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Ultrasound in Emergency Medicine

ENDOCARDITIS WITH FISTULIZATION AND RUPTURE OF AORTIC ROOT ABSCESS TO THE LEFT ATRIUM

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☐ **Abstract—Background: Infective endocarditis (IE) is a difficult emergency department (ED) diagnosis to make. Symptoms are nonspecific and diverse and the classic triad of fever, anemia, and murmur is rare. Severe IE causes considerable morbidity and mortality and should be diagnosed early. However, echocardiogram is essential but not readily available in the ED and can cause diagnostic delay. Case Report: This case describes severe IE and its unique presentation, diagnostic challenges, and the use of bedside cardiac ultrasonography. A 28-year-old previously healthy male presented with intermittent fevers, arthralgias, and myalgias for 2 weeks. He had twice been evaluated and diagnosed with lumbar back pain. Physical examination revealed moderate respiratory distress, pale skin with a cyanotic right lower extremity, and unequal extremity pulses. He became hypotensive and rapidly deteriorated. Chest x-ray study showed bilateral pulmonary infiltrates with subsequent imaging demonstrating worsening septic emboli. Bedside ultrasound revealed mitral and aortic valve vegetations and a presumed diagnosis of IE with septic embolization was made. Formal echocardiography (ECHO) confirmed IE with an aortic root abscess with rupture and fistulization into the left atrium. Why Should an Emergency Physician Be Aware of This?: Clinical criteria for IE include blood cultures and ECHO, however, these are often not available to an emergency physician, making IE a diagnostic challenge even in severe cases. The role of bedside ultrasound for IE continues to evolve and its utility in the diagnosis of severe IE is distinctly demonstrated in this case.** © **2016 Elsevier Inc.**

☐ **Keywords—endocarditis; ultrasound; fistula; abscess**

INTRODUCTION

Infective endocarditis (IE) is a difficult diagnosis to make in the emergency department (ED) with history and physical examination alone. The symptoms are nonspecific and diverse. The most common symptoms remain intermittent fevers and generalized malaise (1). Other symptoms include myalgias, back pain, cough, and headaches. Some patients will have complications of severe IE, such as congestive heart failure and cerebral vascular accidents, and may present in extremis. Rarely reported is the development of an aortic root abscess secondary to IE (2).

To complicate matters, diagnostic strategies are limited in the ED. Laboratory findings, such as leukocytosis, elevated erythrocyte sedimentation rate, or anemia, are insensitive. Blood cultures, while recommended, are not resulted during the ED stay. Echocardiogram, especially transesophageal echocardiography, is time consuming and not readily available in the ED.

The standard diagnostic tool for IE, Duke criteria, is of limited value to an emergency physician (EP) given its reliance on blood culture results and formal echocardiography (ECHO) (Table 1). However, the use of bedside point of care ultrasound (POC US) is becoming more

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Table 1. Duke Criteria (Clinical) for Diagnosis of Infective Endocarditis

Definite endocarditis: Endocarditis is considered definitely present if any one of the following combinations of clinical findings is present
2 major clinical criteria
1 major and any 3 minor clinical criteria
5 minor clinical criteria
Possible endocarditis: Possible endocarditis is defined as the presence of any one of the following combinations of clinical findings
1 major and 2 minor clinical criteria
3 minor clinical criteria
Rejected endocarditis: The diagnosis of endocarditis is considered rejected if any of the following occurs
A firm alternate diagnosis is made
Resolution of clinical manifestations occurs after 4 days of antibiotic therapy or less
Clinical criteria for possible or definite infective endocarditis not met
Major criteria
Positive blood cultures (of typical pathogens) from at least 2 separate cultures
Evidence of endocardial involvement by echocardiography, such as the following: endocardial vegetation, paravalvular abscess, new partial dehiscence of prosthetic valve, new valvular regurgitation
Minor criteria
Predisposition: Predisposing heart condition or i.v. drug use
Fever: Temperature >38°C
Vascular phenomena: Arterial emboli, septic pulmonary infarcts, mycotic aneurysm, conjunctival hemorrhages, or Janeway lesions
Immunologic phenomena: Osler's nodes, Roth's spots, and rheumatoid factor
Microbiologic evidence: Single positive blood culture (except for coagulase-negative *Staphylococcus* or an organism that does not cause endocarditis)
Echocardiogram findings: Consistent with endocarditis but do not meet major criteria

favorable among EPs, potentially leading to a quicker diagnosis and more appropriate treatment and consultation for IE. This case describes severe IE with complications of fistulization and rupture of an aortic root abscess to the left atrium and embolic stroke. The use of POC US guided the diagnosis and expedited care.

CASE REPORT

A 28-year-old previously healthy male presented to an urban Level I trauma center with a chief complaint of intermittent fevers and body aches for 2 weeks. The patient had been seen at another hospital twice in the last several weeks for similar complaints and was given pain medication and muscle relaxants with no symptom relief. He was discharged home after both visits. The patient has a medical history significant for an appendectomy and denied i.v. drug use or new tattoos. Any recent dental procedures were unknown.

Upon initial evaluation, the patient complained of left hip pain. Vitals were as follows: oral temperature of 97.9°F, blood pressure (BP) of 95/30 mm Hg, heart rate of 132 beats/min, and respiratory rate (RR) of 16 breaths/min, with an oxygen saturation of 93% on room air. The patient was alert, awake, oriented, and appeared ill. Physical examination was significant for moderate respiratory distress with clear breath sounds bilaterally, normal heart tones with tachycardia, lower lumbar soft tissue tenderness, warm, dry, and pale skin with a cyanotic right lower extremity. Peripheral pulses were unequal bilaterally: 3 to 4 + in the right radial artery, 1 + in the left radial artery, and 3 to 4 + in the left dorsalis pedis artery. The pulses were present by Doppler ultrasound in the right dorsalis pedis artery and the posterior tibial artery.

Upon reassessment, the patient had worsening hypotension to 60s/20s mm Hg. Three large-bore i.v. needles were placed and 2 L normal saline (NS) was given. The patient became hypoxic on nasal cannula with little improvement on a nonrebreather (NRB) mask. A chest x-ray study showed early pulmonary edema vs. infiltrates. Laboratory testing, including blood cultures, was drawn for presumed septic shock. After a total of 3 L of NS, the BP was 74/45 mm Hg and the RR increased. He became extremely agitated with worsening shortness of air and respiratory distress.

At this point the patient had a weak pulse in the left upper extremity and bounding pulses in bilateral lower extremities. Manual BP in both arms was noted to have a wide discrepancy. The left arm was noted to be 50s and palpable, and the right arm was noted to be 200s and palpable. A right radial arterial line was placed for BP monitoring and initial blood pressure was 233/64 mm Hg.

The patient continued to be in respiratory distress with a respiratory rate of 28 and oxygen saturation on NRB of 70%. The patient was intubated using rapid sequence intubation and continued to be hypoxic despite ventilator support. Antibiotic treatment was started using vancomycin 1.25 g i.v., levofloxacin 750 mg i.v., and piperacillin/tazobactam 3.25 mg i.v. for presumed septic shock.

The patient had an initial blood gas after intubation showing a pH of 7.03, PCO_2 of 58 mm Hg, PO_2 of 66 mm Hg, and base excess of −15 on 100% FiO_2. Initial laboratory results revealed a leukocytosis of 38,5000/mm^3 and a lactate of 4.09 mmol/L. Toxicology was positive for opiates and oxycodone. Repeat chest x-ray study showed worsening of septic emboli and pulmonary edema. A rapid cardiac POC US was completed showing multiple valvular abnormalities, specifically large vegetations seen on the aortic and mitral valves (Figure 1).

With the help of POC US showing vegetative abnormalities along with physical findings, an ED diagnosis of presumed IE with septic embolization was made. The medical intensive care unit (ICU) was consulted and stat ECHO was ordered based on ED US findings. The patient was admitted to the ICU.