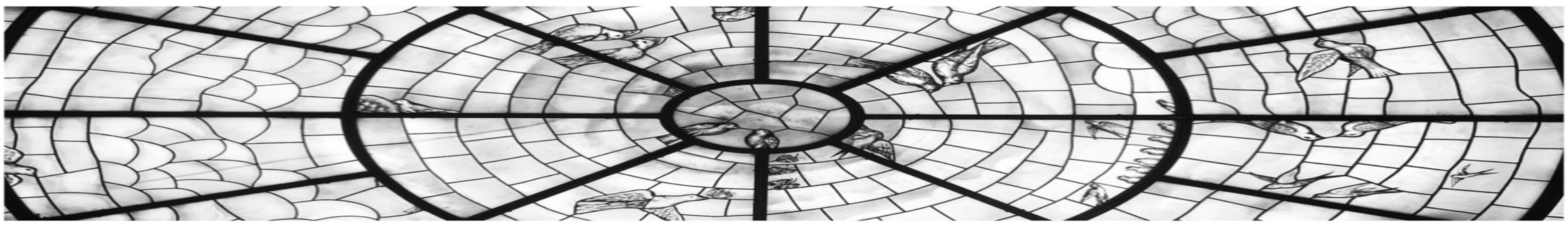

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Clinical

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The impact of COVID-19 on patients with neuromyelitis optica spectrum disorder beyond infection risk

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Background

There is an increasing need for a better understanding of the impact of coronavirus disease 2019(COVID-19) on patients with neuromyelitis optica spectrum disorder (NMOSD) and a few pilot studies have investigated COVID-19 infections in NMOSD but few studies have addressed disease activity and immune status of these patients during the pandemic. We carried out a cross-sectional study to examine immune status, relapses, and COVID-19 infections in a cohort of NMOSD patients using an electronic patient registry (MSNMOBase) for multiple sclerosis and related disorders .

Method

An online questionnaire was administered in June 2020 to all NMOSD patients in the MSNMOBase from January 1, 2011, to June 1, 2020. Clinical demographic characteristics, immune status, relapses, treatments, COVID-19 infections, and preventive measures were evaluated.

Result

Of the 752 registered patients, 535 (71.1%) with qualified data were included. 486 used preventive therapies during the pandemic, including mycophenolate mofetil (71.2%), azathioprine (13.3%) and other immunosuppressants (6.4%). Neither median immune-cell counts nor immunoglobulin levels ($p > 0.05$) were significantly different between patients with or without immunosuppression(Table 1).

During the pandemic, no patients were diagnosed with COVID-19, and a majority(> 95%) took one or more effective protective measures (e.g., wearing a mask and social distancing).

However, a significantly higher annualized relapse rate (ARR) was observed in the 33 patients with treatment interruptions due to the pandemic compared to before it ($p < 0.05$), while ARR changes were not found in patients with continuous treatments or those without treatments ($p > 0.05$). Interruption frequency was significantly higher in patients with relapses compared to those without (34.9% vs 15.7%, $p < 0.01$)(Figure 1).

Table1. Immune status of patients with and without immunosuppressants during the pandemic.

Immune cell count and immunoglobulin level	With Immuno-suppressants	Without Immuno-suppressants	*P* value
Neutrophil, median (range), $\times 10^9$/L	4.22 (1.20, 15.51)	3.98 (1.39, 8.33)	0.674
Lymphocyte, median (range), $\times 10^9$/L	1.88 (0.03, 18.10)	1.75 (0.49, 4.73)	0.968
$CD19^+$ B cell, median (range), /μL	171.5 (0, 1,171)	184 (26, 667)	0.445
$CD3^+CD4^+$ T cell, median (range), /μL	787.5 (24.1, 2677.0)	723 (260, 2,468)	0.976
$CD3^+CD8^+$ T cell, median (range), /μL	571.5 (24.3, 2534.0)	567 (121, 2,460)	0.986
Immunoglobulin G, median (range), g/L	9.82 (3.66, 29.29)	9.86 (5.38, 34.20)	0.395
Immunoglobulin M, median (range), g/L	0.87 (0.13, 4.41)	0.99 (0.28, 1.90)	0.110

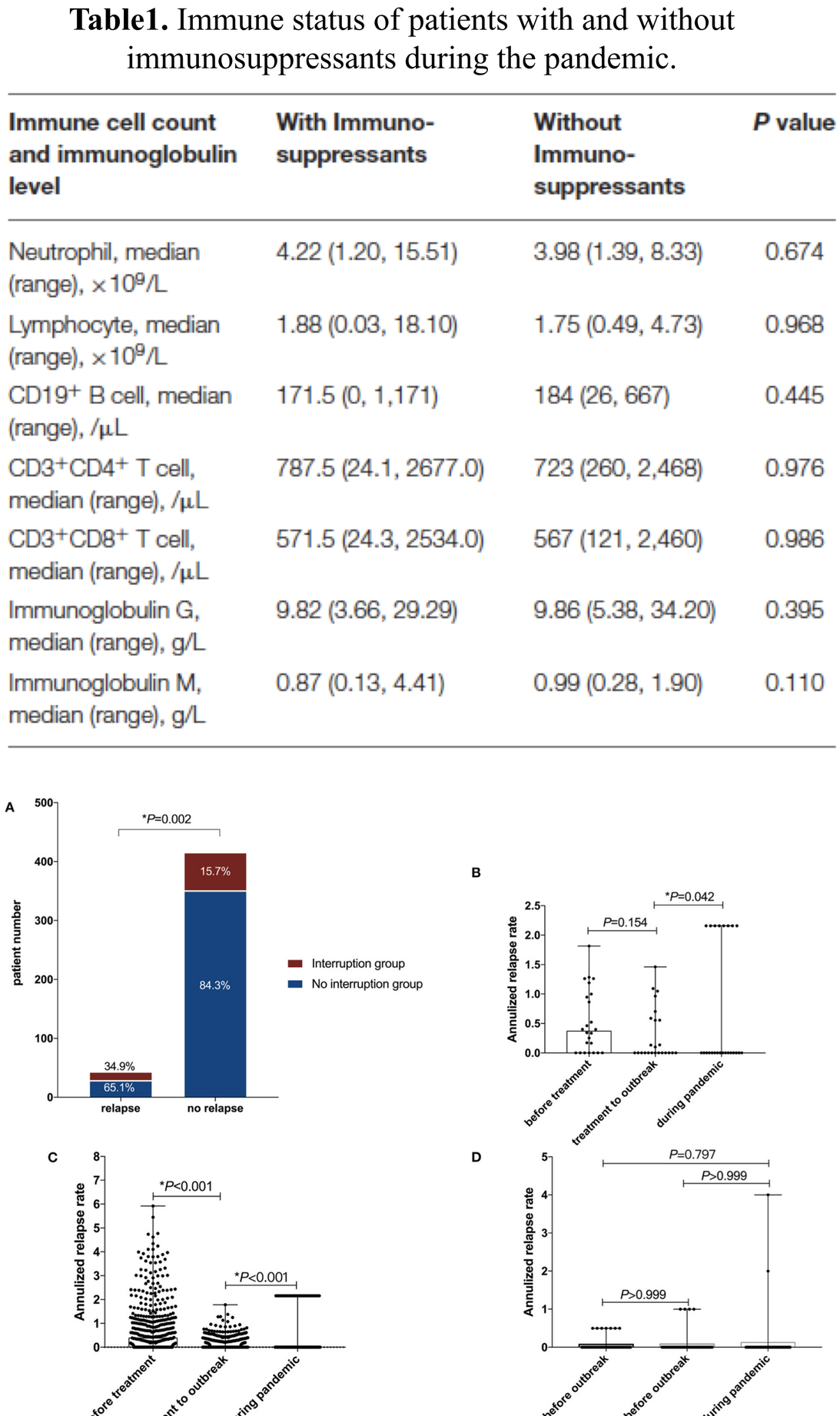

Figure 1. Disease activity during the pandemic. (A) Disruption of treatment or follow-up in patients with or without relapse during the pandemic. (B) Relapse of patients with treatment disruption. (C) Relapse of patients without treatment disruption. (D) Relapse of patients without treatment. *$p < 0.05$ (with significance).

Conclusion

For stable NMOSD patients during the pandemic, the risk for relapse due to treatment interruption may be higher than the risk of COVID-19 infection when protective measures are used, and continuous relapse-prevention treatments may be necessary.