A Case of Acute Necrotizing Fasciitis Following Internal Jugular Vein Thrombophlebitis: Lemierre's Syndrome

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ABSTRACT

Lemierre's syndrome is caused by preexisting oropharyngeal infection and characterized by internal jugular vein (IJV) thrombophlebitis. Frequently, this syndrome involves metastatic infection in areas such as the peritoneum, muscles, and spleen. The most common etiologic organism is *Fusobacterium necrophorum*. In this case, a masticatory space abscess that originated from a tooth caused the IJV thrombophlebitis. The patient had preexisting hypertension, diabetes mellitus, hyperlipidemia, and Parkinson's disease. Blood culture revealed *Streptococcus sanguinis*, and the patient received antibiotics that were highly sensitive to mentioned bacterium; additionally, an anticoagulant was used. With the widespread use of antibiotics, Lemierre's syndrome has become uncommon, and related mortality rates have noticeably decreased. This has led the public to forget about the disease, but it can still be potentially fatal without early diagnosis and appropriate antibiotic treatment.

Key words : Lemierre's syndrome, Internal jugular vein, Thrombophlebitis

INTRODUCTION

Lemierre's syndrome (LS) is an unusual disease caused by preexisting oropharyngeal infection and anaerobic bacteremia. Internal jugular vein (IJV) thrombophlebitis is usually indicative of this syndrome. It occurs mainly in adolescents and young adults who have oropharyngeal infections, and it spreads throughout adjacent organs after a few days of incubation. As a result, IJV thrombophlebitis occurs in the lymph node or tonsillar vein that, if severe, can cause septic pulmonary thromboembolism that can lead to death within 7 to 15 days[1].

The symptoms of LS vary, but they course through the region where the thromboembolism has spread. The most common symptoms are systemic weakness, chills, swelling of the cervical lymph node, and painful swallowing. Other symptoms are liver hypertrophy, that does not accompany hepatitis[2] and appendicitis[3], but these symptoms are rare. For these reasons, the accurate diagnosis of LS is difficult.

According to previous reports, the primary bacterium that causes LS is *Fusobacterium necrophorum*[4]. Before antibiotics were developed, LS was so fatal that mortality was over 90%. However, with antibiotics, its occurrence decreased noticeably[5].

Nevertheless, LS has a high mortality rate when it becomes systemic, and in its early stage, it is difficult to distinguish from other diseases. It is thus important to pay attention to the patient's clinical state.

The purpose of this study is to report LS that occurred secondary to odontogenic infection caused by acute necrotizing fasciitis. We also present a literature review of the clinical management of LS.

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CASE

A 78-year-old female patient who had underlying diabetes mellitus, hyperlipidemia, and Parkinson's disease presented at the emergency room in our institution with a history of a three-day odontalgia, decreased consciousness, swelling on the right side of her face, and chills with a fever up to 38°C. The patient reported having undergone endodontic treatment of maxillary second molar of right side one month earlier.

When the patient entered our institution, her white blood cell (WBC) count was $6.20 \times 10^3/\mu L$; her hemoglobin was 13.1 g/dL, neutrophil count was 74.6%, monocyte count was 20.1%, and prothrombin time (PT) and activated partial thromboplastin time (PTT) were normal.

Her C-reactive protein (CRP) was so high, 355.9 mg/L, that we used contrast-enhanced computed tomography (CT) to check for diffuse edema involvement in the right buccal, masseteric, pterygo-mandibular, superficial temporal, and para-pharyngeal spaces. The patient was rushed for intra-oral drainage of the abscess with local debridement of the necrotic subcutaneous tissue. Culture and sensitivity testing was also done. After the surgery, the patient was hospitalized, and intravenous (IV) antibiotics were administered (Figs 1, 2).

On the patient's postadmission day (PAD) 2 in the hospital, her WBC count had increased to $13.6 \times 10^3/\mu L$, and her neutrophils were at 85.3%. Her CRP, however, had decreased to 156.9 mg/L. The patient still had chills, fever, and swelling in the abscess area, so on the 3rd day in the hospital, we performed additional drainage in the buccal space.

We drained the area three more times, and on PAD 8, the patient's WBC count and CRP had decreased to $11.4 \times 10^3/\mu L$, and 36.9 mg/L, respectively. She also reported some improvement in her current state. The swelling on the right side of her face had reduced, her temperature decreased to 36.8°C, and her vital signs were stable. On that day, a repeat CT showed decreased edema in the masticatory space and a remaining superficial temporal space abscess. Typically, the image showed low density shading and peripheral high density in the internal jugular vein, which was crucial for the diagnosis of IJV thrombophlebitis (Figs 3, 4).

By synthesizing the clinical characteristics and X-ray results, we determined a diagnosis of Lemierre's syndrome derived from an odontogenic infection and necrotizing fasciitis.

On the day of hospitalization, the patient was started on IV antibiotics, amoxicillin sulbactam (Sultamox®) 1.5 g three times daily and metronidazole (Trizele®) 0.5 g three times daily. These antibiotics were replaced based on sensitivity to *Streptococcus sanguinis* with IV ampicillin

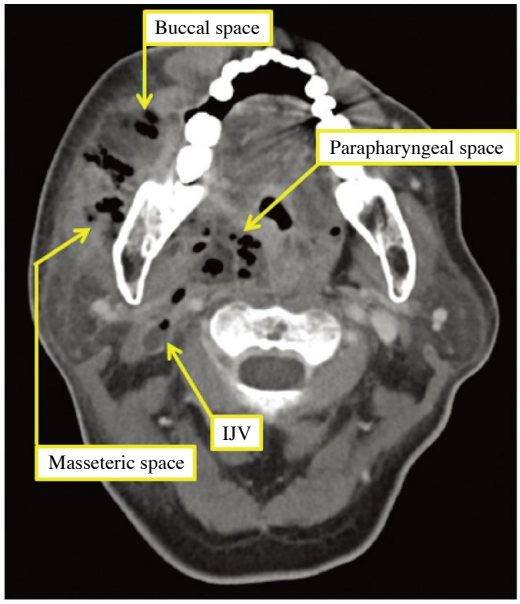

Figure 1. *Facial bone CT of the patient in this case: Axial CT with contrast-enhanced image shows low density in the buccal and pterygopalatine space and thrombosis of the right internal jugular vein (Yellow arrow).*

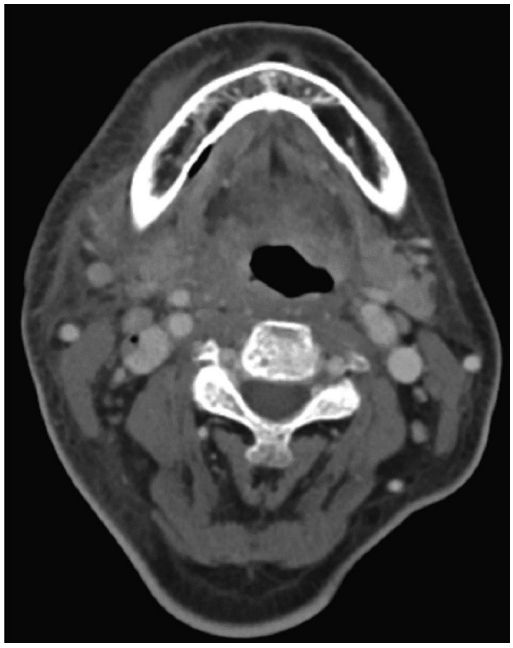

Figure 2. *Axial CT image with contrast enhancement at C1 level shows an intact internal jugular vein.*

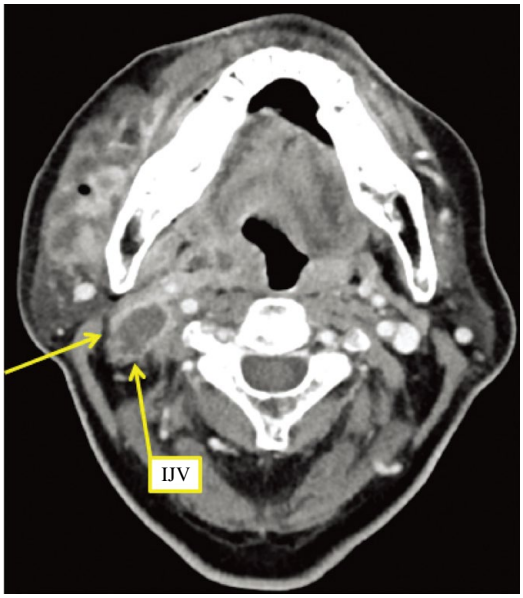

Figure 3. *Contrast-enhanced CT scan shows thrombophlebitis of the right internal jugular vein with a thickened wall (Yellow arrow), and multiple abscess cavities are noted.*

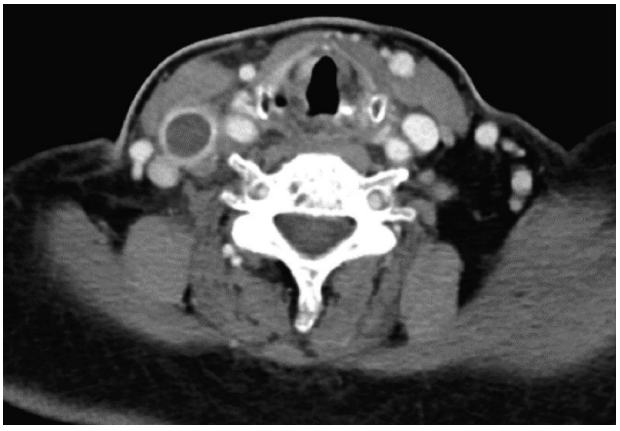

Figure 4. *Axial CT image with contrast enhancement at C3 level shows an enlargement of right internal jugular vein.*

sulbactam (Rukasyn®) 1.5 g four times daily together with IV levofloxacin (Cravit®) 750 mg once daily. In addition, the patient received 30 mg of low-molecular-weight heparin (Clexane®) twice daily via subcutaneous injection. We also conducted, blood cultures, but there were no bacteria.

During the workup for LS, 10 days after we replaced her antibiotics, the patient's CRP had decreased to 3.89 mg/L, and her WBC count had decreased to $4.6 \times 10^3/\mu L$. On the 33rd day, a third contrast-enhanced CT showed decreased thrombosis of the IJV, but there remained a superficial temporal space abscess (Figs 5, 6). As such, we performed additional drainage of the space under local anesthesia, and the patient's symptoms improved while she was hospitalized.

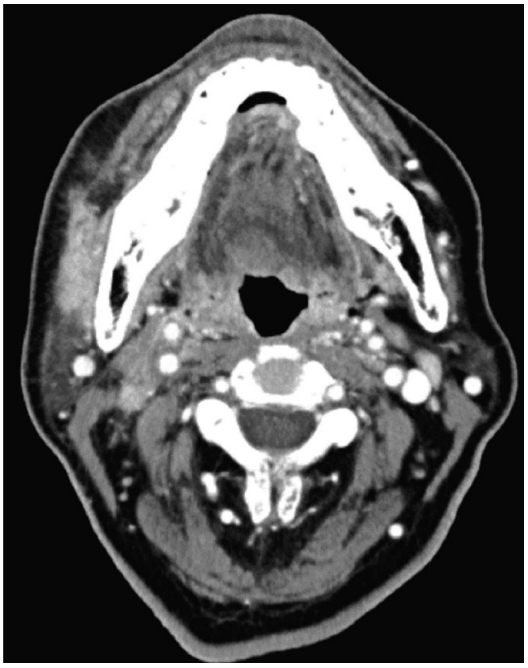

Figure 5. *Contrast-enhanced CT view after 21 days of antibiotic and anticoagulant administration. Decreased size of the right IJV with remaining prominent wall enhancement and an internal filling defect: chronic changed thrombophlebitis.*

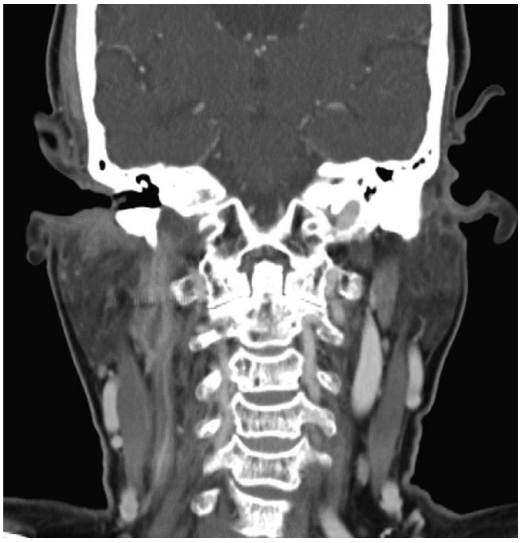

Figure 6. *Coronal CT image with contrast enhancement shows improvement of thrombophlebitis of right IJV.*

Twenty-four days after we replaced her antibiotics, the

Table 1. WBC, CRP values vary according to length of hospital day. Appearing gradually decreasing pattern.

PAD	1	2	8	22	36
WBC (10^3/μL)	6.20	13.6	11.4	4.60	4.60
CRP (mg/L)	355.9	156.9	36.9	3.89	1.24

patient showed good general condition with no swelling or pain, and her vital signs were stable. She was discharged on PAD 36 (Table 1).

After discharge, the patient visited the dental clinic every three months, and we checked her CRP and complete blood cells, which were both normal. She also showed good condition with no complications.

DISCUSSION

LS was first described in 1936 by Lemierre as an oropharyngeal infection followed by septic thrombophlebitis of the internal jugular vein and the subsequent spread of the infection to other organs. It is mainly caused by odontogenic infection, and in the 1920s, before antibiotics were preferred, it had high occurrence and mortality rate greater than 90%[6]. Studies report that LS has high incidence in adolescents and young adults[1].

When infection metastasizes to the oropharyngeal area, LS manifests in varying ways. Within one week after the IJV thrombophlebitis, patients show high fever and chills, and in most patients, the thrombophlebitis spreads to other organs. Clinical symptoms of ongoing IJV thrombophlebitis are cervical pain in the mandible and the anterior part of the sternocleidomastoid muscle, trismus, and difficulties with deglutition. In this case, our patient reported chills, and contrast-enhanced CT showed an oral abscess that originated from acute necrotizing fasciitis[7].

The most common method for diagnosis of IJV thrombophlebitis is contrast-enhanced CT. Other methods are sonography with Doppler as well as magnetic resonance imaging[10]. In this case, we used CT for the diagnosis, and it showed an enlarged IJV with thrombophlebitis and changing in the shading of the blood vessel wall over time. In the early stage, thrombosis is highly dense, and thus it is difficult to distinguish from normal blood. However, with time the thrombosis shows lower density, so its abnormal aspects can be detected. In addition, septic thrombophlebitis in LS mainly metastasizes to the lungs; on chest X-ray, it appeared as a bilateral tuberous infiltration[6]. Therefore, periodic radiographic views of the chest were needed. The thrombosis can also spread to other organs such as the joints, peritoneum, muscles, and spleen.

One of the treatments for IJV thrombophlebitis is antibiotics; wide-spectrum antibiotics are recommended until the patient's pus culture results confirm the origin of the thrombophlebitis. Commonly, penicillin and cephalosporin series are used as the initial antibiotics, and combination with metronidazole is also recommended[5].

There are no principles for using antibiotics with LS. Hagelskjaer reported that penicillin, cephalosporin, and clindamycin were sensitive to *F. necrophorum* and thus, administering them for three to six weeks was effective with LS[11]. In most LS patients, the blood culture results show *F. necrophorum* and gram negative anaerobic bacillus. However, some cases show *Bacteroides*[8] and other bacteria, and these are the origins of IJV thrombophlebitis.

In our case, the bacteria culture results from the buccal and masseteric spaces showed *Streptococcus sanguinis*, and an advanced abscess had invaded the lateral pharyngeal space, which caused the IJV thrombophlebitis. If there are significant symptoms such as abscesses, it is important to diagnose LS early before thrombophlebitis occurs. In our case, the thrombophlebitis was found after 10 days of facial space abscess[9].

IJV ligation and excision were used to treat LS before the widespread usage of antibiotics, but because antibiotics are now available, this method is not used frequently. Persistent septic emboli despite antibiotic treatment were an indication for IJV ligation[11].

The efficacy of anticoagulants is controversial. According to Doyle et al.[12], anticoagulant agents are clinically effective with purulent phlebitis that spreads into the cavernous sinus. They can improve thrombophlebitis rapidly, but they have the critical disadvantage of a high risk of IJV bleeding. In this case, we used 30 mg of low-molecular-weight heparin (Clexane®) injected subcutaneously twice daily, and this resolved the thrombosis.

With the extensive usage of antibiotics, the frequency and mortality of LS have decreased. However, if the source of an infection is not revealed accurately or systemic diseases are not controlled properly, LS is still sufficiently dangerous to cause death. Therefore, when a patient reports early LS symptoms such as chills and fever, exact differential diagnosis and prompt treatment are required.

CONCLUSION

We experienced a case of IJV thrombophlebitis that originated from a dental infection and a facial space abscess. To treat the patient, we conducted intra-oral drainage and administered active antibiotic and anticoagulant therapy. The authors ultimately achieved a desirable result, and thus we are reporting on the case for the literature.

The mortality and frequency of LS have decreased significantly with the extensive usage of antibiotics. However, this disease is still sufficiently dangerous that it can cause death, and therefore, we should aim for exact diagnosis and proper treatment.

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