

A rare, but life-threatening sore throat: A case of Lemierre's syndrome

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Abstract

We present the case of a previously healthy, immunocompetent male with Lemierre's Syndrome. He presented with headache, sore throat and pyrexia. Initial blood tests revealed raised inflammatory markers and electrolyte abnormalities. Blood cultured *Fusobacterium necrophorum*. He developed respiratory distress and imaging confirmed lung abscess and empyema due to septic emboli. He required surgical drainage and a prolonged course of antibiotics. This case highlights the rare, but life-threatening condition of Lemierre's Syndrome. We discuss the importance of prompt recognition and early antibiotic therapy.

Keywords

Lemierre's syndrome, *Fusobacterium necrophorum*, pharyngitis, sepsis.

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Key Points

- Lemierre's syndrome is a rare condition characterised by oropharyngeal infection, anaerobic sepsis and metastatic infection.
- Classically the presence of an internal jugular vein thrombus is reported. We did not identify a thrombus and we suggest that microbiological results, septic emboli and a classical history confirm the diagnosis in our case.
- It commonly affects young, immunocompetent individuals.
- Mortality is significant in this young, fit group at 5–18%.
- Blood cultures are crucial in identifying the causative pathogen.
- Antibiotic therapy will be prolonged.
- Surgical and/or interventional radiology input may be required to manage abscesses.
- In the presence of a radiologically confirmed thrombus consideration should be given to anticoagulation.

Introduction

Headache, sore throat and pyrexia in a young patient are a common presentation to acute medical services. The vast majority will represent a viral pharyngitis that is self-resolving. We present a rare, but life-threatening case of Lemierre's Syndrome, in which a bacterial pharyngitis spreads, with septic emboli to the lungs necessitating thoracic surgical intervention and prolonged antibiotic therapy.

Case presentation

A 20-year old gentleman, presented to the Emergency Department (ED) with a one-week history of headache, sore throat and pyrexia. He described widespread myalgia, which he self-medicated with over the counter analgesia. The patient also complained of intermittent diarrhoea and vomiting over nine days preceding admission.

There was no history of recent foreign travel and no apparent infective contacts.

Examination revealed evidence of cervical and submandibular lymphadenopathy and pharyngitis. He was dehydrated, pyrexia with temperature of 40.4 °C and hypotensive with blood pressure of 94/41 mmHg.

Biochemical disturbance was evidenced by profound hypovolaemic hyponatraemia (Na^+ 115 mmol/L) and hypokalaemia (K^+ 2.8 mmol/L). Both of these corrected in response to intravenous fluids.

The patient had no other past medical history and did not consume alcohol. He smoked cigarettes and there was recent history of recreational drug use, using cocaine 2 weeks prior to the onset of symptoms.

Broad-spectrum antibiotic therapy was commenced given the presenting features with

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raised inflammatory markers including C-reactive protein (CRP) of 144mg/dL and white cell count of $28.4 \times 10^9/L$. Intravenous Tazobactam/Piperacillin was administered, alongside intravenous fluid replacement and antipyretic agents (paracetamol).

Blood cultured a gram-negative rod within the first 24-hours of presentation to hospital. Numerous subsequent blood cultures demonstrated the same appearance. Microbiological review established the growth of the organism *Fusobacterium necrophorum*. Sensitivity testing indicated susceptibility to penicillin, however ongoing pyrexias prompted addition of further agents Clindamycin and Metronidazole.

Multiple areas of pulmonary consolidation and cavitation were noted on computerised tomography (CT) imaging (Figure 1). Para-pharyngeal fat stranding was felt to indicate the clinically detected pharyngitis. Contrast-enhanced CT scan of thorax showed numerous thick walled cavities within the lung parenchyma, with associated consolidation in both the mid and lower zone of the right lung. CT of neck at this stage did not identify a thrombus in the internal jugular vein (Figure 2). He had further imaging with CT neck at 19 days, which again did not demonstrate a thrombus in the internal jugular vein.

There was apparent partial inflammatory response evidenced by improvements in the CRP; however, persistent temperatures were a source of concern and further imaging was requested.

The CT thorax showed an increase in size of the left pleural effusion, with loculation (Figure 3). This

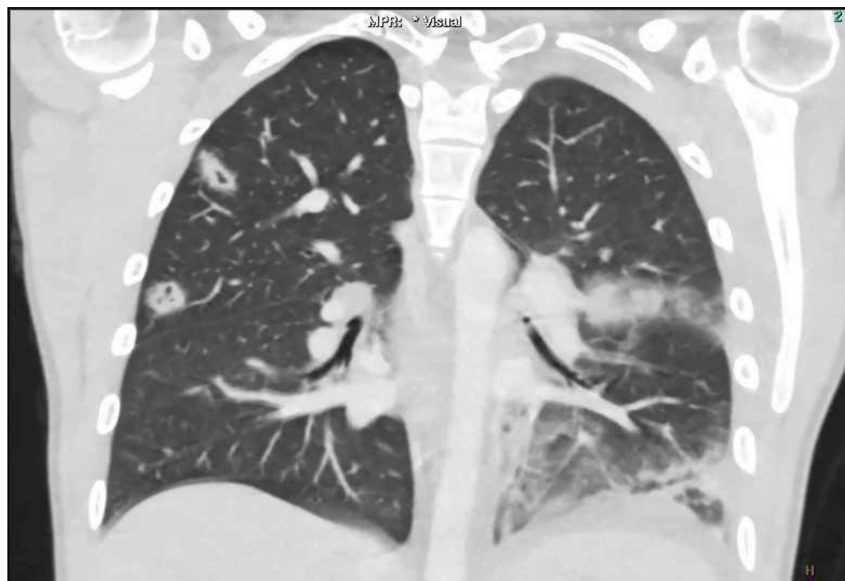


Figure 1. Contrast-enhanced CT scan of thorax (coronal section) showing right upper-lobe cavitating lesions. Left mid and lower zone consolidation is also evident, with a small left base pleural effusion.

is in keeping with a left thoracic empyema, which was drained by the cardiothoracic surgical team with an intercostal chest drain (Figure 4). Twenty-four hours following drainage the patient then underwent left thoracotomy with decortication and debridement of the empyema.

Post-operatively the patient spent 48-hours in the High Dependency Unit (HDU) and was subsequently discharged to ward level care. Three chest drains (apical, basal and mediastinal) remained in place and

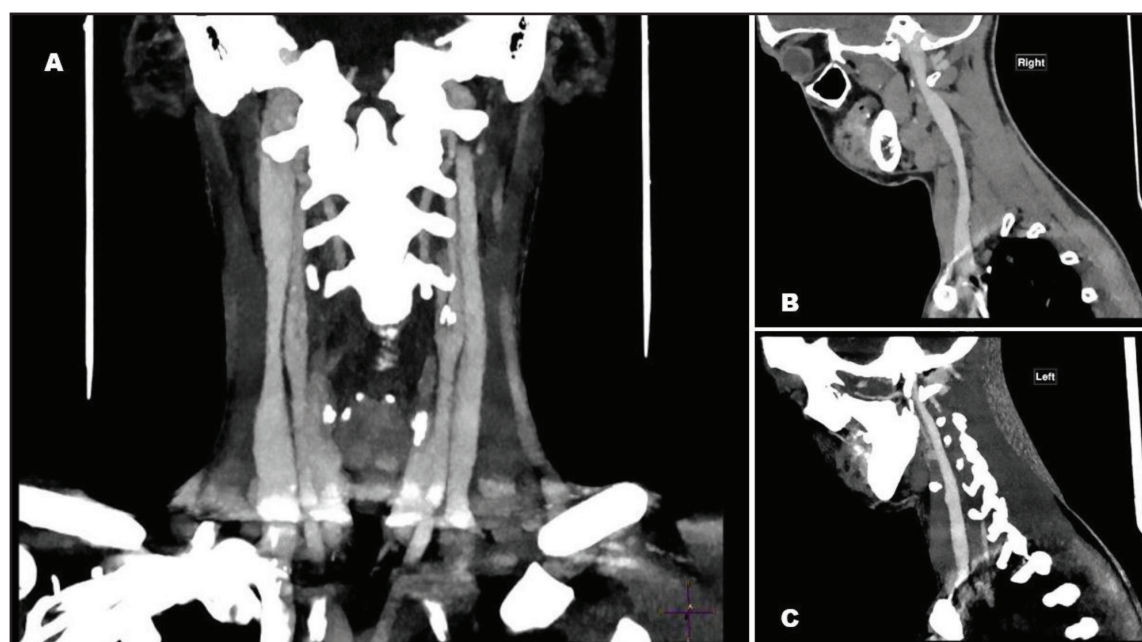


Figure 2. CT scan neck of neck showing no evidence of thrombus in the internal jugular veins. A: Coronal section showing both internal jugular veins. B: Sagittal section showing right internal jugular vein. C: Sagittal section showing left internal jugular vein.

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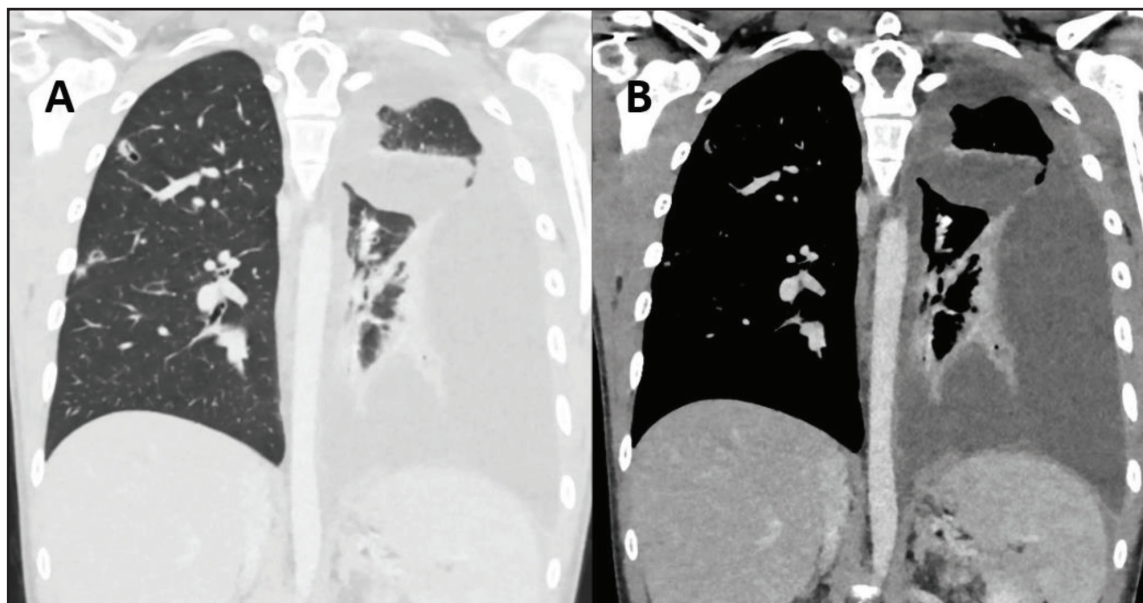


Figure 3. Contrast-enhanced CT scan of thorax (coronal section), A: lung windows showing slight improvement of the cavitating right lobe lesions, B: soft tissue windows showing large left-sided pleural effusion with underlying left lower lobe consolidation and collapse.

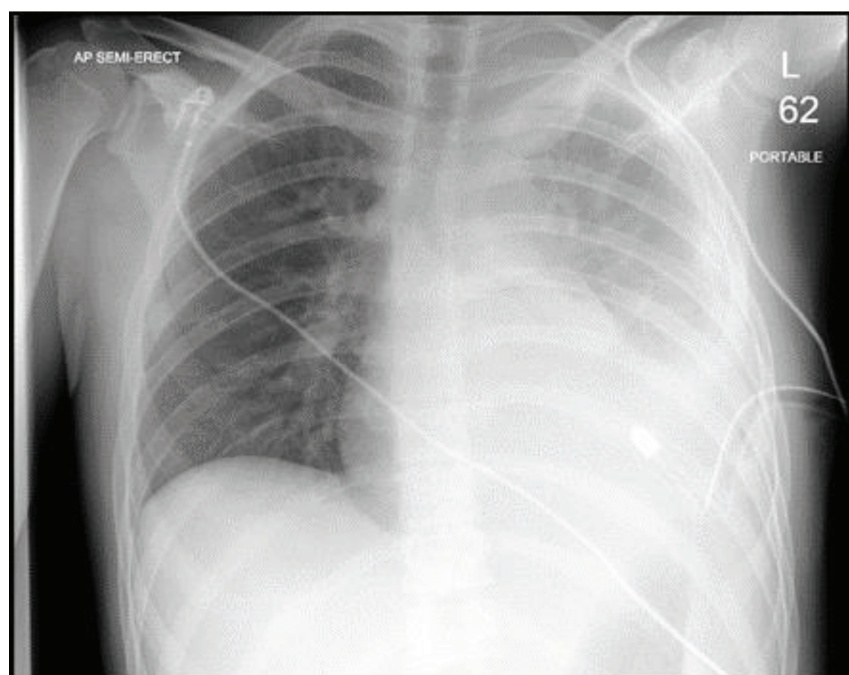


Figure 4. Semi-erect Chest X-ray (Antero-Posterior projection) – showing extensive left pleural effusion and intra-thoracic drain in-situ.

analgesic requirements included patient controlled analgesia and extra-pleural levobupivacaine.

High output from the mediastinal drain of over 2 litres prompted return to theatre due to concerns regarding a chyle leak at day-3 post-operatively. The patient underwent a left postero-lateral thoracotomy with thoracic duct ligation. Procedural notes had shown evidence of a thickened pleura and adhesions. Re-admission to HDU for 72-hours was needed after this latest surgical intervention,

where the patient required ongoing management for descending mediastinitis.

After a further 9 days of ward based recovery and observation his clinical condition improved. He was discharged with oral antibiotics (Clindamycin and Metronidazole) to complete an additional 4 weeks therapy, from initial decortication.

Discussion

Lemierre's syndrome is a rare condition with an incidence of approximately one per million.¹ It was first characterised by a French physician named Andre Lemierre who worked in the Claude Bernard Hospital in Paris, who published an article comprising a case series of 20 patients with tonsillitis who developed anaerobic sepsis. Of the 20 patients in the case series 18 patients died.²

Infection usually occurs in young and previously fit individuals. Incidence is estimated at 14.4 cases per million per year in the 15-24 year old age group and 1.4 cases per million per year in those aged over 40. The incidence is reported to be rising, which may reflect more prudent antibiotic-prescribing guidance in patients with upper respiratory tract infections.³⁻⁵

Lemierre's syndrome is characterised by oropharyngeal infection, anaerobic sepsis and metastatic infection. This is complicated by septic thrombophlebitis of the internal jugular vein. Patients classically describe pain along the lateral aspect of the neck parallel to the sternocleidomastoid muscle with cervical lymphadenopathy, a dry cough and pleuritic chest pains. Presentation is usually between 4 to 12 days following onset of a sore throat.⁴

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The causative microorganisms are classically normal oropharyngeal commensal flora. The most common pathogen is the anaerobe *Fusobacterium necrophorum*, a gram-negative rod. Other reported pathogens include, *Fusobacterium nucleatum*, *Eikenella corrodens*, *Porphyromonas asaccharolytica*, *Streptococcus pyogenes*, *Enterococcus* and *Proteus* species.⁶ Bacteria tend to be highly susceptible to Beta-lactamase resistant Beta-lactams, Metronidazole, Clindamycin and carbapenems.⁷

Organisms which originate in the throat, once established, may penetrate to the adjacent blood vessels leading to septic embolisation to multiple sites. Embolisation to the lungs is most common (up to 85% of cases), causing pleuritic chest pain, tachycardia, tachypnoea and respiratory distress. Pleural effusions and empyema may develop which may necessitate surgical drainage alongside antibiotics (as in our case). Adult Respiratory Distress Syndrome is rare and less than 10% require mechanical ventilation. Other sites of embolism include the joints, soft tissues, liver, abdomen, kidneys and brain with abscess formation.^{8,9,10} We speculate the diarrhoea and vomiting in our case may have been due to intra-abdominal embolisation of *Fusobacterium necrophorum*.

The mechanism of penetration is not definitely confirmed, with theories suggesting spread along the lymphatic system or directly along fascial planes and into the adjacent blood vessels leads to haematogenous spread. Lemierre's syndrome classically affects young, immunocompetent individuals and quite how the causative organism overcomes host defences to penetrate and spread systemically also remains unclear. The current hypothesis is that a concomitant infectious agent (bacterial or viral) acts in synergy to weaken the host defence.¹¹

Recent reports have suggested a genetic susceptibility in individuals with polymorphisms in genes associated with the coagulation cascade (tissue factor 60, Plasminogen-Activator-Inhibitor-1 and Toll-like receptor 5 genes).¹²

In our case, we did not demonstrate radiological evidence of internal jugular vein thrombophlebitis. We looked for this by CT of neck vessels on two separate occasions at an interval of 19 days. There was radiological evidence of throat infection with right-sided parapharyngeal fat stranding. He had a *Fusobacterium necrophorum* bacteraemia. Clinically this gentleman developed sequelae of septic emboli. We feel this gentleman had Lemierre's syndrome based on a combination of microbiological culture, clinical findings and septic embolic sequelae. To our knowledge, ours is the first case of Lemierre's syndrome to be described in the literature without radiological evidence of an internal jugular vein thrombus. We suggest that had he not received

prompt antibiotic treatment he would have developed radiological evidence of internal jugular vein thrombophlebitis.

In the pre-antibiotic era, mortality was extremely high (90% in Lemierre's series).² Mortality is now quoted as a rate of 5-18%.¹³ Treatment prior to antibiotics was generally surgical with ligation of the internal jugular vein to prevent septic embolic spread and drainage of pre-existing abscesses.¹⁰

In addition to antibiotics, the addition of an anticoagulant is also debated. There is to date no randomized controlled trial to guide decision-making. There is a significant risk of metastatic embolism in Lemierre's syndrome, however, it is debated that many of these are not haemodynamically significant and that they resolve promptly with treatment of the infection.^{14,15} The optimum duration of anticoagulation is also unclear, with ranges of between 4 weeks and 6 months suggested.^{16,17} The risks of bleeding when commencing anticoagulation are not insignificant as some patients will develop disseminated intravascular coagulation as part of the systemic sepsis response.¹⁸ This is a different condition to internal jugular venous thrombosis due to central venous access devices or malignancy, for which there are clear guidelines and evidence of benefit to anticoagulation.¹⁹ A number of recent case reports document good outcomes in patients treated with anticoagulants. Present case-reports suggest anticoagulant may be indicated in cases where there is a lack of clinical response despite 48-72 hours of adequate antibiotic therapy or radiological evidence of progression of thrombus.^{14,20-24} We did not treat our patient with therapeutic anticoagulation due to the absence of a thrombus on radiological examinations. He was treated with prophylactic low molecular weight heparin.

We describe a rare condition that is a sequela of a sore throat and may be life-threatening. Prompt recognition and treatment can be life-saving as in our case. Upper respiratory tract infections, including pharyngitis, are common and are usually caused by viruses. Therefore, antibiotic stewardship practices actively discourage the prescription of antibiotics in these cases. However, it is postulated that an anecdotal increase in the incidence of severe bacterial pharyngitis, including Lemierre's syndrome, could be a direct consequence of these patients not receiving earlier antimicrobial therapy. This case illustrates the value of the initial clinical assessment to ensure timely antibiotics.

Declaration of interests

The authors declare they have no competing interests.

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