

CLINICAL VIGNETTE

Infective Endocarditis in Pregnancy

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Introduction

Infective endocarditis (IE) has a low incidence in pregnancy (1 in 100,000) but is associated with high mortality for both the mother and fetus.¹ Maternal mortality has been reported up to 33 percent and fetal mortality up to 29 percent.² This case report describes a patient with infective endocarditis who underwent a successful vaginal birth.

Case Report

A 33-year-old female gravida 2, parity 1, presented to prenatal clinic at 19 weeks to establish prenatal care. Her medical history was significant for heroin and methamphetamine use in pregnancy. A few weeks after establishing care, she presented to obstetrics triage with headaches and chest pain. Her initial vitals and labs were significant for tachycardia and an elevated white blood cell count. A computed tomography (CT) of the chest was obtained to rule out pulmonary embolism. On imaging, no pulmonary embolism was seen but bilateral patchy consolidations were noted concerning for septic emboli. Infectious disease and cardiology were consulted. Blood cultures were obtained, and the patient was given one dose of ampicillin (1 gram) and started on vancomycin (750 mg q8h) and ceftriaxone (1 gram q24h). Initial transthoracic echocardiogram did not show evidence of infective endocarditis but given the high clinical suspicion, subsequent transesophageal echocardiogram (TEE) visualized a 3cm vegetation on the tricuspid valve. Blood cultures subsequently grew methicillin-resistant *Staphylococcus aureus* (MRSA), and vancomycin monotherapy was continued. Cardiothoracic surgery recommended continuing antibiotics, and consideration of tricuspid valve replacement only if the patient was unable to clear her blood cultures. After one week of continued positive blood cultures, vancomycin was switched to ceftaroline and daptomycin for additional coverage. Subsequent blood cultures were negative, and the patient was continued on the same antibiotic treatment for an additional 6 weeks. Her pregnancy was also complicated by severe preeclampsia requiring betamethasone and magnesium, transaminitis concerning for multifactorial hepatocellular injury, latent syphilis infection requiring three doses of penicillin and substance abuse management requiring buprenorphine and eventually methadone. The patient went into active labor at 35 weeks, received a labor epidural for pain management, and

vaginally delivered a neonate with Apgar scores of 9 at five minutes of life. A repeat TEE during her antibiotic course still showed vegetation on her tricuspid valve, but all blood cultures remained negative even after delivery and the patient was eventually discharged from the hospital with plan for a repeat TEE in 2 years.

Discussion

Infective endocarditis, involves disease or infection of the endocardial surfaces of the heart, particularly cardiac valves, or implanted cardiac devices.³ Diagnosis is generally based on the modified Duke criteria. Major criteria include: 2 separate blood cultures positive for typical IE organisms; persistently positive cultures for 12 hours for atypical IE agents; single positive blood culture for *Coxiella burnetii* or anti-phase IgG antibody titer of > 1:800; or echocardiogram positive for IE including vegetation, abscess, or new valve regurgitation or dehiscence. Minor criteria include predisposing factors, such as prosthetic valves or intravenous drug use; fever >38 degrees; local or embolic vascular phenomena; and microbiologic and immunologic phenomena not meeting major criteria.

While IE is rare in pregnancy it is associated with serious risks to maternal and fetal well-being, thorough, effective care is important. Factors associated with endocarditis in pregnancy have evolved over time, with congenital or rheumatic heart disease still the most common predisposing events, but with intravenous drug use increasingly implicated in disease.⁴ *Staphylococcus aureus*, a common skin flora that includes MRSA, is the most likely causative agent, while other bacterial and fungal organisms, including viridans group streptococci, *Enterococcus* species, HACEK bacilli (*Haemophilus species*, *Aggregatibacter actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corodens*, and *Kingella kingae*) are also associated with the disease.

Transthoracic echocardiography (TTE), is the preferred first imaging tool for detecting structural abnormalities in the heart that may increase susceptibility to IE, if not outright evidence of active disease. TTE is reported to have a sensitivity of 50% in detecting disease in prosthetic valves, while transesophageal

echocardiography (TEE) increases the sensitivity to 90%.⁵ Pre-existing structural abnormalities have been reported in 75% of cases of IE,⁵ but less than half of cases in injection drug users show congenital or acquired disease. Right-sided lesions, often involving the tricuspid valve, are more common in IV drug users, and include transient or permanent damage to the valve endothelium that allow vegetations to gradually grow. Small vegetations may separate from primary right-sided lesions, cross pulmonary capillaries, circulating back to the heart leading to mitral or aortic valve disease.

Antibiotic therapy is the mainstay of treatment, with appropriate selection of agent guided by serial blood cultures.⁵ Vancomycin or ampicillin/sulbactam with or without added aminoglycosides, daptomycin, or newer agents including fifth-generation cephalosporins like ceftaroline, are often utilized for days or weeks to clear active infection. Guidelines for treatment including total duration of antibiotic therapy are based on the identified causative agent, as well as the presence or absences of structural defects or implanted prosthetics.⁶

Indications for surgery have been reported by the American Association for Thoracic Surgery (AATS), and include: severe heart failure; severe valve dysfunction; prosthetic valve infection; invasion of vegetations beyond the valve leaflets; recurrent systemic infectious embolization; large mobile vegetations; or persistent sepsis despite adequate antibiotic therapy for more than 5-7 days.⁷ With IE diagnosed in pregnancy, additional risks and considerations are apparent, and surgery is ideally delayed until after successful antibiotic therapy has cleared the infection and, if possible, until after delivery.² In the case presented, the patient was able clear the infection well in advance of reaching term, without the necessity of surgical intervention.

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