

Efficacy of Plasma Exchange Treatment for Demyelinating Optic Neuritis Associated with Various Serum Antibodies: A Prospective Cohort Study

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Table S1. Visual acuity of the studied eyes in optic neuritis patients with different antibody subtypes during different time points.

	Total	AQP4-Ab positive group	Double-Ab negative group	MOG-Ab positive group
BCVA (logMAR, mean±SD)				
The worst acuity at onset (n)	3.42±1.49 (124)	3.33±1.51 (96)	3.95±1.23 (22)	2.93±1.77 (6)
Before IVMP treatment (n)	3.19±1.60 (124)	3.16±1.63 (96)	3.40±1.47 (22)	2.93±1.77 (6)
After IVMP treatment (n)	2.92±1.30 (124)	2.81±1.28 (96)	3.37±1.21 (22)	2.92±1.80 (6)
Before PE treatment (n)	2.34±1.30 (124)	2.22±1.21 (96)	2.75±1.45 (22)	2.69±1.93 (6)
After five-cycle PE therapy (n)	1.79±1.31 (124)	1.61±1.14 (96)	2.59±1.57 (22)	1.89±1.89 (6)
Snellen BCVA > 20/200 (n, %)	25 (20%)	22 (22.9%)	3 (13.6%)	2 (33.3%)
Snellen BCVA > 20/40 (n, %)	8 (6.4%)	8 (8.3%)	0	2 (33.3%)
Follow-up visit				
1-month (n)	1.96±1.52 (105)	1.87±1.46 (83)	2.47±1.69 (16)	1.85±1.93 (6)
3-month (n)	2.05±1.57 (94)	1.94±1.49 (77)	2.95±1.77 (11)	1.85±1.93 (6)
6-month (n)	1.92±1.60 (99)	1.85±1.52 (80)	2.39±1.96 (13)	1.85±1.93 (6)

Abbreviations: AQP4=aquaporin-4; MOG=myelin oligodendrocyte glycoprotein; Ab=antibody; BCVA=best corrected visual acuity; logMAR=log of the minimum angle of resolution; IVMP=intravenous methylprednisolone; PE=plasma exchange; n=number of eyes; SD=standard deviation.

Table S2. Major clinical characteristics of the recruited optic neuritis patients with MOG-Ab positive.

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6
Gender	male	male	female	female	female	male
Age of onset (years)	15	47	14	54	45	17
Age of PE initiation (years)	22	47	20	54	48	37
Bilateral eye involved	No	Yes	No	Yes	No	No
Disease duration (years)	7	0	6	0	3	20
History of ON	Yes	No	Yes	No	Yes	Yes
BMI (kg/m ²)	20.8	20.8	18.6	21.5	20.2	26.8
Time, days						
Onset to IVMP window	3	8	12	1	9	1
Onset to PE window	11	75	18	19	13	38
IVMP initiation to PE initiation window	8	67	6	18	4	37
Snellen BCVA						
The worst acuity at onset	20/50	NLP	LP	NLP	20/500	HM
Before IVMP treatment	20/50	NLP	LP	NLP	20/500	HM
After IVMP treatment	20/40	NLP	LP	NLP	20/500	HM
Before PE treatment	20/30	NLP	LP	NLP	20/500	CF
After five-cycle PE therapy	20/25	NLP	LP	20/30	20/300	CF
1-month follow-up visit	20/20	NLP	LP	20/25	20/300	CF
3-month follow-up visit	20/20	NLP	LP	20/25	20/300	CF
6-month follow-up visit	20/20	NLP	LP	20/25	20/300	CF

Abbreviations: MOG=myelin oligodendrocyte glycoprotein; Ab=antibody; ON=optic neuritis; BMI=body mass index; IVMP=intravenous methylprednisolone; PE=plasma exchange; NLP=no light perception; LP=light perception; HM=hand movement; CF=finger counting; BCVA=best correct visual acuity.

Table S3. The number and percentage of eyes in each visual outcome categories along with different time points in AQP4-Ab positive group.

Visual outcome	worst VA at onset	before IVMP	after IVMP	before PE	after PE	1-month	3-month	6-month
Total	96	96	96	96	96	83	77	80
NLP	46 (47.9%)	44 (45.8%)	15 (15.6%)	12 (12.5%)	6 (6.3%)	11 (13.3%)	11 (14.3%)	12 (15.0%)
LP	11 (11.5%)	10 (10.4%)	27 (28.1%)	6 (6.3%)	4 (4.2%)	6 (7.2%)	6 (7.8%)	4 (5.0%)
HM	7 (7.3%)	5 (5.2%)	19 (19.8%)	20 (20.8%)	10 (10.4%)	9 (10.8%)	9 (11.7%)	9 (11.3%)
CF	11 (11.5%)	16 (16.7%)	10 (10.4%)	24 (25.0%)	21 (21.9%)	15 (18.1%)	12 (15.6%)	10 (12.5%)
20/800 \geq VA > 20/2000	10 (10.4%)	6 (6.3%)	12 (12.5%)	15 (15.6%)	6 (6.3%)	5 (6.0%)	5 (6.5%)	7 (8.8%)
20/200 \geq VA > 20/800	7 (7.3%)	9 (9.4%)	8 (8.3%)	12 (12.5%)	26 (27.1%)	18 (21.7%)	18 (23.4%)	17 (21.3%)
20/60 \geq VA > 20/200	2 (2.1%)	2 (2.1%)	1 (1%)	3 (3.1%)	11 (11.5%)	4 (4.8%)	4 (5.2%)	3 (3.8%)
20/30 \geq VA > 20/60	1 (1%)	1 (1%)	4 (4.2%)	4 (4.2%)	7 (7.3%)	7 (8.4%)	5 (6.5%)	8 (10%)
Scotoma but VA better than 20/30	1 (1%)	2 (2.1%)	0 (0%)	0 (0%)	3 (3.1%)	4 (4.8%)	3 (3.9%)	5 (6.3%)
20/20	0 (0%)	1 (1%)	0 (0%)	0 (0%)	2 (2.1%)	4 (4.8%)	4 (5.2%)	5 (6.3%)
Adjust P^a	0.999	-	0.999	0.083	< 0.001	< 0.001	< 0.001	< 0.001
Adjust P^b	0.001	0.083	0.553	-	0.002	0.999	0.999	0.999

Bold: $P < 0.05$.

Abbreviations: AQP4=aquaporin-4; Ab=antibody; NLP=no light perception; LP=light perception; HM=hand movement; CF=finger counting; VA=visual acuity; IVMP= intravenous methylprednisolone; PE=plasma exchange.

a: compared to before IVMP treatment; b: compared to before PE treatment.

Table S4. Predictive factors associated with the visual improvement ≥ 2 scores after the fifth-cycle PE treatment in AQP4-ON group.

Factors	<i>P</i>	OR (95%CI)
Bilateral affected versus unilateral	0.999	3.5*10 ⁸ (-)
logMAR VA before PE	0.979	1.006 (0.626-1.619)
BMI at PE treatment	0.750	0.980 (0.865-1.111)
Thicknesses of mILM-RPE	0.681	1.007 (0.975-1.040)
Time window from onset to IVMP treatment per 1 day	0.454	0.973 (0.905-1.046)
Female versus male	0.464	0.430 (0.045-4.132)
Disease duration per 1 year	0.428	1.070 (0.905-1.264)
Disease phenotype (ON versus ON+others)	0.462	2.577 (0.207-32.065)
Thicknesses of pRNFL	0.468	1.006 (0.990-1.021)
History of autoimmune disease	0.208	3.242 (0.519-20.237)
Age of PE treatment per 1 year	0.080	1.042 (0.995-1.092)
Number of previous ON episodes	0.048	0.555 (0.309-0.996)
Time window from onset to PE treatment per 1 day	0.003	0.948 (0.915-0.982)

Multiple logistic regression analysis with visual improvement (visual improvement ≥ 2 scores versus visual improvement < 2 scores) after five-cycle PE therapy in the AQP4-ON group as a dependent variable.

Bold: $P < 0.05$

Abbreviations: AQP4=aquaporin-4; ON=optic neuritis; BMI=body mass index; IVMP=intravenous methylprednisolone; PE=plasma exchange; pRNFL=peripheral retinal nerve fiber layer; mILM-RPE= macular inner limiting membrane retinal pigment epithelium; logMAR=log of the minimum angle of resolution; VA=visual acuity; CI=confidence interval; OR=odds ratio.

Table S5. Predictive factors associated with the visual acuity < 1.0 logMAR after the fifth-cycle PE treatment in AQP4-ON group.

Factors	<i>P</i>	OR (95%CI)
BMI at PE treatment	0.871	1.016 (0.838-1.231)
Female versus male	0.797	1.435 (0.091-22.626)
Disease duration per 1 year	0.746	0.971 (0.811-1.162)
Thickesses of pRNFL	0.391	1.008 (0.990-1.026)
Disease phenotype (ON versus ON+others)	0.322	0.098 (0.001-9.779)
Time window from onset to IVMP treatment per 1 day	0.296	0.881 (0.695-1.117)
Number of previous ON episodes	0.194	0.548 (0.221-1.359)
History of autoimmune disease	0.317	0.388 (0.061-2.478)
Age of PE treatment per 1 year	0.096	1.061 (0.989-1.138)
Bilateral affected versus unilateral	0.047	0.042 (0.002-0.964)
Time window from onset to PE treatment per 1 day	0.009	0.929 (0.879-0.982)
logMAR VA before PE	0.001	0.190 (0.069-0.527)
Thickesses of mILM-RPE	0.097	1.037 (0.993-1.083)

Multiple logistic regression analysis with visual acuity (visual acuity < 1.0 logMAR versus visual acuity \geq 1.0 logMAR) after five-cycle PE therapy in the AQP4-ON group as a dependent variable.

Bold: $P < 0.05$.

Others include transverse myelitis and posterior zone syndrome

Abbreviations: AQP4=aquaporin-4; ON=optic neuritis; BMI=body mass index; IVMP=intravenous methylprednisolone; PE=plasma exchange; pRNFL=peripheral retinal nerve fiber layer; mILM-RPE= macular inner limiting membrane retinal pigment epithelium; logMAR=log of the minimum angle of resolution; VA=visual acuity; CI=confidence interval; OR=odds ratio.

Table S6. Visual improvement scores among different time windows (from onset to PE treatment) in AQP4-Ab positive group.

Time window (days)	Improvement score							Total
	-1	0	1	2	3	4	5	
9-20	0	5 (18.5%)	9 (33.3%)	6 (22.2%)	4 (14.8%)	2 (7.4%)	1 (3.7%)	27
21-30	0	8 (32%)	9 (36%)	3 (12%)	3 (12%)	1 (4%)	1 (4%)	25
31-60	0	11 (42.3%)	6 (23.1%)	6 (23.1%)	2 (7.7%)	1 (3.8%)	0	26
61-157	1 (5.6%)	10 (55.6%)	6 (33.3%)	1 (5.6%)	0	0	0	18

Abbreviations: AQP4=aquaporin-4; Ab=antibody