Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Case report

COVID-19 in a MS patient treated with ocrelizumab: does immunosuppression have a protective role?

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A B S T R A C T

Background: Coronavirus disease 19 (COVID-19) is a novel disease entity that is spreading throughout the world. It has been speculated that patients with co-morbidities and elderly patients could be at high risk for respiratory insufficiency and death. Immunosuppression could expose infected patients to even higher risks of disease complications due to dampened immune response. However, it has been speculated that overactive immune response could drive clinical deterioration and, based on this hypothesis, several immunosuppressants are currently being tested as potential treatment for COVID-19.

Methods: In this paper we report on a patient that has been treated with ocrelizumab (a B-cell depleting monoclonal antibody) for primary progressive multiple sclerosis who developed COVID-19.

Results: Despite complete B cell depletion, patient symptoms abated few days after hospitalization, and he was discharged to home-quarantine. Phone interview follow-up confirmed that, after 14 days, no new symptoms occurred.

Discussion: This report supports the putative role of immunosuppressive therapy in COVID-19 affected patients.

Main text

Coronavirus disease 2019 (COVID-19) is a novel disease entity caused by SARS-CoV-2 that recently spread throughout Europe. The disease appears to be mild in the majority of patients, however, a subset (about 15%) of affected individuals can develop a severe disease with respiratory insufficiency, that may require non-invasive or invasive ventilation and intensive care [1]. Elderly individuals and patients with co-morbidities are at higher risk of developing a severe or fatal phenotype of the disease [2]. Immunosuppressed patients might be more susceptible to COVID-19 complications due to the absence of a prompt immunological response able to clear the virus. However, it has been suggested that immunosuppression might play a protective role during COVID-19 infection by preventing or dampening the overly active immune response that, in some cases, might drive clinical deterioration [3].

We report a case of COVID-19 in a patient with multiple sclerosis (MS) treated with ocrelizumab (humanized anti-CD20 monoclonal antibody).

He is a 58-year old withe male who developed progressive lower limbs motor impairment in 2008 and was diagnosed with primary progressive MS (PPMS) in 2009. He was previously treated with interferon beta-1a, glatiramer acetate, and fingolimod. His past medical history includes allergic rhinitis, asthma and peptic ulcer. In January 2018 treatment with ocrelizumab was started within the compassionate use program for PPMS. He also started lamivudine prophylaxis due to the presence of positive HBV anti-core antibody. Periodic 6-month ocrelizumab infusions were performed until August 2019 (a reinfusion was planned in February 2020 but was delayed due to patient convenience and rescheduled in March 2020). At the time of the last infusion patient had moderate hypogammaglobulinemia (IgG 6.5 g/L, reference range 8-17 g/l) with normal IgM and IgA levels, and peripheral blood lymphocyte immunophenotype showed profound B-cell depletion (8 CD19+ cell/mm^3). Expanded disability status scale was 6 (patient was able to ambulate with a cane).

On March 6th 2020 patient developed fever and cough, he was admitted to our hospital on March the 10th due to persistent high fever and severe cough. Blood exam showed normal leucocyte and

Informed consent was obtained from patient.

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lymphocyte count (7.79 × 10^9 cells/L, range 4.90-9.80 and 1.50 × 10^9 cells/L, range 1.10-4.80, respectively), with elevated C-reactive protein (63.1 mg/L, range 0-5), slight increase of interleuchin-6 (IL-6) levels (6 pg/ml, range 0-3.4), and moderate IgG hypogammaglobulinemia (6.5 g/L). Chest X-ray was unremarkable. PCR for SARS-CoV-2 was performed on nasal swab and tested positive on two samples. Arterial blood gas test showed normal blood oxygenation. Patient was treated with symptomatic therapy for high fever (paracetamol), with resolution of symptoms in two days. He was discharged to home-quarantine on March the 13th with normal leukocyte and lymphocyte count (5.13 × 10^9/L cell/L and 1.63 × 10^9/L) and reduced C reactive protein levels (16.4 mg/L). Peripheral blood lymphocyte immunophenotype, performed upon admission, confirmed a complete B-cell depletion (1 CD19+ cell/mm^3), as expected by ocrelizumab drug pharmacodynamic. Phone interview, performed on March the 28th, confirmed that patient is still home-quarantined, without occurrence of any new symptoms.

In this report we describe the first case of a B cells depleted patients that developed COVID-19, without serious complications. We speculate that the persistence of B cells within secondary lymphoid organs, associated with a moderately reduced immune response due to lack of peripheral B cells might have played a favorable role in this patient. The lack of significant increase of IL-6 (that might be released by the peripheral B cells) seems to support our hypothesis. If confirmed by larger case series, our observation might indicate that patients who undergo B cell depletion could be protected from serious complications of COVID-19 and might support the use of selective immunosuppressant such as tocilizumab in serious COVID-19 cases.

Conflicts of interest

Giovanni Novi received speaker honoraria from Merck, Novartis and Roche

Malgorzata Mikulska received speaker honoraria from MSD, Gilead, Pfizer, Biotest, Janssen; all outside the submitted work.

Federica Briano reports no disclosures

Federica Toscanini reports no disclosures

Francesco Tazza reports no disclosures

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