



SARS-COV2 Infection in Vaccinated Patients: Look for Clinical History and Test Humoral Immunity

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On August 1st, a 72 year-old man was diagnosed with SARS-CoV2-positive bilateral broncopneumonia despite full dose of mRNA anti-SARS-CoV2 vaccine was inoculated two months before (Fig. 1). Hypogammaglobulinemia (0,40 g/dl; IgG 449 mg/dl; IgM 18 mg/dl), lymphopenia (270/mm³) with total B-cells absence (Fig. 2) were also found. Clinical history revealed chronic obstructive respiratory disease and low grade non-Hodgkin lymphoma treated elsewhere 14 years before for massive bone marrow involvement and splenomegaly with montly cyclophosphamide, adryamicin, oncovin and anti-CD20 monoclonal antibody Rituximab for 6 cycles. One year later, he was treated with fludarabine and rituximab because of disease refractoriness (3 cycles) with the

achievement of complete remission. Since then, the patient was followed in continue complete remission.

The underlying disease affecting immune system (lymphoma), the treatment given (including targeting B-cells monoclonal antibody and fludarabine), and the severe humoral immunity impairment (lymphopenia, no detectable CD20 + B-cells, hypogammaglobulinemia) could explain the severe immunodeficient status preventing an appropriate response to vaccination. As a matter of the fact circulating anti-S antibodies were detected at very low levels (16.7 UI/ml). This case shows that accurate clinical history and lab tests addressing humoral immunity are mandatory in patients who received anti-SARS-CoV2 vaccine and were however infected [1, 2].

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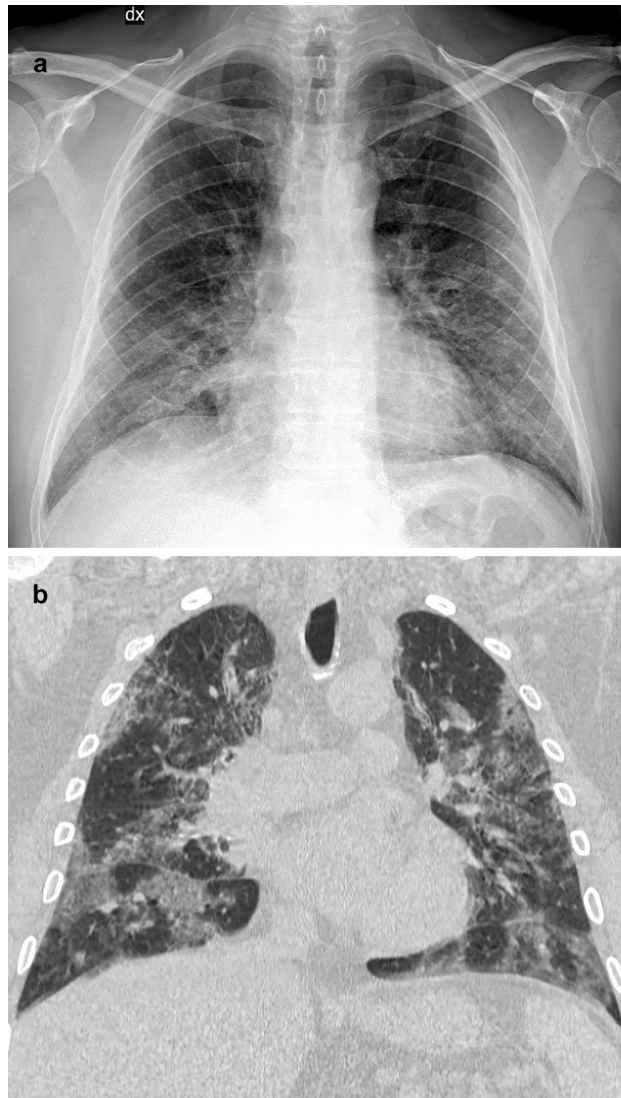


Fig. 1 Chest radiograph, PA view (a): multiple, bilateral subtle consolidations in lower and middle zones, with diffuse peribronchovascular interstitial thickening. No pleural effusion is seen. CT scan (breathing artifacts are present): coronal reconstruction (b)

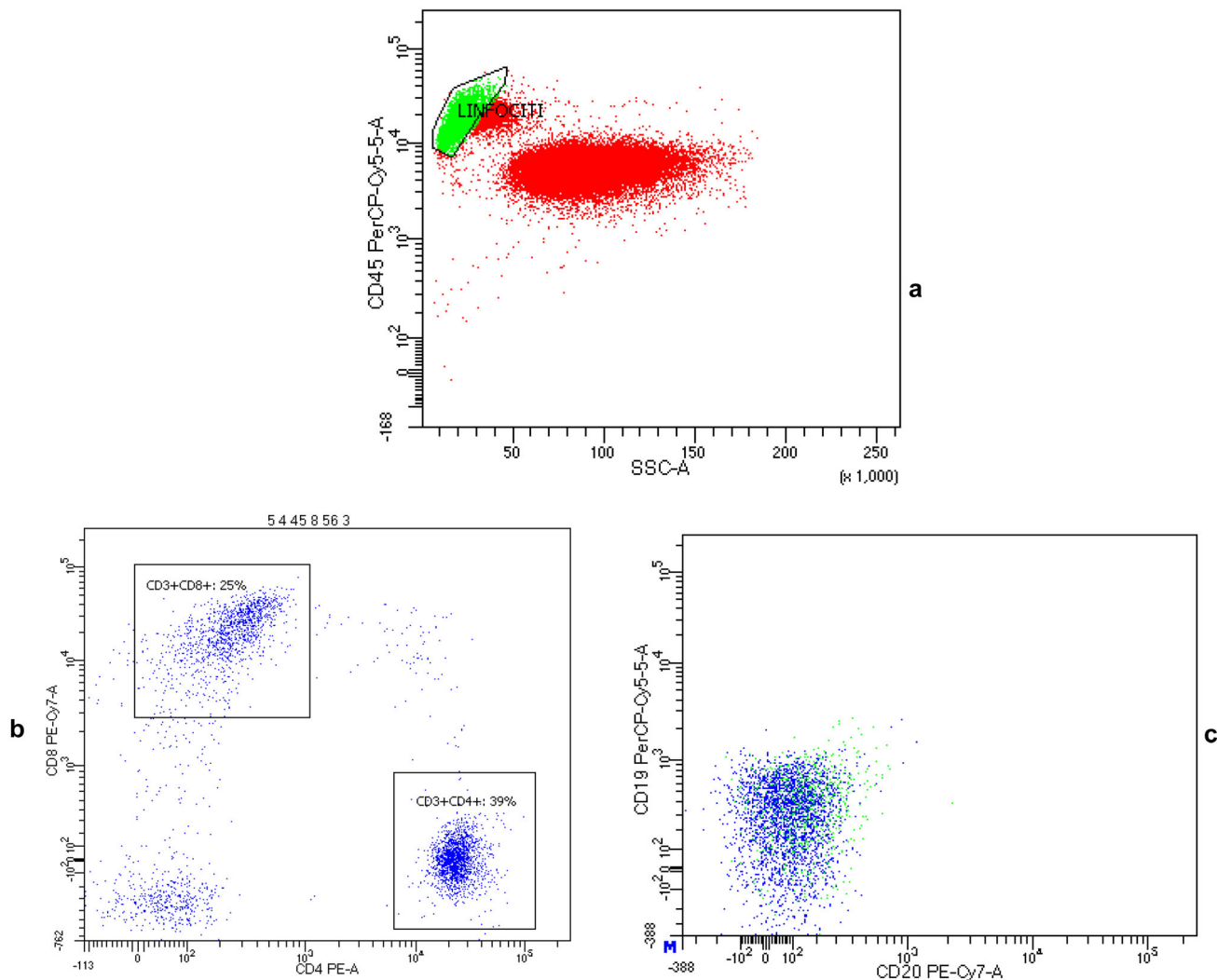


Fig. 2 Lymphocytes immunophenotypic profile evaluated by means of flow cytometry. Analysis was performed on gated lymphocytes (panel a). T lymphocytes (CD3 +) and CD4:CD8 T cells ratio were

found normal (panel b). On the contrary no B-cells (CD19 + CD20 +) were detected (panel c)

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Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from the patient.

References

1. Benda M, Mutschlechner B, Ulmer H, Grabher C, Severgnini L, Volgger A, Reimann P, Lang T, Atzl M, Huynh M, Gasser K, Petrusch U, Fraunberger P, Hartmann B, Winder T (2021) Serological SARS-CoV2 antibody response, potential predictive markers and safety of BNT162b2 mRNA COVID-19 vaccine in haematological and oncological patients. *Br J Haematol*. <https://doi.org/10.1111/bjh.17743>
2. Vijenthira A, Gong I, Betschel SD, Cheung M, Hicks LK (2021) Vaccine response following anti-CD20 therapy: a systematic review and meta-analysis of 905 patients. *Blood Adv* 5:2624–2643. <https://doi.org/10.1182/bloodadvances.2021004629>

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