On **Optic coherence Tomography**(Fig 2) revealed serous elevation of both eye neurosensory retina.An Amsler grid test , color vision , was normal . MRI brain with orbit was also normal. **Visual Evoke Test** (Fig 3) was suggestive of Bilateral Visual Path Dysfunction (R>L)

A diagnosis of unilateral CSCR was established, and she was referred for systemic evaluation by an internist. Vital parameters were within normal limits, and neurological, musculoskeletal, and psychiatric evaluations were unremarkable, although a comprehensive neuropsychiatric assessment was undertaken. All medications were discontinued.
Progressive improvement in visual acuity was observed, along with resolution of the neurosensory retinal detachment. At 6 weeks of follow-up, the patient achieved an uncorrected distance and near visual acuity of 6/6 in both eyes, and OCT revealed no residual abnormalities.

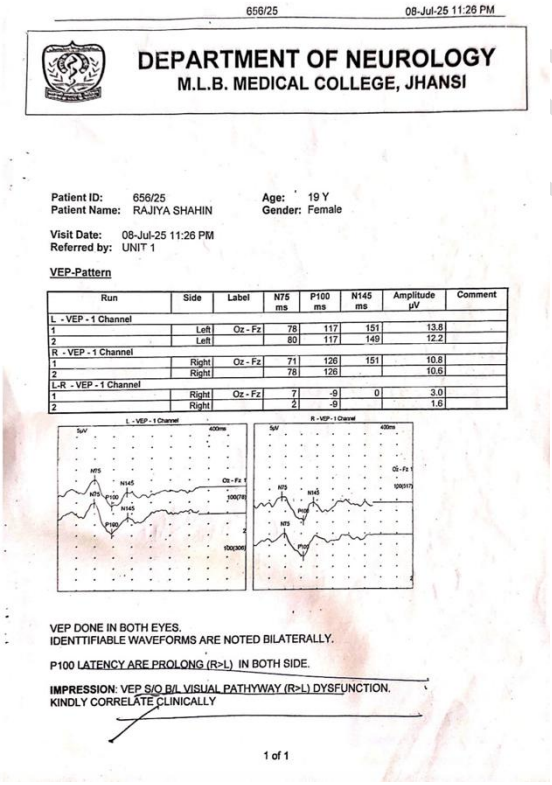
Fig 1,OD OS

Fundus with site of leak showing gross elevation of neurosensory retina that includes the entire macula and reaches close to the temporal border of the disc.



78 Fig2

79 Optical coherence tomography showing the elevation of neurosensory retina.


656/25 08-Jul-25 11:26 PM

DEPARTMENT OF NEUROLOGY
M.L.B. MEDICAL COLLEGE, JHANSI

Patient ID: 656/25 **Age:** 19 Y
Patient Name: RAJIYA SHAHIN **Gender:** Female

Visit Date: 08-Jul-25 11:26 PM
Referred by: UNIT 1

VEP-Pattern

Run	Side	Label	N75 ms	P100 ms	N145 ms	Amplitude µV	Comment
L - VEP - 1 Channel							
1	Left	Oz - Fz	78	117	151	13.8	
2	Left		80	117	149	12.2	
R - VEP - 1 Channel							
1	Right	Oz - Fz	71	126	151	10.8	
2	Right		78	126		10.6	
L-R - VEP - 1 Channel							
1	Right	Oz - Fz	7	-9	0	3.0	
2	Right		2	-9		1.6	

VEP DONE IN BOTH EYES.
IDENTTIFIABLE WAVEFORMS ARE NOTED BILATERALLY.

P100 LATENCY ARE PROLONG (R>L) IN BOTH SIDE.

IMPRESSION: VEP S/O B/L VISUAL PATHYWAY (R>L) DYSFUNCTION.
KINDLY CORRELATE CLINICALLY

1 of 1

80

81 Fig3

82

Discussion

Based on our review of the available literature, this appears to represent one of the earliest documented reports of bilateral central serous chorioretinopathy (CSCR) temporally associated with chloroquine therapy. [5] Following cessation of the medication, the patient demonstrated progressive anatomical and functional recovery, with complete resolution of sub-retinal fluid and restoration of normal visual acuity on serial optical coherence tomography (OCT).[6]

Although chloroquine-associated retinal toxicity has been extensively described in the form of pigmentary retinopathy, photoreceptor degeneration, and retinal pigment epithelium (RPE) dysfunction following prolonged exposure, its association with acute CSCR remains exceedingly uncommon and poorly characterized[7]. In the present case, the close temporal correlation between chloroquine administration and the onset of visual symptoms raises the possibility of a drug-induced chorioretinal adverse effect.

Alternative aetiologies for CSCR were systematically excluded. The patient denied corticosteroid exposure and did not exhibit systemic hypertension, significant psychiatric illness, or other established predisposing factors conventionally implicated in CSCR.[8] Neurological, musculoskeletal, and psychiatric evaluations were unrevealing. Furthermore, the gradual spontaneous resolution of symptoms after withdrawal of the medication further strengthens the likelihood of a causal association.

The precise pathophysiological basis underlying chloroquine-associated CSCR remains speculative; however, several biologically plausible mechanisms may account for this phenomenon. CSCR is currently understood to arise primarily from choroidal vascular dysregulation, characterized by increased choroidal hydrostatic pressure, venous congestion, and choroidal hyperpermeability. These alterations overwhelm the fluid transport capacity of the RPE, resulting in reversal of the normal transretinal fluid gradient and subsequent accumulation of sub retinal fluid beneath the neurosensory retina[9].

Chloroquine possesses a well-recognised propensity to accumulate within melanin-rich ocular tissues, particularly the RPE and choroid. Intracellular accumulation may disrupt lysosomal enzymatic activity, autophagic pathways, and mitochondrial metabolism, thereby impairing the integrity and pumping function of the RPE. Dysfunction of the outer blood-retinal barrier may consequently facilitate serous neurosensory retinal detachment characteristic of CSCR.[7]

In addition, chloroquine has been implicated in vascular and autonomic dysregulation that may contribute to choroidal circulatory instability.[11]Transient disturbances in choroidal auto regulation and autonomic imbalance may increase vascular permeability and fluid extravasation across the choriocapillaris, thereby precipitating serous retinal detachment.[9]Suchdisturbances may arise secondary to autonomic imbalance, particularly excessive sympathetic activation or diminished parasympathetic modulation, leading to increased choroidal vascular permeability and fluid extravasation across the choriocapillaris.

In this context, chloroquine-induced neurotoxicity involving autonomic pathways regulating ocular perfusion represents a plausible contributory mechanism. Transient dysfunction

affecting the Edinger–Westphal nucleus, ciliary ganglion, or hypothalamic afferent pathways such as the suprachiasmatic nucleus could theoretically impair parasympathetic control of choroidal blood flow. Resultant dysautonomia may precipitate bilateral alterations in choroidal vascular tone and hydrostatic dynamics, thereby predisposing to serous retinal detachment.

Furthermore, chloroquine has been associated with neuropsychiatric manifestations including anxiety, insomnia, and autonomic instability, all of which may potentiate endogenous catecholaminergic and corticosteroid-mediated pathways implicated in CSCR pathogenesis. Although overt psychiatric abnormalities were absent in the present case, subclinical neuroendocrine dysregulation cannot be entirely excluded.

The bilateral manifestation observed in this patient may indicate diffuse choroidal susceptibility or systemic autonomic involvement rather than localised retinal toxicity alone. Despite systemic exposure to the offending agent, asymmetric or variable ocular involvement has been documented in both idiopathic and drug-associated CSCR, suggesting that individual choroidal susceptibility may modulate disease expression.

This case underscores the necessity of recognising chloroquine as a potential precipitating factor in patients presenting with acute serous macular detachment, particularly in the absence of conventional risk factors. Prompt identification and withdrawal of the offending agent may facilitate favourable visual and anatomical outcomes while preventing unnecessary investigations and prolonged morbidity.

Conclusion

This case highlights a rare but clinically significant association between chloroquine therapy and the development of bilateral central serous chorioretinopathy (CSCR). Although chloroquine is classically associated with chronic retinal toxicity, the present report suggests that it may also precipitate acute reversible chorioretinal dysfunction through mechanisms involving retinal pigment epithelium impairment, choroidal vascular hyperpermeability, and autonomic dysregulation.

The temporal relationship between drug exposure and symptom onset, absence of conventional CSCR risk factors, and complete anatomical and functional recovery following discontinuation of chloroquine collectively support a probable causal association. This report further emphasises the importance of considering medication-induced CSCR in patients presenting with acute visual disturbances after antimalarial therapy.

Early recognition, prompt withdrawal of the offending agent, and multimodal retinal imaging, particularly optical coherence tomography, are essential for accurate diagnosis and favourable visual prognosis. Further studies are required to elucidate the exact pathophysiological mechanisms underlying chloroquine-associated CSCR and to determine whether certain individuals possess increased susceptibility to this uncommon adverse effect.

References

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