

Respiratory Failure and Ground Glass Opacities in the Age of COVID-19

Christopher Dossett, MD and Tomer Pelleg, DO

BACKGROUND

- Microscopic Polyangiitis (MPA) is a rare small blood vessel vasculitis that can affect the lungs¹
- The novel coronavirus, severe acute respiratory syndrome (SARS) coronavirus 2 (COVID-19), is a virus that causes infection of the respiratory system

PATIENT PRESENTATION

History of Present Illness:

- 66-year-old female presented with 4 days of dyspnea and chest pain
- Reported intermittent small volume hemoptysis for the last month
- Associated night sweats and fatigue
- History of multiple recent visits to a local hospital for her significant other's cancer treatment

Medical History:

- Rheumatoid Arthritis
- Hypertension

Physical Exam:

- Vital Signs: afebrile, BP 155/57, HR 91, RR 30, SpO2 91-87% on room air
- Moderate respiratory distress, tachypneic, accessory muscle use, decreased breath sounds

Laboratory Data:

- CBC- Hbg 4.4, Hct 14.3, WBC 2.92
- CMP- Cr 2.00, baseline (0.7)
- CRP elevated 14.10 (ULN 1)
- INR and PTT normal
- SARS-CoV-2 indeterminate
 - Qualitative PCR undetected
- ANA positive (1:1280)
- P-ANCA positive
- Myeloperoxidase 5.9 (ULN 0.4)

Radiographic:

- CXR: Moderate bilateral pneumonia, right > left
- CT Chest w/o contrast: Diffuse multifocal ground-glass opacities bilaterally, COVID suggested given appearance

RESULTS

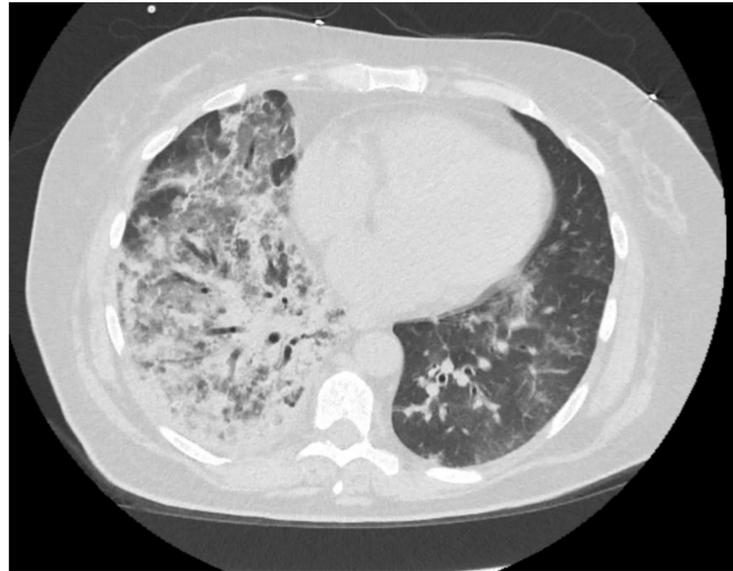


Figure 1. CT Chest revealing ground-glass opacities

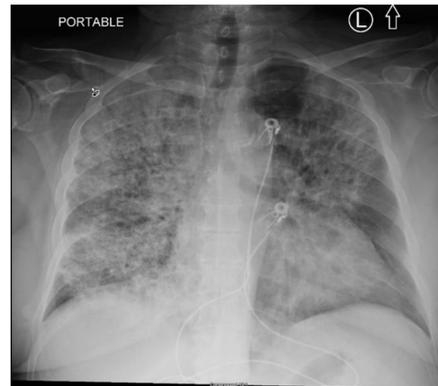


Figure 2. CXR with patchy opacities

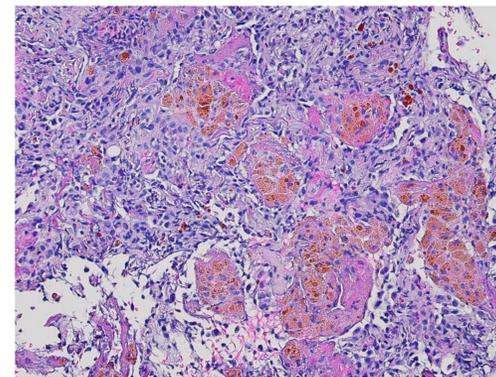


Figure 3. Intra-alveolar hemosiderin

CLINICAL COURSE

- Patient was initially started on antibiotics and corticosteroids for COVID-19 with presumed secondary bacterial pneumonia
- She underwent elective bronchoscopy to evaluation for diffuse alveolar hemorrhage (DAH)
- Bronchoalveolar lavage demonstrated sequential increased RBCs
 - Alveolar cytology demonstrated hemosiderin-laden macrophages
- Laboratory testing demonstrated positive ANA, P-ANCA, and myeloperoxidase consistent with diagnosis of microscopic polyangiitis
- Multiple COVID-19 tests were all negative
- Initiated on high-dose corticosteroids for treatment of MPA
- Liberated from ventilator with gradual resolution of DAH
- Discharged on high-dose corticosteroids with transition to rituximab infusions in outpatient setting

DISCUSSION

- Microscopic Polyangiitis (MPA) is an autoimmune disease that affects small blood vessels¹
- It predominately affects the upper and lower respiratory tract and kidneys
- DAH in MPA patients significantly increases risk of mortality and recurrence that require prompt treatment²
- The novel coronavirus, severe acute respiratory syndrome (SARS) coronavirus 2 (COVID-19), is a virus that causes infection of the respiratory system

Symptoms & Signs	MPA	COVID-19
Fever	Y	Y
Dyspnea	Y	Y
Fatigue	Y	Y
Hemoptysis	Y	Y
Leukopenia	Y	Y
Ground-glass opacities	Y	Y
Alveolar hemorrhage	Y	Rarely

- Due to the large burden of COVID-19 on the medical community, ground-glass opacities have become associated with COVID-19
- CT scans have a higher detection rate of 98% versus RT-PCR for the diagnosis of COVID-19³
- Post-mortem COVID-19 lung tissue samples had low percentage of focal alveolar hemorrhage⁴
- Limited bronchoscopies performed due to high risk of occupational exposure on healthcare workers⁵
- Patient harm can occur with misdiagnosis if the appropriate diagnostic work-up is not performed

REFERENCES

1. Guillemin L, et al. Microscopic polyangiitis: clinical and laboratory findings in eight-five patients. *Arthritis Rheum.* 2000; 43(11):2481-2487.
2. Collins CE, Quismorio FP Jr. Pulmonary involvement in microscopic polyangiitis. *Curr Opin Pulm Med.* 2005; 11(5):447-451.
3. Fang Y, Zhang H, Xie J, et al. Sensitivity of Chest CT for COVID-19: Comparison to RT-PCR. *Radiology.* 2020; 296(2):E115-117.
4. Carsana, Luca, et al. Pulmonary Post-Mortem Findings in a Series of COVID-19 Cases from Northern Italy: a Two-Centre Descriptive Study. *The Lancet Infectious Diseases.* 2020; 20(10): 1135-1140.
5. Löffler C, Mahrhold J, Fogarassy P, Beyer M, Hellmich B. Two Immunocompromised Patients With Diffuse Alveolar Hemorrhage as a Complication of Severe Coronavirus Disease 2019. *Chest.* 2020; 158(5):E215-219.