CASE REPORT

Lemierre's Syndrome in COVID Pandemic: Is there an Association?

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Abstract

Background: Lemierre's syndrome is an uncommon life-threatening condition characterized by septic thrombophlebitis of the internal jugular vein (IJV), anaerobic sepsis, and metastatic infections.

Case description: A 57-year-old diabetic male presented to the emergency department with progressively increasing left-sided neck swelling. A contrast-enhanced computed tomography of the neck revealed an air-containing abscess showed a long-segment thrombus in the left internal jugular vein with septic embolization to the right upper lung. He was also positive for SARS-CoV-2 infection. He underwent emergency drainage of the abscess along with culture appropriate antibiotics. Two days postprocedure, he developed atrial fibrillation and received anticoagulation treatment for 3 months.

Discussion: This case report adds to the growing body of literature of co-occurrence of Lemierre's syndrome in SARS-CoV-2 infection and discusses the possible associations between the two. Besides, it also highlights *Klebsiella pneumoniae* as an uncommon pathogen causing Lemierre's syndrome.

Keywords: *Klebsiella*, Lemierre's syndrome, Neck swelling, SARS-CoV-2, Type 2 diabetes.

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Introduction

Lemierre's syndrome (LS), also known as postanginal septicemia, is a rare, life-threatening condition characterized by septic thrombophlebitis of the internal jugular vein (IJV), anaerobic sepsis, and metastatic infection secondary to an oropharyngeal infection.[1] It was first studied by Andre Lemierre in 1936, and the causative organism identified then was *Fusobacterium necrophorum*.[2] The septic emboli most commonly involve the lungs followed by bones and brain.[3,4] The introduction of antibiotics in the early part of the last century had led to dramatic reduction in the incidence and fatality of this condition, earning it the title of "forgotten disease".[1,4] However, there is a steady increase in its incidence in the last four decades with organisms such as *Bacteroides* spp., group B and C streptococci, *Streptococcus oralis*, *Klebsiella pneumoniae*, *Enterococcus* spp., *Proteus mirabilis*, *Eubacterium* spp., and *Eikenella corrodens*.[3,5–9] There is a significant jump in the numbers of reports on LS in the recent COVID-19 pandemic due to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection as well.[3,4,7,10–14] This case report describes a 57-year-old diabetic patient with LS secondary to *K. pneumoniae* who also had SARS-CoV-2 infection.

Case Description

A 57-year-old male with uncontrolled diabetes mellitus presented to the emergency department with the history of a gradually increasing left-sided neck swelling with fever and chills. He had a 3-day history of associated throat pain. On examination, he had tachycardia and tachypnea with a 4 × 4 cm swelling in the left neck, deep to the sternocleidomastoid muscle with palpable crepitus. The oral, oropharyngeal examination was unremarkable, and there were no other palpable cervical swellings. His blood tests revealed thrombocytopenia with normal hemoglobin and bleeding parameters. His random blood glucose was 355 mg/dL, and urine ketones test was negative. In view of presentation with fever and tachypnea, a SARS-CoV-2 polymerase chain reaction (PCR) test for COVID was done and was reported positive. A contrast-enhanced computed tomography of the neck showed an air-containing abscess deep to the middle third of the left sternocleidomastoid in contact with the left IJV (Fig. 1). The left IJV showed a long-segment thrombus from jugular foramen to just before the formation of SVC (Fig. 2) with septic embolization to the right lung upper lobe. He was taken up for emergency drainage of the abscess after correction of the thrombocytopenia. Around ten milliliters of foul-smelling pus was drained from a gas-filled cavity deep to the left sternocleidomastoid and sent for cultures, and a corrugated drain was left *in situ*. The cultures grew *K. pneumoniae* which was susceptible to amoxicillin/clavulanate, cotrimoxazole, cefpodoxime, and levofloxacin. He was initiated on piperacillin-tazobactam to which he responded well. Two days postprocedure, he developed atrial fibrillation with a fast ventricular rate which was treated with beta blockers. He was initiated

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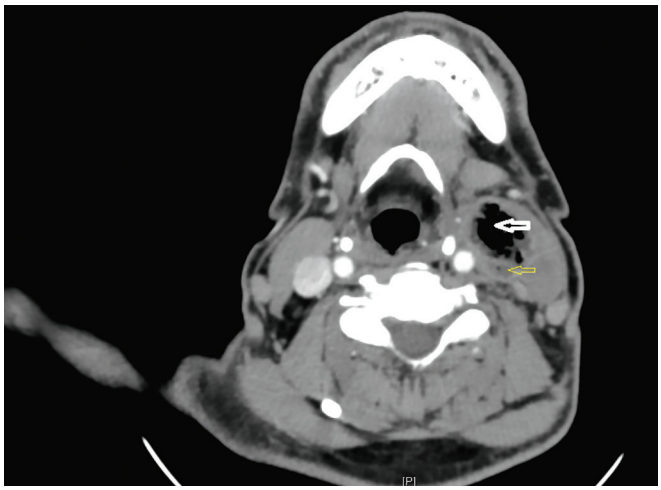

Fig. 1: Axial image of contrast-enhanced CT of neck showing a gas-filled abscess cavity (white arrow) adjacent to thrombosed IJV (yellow arrow)

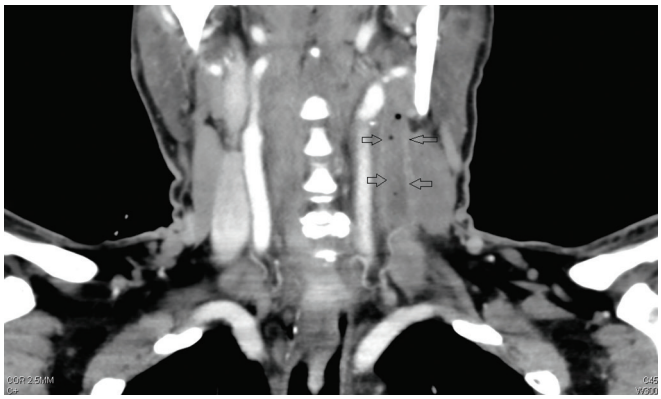

Fig. 2: Coronal image of contrast-enhanced CT of neck showing the entire length of the thrombosed IJV extending up to formation of SVC (black arrows)

on low-molecular-weight heparin followed by oral anticoagulation for 3 months. With daily dressings, his wound gradually granulated and the drain was removed in a week. He received intravenous antibiotics for 2 weeks and was discharged on 2 weeks of oral levofloxacin. At 6-month follow-up, his condition was stable and the wound was closed with secondary suturing.

Discussion

The recent COVID-19 pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has seen a resurgence of many reports on Lemierre's syndrome. A MEDLINE search by the authors found that there were more than 45 reports on LS since the COVID pandemic started in Wuhan, China, in January 2020.[3,4,7,10–14] While the general consensus is that the lockdowns and the poor accessibility to health care worsened the situation, we believe the prothrombotic effect of local infection-induced endothelial injury is accelerated in the presence of COVID-induced hypercoagulable state. Reports on the SARS-Cov-2 infection suggest the presence of an undetermined coagulopathy in COVID-19, with raised D dimer, fibrinogen, and other fibrin degradation products.[15,16] Whether this is a direct effect of the virus or due to the cytokine storm released as a response to the virus is unclear. COVID-19 can mimic sepsis with signs and symptoms including coagulopathy and thrombocytopenia.

K. pneumoniae which was isolated in our patient is an uncommon pathogen for LS with less than a dozen cases in literature.[6–9] *K. pneumoniae* is a common inhabitant of the oral cavity in those with poor dental hygiene. Those particularly at risk include patients with significant alcohol consumption, advanced age, and diabetes mellitus. A possible correlation between diabetes mellitus, *K. pneumoniae* infection, SARS-CoV-2 infection, and IJV thrombosis can be inferred. Hyperglycemia of diabetes impairs the phagocytosis of neutrophils predisposing to increased infections.[9] The endothelial injury caused by *K. pneumoniae* promotes platelet aggregation and thrombus formation. The IJV thrombosis is aggravated by the hypercoagulable state in SARS-CoV-2 infection in high-risk individuals. The thrombocytopenia seen in our patient is seen in both LS and SARS-CoV-2 infection. Further studies are needed to understand this interaction better.

Regardless of the organism, contrast-enhanced CT scan continues to be the investigation of choice. It shows enhancement of IJV with intraluminal filling defects.[4] The main treatment options include antimicrobials with anaerobic coverage and surgical drainage of abscesses. The use of anticoagulation is debatable.[10,17] Low-molecular-weight heparin (LMWH), such as enoxaparin and dalteparin, are the most the common choice of anticoagulation.[10,17] The duration of anticoagulation also varies with studies reporting from 6 to 12 weeks. A recent observational study of 82 patients with LS reports that most patients recovered well without therapeutic anticoagulation.[17] Severe COVID-19 infections predispose to venous thromboembolism.[18] Anticoagulation therapy is often recommended as part of the treatment of COVID-19, especially for patients with severe or critical COVID-19.[18] Onset of atrial fibrillation with coexistent LS and COVID infection prompted the use of anticoagulant therapy in our patient. Future studies assessing the role of anticoagulant therapy in LS coexisting with prothrombotic conditions such as SARS-CoV-2 infection are needed.

Conclusion

This case report adds to the co-occurrence of LS with SARS-CoV-2 infection and highlights the association of thrombosis in LS when associated with COVID coinfection. A good clinical outcome was obtained with a combination of antimicrobial therapy, abscess drainage, diabetic control, and anticoagulation therapy. The need for anticoagulation must be considered on a case to case basis but we believe that a lower threshold must be kept in prothrombotic states such as SARS-CoV-2 infection. This case report also highlights *K. pneumoniae* as an unusual organism causing LS. Increased awareness of these aspects can help in better management of these patients.

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