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CASE REPORT

Infectious Disease

A teenager with fever, chest pain, and respiratory distress during the coronavirus disease 2019 pandemic: a lesson on anchoring bias

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Abstract

Symptoms of coronavirus disease 2019 overlap with other important illnesses affecting young adults. We report a case of a 17-year old male presenting to the emergency department in the midst of a pandemic with symptoms of coronavirus disease 2019. He had fever, dyspnea, chest pain, and myalgias, with bilateral infiltrates on chest radiograph, and developed septic shock secondary to infectious thromboembolic events. However, his blood cultures grew group G streptococcus secondary to his oropharyngeal infection, and he experienced an infectious thrombus in the internal jugular vein, consistent with the rare but well-described Lemierre's syndrome. This case report calls attention to the importance of maintaining differential diagnoses and thereby minimizing the biases and assumptions that come with clinical care during a pandemic.

KEYWORDS
COVID-19, fever

1 | CASE PRESENTATION

A previously healthy 17-year-old male presented to the emergency department (ED) with a 7-day history of worsening symptoms, including left-sided sore throat, chills, diarrhea, vomiting, diffuse body aches, right-sided chest pain, and persistent fever. Throughout the past week, he had several outpatient and ED evaluations, including negative testing for strep pharyngitis, influenza, mononucleosis, and Epstein-Barr virus. He also had 2 nasal swab specimens collected for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus testing. Both were polymerase chain reaction tests, and both were eventually negative. He had been discharged to home with advice on supportive care, including antipyretics and good oral hydration. On this presentation, he had a 97% pulse oximetry on room air, and he was febrile and tachycardic and had marked diastolic hypotension. He had erosions in the left posterior tonsil, an exudative oropharynx, diminished breath sounds bilaterally, and progressively worsening respiratory distress. Laboratory results demonstrated leukopenia as well as markedly elevated D-dimer, C-reactive protein, and procalcitonin. Chest radiograph showed bilateral nodular densities with ground-glass, interpreted as multilobar pneumonia. He was fluid resuscitated, administered broad-spectrum antibiotics, and given nasal cannula oxygen. He was admitted

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to an isolation floor for patients suspected to have coronavirus disease 2019 (COVID-19) while his third SARS-CoV-2 virus polymerase chain reaction test was pending.

A non-occlusive thrombus of his left internal jugular vein was found on computed tomography imaging. His blood cultures revealed group G streptococcus, and he was initially treated with clindamycin, vancomycin, ceftriaxone, and ampicillin/sulbactam for 2 days. He was diagnosed with Lemierre's syndrome and group G strep sepsis. A later blood culture found *Fusobacterium necrophorum*; on this finding, his antibiotics were switched to meropenum.

Throughout the length of his stay, the patient experienced severe chest pain, presumably from septic micro emboli. He received pain medication for his chest pain and had worsening hypoxemia and respiratory distress (accessory muscle use and increasing respiratory rates) during the first 3 days of his hospital stay. He had worsening edema on his chest radiograph without improvement with furosemide, was subsequently transferred to the pediatric ICU on hospital day 4, and was placed on bilevel positive airway pressure to maintain adequate oxygen levels. He had a peripherally inserted central catheter on hospital day 5. Despite antibiotics, he continued to have worsening symptoms, and an effusion developed on his chest radiograph. On hospital day 7, a chest tube was introduced into his right lung that drained punch-colored sterile pleural fluid. Thereafter he was easily weaned off the oxygen support and was transitioned to room air. His D-dimer increased further, and his laboratory results showed increasing thrombocytosis. Considering the potential for his peripherally inserted central catheter line to clot during this thromboembolic illness, hematology was consulted and agreed he should be treated with enoxaparin.

On discharge, an ultrasound demonstrated resolution of the internal jugular thrombus, and his blood cultures were sterile. He was discharged on hospital day 13. He completed outpatient parenteral antibiotic therapy through a peripherally inserted central catheter with 24 days of ertapenem and enoxaparin. He had frequent follow-up with pediatric infectious disease and made a complete recovery.

2 | DISCUSSION

Lemierre's syndrome is a rare disease that is estimated to have a worldwide incidence of 1/1,000,000.[1] It occurs when an oropharyngeal infection spreads into deep spaces within the neck, causing septic thrombophlebitis and possible spreading septicemia if not caught early.[2,3] Typically, *F. necrophorum* is involved, causing a bloodstream infection and promoting the formation of septic emboli, which can migrate to pulmonary capillaries[1,4,5]

Typical treatment for Lemierre's syndrome involves intravenous antibiotics to treat the underlying pathogens. The use of anticoagulation medication, such as low-molecular weight heparin, is considered controversial, as limited research has been done with regard to its effectiveness in Lemierre's syndrome.[4,6]

This patient was evaluated in the midst of a COVID-19 pandemic in a geographic area that was greatly affected by the high prevalence of SARS-CoV-2. Despite a sore throat, he was triaged into an ED pod for cohorted patients with suspected COVID-19. This initial decision could potentially have led to further cognitive errors on the part of the treatment team. Putting too much weight on this initial presentation of fever in a pandemic would have been consistent with "anchoring bias" in which initial facts distort the clinician's ability to take in further information objectively.[7] It has been well established that clinicians who succumb to anchoring effects are more likely to make diagnostic errors.[8–11] Despite the patient's initial findings, some of which could have been consistent with the frequently encountered clinical deterioration with acute COVID-19, the ED team recognized alternative diagnoses for his persistent fevers, tachycardia, and hypotension and appropriately treated his septic shock with broad-spectrum antibiotics and fluid resuscitation. Although our case is similar to the characteristic clinical picture of Lemierre's syndrome resulting from strep pharyngitis, the diagnosis was complicated by a group G streptococcus infection. The rapid antigen detection testing is highly specific for group A strep, but does not reliably identify group G strep.[12]

This case is further complicated by the lack of data concerning the reliability of SARS-CoV-2 viral testing. This patient was tested multiple times and suspicion remained high even after negative results. The sensitivity of this testing varies by type of specimen obtained, and there is a lack of gold standard testing for comparison. The reported sensitivity of nasopharyngeal specimens appears to vary between studies, all with relatively few participants. A discussion by Woloshin et al[13] in the *New England Journal of Medicine* notes that a preprint study from Wuhan, China, found that among 490 nasal swabs from 213 hospitalized patients with COVID-19, 27% were falsely negative. A systematic review by Arevalo-Rodriguez et al[14] suggested that the false negative rate could be between 2%–29%, equating to 71%–98% sensitivity. Because there are still many unknown factors, such as variations between time of testing and stage of disease, a negative COVID-19 result currently does not reliably exclude the disease.

3 | CONCLUSION

This case report summarized the presentation and treatment of a 17-year-old male who was ultimately diagnosed with Lemierre's syndrome days after being treated as a presumed COVID-19 case. Although he was successfully treated for Lemierre's syndrome, this case illustrates the importance of exploring various diagnoses even when symptoms are consistent with the disease of a current global pandemic.

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CONFLICTS OF INTEREST

The authors have no additional outside support information, conflicts, or financial interest to disclose.

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