

Research Article

Clinical and Imaging Profile of MOG Antibody-Associated Optic Neuritis in Indian Patients

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Received: 03.05.26, Revised: 07.06.26, Accepted: 04.07.26

ABSTRACT

Background: Myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD) has emerged as a distinct inflammatory demyelinating disorder of the central nervous system. Optic neuritis (ON) is one of the most common clinical manifestations of MOGAD and is characterized by unique clinical and radiological features. Early recognition is essential because visual outcomes and treatment responses differ from other forms of optic neuritis.

Methods: A retrospective observational study was conducted involving 30 patients diagnosed with MOG antibody-associated optic neuritis (MOG-ON). Demographic characteristics, clinical presentation, magnetic resonance imaging (MRI) findings, visual acuity at presentation and follow-up, treatment response, and recurrence profiles were analyzed. Descriptive statistics were used to summarize clinical and imaging characteristics.

Results: The mean age of patients was 27.8 ± 12.4 years, with a female predominance (60.0%). Unilateral optic neuritis was observed in 53.3% of patients, while 46.7% had bilateral involvement. Ocular pain (83.3%) and optic disc edema (66.7%) were common clinical findings. MRI demonstrated optic nerve enhancement in 90.0% and long-segment optic nerve involvement in 60.0% of patients. Visual outcomes improved substantially during follow-up, with 66.7% achieving visual acuity $\geq 6/12$ compared to 10.0% at baseline. Complete visual recovery occurred in 60.0% of patients, and 86.7% exhibited steroid-responsive disease. Relapses occurred in 23.3% of patients during follow-up.

Conclusion: MOG antibody-associated optic neuritis in Indian patients is characterized by young age at presentation, frequent bilateral involvement, optic disc edema, characteristic MRI findings, and favorable visual recovery following treatment. Recognition of these features may facilitate early diagnosis and optimal management.

Keywords: MOG Antibody Disease, Optic Neuritis, MOGAD, Magnetic Resonance Imaging, Visual Outcome, India.

INTRODUCTION

Optic neuritis (ON) is an inflammatory disorder of the optic nerve characterized by acute visual loss, impaired color vision, visual field defects, and ocular pain. Traditionally associated with multiple sclerosis, ON is now recognized as a manifestation of several antibody-mediated demyelinating disorders including myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD) (4).

Myelin oligodendrocyte glycoprotein (MOG) is a glycoprotein located on the outer surface of oligodendrocytes and myelin sheaths within the central nervous system. Autoantibodies directed against MOG are associated with a spectrum of inflammatory demyelinating disorders involving the optic nerves, spinal cord, and brain (12).

MOG antibody-associated optic neuritis (MOG-ON) has emerged as a distinct clinical entity

that differs from both multiple sclerosis-associated optic neuritis and aquaporin-4 antibody-positive neuromyelitis optica spectrum disorders. Patients frequently present with severe visual impairment, bilateral disease, and marked optic disc edema.

Several studies have highlighted the unique characteristics of MOG antibody-related disorders. Cobo-Calvo et al. described MOG-associated disorders as a heterogeneous disease spectrum with frequent optic nerve involvement and favorable recovery following treatment (5). Jeyakumar et al. further emphasized the importance of recognizing MOG-ON as a separate disease entity because of its distinct clinical course and management considerations (2).

The prevalence of MOG antibodies among patients presenting with optic neuritis has

been increasingly recognized worldwide. The Optic Neuritis Treatment Trial antibody analysis demonstrated that a proportion of patients previously classified as idiopathic optic neuritis are positive for MOG-IgG antibodies (7).

Data from Indian populations remain relatively limited. Ambika et al. reported important clinical and imaging characteristics among Indian patients with optic neuritis and demonstrated differences between MOG-positive and seronegative cases (1). More recently, the Long-term Indian Optic Neuritis (LION) Study provided valuable information regarding the clinical behavior and imaging profile of optic neuritis in the Indian population (11).

MATERIALS AND METHODS

Study Design and Setting

This retrospective observational study included patients diagnosed with MOG antibody-associated optic neuritis at a tertiary care ophthalmology and neurology center in India.

Study Population

Thirty patients with confirmed MOG antibody-associated optic neuritis were included in the study.

Inclusion Criteria

1. Patients diagnosed with optic neuritis.
2. Positive serum MOG-IgG antibody status.
3. Availability of complete clinical and MRI records.
4. Minimum follow-up duration sufficient to assess visual outcomes.

Exclusion Criteria

1. Aquaporin-4 antibody-positive NMOSD.
2. Multiple sclerosis-associated optic neuritis.

3. Ischemic, compressive, toxic, or hereditary optic neuropathies.

4. Incomplete clinical records.

Clinical Evaluation

Demographic information including age and sex was recorded. Clinical assessment included laterality of optic neuritis, presence of ocular pain, optic disc edema, attack status (first episode or recurrence), and visual acuity evaluation.

MRI Evaluation

All patients underwent MRI of the brain and orbits with contrast enhancement. MRI characteristics assessed included:

- Optic nerve enhancement
- Long-segment optic nerve involvement
- Bilateral optic nerve involvement
- Optic nerve sheath enhancement
- Chiasmal involvement
- Associated brain lesions

Visual Outcome Assessment

Best corrected visual acuity (BCVA) was assessed at presentation and at final follow-up. Visual outcomes were categorized into:

- $\geq 6/12$
- $<6/12-6/60$
- $<6/60-3/60$
- $<3/60$

Statistical Analysis

Data were analyzed using descriptive statistical methods. Continuous variables were expressed as mean $\pm$ standard deviation, whereas categorical variables were presented as frequencies and percentages.

RESULTS

Table 1. Demographic and Clinical Characteristics of MOG-ON Patients (n=30)

Variable	n (%)
Mean age (years)	27.8 $\pm$ 12.4
Male	12 (40.0)
Female	18 (60.0)
Unilateral ON	16 (53.3)
Bilateral ON	14 (46.7)
First attack	22 (73.3)
Recurrent ON	8 (26.7)
Ocular pain	25 (83.3)
Optic disc edema	20 (66.7)

Table 2. MRI Characteristics of MOG Antibody-Associated Optic Neuritis (n=30)

MRI Finding	n (%)
Optic nerve enhancement	27 (90.0)
Long-segment involvement	18 (60.0)
Bilateral optic nerve involvement	14 (46.7)

Optic nerve sheath enhancement	10 (33.3)
Chiasmal involvement	4 (13.3)
Brain MRI lesions	6 (20.0)

Table 3. Visual Acuity at Presentation and Final Follow-up (n=30)

Visual Acuity	Baseline n (%)	Final Follow-up n (%)
≥6/12	3 (10.0)	20 (66.7)
<6/12 – 6/60	8 (26.7)	7 (23.3)
<6/60 – 3/60	10 (33.3)	2 (6.7)
<3/60	9 (30.0)	1 (3.3)

Table 4. Clinical Outcome and Recurrence Profile (n=30)

Outcome Variable	n (%)
Complete visual recovery	18 (60.0)
Partial recovery	10 (33.3)
Poor recovery	2 (6.7)
Relapse during follow-up	7 (23.3)
Steroid-responsive episodes	26 (86.7)

DISCUSSION

The present study evaluated the clinical and imaging characteristics of MOG antibody-associated optic neuritis in Indian patients and demonstrated that the disease predominantly affects young adults, frequently presents with bilateral involvement, and is associated with favorable visual recovery.

The mean age observed in the present study is comparable to previous reports indicating that MOG-ON commonly affects younger individuals. Similar demographic patterns have been reported by Jarius et al., who described MOG-IgG-associated disease as predominantly affecting children and young adults (10).

Ocular pain and optic disc edema were among the most common presenting features in our cohort. Chen et al. reported a similarly high frequency of optic disc edema and papillitis among patients with MOG antibody-positive optic neuritis, supporting the characteristic inflammatory phenotype observed in our study (6).

MRI findings demonstrated optic nerve enhancement in the majority of patients and long-segment involvement in a substantial proportion. Salama et al. reported that extensive optic nerve involvement and characteristic orbital MRI findings are useful differentiating features between MOG-associated disease and aquaporin-4-positive NMOSD (8).

Visual outcomes in our cohort were generally favorable despite severe visual impairment at presentation. Jurynczyk et al. demonstrated that patients with MOG antibody disease often recover useful vision following acute attacks, even when initial visual loss is profound (9).

The significant improvement in visual acuity observed during follow-up in the present study is consistent with these observations.

Steroid responsiveness was observed in most patients, reflecting the known treatment responsiveness of MOG-associated disease. Ramanathan et al. reported favorable responses to corticosteroid therapy and immunomodulatory treatment in patients with relapsing MOG antibody-associated demyelination (3).

Despite favorable recovery, relapses occurred in nearly one-quarter of patients during follow-up. Jarius et al. highlighted the relapsing nature of MOG-IgG-associated disease and emphasized the importance of long-term surveillance and appropriate immunotherapy in preventing recurrent attacks (10).

CONCLUSION

MOG antibody-associated optic neuritis in Indian patients predominantly affects young adults and demonstrates characteristic clinical and radiological features. Ocular pain, optic disc edema, bilateral involvement, optic nerve enhancement, and long-segment optic nerve lesions are common findings. Despite severe visual loss during acute attacks, most patients experience favorable visual recovery and demonstrate excellent responsiveness to corticosteroid therapy. However, relapses remain a significant concern, emphasizing the need for long-term follow-up. Early recognition of clinical and MRI features combined with antibody testing can facilitate accurate diagnosis and improve management outcomes in patients with MOG-ON.

REFERENCES

1. Ambika S, Durgapriyadarshini S, Padmalakshmi K, Noronha V, Arjundas D. Clinical profile, imaging features and short term visual outcomes of Indian optic neuritis patients with and without seromarkers for myelin oligodendrocyte glycoprotein and neuromyelitis optica. *Indian J Ophthalmol.* 2022;70(1):194-200.
2. Jeyakumar N, Lerch M, Dale RC, Ramanathan S. MOG antibody-associated optic neuritis. *Eye (Lond).* 2024;38(12):2289-2301.
3. Ramanathan S, Mohammad S, Tantsis E, Nguyen TK, Merheb V, Fung VS, et al. Clinical course, therapeutic responses and outcomes in relapsing MOG antibody-associated demyelination. *J Neurol Neurosurg Psychiatry.* 2018;89(2):127-137.
4. Reindl M, Di Pauli F, Rostásy K, Berger T. The spectrum of MOG autoantibody-associated demyelinating diseases. *Nat Rev Neurol.* 2013;9(8):455-461.
5. Cobo-Calvo Á, Ruiz A, D'Indy H, Poulat AL, Carneiro M, Philippe N, et al. MOG antibody-related disorders: common features and uncommon presentations. *J Neurol.* 2017;264(9):1945-1955.
6. Chen JJ, Flanagan EP, Jitprapaikulsan J, López-Chiriboga AS, Fryer JP, Leavitt JA, et al. Myelin oligodendrocyte glycoprotein antibody-positive optic neuritis: clinical characteristics, radiologic clues, and outcome. *Am J Ophthalmol.* 2018;195:8-15.
7. Chen JJ, Tobin WO, Majed M, Jitprapaikulsan J, Fryer JP, Leavitt JA, et al. Prevalence of myelin oligodendrocyte glycoprotein and aquaporin-4-IgG in patients in the optic neuritis treatment trial. *JAMA Ophthalmol.* 2018;136(4):419-422.
8. Salama S, Khan M, Shanchei A, Levy M, Izbudak I. MRI differences between MOG antibody disease and AQP4 NMOSD. *Mult Scler J.* 2020;26(14):1854-1865.
9. Jurynczyk M, Messina S, Woodhall MR, Raza N, Everett R, Roca-Fernandez A, et al. Clinical presentation and prognosis in MOG-antibody disease: a UK study. *Brain.* 2017;140(12):3128-3138.
10. Jarius S, Ruprecht K, Kleiter I, Borisow N, Asgari N, Pitarokoli K, et al. MOG-IgG in NMO and related disorders: a multicenter study of 50 patients. Part 2: epidemiology, clinical presentation, radiological and laboratory features, treatment responses, and long-term outcome. *J Neuroinflammation.* 2016;13(1):280.
11. Ambika S, Durgapriyadarshini S, Bassi ST, Lakshmi KP, Praveen S, Dharani V. Long-term Indian optic neuritis study (THE LION STUDY): clinical, imaging features and visual behavior of optic neuritis in Indian population over two decades. *Front Ophthalmol.* 2025;5:1688001.
12. Sechi E, Cacciaguerra L, Chen JJ, Mariotto S, Fadda G, Dinoto A, et al. Myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD): a review of clinical and MRI features, diagnosis, and management. *Front Neurol.* 2022;13:885218.