Neuromyelitis Optica Spectrum Disorders differ by autoantibody type, but not clinical course, between racial groups

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Background

- NMOSD is a rare, frequently disabling constellation of inflammatory CNS syndromes which may be grouped by pathogenic autoantibodies to aquaporin-4 (AQP4-IgG), myelin oligodendrocyte glycoprotein (MOG-IgG), or seronegativity to both antibodies[1,2]
- Previous analysis of NMOSD in the University of Alabama at Birmingham (UAB) neurology clinics found overrepresentation of NMOSD among Black patients, driven mainly by AQP4-IgG seropositivity, consistent with other published cohorts
- Reports on racial differences in NMOSD-related disability have been inconsistent, possibly due to small cohort sizes and regional differences in patient populations[3,4]

Methods

- All clinical records at the University of Alabama at Birmingham with an NMOSD diagnosis were found using the i2b2 search engine
- A retrospective chart review was conducted to collect demographics, BMI, antibody status, and details of the clinical course
- Patients who identified as Asian or Hispanic/Latino where excluded in this analysis due to low numbers
- Likelihood ratio Chi-square test or Fisher's Exact (FE) test used for comparisons, $p<0.05$ considered meaningful
- Kaplan-Meier survival analysis was used for non-parameteric time-to comparisons
- Analysis was completed using JMP

Results

Table: Patient Characteristics (N=121)

Gender	**N (%)**
Female	102 (84.3%)
Male	19 (15.7%)
Race	
White	31 (25.6%)
Black	73 (60.3%)
Asian	8 (6.6%)
Hispanic/Latino	2 (1.7%)
Other	7 (5.8%)
Average age at presentation	**Years (SD)**
White	46.9 (19.6)
Black	36.6 (14.3)
Other	36.2 (10.4)
Antibody Serology	
Aquaporin-4 Antibody	83 (68.6%)
Myelin Oligodendrocyte Glycoprotein Antibody	20 (16.5%)
Seronegative	18 (14.9%)

Results

Fig. 1: Antibody status by Race

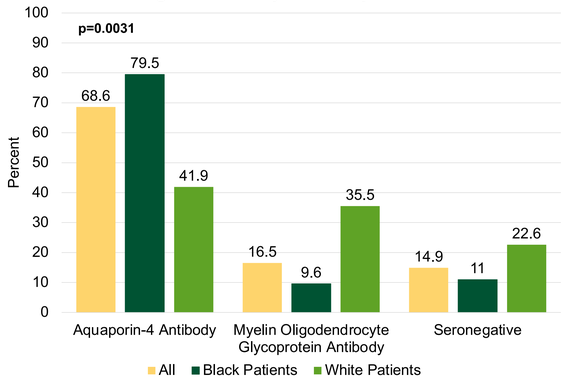


Fig. 2: Disability Status by Race

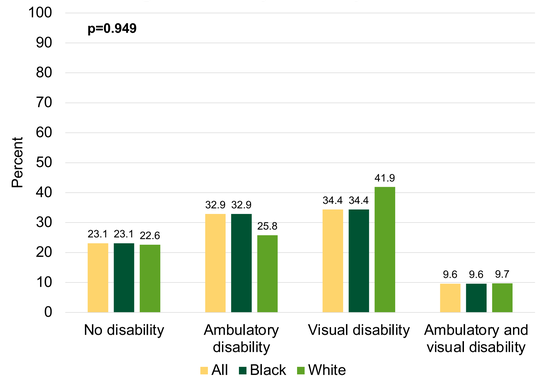


Fig. 3: Ambulatory Disability by Auto-Antibody Status

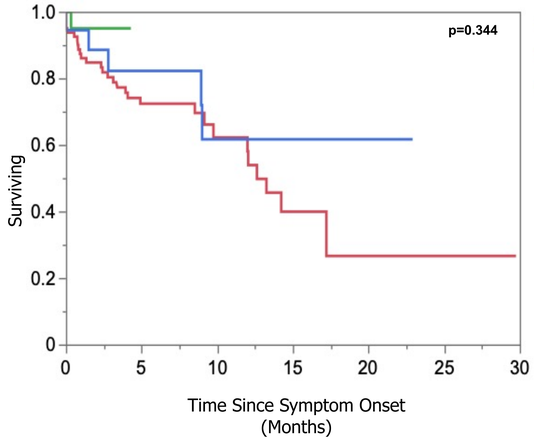


Fig. 4: Ambulatory Disability by Race

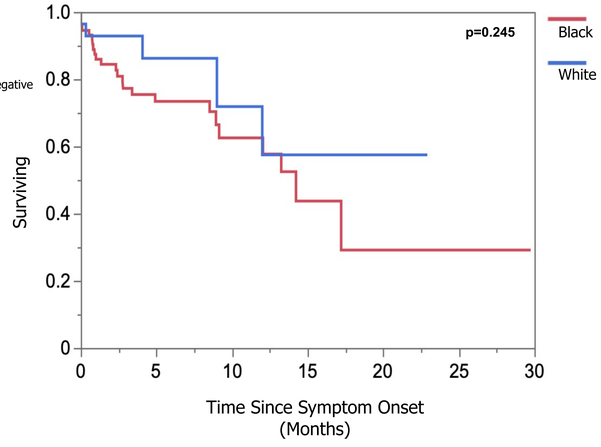


Fig. 5: Visual Disability by Auto-Antibody Status

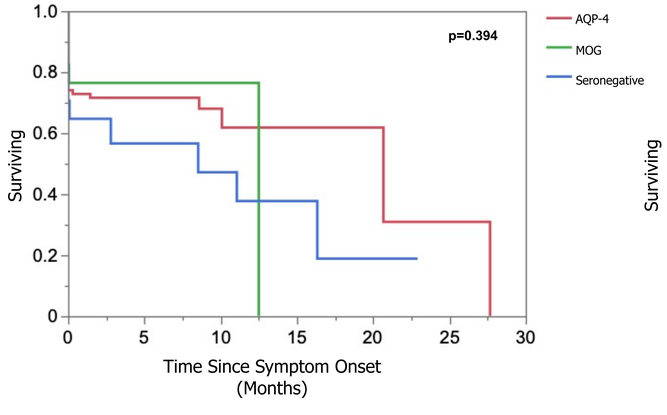
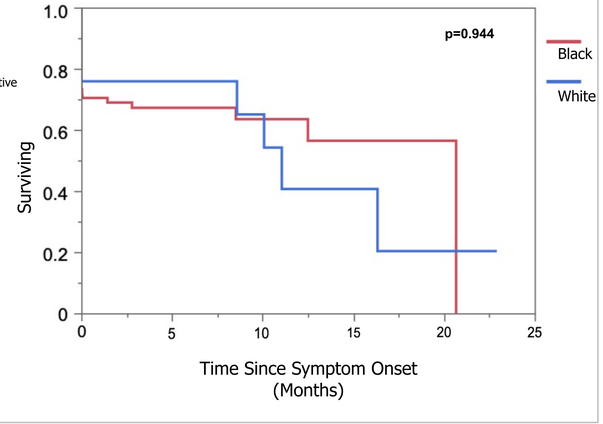


Fig. 6: Visual Disability by Race



Results

- Black patients are more likely to be AQP-4 antibody positive than white patients OR 5.4 (95% CI 2.15, 13.3), p=0.0003
- Patients who were White were more likely to be categorized as MOG-IgG positive (35.5%) or seronegative (22.6%) than patients who were Black
- White patients, 38.0 years, on average are older at diagnosis than to Black patients, 49.1 years (p=0.0026)
- No significant difference in ambulatory or visual disability was seen on Kaplan-Meier survival analysis

Conclusions

- Kaplan-Meier curve suggests a trend towards curve separation when analyzing visual disability by antibody status, but no significance was seen due to small sample size
- Racial group did not associate with overall risk of disability by functional category, nor was there suggestion of trend separation on the Kaplan-Meier curves.

Summary

- Although prevalence of NMOSD-associated antibodies differ by race, clinical presentations and disability outcome do not vary be race in this large, single cohort study

Limitations

- Findings may be different in other geographic areas of the United States
- Our population did not include enough Asian and Hispanic/Latino patients for analysis based on race

References

1. Wingerchuk DM, Hogancamp WF, O'Brien PC, Weinshenker BG. The clinical course of neuromyelitis optica (Devic's syndrome). Neurology. Sep 22 1999;53(5):1107-14. doi:10.1212/wnl.53.5.1107
2. Sato DK, Callegaro D, Lana-Peixoto MA, et al. Distinction between MOG antibody-positive and AQP4 antibody-positive NMO spectrum disorders. Neurology. Feb 11 2014;82(6):474-81. doi:10.1212/WNL.0000000000000101
3. Hor JY, Asgari N, Nakashima I, et al. Epidemiology of Neuromyelitis Optica Spectrum Disorder and Its Prevalence and Incidence Worldwide. *Front Neurol.* 2020;11:501. doi:10.3389/fneur.2020.00501
4. Tackley G, O'Brien F, Rocha J, et al. Neuromyelitis optica relapses: Race and rate, immunosuppression and impairment. *Mult Scler Relat Disord.* May 2016;7:21-5. doi:10.1016/j.msard.2016.02.014

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