Newly Diagnosed Glomerulonephritis During COVID-19 Infection Undergoing Immunosuppression Therapy, a Case Report

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During the COVID-19 pandemic, we had a 25 years old male case without any underlying disease or history of autoimmune disease in COVID-19 Clinic, Isfahan, Iran. He presented with arthralgia and weakness so we started COVID-19 therapeutic regimen. In his hospitalization, creatinine increases and abnormalities in random urine sediment was seen. Methylprednisolone and cyclophosphamide were prescribed due to suspected glomerulonephritis. After renal biopsy the diagnose was confirmed as crescentic proliferative glomerulonephritis. The patient also, underwent plasmapheresis and intravenous immunoglobulin injection. He was discharged healthy without development of new pulmonary symptoms despite immunosuppressive treatment.

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INTRODUCTION

In the Last days of 2019, novel coronavirus disease (COVID-19) broke out in Wuhan, China; as an epidemy and has later spread to the rest of China and 198 other countries around the world.[1-3] On March 20th of 2020, there were 266073 confirmed cases and 11184 deaths globally and 19644 confirmed cases and 1433 deaths in Iran.[4] WHO declared it as an International Public Health Emergency Concern.[5] The clinical manifestations, treatment, and prognosis of COVID-19 pneumonia for patients with immunosuppression therapy may differ from those of the general population.[6] There are a rising amount of documents to determine the pathogenesis and clinical manifestations of the disease and it's impacts. This report describes clinical features of a case of COVID-19 infection undergoing immunosuppression therapy due to newly diagnosed glomerulonephritis (GN).

CASE REPORT

On February 26th, 2020; a 25-years-old, male student, single, live in Esfahan with no history of comorbidities and without high risk exposure, presented at the outpatient department of coronavirus clinic in Esfahan, Iran; with a 2-days history of rhinorrhea, arthralgia, weakness, and pallor. He has no history of fever, cough, or dyspnea and had received hydroxychloroquine orally by a rheumatologist due to suspected rheumatologic disease. Blood sample has been taken and the results of primary tests include Hemoglobin (Hb) = 5.2 g/L, Creatinine = 3.7 g/dL, and 3+ protein in urine analysis (UA) at the time of referral. On admission to hospital, his oral temperature was 37.1°C, SPO_2 97% on room air without throat congestion. He was isolated and laboratory study has been sent for him.

His laboratory results on admission was: Cr, 4.2; Hb, 4.5 g/dL; CRP, 2+; ESR, 120 mm/h; WBC, 4500 /mm^3 (with 19% Lymphocyte). Hepatitis viral tests include HBS Antigen and HCV Antibody was negative. Due to increased creatinine, numerus red blood cell cast and more than 10% acanthocyte in urinary sediment, we decided to send glomerulonephritis tests such as

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Anti-double stranded DNA antibody (anti-dsDNA), Anti-neutrophil cytoplasmic antibodies (ANCAs) C and P, Complement tests including C3, C4, CH50, 24 hours urine sample with protein and volume evaluation.[7]

High-resolution computed tomography (HRCT) (Figure 1) obtained Ground glass opacities resemble diffuse alveolar hemorrhage versus corona virus infection thus, specimens were obtained as per CDC guidelines and included serum, nasopharyngeal and oropharyngeal swab specimens for COVID-19 Real time-Polymerase chain reaction (RT-PCR) has been sent.[8]

On February 27th the treatment has been started with 1g of methylprednisolone intravenously for 3 repeated doses. Due to Hb level drop and alveolar hemorrhage, he underwent plasmapheresis with PLASMART, Versatile™ PES, Medica filter, as MPS plasmapheresis and 3 doses Intravenous immunoglobulin (IVIG), 20 g each time. Renal biopsy has been taken to diagnose the main reason of creatinine rises (February 29th, Figure 2).

Results of laboratory data was: C-ANCA titer, 1/50 (positive); and 2900 mg proteins in 24 hours urine sample. On the 1st of March PCR test was positive for COVID-19 so we started the treatment of COVID-19 with hydroxychloroquine[9] plus levofloxacin for a week.

Second PCR test has been sent and it was negative for COVID-19 after a week; laboratory study showed: Cr level, 5.2 mg/dL; and Hb, 4.9 g/dL. Based on the result of pathology, we prescribe 750 mg Cyclophosphamide on march 9th. Three days after the cyclophosphamide administration, the patient discharged without any symptoms and the creatinine level was stable as 5.5 mg/dl.

DISCUSSION

ANCA GN and vasculitis are characterized by separate pathological lesions and an autoimmune response which produces ANCAs.[10] Based on pathological and clinical characteristics, ANCA-associated vasculitis is subdivided into microscopic polyangiitis (MPA), granulomatosis with polyangiitis (Wegener, GPA), and eosinophilic granulomatosis with polyangiitis (Churg–Strauss, EGPA) and renal-limited vasculitis (RLV) with pauci-immune necrotizing GN alone without evidence of systemic vasculitis.[10] In 1 or 2 weeks, each localized vascular lesion arising from this

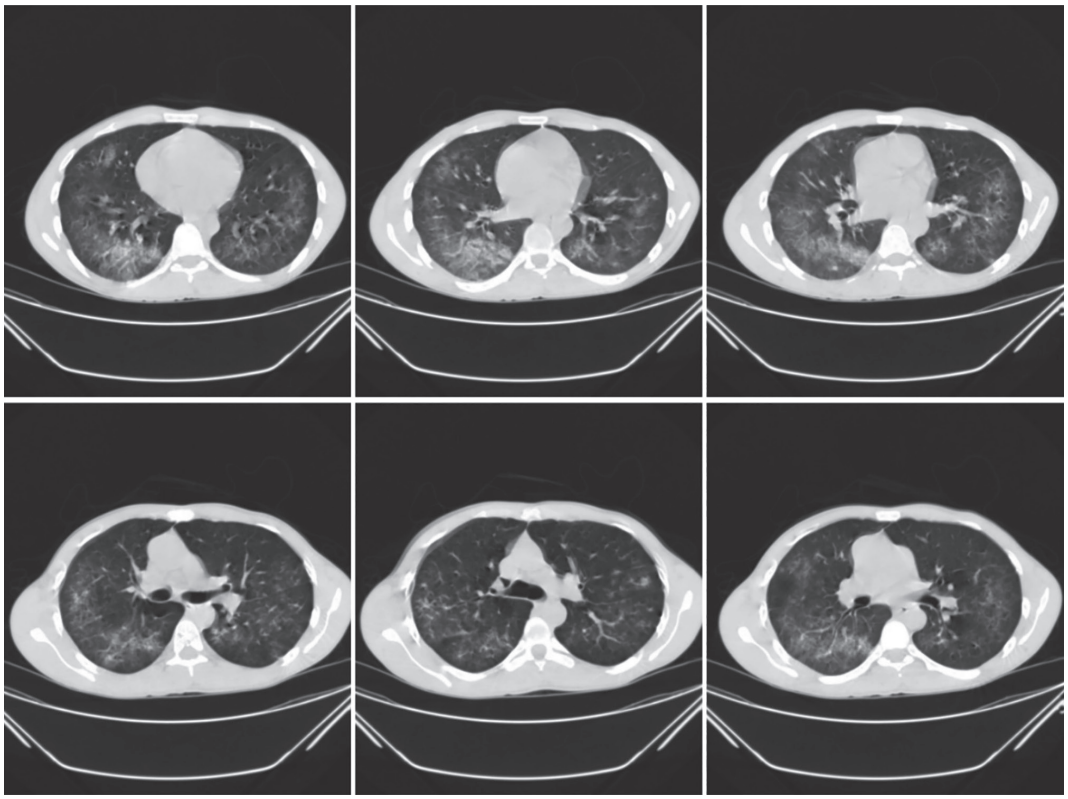

Figure 1. It shows axial mediastinal HRCT.

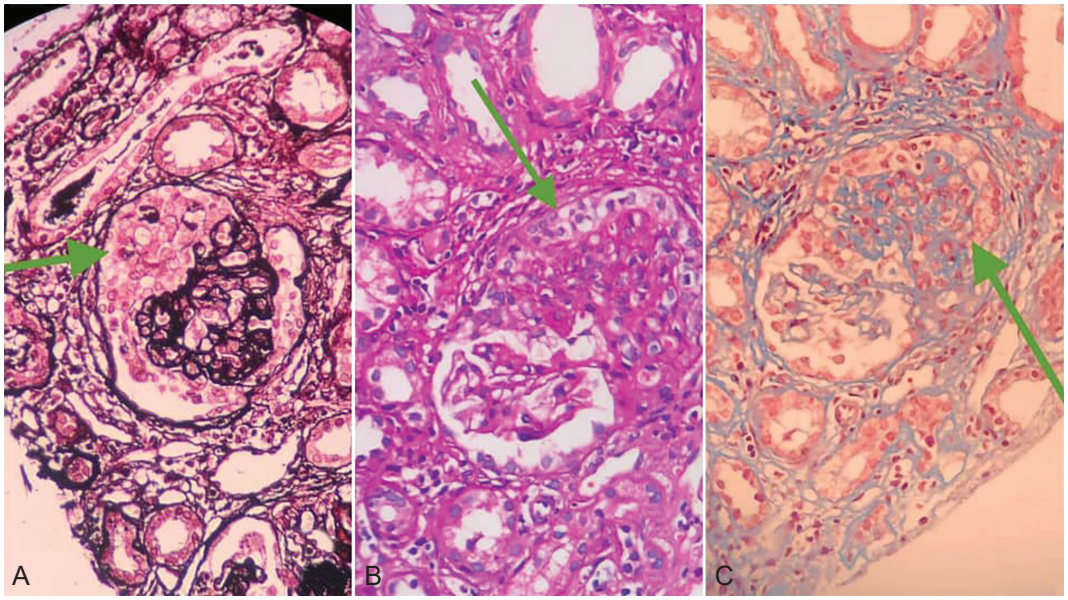

Figure 2. Renal biopsy shows crescentic proliferative glomerulonephritis. (A, Cellular Crescent (Jones staining ×400); B, Cellular Crescent (Hematoxylin and Eosin staining ×400); C, Cellular Crescent and Endocapillary Proliferation (Masson staining ×400)).

process progresses from an acute to a chronic phase; however, multiple new acute lesions tend to develop in multiple vessels before patients reach remission.

Therefore, persistent lesions have developed in patients with active disease as well as newly emerging acute lesions. It is observed as varying numbers of glomeruli with acute necrotizing lesions (usually followed by crescents), sclerotic lesions or both in most of ANCA GN renal biopsy specimens.[11] In the study of 536 patients with SARS, 36 (6.7%) experienced acute renal dysfunction that occurred after the onset of viral infection at a median period of 20 days (range 5 to 48 days) following normal plasma creatinine levels at first clinical presentation. Among these 36 patients, 91.7% died. It obtained that acute renal dysfunction is rare in SARS but carries a high mortality rate.[12]

Our case develops a GN during his COVID-19 infection with no history of rheumatoid disease or any previous renal dysfunction. Also, he didn't have any notable drug history. Although the patient's 2nd COVID-19 RT-PCR test was negative. Negative outcomes do not rule out COVID-19 and cannot be seen as the primary basis for recommendations on care or case management.[13] According to the Iran ministry of health and medical education COVID-19 guideline,[9] two negative tests of COVID-19 within two days are necessary for definitive recovery of the patient, we could not wait for the result of second test due to the critical condition of the patient and we trusted his 1st one. Despite the acute phase of the disease, we started the methylprednisolone and cyclophosphamide. He was discharged healthy and the Cr levels remained stable. We prescribe immunosuppressive drugs but it was not led to COVID-19 development, worsening the clinical statue nor incidence of pulmonary symptoms.

CONCLUSION

Maybe, based on the therapeutic indications of high dose corticosteroids or immunosuppressive, prescribing these drugs with close observation and support has limited the risk of disease development. It is also noteworthy that receiving hydroxychloroquine and levofloxacin in combination of supporting treatment include plasmapheresis and IVIG could increase the capacity of immunosuppression tolerance and inhibited COVID-19 infection. Coexistence of GN and COVID-19 is a new situation that needs more evidence to discuss about and should be considered.

CONFLICT OF INTEREST

There are no conflicts of interest

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REFERENCES

1. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The Lancet. 2020; 395(10223):497-506.
2. Rothe C, Schunk M, Sothmann P, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. New England Journal of Medicine. 2020.
3. Holshue ML, DeBolt C, Lindquist S, et al. First case of 2019 novel coronavirus in the United States. New England Journal of Medicine. 2020.
4. Organization WH. Coronavirus disease 2019 (COVID-19) Situation Report – 61. Geneva; 2020 21 March 2020.
5. Organization WH. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). Geneva, Switzerland. 2005.
6. Michaels MG, La Hoz RM, Danziger Isakov L, et al. Coronavirus Disease 2019: Implications of Emerging Infections for Transplantation. American Journal of Transplantation. 2020.
7. Fervenza FC, Sethi S. Evaluation and treatment of membranoproliferative glomerulonephritis. UpToDate, Waltham, MA (accessed on December 11, 2016). 2016.
8. Prevention CfDCa. Clinical Specimens: Novel Coronavirus (2019-nCoV): Centers for Disease Control and Prevention; 2020 [25 March 2020]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/lab/guidelines-clinical-specimens.html.
9. education Imoham. New Corona Virus Country Guidelines (2019-nCov). Iran ministry of health and medical education; 2020.
10. Jennette JC, Falk R, Bacon P, et al. 2012 revised international chapel hill consensus conference nomenclature of vasculitides. Arthritis & Rheumatism. 2013; 65(1):1-11.
11. Jennette J. Pauci-immune and antineutrophil cytoplasmic autoantibody-mediated crescentic glomerulonephritis and vasculits. Heptinstall's pathology of the kidney. 2007:643-74.
12. Chu KH, Tsang WK, Tang CS, et al. Acute renal impairment in coronavirus-associated severe acute respiratory syndrome. Kidney international. 2005; 67(2):698-705.
13. Administration FaD. New York SARS-CoV-2 Real-time RT-PCR Diagnostic Panel: Food and Drug Administration; [Available from: https://www.fda.gov/media/135661/download.

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