blood work
images in hematology

Hypersegmented granulocytes and COVID-19 infection

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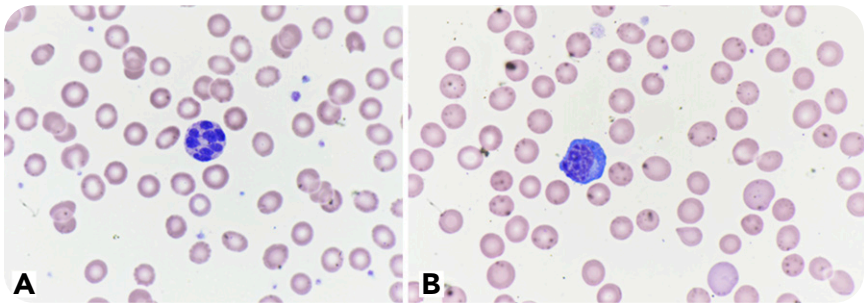

A 69-year-old man with a history of type 2 diabetes mellitus, coronary artery disease, and end-stage renal disease presented with fever, cough, shortness of breath, and body aches, which he had experienced for 2 weeks. On admission, he was hypoxic (SpO_2 saturation, 89%) and found to be COVID-19$^+$ by real-time polymerase chain reaction via a nasopharyngeal swab sample. The patient was placed on a nonbreathing mask soon thereafter due to persistent hypoxia. Admission laboratory workup showed normocytic anemia (hemoglobin, 10.3 g/dL; mean corpuscular volume, 99.5 fL), elevated C-reactive protein (241.9 mg/L), ferritin (4850 ng/mL), and serum lactate dehydrogenase (270 U/L) with decreased serum iron (40 μg/dL). Serum vitamin B12 and folate were normal. A complete blood count manual differential showed leukocytosis. Scattered hypersegmented neutrophils were present, with up to 8 nuclear lobes (panel A [hematoxylin-and-eosin (H&E) stain; 100× objective; original magnification ×1000]), many showing toxic change, hypogranular cytoplasm, atypical small lymphocytes (Downey type 1 and plasmacytoid forms; panel B [H&E stain; 100× objective; original magnification ×1000]), and scattered large to giant platelets.

Increased neutrophil-to-lymphocyte ratios and toxic changes in neutrophils, thrombocytopenia, and plasmacytoid lymphocytes have recently been reported in COVID-19 patients. Hypersegmented neutrophils are associated with vitamin B12, folate, and iron deficiencies; methotrexate toxicity; chemotherapeutic drugs; heat stroke; Boucher-Neuhäuser syndrome; uremia; and myelodysplastic syndrome. Nevertheless, COVID-19 is the culprit here.

DOI 10.1182/blood.2020006483