Pulmonary infiltrates associated with *Vibrio vulnificus* septicemia

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In the case described, fatal *Vibrio vulnificus* primary septicemia was complicated by development of diffuse pulmonary infiltrates. Clinical features of this recently discovered infectious disease are discussed. Various aspects of diagnoses of pulmonary infiltrates in patients with *V. vulnificus* septicemia are also presented. Vibriosis should be suspected in patients with chronic, underlying, predisposing diseases, recent ingestion of raw seafood, and characteristic skin lesions.

(Key words: *Vibrio vulnificus* infection, vibriosis, pulmonary infiltrates, primary septicemia, bacterial infection, myofasciitis)

Illnesses associated with *Vibrio vulnificus* can be grouped clinically into primary septicemia, wound infections, and gastrointestinal illness.¹ Patients with primary septicemia may have symptom complexes varying from fever and chills only to a severe illness characterized by bullous skin lesions, high fever, hypotension, and a 46% mortality rate.²

The most frequently cited predisposing factors in the development of septicemia are underlying chronic illnesses, such as liver disease and diabetes, coupled with a history of recent ingestion of raw oysters.³ Several pulmonary manifestations of vibriosis—including acute bronchopneumonia, alveolar hemorrhage, nosocomial pneumonia, and the adult

respiratory distress syndrome (ARDS)—are reviewed in the recent literature. We describe here a case of fatal primary septicemia complicated by pulmonary infiltrates.

Report of case

A 51-year-old man was transferred to Hahnemann University Hospital (Philadelphia) from a local hospital where he had been seen because his right leg had been swollen and tender for 2 days. An initial evaluation for deep venous thrombophlebitis performed at the first institution showed no abnormality.

Despite the administration of five antibiotics, the patient had increased swelling and pain. Just prior to transfer to our hospital, he had been intubated for treatment of acidosis, hypotension, and progressive obtundation. His past medical history revealed hepatic cirrhosis and noninsulin-dependent diabetes mellitus. Several days prior to the initial hospital admission, the patient had returned from Florida, where he had consumed raw oysters.

On physical examination, the patient's temperature was 37.8°C; his pulse rate, 130 beats per minute; respirations, 30 per minute; and systolic blood pressure, 80 mm Hg. Auscultation revealed the lungs to be clear; no ascites was present. In addition to tenderness and swelling, tense hemorrhagic bullae were present on the dorsum of the right foot and the posterolateral aspect of the right calf. An arterial blood gas on 1.0 FIO₂ revealed a pH of 7.39, a PCO₂ of 23 mm Hg, and a PaO₂ of 395 mm Hg. A chest x-ray film showed no infiltrates.

An emergent fasciotomy was performed; it confirmed extensive myonecrosis. A pulmonary artery line was placed to facilitate fluid management. The initial pulmonary capillary wedge pressure was 7 mm Hg. Administration of broad-spectrum antibiotics was continued. The right leg was amputated above the knee after fluid resuscitation.

Following surgery, the left calf became tender. Results of noninvasive studies again proved negative for deep venous thrombophlebitis. No bullae or compartment syndrome appeared. Small gram-negative rods identified as *V. vulnificus* were iso-

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Figure. Chest x-ray film shows diffuse alveolar filling process in a patient with *V vulnificus* primary septicemia.

lated from cultures of the blood and right leg. A chest x-ray film taken on the second postoperative day showed a diffuse alveolar filling process (Figure). A repeated arterial blood gas test produced the following values: pH, 7.42; PCO₂, 36 mm Hg; and PO₂, 78 mm Hg on 0.4 FIO₂.

The patient's remaining hospital course was characterized by hepatic failure, renal failure, and refractory hypotension. He died on the ninth day of hospitalization without resuscitation. Permission to perform an autopsy was not granted.

Discussion

The patient had displayed many of the cardinal clinical features of *V vulnificus* primary septicemia. These cases tend to be clustered around the summer and fall months in Gulf Coast states.⁴ A history of ingestion of raw seafood, especially oysters, 24 to 48 hours prior to the onset of symptoms is commonly elicited.⁵ The mean incubation period is 28 hours and the range is 16 hours to 2 weeks.⁴ Refractory hypotension is often present at the time of initial presentation and portends a mortality rate that approaches 100%.⁶ Skin lesions are present in 67% of patients; hemorrhagic bullae containing organisms are most characteristic.⁷ Intensive leg pain is often accompanied by a necrotizing myofasciitis.⁸

Liver disease, leukemia, diabetes mellitus, hemochromatosis, steroid-dependent asthma, peptic ulcer disease, and chronic renal failure are associated with *V vulnificus* septicemia.^{3,4} Hepatic cirrhosis is the most frequently cited predisposing condition. Bacteria from the intestine enter the bloodstream from the portal vein or intestinal lymphatics and are shunted into the systemic circulation.^{3,9} Poor nutrition, increased iron stores, and defective leukocyte function are additional factors contributing to *V vulnificus* susceptibility in patients with chronic liver disease.⁹

Appearance of pulmonary infiltrates in this patient correlated clinically with the development of noncardiogenic pulmonary edema (NCPE). This occurred as part of a multiple-system organ failure complex associated with sepsis. *Vibrio vulnificus* reportedly possesses an antiphagocytic surface antigen⁷ that may promote ongoing damage to the respiratory capillary endothelium producing "leaky" capillaries.

Although reported as present in almost every specific bacterial infection, NCPE has not been reported to be found with *V vulnificus* infection, but this lack may be due to the extremely high early mortality rate. Our pa-

tient had diffuse pulmonary infiltrates and a normal pulmonary capillary wedge pressure but was not hypoxemic enough to be placed in a strict ARDS category.

Alveolar hemorrhage and gram-negative nosocomial pneumonia are also found at the autopsy of patients who died of primary septicemia.^{3,9} Acute bronchopneumonia contracted by hematogenous spread or, possibly, by aspiration is the most recently documented respiratory complication of *V vulnificus* infection.^{8,10} Sabapathi¹⁰ described a 60-year-old man who fell into a harbor after a cardiopulmonary arrest and then had fever and focal pulmonary infiltrates. Sputum cultures subsequently grew both *Vibrio cholera* and *V vulnificus*, which had not been reported previously.¹⁰

Early diagnosis and antibiotic therapy seem to improve case fatality rates, although a substantial number of bacteremic patients die despite treatment.³ *Vibrio vulnificus* demonstrates susceptibility to a wide variety of antibiotics in vitro. Regimens including tetracycline have proved to be most efficient. Necrotizing myofasciitis is best managed by proximal amputation.⁶ Even though our patient was

treated early with appropriate antibiotics and surgical management, his outcome was poor, reflecting the extreme virulence of the *V vulnificus* organism. Patients with underlying predisposing illness should be counseled to avoid raw seafood, especially oysters.^{1,4,6}

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