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A 57-Year-Old Woman With Fever, Urinary Frequency, and Shock



Ying-Chih Ko, MD; Min-Shan Tsai, MD, PhD; Hooi-Nee Ong, MD; Chien-Hua Huang, MD, PhD; Shi-Ni Wu, MD; Wei-Tien Chang, MD, PhD; and Wei-Ting Chen, MD



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A 57-year-old woman, with a history of hypertension and diabetes mellitus, presented to the ED with fever, decreased urine, and urinary frequency for 1 day. She reported a history of mild sore throat prior before presentation. A full medical evaluation was delayed because of limitations during the outbreak of COVID-19, and her symptoms eventually improved with oral medications. Her vital signs were normal, except for a heart rate of 125 beats/min. Physical examination showed clear lungs and a soft, nontender abdomen. Laboratory investigations revealed a WBC count of 4.1 K/ μ L with left shift (31% band neutrophils), thrombocytopenia (71 K/ μ L), elevated serum creatinine level (1.8 mg/dL), mild metabolic acidosis (HCO_3^- of 19.8 mM), and elevated serum lactic acid level (4.8 mM). The liver function was normal, and the urine analysis showed no evidence of urinary tract infection. Empiric

antibiotics with ceftriaxone and IV fluids were prescribed for bacteremia and lactatemia. Initial chest radiograph showed clear lung fields bilaterally, and CT scans of the abdomen indicated no evidence of intraabdominal infection. Paired blood culture at initial survey yielded *Klebsiella pneumoniae* with time to positivity at 7 and 11 hours, respectively. Shock developed rapidly during her stay in the ED, and her mental status deteriorated. After tracheal intubation and vasopressor infusion, she was admitted to the ICU. After admission to the ICU, erythema of the right neck was noted, and a point-of-care ultrasound (POCUS) evaluation was performed (Videos 1-3).

Question: Based on the clinical evaluation and POCUS videos, what is the most likely diagnosis?

AFFILIATIONS: From the Department of Emergency Medicine, National Taiwan University Hospital, Taipei, Taiwan.

CORRESPONDENCE TO: Wei-Ting Chen, MD; email: biochip52@hotmail.com

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Answer: POCUS showed occlusion of the right internal jugular vein with intraluminal gas formation. The patient's history of oropharyngeal infection suggested a high likelihood of Lemierre's syndrome (LS). Videos 2 and 3 show the transverse and longitudinal views of the occluded vein, respectively. Multiple intraluminal hyperechoic foci with a posterior dirty shadow were present, which indicated abscess formation

Subsequent neck and chest CT scans showed intraluminal filling defect with air-containing loculation in the right internal jugular vein and multifocal peripheral consolidations at bilateral lungs, which are findings compatible with the tentative POCUS-based diagnosis (Fig 1).

Discussion

LS, named after Andre Lemierre in 1936,¹ is characterized by antecedent oropharyngeal infection, evidence of internal jugular venous thrombosis, and typically anaerobic septicemia. LS has a reported mortality rate of up to 90%.¹ With the introduction and widespread use of antibiotics, the incidence of LS has decreased dramatically and has been referred to as the "forgotten disease" in the postantibiotic era.^{2,3}

The syndrome was missed easily and delayed with potential fatalities because of nonspecific symptoms, young and previously healthy population, and low incidence.⁴ In the population, the expected symptoms such as sore throat, neck mass, or neck pain only account for less than one-third of the initial clinical presentation, which makes the diagnosis more difficult.⁵ The patient's initial complaints were urinary frequency cause by sepsis-related oliguria rather than sore throat, and shock rapidly developed after she presented to the ED. After consciousness deterioration and being intubated, the source of infection was even more difficult to detect.

Several imaging modalities can be used to diagnose LS. In previous studies, chest radiographs have been regarded as the first-line investigation; approximately 90% of the patients had abnormal chest radiographs.^{4,5} CT scanning is typically the diagnostic modality of choice for identification of septic lung and thrombophlebitis of the internal jugular vein.^{6,7}

However, it is difficult to have the differential diagnosis and to arrange the examination if there are only nonspecific complaints with an initial normal chest radiograph, just as the presentations of the patient. Further, as the condition worsens and profound shock sets in, the patient would be too unstable to undergo CT imaging. In this case, POCUS served as a life-saving tool in critical care and contributed to an expedited

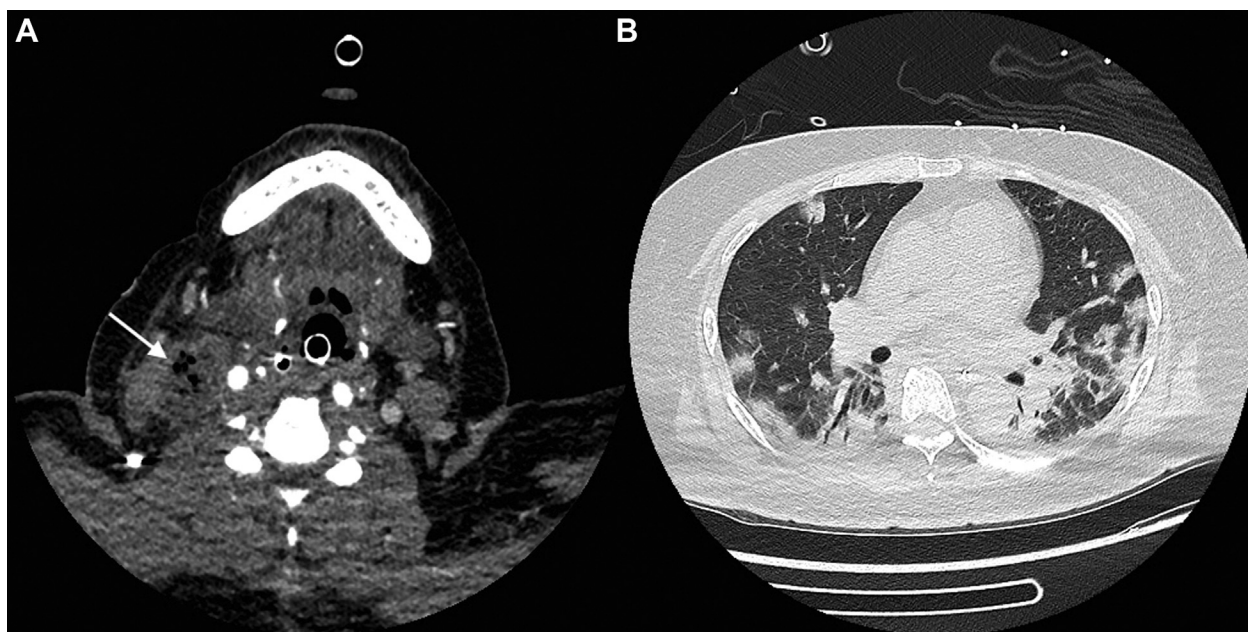


Figure 1 – A, CT image of the neck shows an intraluminal filling defect with air-containing loculation in the right internal jugular vein (arrow). B, CT image of the chest shows multifocal peripheral consolidations at the bilateral lungs.

diagnosis, focused treatment, and postoperative follow up. POCUS has advantages in children or patients who have concerns about contrast or radiation; the advantages of portability enable the physician to obtain a real-time image when other types of examination are unsuited to the patient.

Resurgence of LS has been noticed since 1990,⁸ possibly because of increased antibiotic resistance and discouragement from prescribing antibiotics for upper respiratory tract infections.⁵ In addition to this documented phenomenon, the incidence rate of LS may be underestimated because of changes in health behavior, COVID-19-related isolation policies, delays in access to medical care, and a fear of hospitalization, all of which may be reasons for increased morbidity and mortality rates.⁹

Neck dissection with right internal jugular vein ligation was performed for source control. Surgical cultures showed *Klebsiella pneumoniae* that was identical with blood culture findings. After prolonged antibiotics use, repeated debridement, and anticoagulant administration, the patient was extubated after 3 weeks of admission and was discharged smoothly.

Reverberations

1. *LS is a rare, easily missed but deadly complication of antecedent oropharyngeal infection.*

2. *POCUS can provide a real-time, repeatable, and reliable way to diagnose LS.*

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Additional information: To analyze this case with the videos, see the online version of this article.

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