Early Diagnosis of Lemierre’s Syndrome Based on a Medical History and Physical Findings

Yutaka Murata, Mikio Wada, Atsushi Kawashima and Keizo Kagawa

Abstract

A 37-year-old woman presented with fever and rigor after experiencing respiratory symptoms the previous week that had resolved within a few days. On presentation, her neck was swollen along the right sternocleidomastoid muscle, and chest CT showed pulmonary septic embolisms. Lemierre’s syndrome was strongly suspected based on the patient’s medical history and physical findings. Further examination revealed venous thrombus, and Fusobacterium necrophorum was later isolated from blood cultures. Antibiotics for anaerobes were administered before a final diagnosis was made, and the patient’s symptoms thereafter improved. A rapid diagnosis is essential, since Lemierre’s syndrome can be fatal with a diagnostic delay.

Key words: Fusobacterium necrophorum, pulmonary septic embolism, history taking, physical examination


Introduction

Lemierre’s syndrome is characterized by oropharyngeal infection, clinical or radiological evidence of internal jugular vein thrombosis and isolation of anaerobic pathogens, usually Fusobacterium necrophorum. Reports of Lemierre’s syndrome have increased over the past 10 years (1). Despite the characteristic presentation, many clinicians are unaware of the condition, and diagnosis is often delayed with potentially fatal consequences (2). Taking a detailed history and performing a careful physical examination are essential for early detection of this syndrome. We herein report a case of Lemierre’s syndrome in which treatment was initiated prior to making a final diagnosis based on careful history taking and physical examinations.

Case Report

Seven days prior to being hospitalized, a 37-year-old Japanese woman was seen by a private practice physician after presenting with fever and a sore throat. Although the physician prescribed ciprofloxacin (CPFX), the patient’s throat symptoms did not improve. Four days before being hospitalized, she was seen in our emergency department with a complaint of right neck pain and was found to have an inflamed pharynx and swollen right cervical lymph nodes. The result of a rapid streptococcal antigen test was negative. She was diagnosed with upper respiratory inflammation due to a viral infection, prescribed a common cold drug and sent home. Her sore throat subsequently disappeared; however, her fever did not subside.

Coughing and nausea began two days prior to hospitalization. The patient was re-examined in the emergency department on the day of hospitalization due to having fever and rigor. She had no disease or allergy history and no contact with any sick persons before disease onset. She had a 17-year history of smoking 20 cigarettes/day and no history of alcohol or drug abuse. She lived with her husband and child and was employed in an office. Her height was 158.8 cm and her weight was 49.3 kg. At the visit, she was lucid, her blood pressure was 90/48 mmHg, her pulse rate was 90/min and regular, her body temperature was 39.2°C and her oxygen saturation was 93% (without oxygen administration). Her bulbar conjunctiva were not icteric and her palpebral conjunctiva were not anemic. Significant reddening, swelling and furring in the oral cavity on the superior right side from the larynx to the tonsil were noted. There was reddening of the hard palate without deviation of the uvula. The patient was negative for dental caries and trismus. There was swel-
Fingure 1. Right jugular vein thrombosis (A) and multiple nodular shadows in the lungs (B) on contrast-enhanced CT.

Figure 2. Right jugular vein thrombosis on ultrasonography.

Table. Laboratory Data on Admission

<table>
<thead>
<tr>
<th>WBC 22190 /μL</th>
<th>TP 5.5 g/dL</th>
<th>PT-INR 1.02</th>
<th>ALb 2.6 g/dL</th>
<th>APTT 28 seconds</th>
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<tbody>
<tr>
<td>Stab 33 %</td>
<td>T-bil 1.2 mg/dL</td>
<td>fibrinogen 545 mg/dL</td>
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<tr>
<td>Seg 62 %</td>
<td>GOT 45 IU/L</td>
<td>FDP 11.9 μg/mL</td>
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<tr>
<td>Lymph 4 %</td>
<td>GPT 31 IU/L</td>
<td>D-dimer 5 μg/mL</td>
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</tr>
<tr>
<td>Mono 1 %</td>
<td>LDH 308 IU/L</td>
<td>EBV VCA-IgM negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eos 0 %</td>
<td>ALP 1078 IU/L</td>
<td>Rapid flu test negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hb 13 g/dL</td>
<td>γ-GTP 143 IU/L</td>
<td>Rapid strep test negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hct 38.1 %</td>
<td>CK 102 IU/L</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>MCV 86.6 fl</td>
<td>BUN 38 mg/dL</td>
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<td></td>
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<tr>
<td>Plt 3.3 × 10^4/μL</td>
<td>CRP 28.08 mg/dL</td>
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</table>

No pleurodynia, abnormal abdominal findings or costovertebral angle (CVA) tenderness were observed. A diagnosis of Lemierre’s syndrome was strongly suspected based on the following factors: healthy young woman, antecedent pharyngitis, history of antibiotics ineffective against anaerobic bacteria, fever with rigor and findings indicative of right jugular vein thrombosis.

The blood test findings (Table) indicated increased inflammation and disseminated intravascular coagulation (DIC). Chest X-ray showed some nodular shadows in the lungs bilaterally. Thrombosis of the right internal jugular vein and multiple nodular shadows throughout the lung fields were confirmed on contrast-enhanced CT of the cervical, thoracic and abdominal regions (Fig. 1); however, no tumors were observed. Neck ultrasound confirmed a 14 mm × 6 mm thrombus in the right internal jugular vein (Fig. 2).

No particular abnormalities were observed on transthoracic echocardiography or electrocardiogram. The imaging and blood test results supported a diagnosis of Lemierre’s syndrome.
After hospitalization, stabilization of blood pressure with transfusions and blood oxygenation with administration of oxygen at 2 L/min was achieved. After collecting two sets of blood cultures, intravenous (IV) administration of sulbactam sodium/ampicillin sodium (SBT/ABPC, 1.5 g × 3/day) and clindamycin (CLDM, 600 mg × 3/day) was initiated since we strongly suspected an anaerobic infection. Additionally, continuous IV heparin at 10,000 units/day was added after an initial IV injection of 5,000 units. *Fusobacterium necrophorum* was isolated from two sets of blood cultures on day 3 of hospitalization. On day 4, the antibiotic was de-escalated to ampicillin (ABPC, 2 g × 4/day) based on sensitivity test results. The patient’s rigor and right neck pain disappeared on day 3. Her oxygenation improved on day 5 and oxygen administration was discontinued. A 38°C fever and coughing continued until day 9. On day 15, disappearance of the right internal jugular vein thrombosis was confirmed on neck ultrasonography; therefore, heparin was discontinued (Fig. 3). On day 16, the antibiotic regimen was switched to oral amoxicillin (AMPC, 500 mg × 3/day). The patient was discharged on day 17. At follow-up on day 29 after discharge, the antibiotics were discontinued given normalization of serum inflammatory indicators. The total period of antibiotic administration was 46 days. On day 78 following discharge, the disappearance of the multiple lung nodules was confirmed on thoracic CT.

**Discussion**

Lemierre’s syndrome was first reported by Andre Lemierre in 1936 (3). Reports of the disease have increased since the 1990s (2), likely due to antibiotic resistance, greater reluctance by physicians to prescribe penicillin for uncomplicated sore throats, a shift to prescribing second or third generation cephalosporins and because the disease has become easier to diagnose (1). Typically, the onset of septicemic illness occurs four to five days (up to 12 days) after the onset of sore throat and is accompanied by an increase in fever to 39-41°C often followed by rigor. The initial sore throat may begin to improve with the onset of septicemic illness. Patients often complain of neck pain and occasional stiffness. Tender swelling at the angle of the jaw or anterior to and parallel with the sternomastoid muscle reflects the development of internal jugular venous thrombosis. Septic complications such as pulmonary septic embolism, septic arthritis and meningitis may occur secondary to the development of peritonsillar abscesses and internal jugular venous thrombosis. Liver function tests are abnormal in approximately 50% of patients (2). *F. necrophorum* produces hemagglutinin, which induces platelet aggregation that leads to DIC and thrombocytopenia. Direct invasion of the vessel wall by bacteria, causing inflammation and thrombus formation, may contribute to the development of thrombophlebitis of the internal jugular vein. High-molecular-weight kinin-
gen and factor XI are components of the contact system that forms a link between inflammation and coagulation. They bind to the surface of *F. necrophorum*, which activates the contact system, leading to clot formation (4). Some authors have stated that anticardiolipin antibodies may be responsible for thrombus formation in patients with Lemierre’s syndrome (5, 6). The mortality rate of Lemierre’s syndrome is reported to be approximately 5% (1).

The criteria used to define Lemierre’s syndrome vary widely, and many reports have described cases of classical Lemierre’s syndrome with metastatic lesions and *F. necrophorum* isolated from blood cultures without evidence of internal jugular vein thrombosis (7). Regardless of the criteria used, tests for making a definitive diagnosis, such as blood cultures or enhanced CT, are not always completed if physicians are not aware of the disease.

A diagnosis of Lemierre’s syndrome could be suspected based on detailed interviews and careful physical examinations conducted in the emergency room. Our case involved a recent oropharyngeal infection, fever with rigor, internal jugular venous thrombophlebitis, pulmonary septic embolism, DIC and isolation of *F. necrophorum* from blood cultures. Lemierre’s syndrome is primarily a clinical diagnosis; however, physicians often suspect cardiopulmonary infections such as Legionnaire’s disease or endocarditis in patients with sepsis and pulmonary infiltrations and look for an intra-abdominal cause when anaerobic bacteremia is reported (8). Most cases of Lemierre’s syndrome caused by *F. necrophorum* seem to be diagnosed after isolation of *F. necrophorum* in blood cultures rather than on admission. Antibiotics are subsequently switched to those effective against anaerobes (6, 9-11). Our findings support the notion that making a diagnosis based on findings from detailed history taking and careful physical examinations is crucial for early detection of Lemierre’s syndrome.

**The authors state that they have no Conflict of Interest (COI).**

**References**