Humoral immune response to SARS-CoV2 vaccines in multiple sclerosis and controls

Gabriel Bsteh[1], Harald Hegen[2], Gerhard Traxler[3], Nik Krajnc[1], Fritz Leutmezer[1], Franziska Di Pauli[2], Barbara Kornek[1], Paulus Rommer[1], Gudrun Zulehner[1], Sophie Dürauer[4], Angelika Bauer[2], Sarah Kratzwald[4], Sigrid Klotz[4], Michael Winklehner[4], Florian Deisenhammer[2], Michael Guger[3], Romana Höftberger[4], and Thomas Berger[1]

[1]*Department of Neurology, Medical University of Vienna, Vienna, Austria*

[2]*Department of Neurology, Medical University of Innsbruck, Innsbruck, Austria*

[3]*Department of Neurology 2, Med Campus III, Kepler University Hospital GmbH, Linz, Austria*

[4]*Division of Neuropathology and Neurochemistry, Department of Neurology, Medical University of Vienna, Vienna, Austria*

Presenting author:

Prof. Gabriel Bsteh, MD, PhD

Department of Neurology, Medical University of Vienna, Vienna, Austria

Waehringer Guertel 18-20, 1090 Vienna, Austria

Email: gabriel.bsteh@meduniwien.ac.at

Telephone: 0043 1 40400 31450

Keywords: Multiple sclerosis, COVID-19, SARS-CoV-2, risk, mortality, severity, disease-modifying treatment

Abstract

Background: Vaccination against SARS-CoV2 is mostly recommended for patients with multiple sclerosis (pwMS), although some disease-modifying treatments (DMT) might limit immune response. However, data informing on differences in efficacy and safety of available vaccines in MS patients are scarce.

Objective: To compare rate of humoral immune response and safety of SARS-CoV-2 vaccines in pwMS and healthy controls (HC).

Methods: In this multicenter prospective observational study on 456 pwMS and 116 HC, SARS-CoV-2 IgG response was measured using anti-spike protein-based serology 3 months after the first dose. The primary endpoint was defined as the proportion of patients developing protective antibodies (seroconversion), secondary endpoints included antibody titer, efficacy and safety parameters.

Results: Compared to 97.4% in HC, seroconversion occurred in 96.7% (88/91) of untreated MS patients, 97.1% (135/139) on immunomodulatory (IM-DMT) and 61.1% (138/226, $p<0.001$) on immunosuppressive DMT (IS-DMT). Specifically, seroconversion was lowest under antiCD20 monoclonal antibodies (CD20mAb; 52.6%) followed by sphingosine 1 receptor modulators (S1PM; 63.6%). Predictors of seroconversion were IS-DMT (OR 0.04; $p<0.001$), CD20 mAb (OR 0.03, $p<0.001$), S1PM (OR 0.05, $p<0.001$) and the combined group of cladribine and alemtuzumab (OR 0.18, $p<0.001$). In the S1PM subgroup likelihood of seroconversion increased with higher lymphocyte count (OR 1.31 per 0.1 G/l, $p=0.035$), while in patients on cladribine/alemtuzumab seroconversion was associated with time since last DMT intake (OR 1.38 per month) but not with lymphocyte count. In patients treated with CD20mAb, complete B-cell depletion significantly decreased probability of seroconversion (OR 0.52, $p=0.038$), whereas time since last DMT intake was not. Safety of SARS-CoV-2 vaccines in MS patients was excellent and similar to HC.

Conclusions: Humoral response to SARS-CoV2 vaccines in MS patients is generally excellent. While reduced by immunosuppressive DMT, most importantly by B-cell depleting CD20mAb and S1PM, protective humoral response is still expected in the majority of patients. SARS-CoV2 vaccination should be offered to every MS patient.