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Myelin Oligodendrocyte Glycoprotein Positive Cohort of 15 Patients: Clinical, Imaging, and Optical Coherence Tomography Characteristics

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Background

- Seropositivity for anti-myelin oligodendrocyte glycoprotein (MOG) antibodies has been increasingly recognized in pediatric patients with acute disseminated encephalomyelitis, optic neuritis, transverse myelitis and neuromyelitis optica spectrum disorder.
- This syndrome is thought to be a distinct entity from other pediatric demyelinating syndromes including multiple sclerosis, and aquaporin-4 associated neuromyelitis optica spectrum disorder.
- Whether anti-MOG syndromes are associated with favorable neurological outcomes and whether they are relapsing diseases have been debated.
- Few studies have characterized this populations' neuroimaging and optical coherence tomography (OCT) features.

Objectives

- We describe the demographic, clinical, neuroimaging, and optical coherence tomography characteristics of our anti-MOG antibody positive cohort at UT Southwestern Medical Center.

Methods

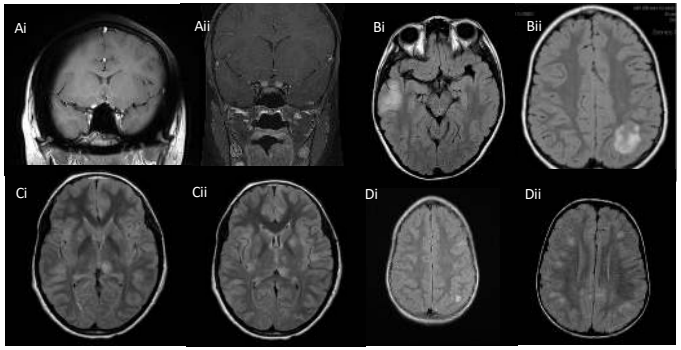
- In this retrospective chart review study, 15 pediatric patients with diagnoses including acute disseminated encephalomyelitis, optic neuritis, and NMOSD were identified as anti-MOG antibody positive through a cell-based assay of their serum samples.
- This cohorts' demographic, clinical, neuroimaging, optical coherence tomography characteristics were analyzed.
- OCT data from pediatric patients with anti-AQP4 positive optic neuritis and multiple sclerosis related optic neuritis are provided for comparison to MOG positive patients.

Results

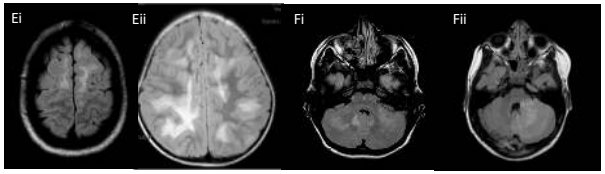
- The average age of first acute demyelinating episode was 9.5 years (range 3-17 years, SD 4.3 years).
- 12 of 15 patients were female (80%).
- 13 of 15 patients had bilateral optic neuritis/neuropathy based on clinical history and/or OCT results. 2 remaining patients had monophasic ADEM.
- Mean follow-up time was 3.93 years (SD 3.47, less than 1 year-14 years).
- OCT data

	MOG positive *	AQP4 positive **	Multiple sclerosis ***
Average RNFL	59.9 µm	60.2 µm	80.7 µm
PMB RNFL	35.4 µm	34.4 µm	42.7 µm
Macular volume	7.96 mm^3	7.87 mm^3	8.08 mm^3
Ganglion cell layer volume	0.85 mm^3	0.79 mm^3	0.86 mm^3
ETDRS Letters (high contrast)	51.6	35.1	56.75
2.5% SLOAN Low Contrast	22.25	13.9	27

- Interestingly, OCT revealed bilateral RNFL thinning in 2 patients with clinical history of unilateral optic neuritis, and in one patient with ADEM without a clinical history of optic neuritis.
- For those who had brain involvement, areas affected included thalamus, basal ganglia, cerebellum, and supratentorial white matter.
- 4 of 15 (26.7%) of these patients had evidence of a clinical and radiological relapse during follow-up period.



Examples of neuroimaging in MOG positive patients: Ai-ii) optic neuritis, Bi-ii) tumefactive lesions, Ci-ii) thalamic and basal ganglia lesions, D)i-ii well-demarcated white matter lesions, E)i-ii confluent white matter lesions, F) i-ii cerebellar lesions



Conclusions

- In our selected cohort of anti-MOG antibody positive patients, neuroimaging features overlapped with typical MS lesions but also diverged given deep gray matter involvement.
- OCT identified clinically silent RNFL thinning.
- Anti-MOG antibody positive patients have OCT characteristics that resemble patients with anti-AQP4 related optic neuritis, but they have better visual acuity.

Discussion / Future Directions

- This study highlights the utility of testing for MOG antibodies in all cases of pediatric demyelination given overlapping clinical and radiographic features with NMOSD and multiple sclerosis.
- OCT may aid in identifying subclinical optic neuropathy.
- The study is limited by small sample size, retrospective methodology, selection bias, and limited duration of follow-up.
- More research is needed to identify and characterize biomarkers in pediatric MOG related syndromes.

Disclosures

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* Based on 13 patients with bilateral optic neuritis (26 eyes total)
** Based on 8 patients, 3 with bilateral ON, 5 with unilateral ON (11 eyes total)
*** Based on 3 MOG negative MS patients, 1 with bilateral ON, 2 with unilateral ON (4 eyes total)