

A Case of Lemierre's Syndrome Presenting with Multiple Pulmonary Abscesses Associated with a Tension Hydropneumothorax Resulting in a Mediastinal Shift

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Abstract

Introduction: We report a case of Lemierre's syndrome. **Clinical Picture:** A previously healthy 36-year-old woman presented with a 2- to 3-month history of fever, cough, dyspnoea and sore throat, which had worsened in the week prior to presentation. Computed tomography of the thorax showed multiple bilateral cavitating lesions and a right-sided hydropneumothorax with mediastinal shift. Blood cultures grew *Fusobacterium* and *Bacteroides* species. **Treatment:** Broad-spectrum antibiotics were commenced, a chest drain was inserted, and the patient was transferred to the intensive care unit due to worsening respiratory failure. **Outcome:** Despite intensive supportive care with broad-spectrum antibiotics, aggressive fluid resuscitation and high-dose inotropic support, the patient developed acute renal failure, disseminated intravascular coagulation and intractable shock, and succumbed 8 days later. **Conclusions:** Although this condition is uncommon, it should be considered in the differential diagnosis of patients with pulmonary cavitating lesions, especially in the context of fever and rigors preceded by a sore throat.

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Key words: Antibiotics, Hydropneumothorax, Hypotension, Lung abscess, Respiratory failure

Introduction

Lemierre's syndrome (LS) is a condition which follows an oropharyngeal infection, often in an otherwise healthy young adult. This usually progresses to septic thrombophlebitis of the internal jugular vein (IJV), leading to metastatic abscesses mainly of the lungs, but organs such as the liver, bones, joints and kidneys can also be affected. In 1936, Lemierre first described one of these cases.¹ The syndrome is thought to be uncommon now due to the widespread use of antibiotics in the primary setting, but if it does occur, its rarity may cause diagnostic difficulty. Moreover, if not detected and treated early, the condition can become fatal and mortality rates as high as 10% have been reported.² We report here a case of advanced Lemierre's syndrome in a young woman.

Case Report

A 36-year-old Chinese lady with no significant medical history presented to our hospital with a 2- to 3-month history of cough, fever and progressive dyspnoea. The cough had started insidiously after a sore throat and had become productive of yellow sputum. She also had fevers, rigors and night sweats on a regular basis over this period

of time and had experienced a significant weight loss of about 20 kg to 30 kg. In the week leading to the hospital admission, the dyspnoea had become so severe that she was unable to climb even one flight of stairs. Due to the worsening of her symptoms, she had gone to see a general practitioner. She was given symptomatic treatment but had shown no improvement, and was subsequently admitted to our hospital. She lived with her husband, and they did not have any children. She denied risk factors for human immunodeficiency virus (HIV) infection. She was a lifelong non-smoker, did not drink alcohol and worked as a cleaner. She also denied previous infection or exposure to pulmonary tuberculosis (PTB), intravenous drug use, and did not have any significant family history or any recent travel history.

On admission, she looked cachectic. The temperature was 38.4°C, blood pressure 100/30 mm Hg, heart rate 132/minute, respiratory rate 40/minute, and the oxygen saturation recorded on pulse oximetry was 87% on room air. There were right-sided basal crepitations with reduced breath sounds and the trachea was deviated to the left. The oropharynx was not injected and there were no obvious dental caries or abscesses. The gastrointestinal and neurological examinations were unremarkable. Initial

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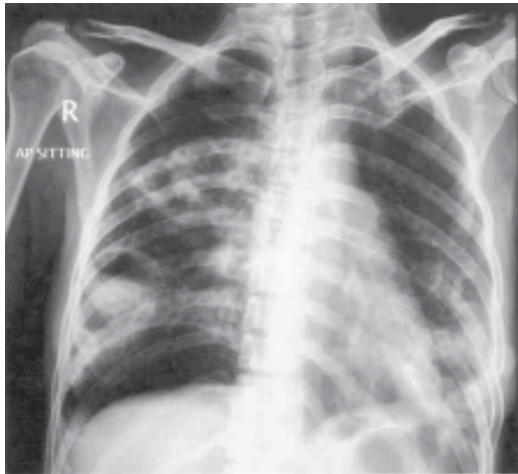


Fig. 1. Plain chest radiograph showing multiple bilateral cavitating lesions and right-sided pneumothorax.

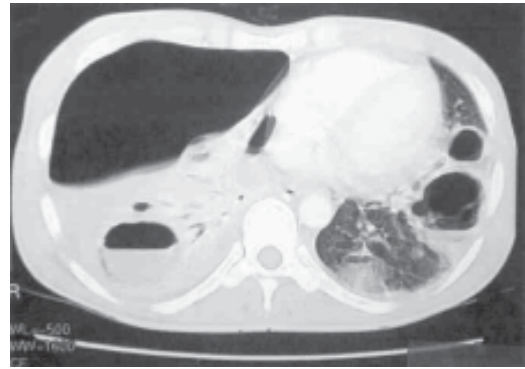


Fig. 2. Computed tomography of the thorax showing massive right-sided hydropneumothorax with mediastinal shift and cavitating lesions with air-fluid levels.

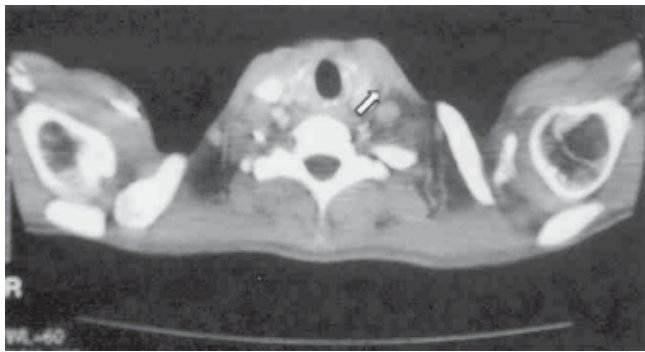


Fig. 3. Computed tomography of the neck showing the left-sided internal jugular vein thrombosis causing a filling defect (arrow).

investigations revealed haemoglobin, 12.0 g/dL; leukocyte count, 15,600/mm³ (polymorphs, 92.3%; lymphocytes, 3.0%; and eosinophils, 1.2%); and platelet count, 11,000/mm³. No malarial parasites were seen on the blood film. Total serum bilirubin was 58.5 µmol/L; alkaline phosphatase, 79 µL; alanine transaminase, 28 µL; aspartate transaminase, 42 µL; and serum albumin, 23 g/L. The serum sodium was 127 mmol/L; serum potassium, 2.3 mmol/L; and random plasma glucose, 7.3 mmol/L. The serum urea and creatinine were within normal limits. C-reactive protein was 250.6 mg/L. Arterial blood gases revealed hypoxaemia with the partial pressure of oxygen at 60.1 mm Hg on 3L/min oxygen via nasal prongs. The initial chest radiograph (Fig. 1) showed bilateral multiple cavitating lesions, some with air-fluid levels and a right-sided pneumothorax. An urgent contrast-enhanced computed tomography (CT) of the thorax was ordered.

A complete septic workup was performed, sputum for acid-fast bacilli (AFB) smear was requested, serology for melioidosis was sent for, the patient was fluid-resuscitated and commenced on intravenous imipenem 500 mg

8-hourly. In view of the possibility of PTB, she was placed in isolation. After consent was obtained, a HIV serology was performed and subsequently proved negative. The CT of the thorax confirmed a massive right-sided hydropneumothorax with mediastinal shift to the left, with almost complete collapse of the right lung. Bilateral cavitating lesions were seen, with air-fluid levels (Fig. 2). Limited images of the neck revealed thrombosis of the left IJV (Fig. 3). Based on this information, an urgent chest tube was placed in the right pleural cavity. The pleural fluid appeared bloody. The initial pleural fluid analysis suggested an exudate, with the ratio of the pleural lactate dehydrogenase (LDH) to serum LDH being 5.7, with 70% neutrophils. Due to the thrombocytopenia, anticoagulation was deferred. On the 2nd hospital day, the patient became hypoxaemic and had increasing respiratory distress. She was transferred to the medical intensive care unit, where she was intubated and ventilated. During the intubation, the patient went into asystolic cardiac arrest, but was successfully resuscitated. On the third hospital day, *Fusobacterium* sp. and *Bacteroides fragilis* were identified from anaerobic blood cultures sent on admission. The same day, the initial pleural fluid culture grew a combination of 4 different organisms namely, *Proteus mirabilis*, *Bacteroides fragilis*, *Peptostreptococcus* sp. and *Fusobacterium* sp. A diagnosis of Lemierre's syndrome was made at that time. High-dose crystalline penicillin was added to the antibiotic regime. That night, the patient had another chest tube inserted into the left pleural cavity due to a second spontaneous pneumothorax. While there was initial re-expansion of the pneumothoraces, there were subsequent partial lung collapses, with the patient never achieving complete expansion. Over the next few days, the patient's clinical condition worsened further. She developed shock, requiring increasing amounts of inotropes, and went into progressive anuric renal failure and acidosis. Renal replacement therapy could not be instituted because of refractory hypotension despite high-dose vasopressor

support. She also developed disseminated intravascular coagulation (DIC), with significant oozing from line sites necessitating the use of fresh frozen plasma and platelet transfusions. She remained in anoxic encephalopathy and suffered 2 more episodes of asystolic cardiac arrest on the 8th hospital day before she finally succumbed.

Discussion

Lemierre's syndrome is caused by anaerobic gram-negative bacilli such as *Fusobacterium necrophorum*, but other pathogens such as streptococcus species, staphylococci, *Eikenella corrodens*, *Peptostreptococcus* species, *Bacteroides* species and other *Fusobacterium* species such as *F. nucleatum* have also been implicated.^{3,4} There are very few reports where the aetiology has been polymicrobial in nature, as in this case. These are slow-growing anaerobes, mainly present in the oropharynx. *F. nucleatum* is commonly found in periodontal disease and produces tissue irritants, such as proteases and cytokines, which destroy oropharyngeal tissue and lead to the disintegration of surrounding connective tissue by activating human procollagenase.⁵ In contrast, *F. necrophorum* produces both exotoxins and endotoxins that give the organism the capability of invading a previously healthy host.^{6,7} The lipopolysaccharide endotoxin produced by *F. necrophorum* can activate the Hageman factor and, hence, the intrinsic coagulation pathway leading to DIC, as was observed in this patient.⁸

The organism responsible then spreads to the IJV causing thrombophlebitis, either via direct extension of the infection via the neck tissue, or via propagation of the thrombophlebitis from local oropharyngeal veins to the IJV.⁴ Metastatic infections then develop with abscess formation in the lung, but other organs, such as the liver and the bones, can also be affected. The clinical findings are varied. Patients may present with signs of tonsillitis or pharyngitis as well as with oral ulceration.^{6,7} However, the oropharynx could be normal by the time systemic sepsis occurs, as in this case, since sepsis usually follows infection by about a week. There may be manifestations of other primary sources of infection, such as sinusitis or mastoiditis. Neck and mandible pain, along with tenderness along the border of the sternocleidomastoid, may indicate septic thrombophlebitis of the ipsilateral IJV.^{1,3,4,7} In the advanced metastatic stages, signs and symptoms of pleuropulmonary embolisation, like persistent fevers, rigors, pleuritic chest pain and dyspnoea, may be present.¹

High-resolution CT (HRCT) scan of the thorax best identifies septic pulmonary abscesses, although a normal contrast-enhanced CT of the thorax would be a good alternative. The imaging modality that demonstrates the IJV thrombophlebitis is probably an ultrasound, but it is

debatable whether this is required in the initial stages, unless IJV ligation or anticoagulation is planned.⁹ In our patient, the initial CT scan (Fig. 3) clearly identified the IJV thrombosis and the patient was far too unstable clinically to benefit from IJV ligation or anticoagulation, so the ultrasound was not done.

Investigations reveal leukocytosis with a left shift, thrombocytopenia and increased prothrombin time. DIC, as mentioned earlier, is a common complication. Liver function test abnormalities can be seen in up to 50% of cases^{6,7} and is probably due to microabscesses in the liver. Elevated blood urea nitrogen and creatinine levels, elevated erythrocyte sedimentation rate, and transient haematuria have also been reported.⁷

Beta-lactam agents are the preferred antibiotics. These include cephalosporin, amoxicillin-clavulanate, and ticarcillin-clavulanate.¹⁰ Metronidazole, because of its excellent tissue penetration, is often added for 2 to 6 weeks.⁹

In Southeast Asia, one must always be aware of two differential diagnoses, which are also potentially lethal. Tuberculosis is still rampant in this part of the world and must be considered in any patient with cavitating lesions. Therefore, appropriate isolation and sending sputum for AFB would be paramount. The other endemic disease in this part of the world is melioidosis and its pulmonary manifestation has to be added to the differential diagnosis. Our choice of antibiotics, imipenem, reflects those considerations. Imipenem, being a broad-spectrum beta-lactam, has adequate coverage against *Burkholderia pseudomallei*, the organism responsible for melioidosis. In addition, it provides adequate coverage for the anaerobes responsible for this syndrome. Should medical management fail, surgical ligation or excision of IJV should be considered.^{3,4,6-9} Our patient was not suitable for surgery because of intractable shock and DIC. Currently, anticoagulation seems to be favoured. A recent review showed that 11 of 41 patients with extensive thrombosis improved following the addition of anticoagulants (heparin followed by warfarin for up to 6 months) to the antibiotic regimen.¹¹ More controlled studies are needed, however, for routine recommendation. We did not consider anticoagulation in this present case, because of worsening DIC and bleeding.

Conclusion

Lemierre's syndrome is often labelled a forgotten disease, but it may still occur from time to time and cause a diagnostic problem in our daily practice. Our case highlights the importance of considering Lemierre's syndrome in the differential diagnosis of a patient with cavitating pulmonary lesions. Delayed diagnosis and treatment, as seen in this

case, can still lead to death despite the availability of modern investigations and treatments. Secondly, our case not only shows all the typical radiological, clinical, and biochemical features of this condition, but also illustrates the fact that Lemierre's syndrome could lead to a pyopneumothorax, a complication very rarely reported in the literature.

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