Immunosuppressants

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COVID-19: 11 case reports

In a single-center retrospective study involving 11 patients presented between March 2020 and July 2020, nine men and two women aged 35–79 years were described, who developed COVID-19 following immunosuppressive therapy with prednisone, mycophenolate-mofetil, ciclosporin and unspecified mTOR inhibitors [*routes, durations of treatments to reaction onsets not stated*].

Patient 1: A 79-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, mycophenolate-mofetil 1.5 g/day and ciclosporin [cyclosporine A] 4 mg/kg/day. His comorbid conditions included hypertension, diabetes mellitus and chronic kidney disease. He was hospitalised in 2020 due to fever, cough and dyspnoea. Following admission, laboratory investigation demonstrated the following: total leukocytes 6.1 × 1000/mm^3, lymphopenia, thrombocytopenia, D-dimer 1836 ng/mL and C-reactive protein 21 mg/dL. A RT-PCR test of a nasopharyngeal swab sample was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated less than 50% of bilateral pulmonary infiltrates with ground-glass opacity. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, mycophenolate-mofetil and ciclosporin were identified to be responsible for the development of COVID-19. He was then shifted to ICU and started receiving off-label treatment with azithromycin. He also developed acute renal failure associated with COVID-19. After 4 days of hospitalisation, he died with acute renal failure due to COVID-19.

Patient 2: A 67-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with mycophenolate-mofetil 1.5 g/day, prednisone 0.4 mg/kg/day and unspecified mTOR inhibitor. His comorbid conditions included systemic arterial hypertension, diabetes mellitus and chronic kidney disease. He was hospitalised in 2020 due to cough and dyspnoea. Following admission, laboratory investigation demonstrated the following: total leukocytes 9.8 × 1000/mm^3, lymphopenia, thrombocytopenia, troponin I 0.41 ng/L, D-dimer 1397 ng/mL, C-reactive protein 40 mg/dL and B-type natriuretic peptide 8410 pg/mL. A RT-PCR test of a nasopharyngeal swab sample was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated more than 50% of bilateral pulmonary infiltrates with ground-glass opacity. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, mycophenolate-mofetil and unspecified mTOR inhibitor were identified to be responsible for the development of COVID-19. He was then shifted to ICU and started receiving off-label treatment with hydroxychloroquine, azithromycin and unspecified corticosteroid. Additionally, he received unspecified vasoactive drug due to haemodynamic instability. He also developed acute renal failure associated with COVID-19. After 4 days of hospitalisation, he died with acute renal failure due to COVID-19.

Patient 3: A 52-year-old woman, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, mycophenolate-mofetil 1.5 g/day and ciclosporin [cyclosporine A] 4 mg/kg/day. Her comorbid conditions included systemic arterial hypertension, diabetes mellitus and obesity. She was hospitalised in 2020 due to fever, cough and dyspnoea. Following admission, laboratory investigation demonstrated the following: total leukocytes 3.7 × 1000/mm^3, lymphopenia, platelet count 220 × 1000/mm3, troponin I 0.02 ng/L D-dimer 287 ng/mL, C-reactive protein 7.1 mg/dL and B-type natriuretic peptide 1230 pg/mL. A RT-PCR test of a nasopharyngeal swab sample was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated less than 50% of bilateral pulmonary infiltrates with ground-glass opacity. She was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, mycophenolate-mofetil and ciclosporin were identified to be responsible for the development of COVID-19. Following improvement in laboratory investigations, she was discharged home after 11 days of hospitalisation.

Patient 4: A 50-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, mycophenolate-mofetil 1.5 g/day, ciclosporin [cyclosporine A] and unspecified mTOR inhibitor. His comorbid conditions included systemic arterial hypertension and diabetes mellitus. He was hospitalised in 2020 due to fever, cough and gastrointestinal symptoms. Following admission, laboratory investigation demonstrated the following: total leukocytes 7.7 × 1000/mm^3, lymphopenia, thrombocytopenia, troponin I 0.01 ng/L and C-reactive protein 2 mg/dL. A SARS-CoV-2 ELISA test was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated less than 50% of bilateral pulmonary infiltrates with ground-glass opacity. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, mycophenolate-mofetil, ciclosporin and unspecified mTOR inhibitor were identified to be responsible for the development of COVID-19. Therefore, he started receiving off-label treatment with azithromycin. He also developed acute renal failure associated with COVID-19. Following improvement in laboratory investigations, he was discharged home after 5 days of hospitalisation.

Patient 5: A 35-year-old woman, who had undergone heart transplant, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, mycophenolate-mofetil 1.5 g/day and ciclosporin [cyclosporine A] 4 mg/kg/day. Her comorbid condition included diabetes mellitus. She was hospitalised in 2020 due to fever and cough. Following admission, laboratory investigation demonstrated the following: total leukocytes 8.3 × 1000/mm^3, lymphopenia, platelet count 259 × 1000/mm^3, troponin I 0.03 ng/L D-dimer 675 ng/mL, C-reactive protein 1.1 mg/dL and B-type natriuretic peptide 2800 pg/mL. A RT-PCR test of a nasopharyngeal swab sample was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated less than 50% of bilateral pulmonary infiltrates with ground-glass opacity. She was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, mycophenolate-mofetil and ciclosporin were identified to be responsible for the development of COVID-19. She also developed acute renal failure associated with COVID-19. Following improvement in laboratory investigations, she was discharged home after 21 days of hospitalisation.

Patient 6: A 69-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, ciclosporin [cyclosporine A] 4 mg/kg/day and unspecified mTOR inhibitor. His comorbid conditions included hypertension, diabetes mellitus, chronic kidney disease and obesity. He was hospitalised in 2020 due to fever, cough, dyspnoea and gastrointestinal symptoms. Following admission, laboratory investigation demonstrated the following: total leukocytes 2.8 × 1000/mm^3, lymphopenia, thrombocytopenia, troponin I 0.12 ng/L, D-dimer 4061 ng/mL, C-reactive protein 33 4mg/dL and b-type natriuretic peptide 270 pg/mL. A RT-PCR test of a nasopharyngeal swab sample was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated more than 50% of bilateral pulmonary infiltrates with ground-glass opacity. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, ciclosporin and unspecified mTOR inhibitor were identified to be responsible for the development of COVID-19. Therefore, he was shifted to ICU and started receiving off-label treatment with unspecified corticosteroid. Additionally, he received unspecified vasoactive drug due to haemodynamic instability. He also developed acute renal failure associated with COVID-19. After 44 days of hospitalisation, he died with acute renal failure due to COVID-19.

Patient 7: A 51-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with

prednisone 0.4 mg/kg/day, mycophenolate-mofetil 1.5 g/day, ciclosporin [cyclosporine A] and unspecified mTOR inhibitor. His comorbid conditions included hypertension, diabetes mellitus and chronic kidney disease. He was hospitalised in 2020 due to fever, cough and dyspnoea. Following admission, laboratory investigation demonstrated the following: total leukocytes $10.5 \times 1000/mm^3$, lymphopenia, platelet count $153 \times 1000/mm^3$, troponin I 0.07 ng/L and D dimer 6933 ng/mL, C-reactive protein 33 mg/dL and B-type natriuretic peptide 1074 pg/mL. A RT-PCR test of a nasopharyngeal swab sample was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated less than 50% of bilateral pulmonary infiltrates with ground-glass opacity. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, mycophenolate-mofetil, ciclosporin and unspecified mTOR inhibitor were identified to be responsible for the development of COVID-19. Therefore, he was shifted to ICU and started receiving off-label treatment with azithromycin and unspecified corticosteroid. He also developed acute renal failure associated with COVID-19. Following improvement in laboratory investigations, he was discharged home after 22 days of hospitalisation.

Patient 8: A 74-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, ciclosporin [cyclosporine A] and unspecified mTOR inhibitor. His comorbid conditions included hypertension, diabetes mellitus and chronic kidney disease. He was hospitalised in 2020 due to gastrointestinal symptoms. Following admission, laboratory investigation demonstrated the following: total leukocytes $5.1 \times 1000/mm^3$, lymphopenia, thrombocytopenia, troponin I 0.01 ng/L and D dimer 1839 ng/mL, C-reactive protein 8.1 mg/dL and B-type natriuretic peptide 430 pg/mL. A SARS-CoV-2 ELISA test was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated less than 50% of bilateral pulmonary infiltrates with ground-glass opacity. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, ciclosporin and unspecified mTOR inhibitor were identified to be responsible for the development of COVID-19. He also developed acute renal failure associated with COVID-19. Following improvement in laboratory investigations, he was discharged home after 9 days of hospitalisation.

Patient 9: A 37-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, mycophenolate-mofetil 1.5 g/day and ciclosporin [cyclosporine A] 4 mg/kg/day. His medical history was significant for hypertension. He presented in 2020 due fever. Laboratory investigation demonstrated the following: total leukocytes $9.6 \times 1000/mm^3$, lymphocyte count $1.7 \times 1000/mm^3$, platelet count $180 \times 1000/mm3$, troponin I 0.01 ng/L and D dimer 147 ng/mL and B-type natriuretic peptide 147 pg/mL. A SARS-CoV-2 ELISA test was found to be positive for SARS-CoV-2 infection. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, ciclosporin and mycophenolate-mofetil were identified to be responsible for the development of COVID-19. During the last follow-up, laboratory investigation demonstrated clinical improvement.

Patient 10: A 37-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, mycophenolate-mofetil 1.5 g/day and ciclosporin [cyclosporine A] 4 mg/kg/day. His medical history was significant for hypertension, diabetes mellitus and chronic kidney disease. At presentation in 2020, he was asymptomatic. Laboratory investigation demonstrated the following: total leukocytes $6.1 \times 1000/mm^3$, lymphopenia, thrombocytopenia, and B-type natriuretic peptide 694 pg/mL. A SARS-CoV-2 ELISA test was found to be positive for SARS-CoV-2 infection. He was then diagnosed with asymptomatic COVID-19. The immunosuppressive therapy with prednisone, ciclosporin and mycophenolate-mofetil were identified to be responsible for the development of COVID-19. During the last follow-up, laboratory investigation demonstrated clinical improvement.

Patient 11: A 44-year-old man, who had undergone heart transplantation, had been receiving immunosuppressive therapy with prednisone 0.4 mg/kg/day, ciclosporin [cyclosporine A] and mycophenolate-mofetil 1.5 g/day. His medical history was significant for hypertension. He was hospitalised in 2020 due to fever, cough and gastrointestinal symptoms. Following admission, laboratory investigation demonstrated the following: total leukocytes $5.4 \times 1000/mm^3$, lymphopenia, platelet count $202 \times 1000/mm^3$, troponin I 0.01 ng/L and D dimer 341 ng/mL, C-reactive protein 1.3 mg/dL and B-type natriuretic peptide 342 pg/mL. A RT-PCR test of a nasopharyngeal swab sample was found to be positive for SARS-CoV-2 infection. Thereafter, a chest tomography was performed, which demonstrated less than 50% of bilateral pulmonary infiltrates with ground-glass opacity. He was then diagnosed with COVID-19. The immunosuppressive therapy with prednisone, ciclosporin and mycophenolate-mofetil were identified to be responsible for the development of COVID-19. He also developed acute renal failure associated with COVID-19. Following improvement in laboratory investigations, he was discharged home after 6 days of hospitalisation.

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» **Editorial comment:** Details of the five patients (79-year-old man, 67-year-old man, 52-year-old woman, 50-year-old man and 35-year-old woman) have previously been published and processed for Adis PV [see Reactions 1851 p184; 803554481]