Jpn. J. Infect. Dis., 67, 488–489, 2014

Short Communication

A Severe Case of Lemierre Syndrome with *Streptococcus constellatus* Infection

Midori Shimada[1], Yoshitomo Morinaga[2]*, Takeshi Kitazaki[1], Minoru Fukuda[1,3], Kohji Hashiguchi[1], Katsunori Yanagihara[2], and Shigeru Kohno[3]

[1]*Respiratory Medicine, The Japanese Red Cross, Nagasaki Genbaku Hospital, Nagasaki 852-8104; and*
[2]*Department of Laboratory Medicine and*
[3]*Second Department of Internal Medicine, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki 852-8501, Japan*

(Received March 27, 2014. Accepted May 21, 2014)

SUMMARY: A 76-year-old Japanese male presenting with high fever, headache, and disturbance of consciousness was hospitalized. Contrast computed tomography revealed thrombophlebitis in the internal jugular vein and abscesses in the posterior neck region, pharynx, and pterygoid muscle. *Streptococcus constellatus* infection was confirmed by culture of blood samples, and the patient was diagnosed with Lemierre syndrome. In addition to the administration of antibiotics and anticoagulants, abscess drainage was performed. *S. constellatus* should be considered as a causative bacterium in elderly patients with Lemierre syndrome.

Lemierre syndrome is caused by acute otolaryngologic infection followed by septicemic thrombosis of the internal jugular vein, and can be complicated by septic emboli (1). It is potentially life-threatening if appropriate antibiotic therapy is not provided and is often observed in children or young adults (2–4). This syndrome is most commonly associated with the microorganism *Fusobacterium necrophorum*, and rarely with *Streptococcus constellatus*. In this study, we present a severe case of Lemierre syndrome caused by *S. constellatus* in an elderly patient.

A 76-year-old Japanese male experienced intraoral pain and developed a headache 2 days later, prompting a visit to a primary care doctor. The patient underwent magnetic resonance imaging (MRI), but abnormalities were not observed. Ten days later, he was brought by ambulance to our hospital, where he presented with high fever (38.0°C) and disturbance of consciousness; the patient was consequently admitted. His history revealed no noteworthy information.

The physical findings on admission were as follows: a pulse rate of 116/min, irregular pulse, blood pressure of 92/67 mmHg, oxygen saturation (SpO_2) of 97% with nasal oxygen supplementation at 4 L/min, and a respiration rate of 22 breaths/min. The patient exhibited nuchal rigidity, jolt accentuation, trismus, and multiple damaged teeth. Auscultatory findings were normal for chest and heart. Laboratory analysis revealed the following: leukocyte counts of 18,100 cells/μL, C-reactive protein levels of 22.8 mg/dL, serum creatinine levels of 1.15 mg/dL, prothrombin time (international normalized ratio) of 1.18, fibrinogen levels of 550 mg/dL, and d-dimer levels of 16.3 μg/mL. These laboratory findings revealed robust inflammatory response and renal dysfunction as well as disseminated intravascular coagulation. Chest computed tomography (CT) revealed multiple pulmonary nodules adjacent to the pleura; however, abscess formation was not observed in other organs. Although an electrocardiogram revealed atrial fibrillation, there was no sign of endocarditis on ultrasonographic examination. Therefore, meningitis and septic pulmonary thromboembolism were initially suspected.

Following sampling of blood and cerebrospinal fluid for microbiological examinations, the patient was treated with intravenous meropenem hydrate (0.5 g thrice daily). However, there was insufficient evidence for a diagnosis of bacterial meningitis. Next, 2 sets of cultures of blood samples became positive, and *S. constellatus* was identified by a biochemical identification method using the VITEK®2 compact (SYSMEX bioMerieux Co., Ltd., Tokyo, Japan). The isolate was susceptible to β-lactams, and the minimal inhibitory concentrations of penicillin G, ampicillin, and meropenem for the isolate were 0.06, 0.25, and 0.25 μg/mL, respectively. Continued treatment with the antibiotics meropenem (1.0 g thrice daily) or piperacillin-tazobactam (4.5 g thrice daily) failed to improve the patient's headache.

For further examination, head MRI was performed. He was negative for pyogenic spondylitis; however, abscesses and thrombosis of neck and pharynx were suspected. Contrast CT scans also revealed thrombophlebitis in the internal jugular vein and abscesses in the posterior neck region, left side of the pharynx, and pterygoid muscle (Figs. 1A and 1B). The patient was therefore diagnosed with Lemierre syndrome. In addition to conservative treatment that involved increased antibiotic dosage (piperacillin-tazobactam at 4.5 g, 4 doses/day) and heparin administration, abscess drainage was performed, which gradually resulted in improvement of symptoms.

Thirty-four days following admission, the administration of piperacillin-tazobactam was discontinued due to eruptions. Moreover, heparin administration was ter-

*Corresponding author: Mailing address: Department of Laboratory Medicine, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki 852-8501, Japan. Tel: +81-95-819-7574, Fax: +81-95-819-7422, E-mail: y-morina@nagasaki-u.ac.jp

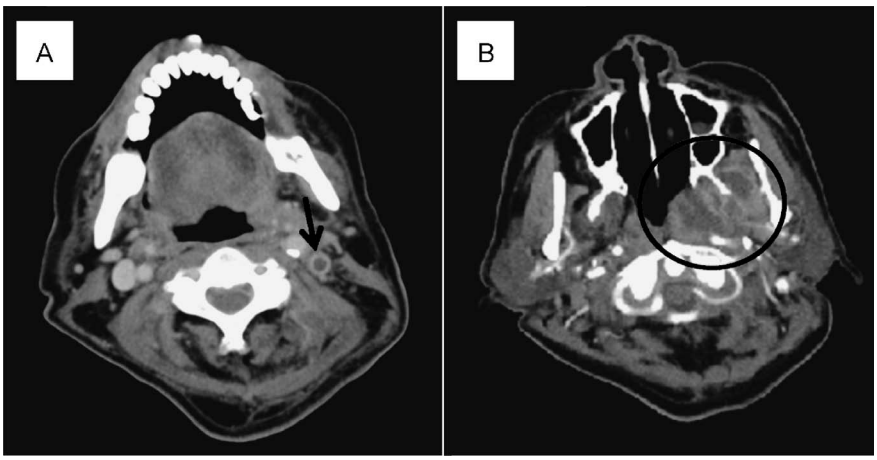

Fig. 1. Enhanced computed tomography image of the neck on Day 9. (A) The filling defects in the left internal jugular vein. (B) The low-density area in the left side of the pharynx and pterygoid muscle.

minated 40 days post-admission, and treatment with dabigatran etexilate was initiated because thrombophlebitis in the internal jugular vein was no longer observed. The patient was discharged 53 days after admission, following improvements in the laboratory test results and the patient's symptoms.

The onset of Lemierre syndrome is typically heralded by acute otolaryngologic infection followed by septicemic thrombosis of the internal jugular vein and could lead to further complications such as septic emboli (1). Although *F. necrophorum*, an anaerobic bacterium, is most often associated with this syndrome (5), associations with *S. constellatus*, a member of the *Streptococcus anginosus* group, are rarely found (3,6). In case report of 11 patients with Lemierre syndrome, *S. anginosus* group was isolated from 2 patients aged 65 years or more; of the remaining patients, infection was attributable to *Neisseria* spp. in the case of 1 patient, and to *Fusobacterium* spp. in the remaining patients aged $<$35 years (3).

Similar to *F. necrophorum, S. constellatus* is known to exhibit invasive phenotype albeit with variations in characteristics. For instance, coagulopathy is not a common complication in patients with Lemierre syndrome caused by *F. necrophorum* (4); however, in the current study, Lemierre syndrome was caused by *S. constellatus* and the patient developed coagulopathy. Since *S. constellatus* shows strong tendencies for invasiveness and abscess formation (7), Lemierre syndrome caused by *S. constellatus* is likely to become severe. In addition, the predisposition of *S. constellatus* to abscess formation is likely to necessitate an additional invasive medical procedure, as observed in the current case report.

The members of the *S. anginosus* group are susceptible to penicillin, amoxicillin, cefotaxime, or ceftriaxone at concentrations achievable with regular dosages (8), although variations in susceptibilities to tetracycline, clindamycin, and erythromycin have been reported elsewhere (9). Although *S. constellatus* is susceptible to these antibacterial agents, combination therapy that includes abscess drainage should be considered for certain difficult cases.

Lemierre syndrome is potentially life-threatening in the absence of appropriate antibiotic therapy. Thus, accurate diagnosis and initiation of appropriate therapy are very important. In the current study, the diagnosis of Lemierre syndrome was rendered difficult due to the occurrence of symptoms mimicking meningitis. We therefore emphasize that a diagnosis of Lemierre syndrome should be considered in patients presenting with septic emboli, multiple hematogenous abscesses, and pain in the oral cavity. In addition, *S. constellatus* should be considered as a causative pathogen when Lemierre syndrome is suspected in elderly patients presenting with severe complications such as coagulopathy.

Conflict of interest None of declare.

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