A Pain in the Neck: Lemierre Syndrome with an Atypical Pathogen

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Introduction

Lemierre syndrome is a condition described as thrombophlebitis of the internal jugular vein secondary to a primary head and neck infection, extending into the lateral pharyngeal spaces of the neck. Also known as postanginal sepsis, it most commonly occurs in otherwise healthy adolescents and young adults. Subsequent release of septic emboli is very common, and the lungs are the most likely site for this to occur. Other sites of spread include the spleen, liver, bone, joint, muscle, cardiac tissues, and brain. The classic pathogen is *Fusobacterium* species. Other implicated agents include *Bacteroides* species, *Streptococcus* species, *Staphylococcus* aureus, and *Klebsiella pneumoniae*; up to one-third of infections are polymicrobial.

Case Presentation

A 20-year-old female with history of PTSD, adenoidectomy, and frequent childhood ear infections presented to the emergency department (ED) for shortness of breath over several hours. This was preceded by flu-like symptoms, subjective fevers, upper back and neck pain, decreased oral intake, and emesis. Notably, she also endorsed sore throat and odynophagia.

In the ED, she tachycardic, tachypneic, and mildly hypoxemic. Exam revealed posterior oropharyngeal erythema with leftward deviation of the uvula. Subsequent contrasted tomography (CT) of the neck revealed bilateral tonsillitis, left jugular vein thrombosis, and retropharyngeal edema. CT angiography of the chest revealed diffuse nodular opacities with central lucency, consistent with pulmonary septic emboli, as well as small bilateral pleural effusions. The patient was started on broad-spectrum antibiotic therapy and shortly after admission required the medical intensive care unit for acute hypercapnic hypoxic respiratory failure and septic shock in the setting of Lemierre syndrome.

Blood and respiratory cultures speciated to *Arcanobacterium hemolyticum*. Fevers persisted despite proper antibiotic therapy. Evaluation for dural venous sinus thrombosis and endocarditis yielded negative results. Repeat chest imaging demonstrated worsening bilateral pleural effusions with bibasilar consolidations, as well as a new loculated pleural effusion in the left upper lung. Bilateral thoracostomy tubes were placed for administration of lytics, and thoracentesis was performed. Cultures from pleural samples never grew any pathogens. Eventually, she was able to be extubated and weaned off supplemental oxygen. Antibiotic deescalation continued, and she was eventually discharged on Augmentin monotherapy.

Figure A: Axial CT slice revealing left internal jugular vein thrombosis

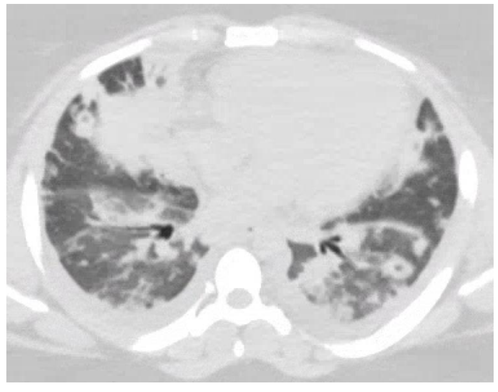

Figure B: CTPE lung window demonstrating septic pulmonary emboli & effusions

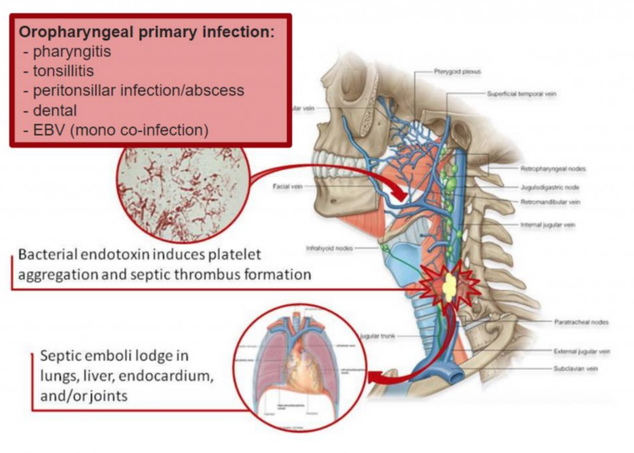

Figure C: Relevant anatomy and pathophysiology of Lemierre syndrome
Image courtesy of: *EM in 5: Lemierre's Syndrome*. (October 2018). EMDocs.net. photograph. Retrieved April 10, 2025, from: https://www.emdocs.net/em-in-5-lemierres-syndrome/

Discussion

- While the classic pathogen for Lemierre syndrome is *Fusobacterium* species, other species have been implicated.
- *Arcanobacterium haemolyticum*, a gram-positive bacillus known for causing pharyngitis with a scarlatiniform rash, has also been associated with Lemierre's.
- Due to *A. haemolyticum's* similarities in presentation with scarlet fever and viral exanthems, along with difficulties isolating in culture, delays in diagnosis can be common. More aggressive infections such as endocarditis and septicemia are possible, but this is usually in elderly or immunosuppressed patients.
- There are few case reports of Lemierre syndrome in those with *A. haemolyticum*, and most of those that do exist involve coinfection with *F. necrophorum*. Cases with the bug isolated alone on blood culture in immunocompetent patients are very rare, and it has been found on the skin and in the oropharynx of healthy humans.
- There are no established regimens for treatment of *A. haemolyticum*, although it has often been shown to be susceptible to penicillin. Broad-spectrum antibiotics, including anaerobic coverage, are still recommended until culture sensitivities allow tailoring of therapy.
- Anticoagulation has not demonstrated sure efficacy in Lemierre syndrome, usually being reserved for accompanying dural venous sinus thrombosis, extensive clot burden, or failure to improve in 72 hours on appropriate therapy.

Conclusion

This case exemplifies how simple head and neck infections can progress to more sinister pathology if not addressed early on. It is significant in that a usually benign member of skin and oral flora caused serious complications in an otherwise healthy young adult. It also demonstrates complications of Lemierre's syndrome, namely septic pulmonary emboli, which further complicated this patient's clinical course and prolonged treatment. Providers should be quick to treat common bacterial otic and oropharyngeal infections to avoid progression to more sinister states.

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