



Original Article

Ophthalmic Evaluation of Patients Presenting with Headache: Clinical Spectrum and Detection of Posterior Cerebral Artery Infarction through Visual Field Assessment

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ABSTRACT

Background: Headache is a common presenting complaint in ophthalmic practice and may be associated with refractive, ocular hypertensive, or neuro-ophthalmic causes. Visual field assessment can provide an important anatomical clue when ocular examination does not adequately explain visual symptoms.

Objective: To describe the spectrum of ophthalmic findings among patients presenting with headache and to highlight the diagnostic contribution of visual field assessment in detecting posterior cerebral artery (PCA) territory infarction.

Methods: A retrospective descriptive analysis was performed among 50 patients evaluated for headache in the Department of Ophthalmology, M.B.S. Hospital, Government Medical College, Kota, Rajasthan, during 2026. Clinical and ophthalmic assessment was performed in all patients. Patients with raised intraocular pressure or suspected raised intracranial pressure underwent appropriate further evaluation. In the patient with visual field loss, corrected visual acuity, automated Humphrey 24-2 perimetry, non-contrast computed tomography (NCCT) of the head, electrocardiography, neurological examination and available laboratory investigations were reviewed.

Results: Among 50 patients evaluated for headache, 42 (84%) had refractive error, 5 (10%) had raised intraocular pressure, 2 (4%) had raised intracranial pressure/papilledema, and 1 (2%) had homonymous visual field loss. In the latter patient, corrected visual acuity was 6/24 in the right eye and 6/36 in the left eye. Automated perimetry demonstrated extensive homonymous visual field loss, while NCCT showed a large wedge-shaped hypodense lesion in the left medial temporo-occipital region consistent with an acute left PCA-territory infarct. Total cholesterol was 245 mg/dL, LDL cholesterol 187 mg/dL and HDL cholesterol 28 mg/dL. Motor and sensory examinations were normal, MMSE score was 30, and no aphasia or dysarthria was documented.

Conclusion: Most patients presenting with headache had common ophthalmic causes, particularly refractive error. However, targeted visual field assessment identified a clinically important homonymous defect in one patient and prompted anatomical correlation with a PCA-territory infarct. Careful ophthalmic and neuro-ophthalmic evaluation of headache may therefore help identify uncommon but potentially serious neurological disease.

Keywords: headache; posterior cerebral artery infarction; homonymous hemianopia; automated perimetry; visual field defect; neuro-ophthalmology.

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INTRODUCTION

Headache is frequently encountered in ophthalmic practice and may accompany common ocular conditions as well as neuro-ophthalmic and intracranial disease. A structured ocular examination can identify refractive error, raised intraocular

pressure and papilledema, while visual field testing becomes particularly important when the pattern of visual dysfunction suggests a lesion beyond the eye.

Homonymous hemianopia localizes pathology posterior to the optic chiasm and, in adults, stroke is its most common cause. Visual field characteristics and associated neurological findings can help localize the responsible retrochiasmal lesion.[1] Acute homonymous visual field loss may therefore represent cerebral ischaemia and should prompt appropriate neuroimaging and stroke evaluation.[2] Visual problems after stroke are common and can substantially affect reading, navigation, mobility and activities of daily living.[3-6]

The present retrospective analysis was undertaken to describe the ophthalmic findings among patients presenting with headache and to highlight the diagnostic role of automated perimetry in the patient in whom a homonymous field defect led to correlation with an acute PCA-territory infarct.

MATERIALS AND METHODS

This was a retrospective descriptive analysis of 50 patients evaluated for headache in the Department of Ophthalmology, M.B.S. Hospital, associated with Government Medical College, Kota, Rajasthan, during 2026. Clinical records were reviewed in a de-identified manner. Written informed consent for publication of the individual patient clinical information and images was obtained, and identifying information was excluded from the manuscript.

Patients presenting with headache underwent clinical and ophthalmic evaluation. The available records were reviewed for the principal ophthalmic or neuro-ophthalmic finding. Patients with raised intraocular pressure underwent further disc and gonioscopic evaluation, while patients with raised intracranial pressure/papilledema were referred for urgent neuroimaging and neurological/neuro-ophthalmological assessment. In the patient with visual field loss, neurological assessment included level of consciousness, orientation, Glasgow Coma Scale, pupillary responses, motor and sensory examination, language assessment and cognitive screening. Corrected visual acuity was recorded in both eyes. Automated perimetry was performed using a Zeiss Humphrey Field Analyzer with a Central 24-2 threshold test, SITA-Standard strategy, size III white stimulus and 31.5-asb background. NCCT of the head, electrocardiography, complete blood count, lipid profile, renal and liver biochemical parameters, coagulation studies and available infectious screening investigations were reviewed.

Data were summarized descriptively using frequencies and percentages for the 50-patient headache cohort. No inferential statistical testing was undertaken. Rehabilitation-relevant assessment in the patient with PCA infarction included functional vision, mobility and balance, activities of daily living, cognition, motor and sensory examination, and communication. Compensatory visual scanning, environmental modification, occupational-therapy-based ADL retraining, field-adapted mobility training and safety education were explained.

RESULTS

Among 50 patients evaluated for headache in the Department of Ophthalmology, refractive error was the most frequent finding in 42 (84%) patients, followed by raised intraocular pressure in 5 (10%), raised intracranial pressure/papilledema in 2 (4%), and homonymous visual field loss in 1 (2%). Refractive errors were managed with optical correction. Patients with raised intraocular pressure underwent further disc and gonioscopic evaluation and were managed according to the underlying ocular diagnosis. Patients with raised intracranial pressure/papilledema were referred for urgent neuroimaging and neurological/neuro-ophthalmological evaluation. The distribution of findings is shown in Table 1.

Table 1: Distribution of principal findings among patients presenting with headache (n=50)

Principal finding	n	%
Refractive error	42	84
Raised intraocular pressure	5	10
Raised intracranial pressure / papilledema	2	4
Homonymous visual field loss	1	2
Total	50	100

The patient with visual field loss underwent fundus examination, confrontation testing, NCCT, automated perimetry and OCT. Corrected visual acuity was 6/24 in the right eye and 6/36 in the left eye. Automated Humphrey 24-2 field maps demonstrated extensive loss affecting corresponding hemifields in both eyes, producing a homonymous pattern consistent with a retrochiasmal lesion. NCCT demonstrated a large wedge-shaped hypodense area with blurring of the grey-white matter junction in the left medial temporo-occipital lobe, reported as a likely acute infarct in the left PCA territory. An ill-defined area of encephalomalacia with gliosis in the right frontal lobe was interpreted as an old insult. No midline shift or intra-axial or extra-axial haemorrhage was identified.

FIGURES:

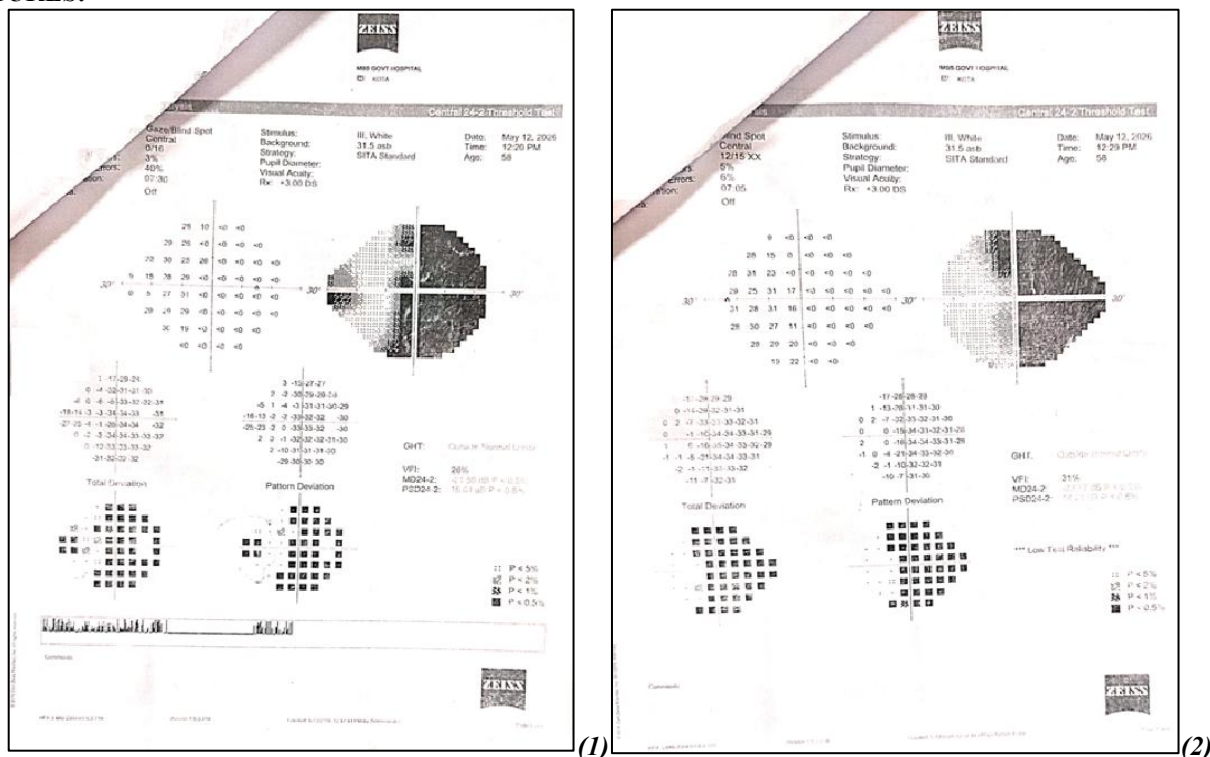


Figure 1&2: Automated Humphrey 24-2 visual field examination left (1) and right (2) eye, demonstrating marked homonymous field loss.

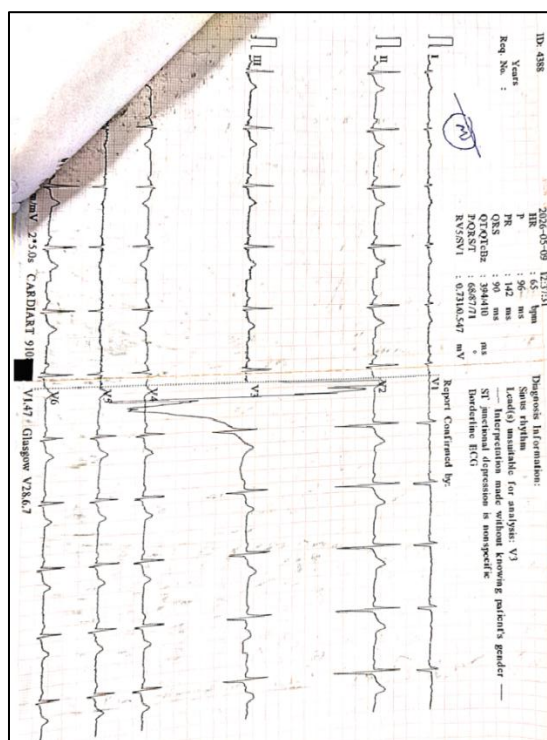


Figure 3: Electrocardiogram showing sinus rhythm with machine-reported nonspecific ST-junctional depression and borderline classification.

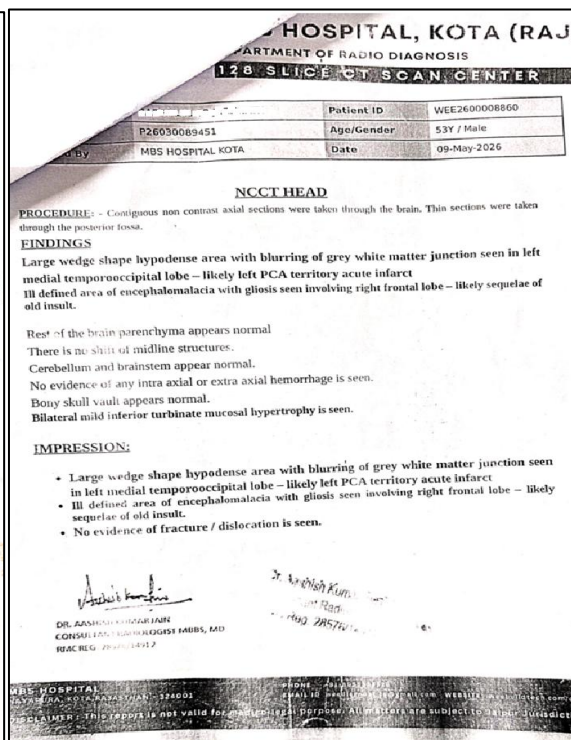


Figure 4: Non-contrast CT head showing the left medial temporo-occipital lesion reported as an acute left PCA-territory infarct, with old right frontal encephalomalacia/gliosis.

On history-taking and neurological examination, this patient was a 53-year-old chronic smoker who was conscious with altered behaviour, oriented to time, place and person, and had a Glasgow Coma Scale score of E4V5M6. Pupils were bilaterally reactive to light. Motor and sensory examinations were normal, no aphasia or dysarthria was documented, and the MMSE score was 30. Electrocardiography showed sinus rhythm at approximately 65 beats/minute with machine-

reported nonspecific ST-junctional depression and an overall borderline classification. The principal vascular-risk-related laboratory abnormalities were total cholesterol 245 mg/dL, LDL cholesterol 187 mg/dL and HDL cholesterol 28 mg/dL. Other available laboratory findings are summarized in Table 2.

Table 2: Selected laboratory investigations in the patient with PCA-territory infarction

S.No.	Investigation	Result	Interpretation in source
1	Hemoglobin	13.7 g/dL	CBC
2	WBC count	$8.43 \times 10^3/\mu\text{L}$	CBC
3	Platelet count	$215 \times 10^3/\mu\text{L}$	CBC
4	Total cholesterol	245 mg/dL	Above reference range
5	HDL cholesterol	28 mg/dL	Below reference range
6	LDL cholesterol	187 mg/dL	Above reference range
7	Triglycerides	150 mg/dL	Within reference range
8	Creatinine	1.27 mg/dL	Within reference range
9	AST	19 U/L	Within reference range
10	ALT	43 U/L	Within reference range
11	Sodium	135 mmol/L	Lower end of reference range
12	Potassium	4.3 mmol/L	Within reference range

The documented rehabilitation assessment was normal for the recorded standardized domains. Cognitive screening was normal (MMSE 30), and no motor, sensory, aphasic or dysarthric deficit was recorded. Visual compensatory strategies and safety-oriented rehabilitation measures were explained.

DISCUSSION

The principal finding of this retrospective series was that most patients presenting with headache had common ophthalmic abnormalities, particularly refractive error. Nevertheless, one of 50 patients (2%) had a homonymous visual field defect associated with an acute PCA-territory infarct. This observation underscores the value of looking beyond common ocular causes when the visual complaint or field pattern is not adequately explained by routine examination.

In the patient with PCA infarction, automated perimetry and neuroimaging showed strong anatomical concordance. A homonymous field pattern localizes the deficit posterior to the optic chiasm, and stroke is the most frequent cause of homonymous hemianopia in adults.[1] The left medial temporo-occipital lesion on NCCT was therefore consistent with the perimetric localization. Prospective stroke cohorts have demonstrated that visual field loss is a clinically important post-stroke deficit and may be under-recognized without systematic visual assessment.[3,4]

The patient was a chronic smoker and had elevated total cholesterol and LDL cholesterol with low HDL cholesterol. These findings reinforce the need for vascular risk assessment in patients with cerebral ischaemia, although this descriptive dataset cannot establish causal associations. Current acute ischaemic stroke guidance emphasizes timely evaluation and evidence-based management once stroke is suspected.[2]

Post-stroke visual field loss can interfere with reading, obstacle detection, navigation, driving, occupational performance and community mobility.[1,3] Rehabilitation should therefore consider functional vision even when limb motor examination is normal. Evidence for specific visual-field interventions remains limited, but compensatory scanning strategies and individualized rehabilitation approaches are commonly evaluated and may be considered according to functional needs.[5,6]

Stroke remains an important cause of morbidity and disability. The retained regional reference by Gupta et al. describes recurrent-stroke patients evaluated at a tertiary care hospital in Rajasthan and provides locally relevant clinical context.[7] Early diagnosis and treatment can definitely help such patients.

This study has several limitations. It was retrospective, involved only 50 patients presenting to a single ophthalmology department, and the available records did not support detailed analysis of headache phenotype, duration, demographic distribution or associations between clinical variables. Only one patient had homonymous visual field loss/PCA infarction, precluding inferential analysis of predictors or outcomes. MRI/vascular imaging and longitudinal visual-field follow-up were not available in the supplied record. Larger prospective studies with standardized headache characterization, ophthalmic examination and neuroimaging criteria are required.

CONCLUSION

Among patients presenting with headache, refractive error was the most frequent ophthalmic finding, while raised intraocular pressure and raised intracranial pressure/papilledema were less common. Importantly, automated visual field assessment identified homonymous visual field loss in one patient, with NCCT demonstrating an acute left PCA-territory

infarct. Careful ophthalmic assessment of headache, including formal perimetry when clinically indicated, can provide valuable localization and may uncover serious retrochiasmal neurological disease despite relatively preserved motor and sensory function.

AUTHOR CONTRIBUTIONS

Dr Nahar Singh supervised and guided the clinical work and manuscript preparation. Dr Priyank Sharma performed the neurological examination. Dr Anushka Gupta acquired the clinical data, performed the ophthalmological assessment and drafted the manuscript. All authors reviewed and approved the final manuscript.

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