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Treatment of a case of COVID-19 by intravenous immunoglobulin

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ABSTRACT

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is a positive-sense single-stranded RNA virus. As of today, no specific treatment has been found COVID-19. İntravenous immunoglobulin (IVIG) is a widely used therapy to prevent life-threatening infections in patients with primary and secondary immune deficiencies and autoimmune/inflammatory conditions. IVIG administration could be beneficial in the treatment of patients with severe COVID-19. In this respect, this presentation aimed to report a case of COVID-19 treated with IVIG.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a positive-sense single-stranded RNA virus. Since the first cases were reported by China in december 2019, an outbreak has emerged. The World Health Organization (WHO) named the disease caused by SARS-CoV-2 as coronavirus disease 2019 (COVID-19) [1]. As of today, no specific treatment has been found for COVID-19. Intravenous immunoglobulin (IVIg) therapy has been used for the prevention of life-threatening infections in patients with primary and secondary immunodeficiencies and autoimmune/inflammatory conditions. It has been shown that IVIg has the ability to provide passive immune protection against various pathogens. Some researchers have administered IVIg to patients with COVID-19 for the modulation of inflammation [2]. Here we report a case of COVID-19 treated with IVIg.

A 49-year-old man with a history of irregular type 2 diabetes mellitus presenting with fever >38 °C during the last 2 days and accompanying cough for 1 week was admitted to the hospital. Physical examination revealed that both his heart rate and blood pressure were in the normal range, whereas his oxygen saturation was 90% under ambient air. Laboratory analysis showed a blood glucose level of 279 mg/dL (normal range, 74–106 mg/dL), a white blood cell count of 10,120/μL (normal range, 4000–10,000/μL), a neutrophil percentage of 87.3% (normal range, 50–70%), a lymphocyte percentage of 9.1% (normal range, 20–40%), a C-reactive protein level of 34.3 mg/dL (normal range, 0–0.8 mg/dL) and a procalcitonin level of 0.45 ng/mL (normal range, 0.10–0.49 ng/mL). Chest radiography revealed reticulonodular densities in all bilateral zones (Fig. 1). The chest computed tomography (CT) examination showed widespread patchy ground-glass opacities in the lungs (Fig. 2). The patient was hospitalised and treated with oxygen at 2 L/min using a nasal mask. He was given piperacillin/tazobactam 4.5 g intravenous every 8 h, azithromycin 500 mg orally, hydroxychloroquine 400 mg orally every 12 h and oseltamivir 75 mg orally every 12 h. The result of the nasopharyngeal swab for COVID-19 was positive. On his second day on the ward, he was admitted to the intensive care unit (ICU) owing to low oxygen saturation and tachypnoea despite receiving higher oxygen concentrations. In the meantime, the second test result of the nasopharyngeal swab for COVID-19 was positive. Therefore, piperacillin/tazobactam was discontinued and favipiravir 1600 mg orally every 12 h and meropenem 1 g intravenous every 8 h were added to the treatment. On his second day in the ICU, the patient had tachypnoea with a decreased ratio of partial arterial pressure of oxygen to fractional inspired concentration of oxygen (PaO_2/FiO_2) of 190; he was then intubated and placed on ventilatory support. It was then decided to administer IVIg 0.5 g/kg intravenously followed by a dose of 1 g/kg on the next day. His respiratory parameters improved and he was extubated on the fourth day of ICU stay. Chest radiography showed a dramatic regression of the pulmonary infiltrates (Fig. 3). He was discharged from the ICU with full recovery on the sixth day.

IVIg is a widely used therapy to prevent life-threatening infections in patients with primary and secondary immune deficiencies. However, the use of IVIg as a therapeutic agent in

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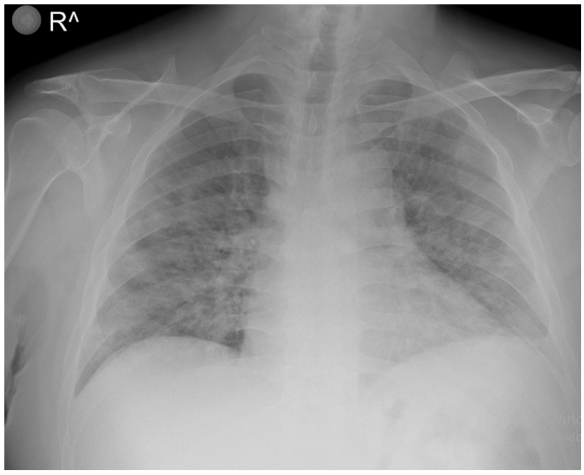

Fig. 1. Chest radiography showing reticulonodular density in all bilateral zones.

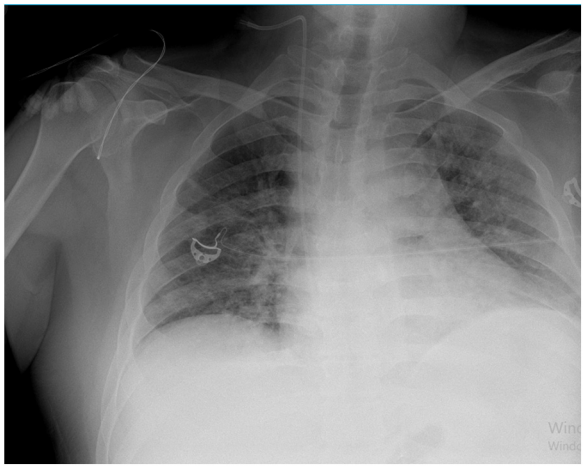

Fig. 3. Chest radiography showing regression of radiological findings.

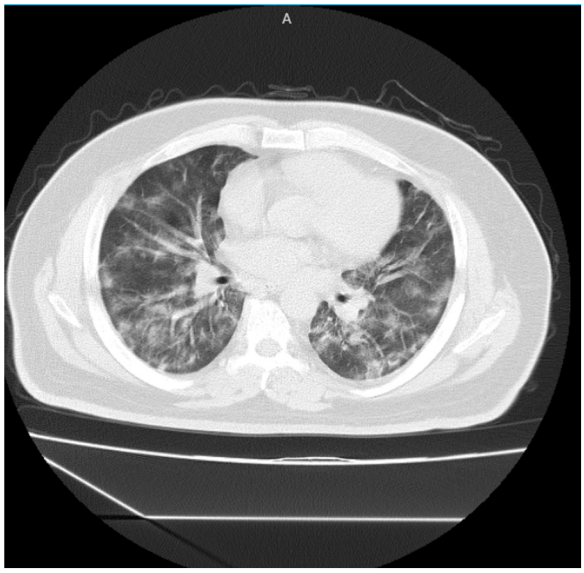

Fig. 2. Sagittal computed tomography (CT) image at the time of hospital admission showing widespread patchy ground-glass opacities.

SARS-CoV-2 infection for the modulation of inflammation is very limited. IVIg may lessen the inflammatory response in COVID-19 owing to the presence of autoreactive antibodies that bind cytokines or form complexes with other antibodies. In addition, IgG dimers in IVIg may obstruct the activation of FcγR on innate immune effector cells [3]. In a case series of patients with severe COVID-19, those who received IVIg at 0.3–0.4 g/kg/day for 5 days showed reduced fever on the second day of the treatment and relief of respiratory symptoms within 5 days. Antiviral agents were given to the two of the three patients whereas one patient received steroids, which may greatly affect the ability to make a conclusion regarding the efficacy of IVIg. However, the authors were not able to obtain precise results where co-morbidities, stage of illness and the effect of other treatments were not taken into account [4]. Furthermore, IVIg used for SARS-CoV has been reported in several studies. Another single-centre study in Taiwan in patients infected with SARS-CoV in which IVIg was given for leukopenia, thrombocytopenia or rapid progression of lesions on radiography revealed that IVIg results in an increase in leukocyte and thrombocyte counts [5]. Moreover, another case with Middle East Respiratory syndrome (MERS) where IVIg was used for thrombocytopenia showed improvement in the thrombocyte count [6]. All of these studies demonstrate the lack of evidence to support IVIg use for the treatment of coronaviruses, including SARS-CoV, SARS-CoV-2 and MERS-CoV.

In conclusion, this case report reveals that IVIg administration could be beneficial in the treatment of patients with severe COVID-19.

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None.

Conflict of interest

None declared.

Ethical approval

Written informed consent was obtained from the patient in accordance with the Declaration of Helsinki.

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