An ARDS Mystery: Could Mycoplasma Be the Culprit?

Ian Yu, MD; Majd Hemam, MD; Maliha Zainib, MD; Rakhee Barai, MD; James Gubitosa, DO; Anne K. Sutherland, MD

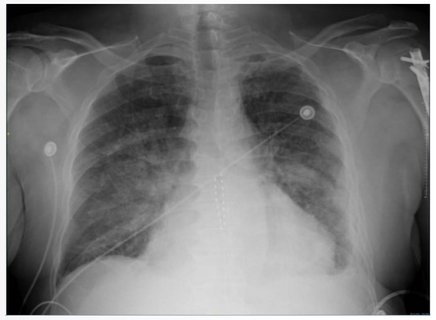
Department of Internal Medicine, Rutgers New Jersey Medical School

Introduction

Mycoplasma pneumoniae (MP), while a well-known cause of community acquired pneumonia (CAP), is generally not immediately considered when evaluating acute respiratory distress syndrome (ARDS). Despite this, the overall incidence of MP-related ARDS has an incidence of 0.5-2% of all MP cases (1). Its progression to ARDS is thought to be secondary to delays in recognition and treatment of MP CAP as well as the presence of other pulmonary or immunocompromising comorbidities. Here we present the case of a patient with ARDS of unknown etiology, whose case was highly suspicious for MP infection.

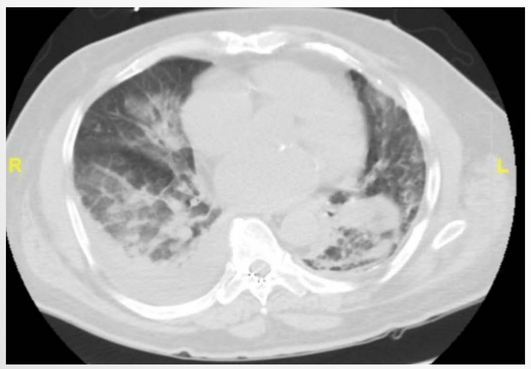
Imaging

Admission CXR



The heart is normal in size. There is right greater than left patchy groundglass opacities compatible with pneumonia. There is no pleural effusion or pneumothorax. Pleural thickening at the left lung base, unchanged. There are bilateral old rib fractures. Degenerative changes in the spine. Partially visualized is an intramedullary nail fixation of the left humerus.

Admission CT Chest without Contrast



There is a small right and trace left pleural effusion. There is also fluid loculated within the left fissure. There are extensive patchy areas of groundglass opacity demonstrated within the lungs bilaterally most prominent throughout the right lung, concerning for multifocal pneumonia including the possibility of atypical infection.

Case Description

70 year old man with PMH of HTN, diabetes mellitus type 2, CKD, who presented with 4 days of shortness of breath and cough. He reported gradual progression of his symptoms without a clear inciting event, no known sick contacts/COVID-19 exposures, and no associated fevers or chills. His only travel was an 18-hour train ride from Florida to NJ three weeks prior to presentation. He required bilevel non-invasive positive pressure ventilation on admission. His workup was notable for CXR with bilateral groundglass opacities, R>L, CT chest with similar findings in addition to honeycombing of the RUL. PCR testing of nasopharyngeal samples for SARS-CoV-2 were negative on an isolated assay as well as on a combined test with influenza and RSV, which were also negative. Additionally, a respiratory pathogen panel was negative and urine antigen testing for legionella and streptococcus pneumonia were also negative. Contrast CT chest was negative for pulmonary embolism.

He was started on empiric treatment for bacterial pneumonia. His respiratory status failed to improve by day 5 and he was admitted to the ICU; repeat SARS-CoV-2 nasopharyngeal PCR testing was again negative. On day 7, he was intubated and began prone mechanical ventilation as per the PROSEVA trial. Out of concern for possible Legionella infection with false-positive testing, his antimicrobial coverage was adjusted to include levofloxacin. Bronchoscopy demonstrated serosanguinous fluid in the RLL concerning for alveolar hemorrhage and the patient was started on dexamethasone as per the DEXA-ARDS trial. His renal function also worsened to the point of requiring intermittent hemodialysis.

A repeat respiratory pathogen panel on hospital day 8 was again negative, however serologies for mycoplasma pneumoniae were positive for IgG (839 U/ml) and negative for IgM (<700 U/ml) on day 9. Workup for interstitial lung disease on day 10 was negative (normal C3 level, slightly elevated C4 level, mild increase in IgE without any other immunoglobulin level abnormalities, and negative serum ANA, HF, ASO, Anti-GM, ANCA, anti-cardiolipin, anti-DS-DNA, and ASMA). Sputum legionella CYE culture sample was sent off on day 12 and was negative.

The patient's respiratory status did respond to prone ventilation with gradual reductions in his oxygenation and pressure requirements. Repeat SARS-CoV-2 nasopharyngeal PCR was again negative on day 18, and his renal function improved to the point where was trialed off of intermittent hemodialysis on day 19. He was successfully extubated to bilevel positive pressure ventilation on day 24 but his respiratory status remained tenuous. Repeat mycoplasma serologies were sent off on day 25 which again resulted positive for IgG at slightly higher levels (1206 U/ml) but IgM remained negative (< 700 U/ml). On day 27, patient's family opted to make the patient comfort care and upon downgrade to the general medical floors on day 28, the patient passed away.

Test Results

	Abnormal	Within normal limits
Cultures	Fungal sputum culture (Candida albicans x2)	Blood (x7), Sputum (x2), Sputum AFB (x2), Legionella
Infectious	EBV PCR (positive), MRSA nares PCR (initially negative, later positive), Mycoplasma IgG (elevated x2)	SARS-CoV-2 PCR (x3), Respiratory panel PCR (x2), CMV PCR, SARS-CoV-2 Ab (IgM, IgG, IgA x2), Beta-D-glucan (x2), Coccidiodes (IgG), Aspergillus, EBV IgM, Mycoplasma IgM (x2), urine Strep antigen, urine Legionella antigen, urine Histoplasma antigen
Auto-immune	C4 complement level (elevated), IgE levels (elevated)	ANA Ab, Anti-GBM Ab, C3 complement, RF, ANCA, ASO Ab, Anticardiolipin (IgG, IgM), dsDNA, CCP Ab, ASMA, IgA levels, IgG levels, IgM levels, IgD levels

Discussion

Despite a negative mycoplasma pneumoniae PCR and IgM, mycoplasma pneumoniae was deemed to be the likely cause of this patient's ARDS via a diagnosis of exclusion, typical imaging findings, and the presence of a positive and uptrending mycoplasma pneumoniae IgG. While mycoplasma pneumoniae PCR is the most sensitive and feasible method of diagnosis, the sensitivities on nasophrayngeal and orophargyngeal samples are 50-90% and 37.5-79%, respectively. Furthermore, these swabs are heavily dependent upon technique and the amount of sputum production present.

IgM can be negative in the first several weeks of acute infection or reinfection, but significant increases in IgG have shown to be predictive of ongoing infection (2). This patient's case illustrates the importance of considering a broad differential when appraising ARDS. It is our hope that screening tests, such as PCR, continue to evolve so that diagnosis and the appropriate treatment may occur more readily in the future.

References

1. Ding, L., Zhao, Y., Li, X., Wang, R., Li, Y., Tang, X., Sun, B., & He, H. (2020). Early diagnosis and appropriate respiratory support for Mycoplasma pneumoniae pneumonia associated acute respiratory distress syndrome in young and adult patients: a case series from two centers. BMC Infectious Diseases, 20(1), 0–1. https://doi.org/10.1186/s12879-020-05085-5

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