Tricuspid valve endocarditis during the second trimester of pregnancy

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Summary: Bacterial endocarditis in pregnancy is rare, usually resulting from preexisting cardiac lesions or intravenous drug use. We present an interesting case of tricuspid valve endocarditis in a pregnant woman and raise important points in the management of this condition during pregnancy.

Keywords: bacterial endocarditis, pregnancy

INTRODUCTION

The incidence of infective endocarditis is approximately 1.7–6.2 cases per 100,000 patient years.^{1,2} Men are affected more than women at a 2:1 ratio, and the incidence of the disease increases with age.² Right-sided endocarditis accounts for 5–10% of cases, usually involving the tricuspid valve.¹ Bacterial endocarditis in pregnancy is rare, usually resulting from pre-existing cardiac lesions or intravenous drug use.³ Although case reports address infective endocarditis during pregnancy, there is limited information about right-sided lesions. We present an interesting case of tricuspid valve endocarditis in a pregnant woman and also review the available literature.

CASE REPORT

A 24-year-old Gravida 4 Para 0030 woman without prenatal care presented with a singleton gestation at 21 weeks by menstrual dates with a three-day history of fever and constant, sharp low back pain extending to the right lower extremity. She reported a temperature of 100.6°F, for which she took an over-the-counter non-steroidal anti-inflammatory agent. Medical history was unremarkable. The patient reported using intravenous cocaine for two months prior to admission; last use was 12 days prior to presentation. She denied tobacco or alcohol use. Review of systems was otherwise negative. She was cachectic with track marks on her extremities. Vital signs included a temperature of 99.4°F, pulse of 105 beats per minute (bpm), blood pressure of 108/58 mmHg, respiratory rate of 24 breaths per minute and oxygen saturation rate of

100% on room air. Cardiac exam revealed a tachycardic rate, normal rhythm without an appreciable murmur, jugular venous distention, or S3, S4 gallops. The abdomen was gravid and the fetal heart rate was 160 bpm. There was limited range of motion of the right lower extremity. Haemoglobin was 8.0 g/dL and white blood cell count was 8.2 thou/cm with nine bands. Urinary drug screen confirmed cocaine. The patient was admitted to the Maternal Fetal Medicine service and shortly thereafter developed a temperature of 102.1°F and tachycardia at 130 bpm. Bacterial endocarditis was suspected based on the presence of a fever, intravenous drug use and the absence of other infectious sources. The patient declined transoesophageal echocardiography for evaluation. Although nafcillin was started, vancomycin was recommended by Infectious Diseases for presumed community acquired methicillin-resistant *Staphylococcus aureus*. Blood cultures grew methicillin-sensitive *S. aureus* (MSSA). Transthoracic echocardiography revealed normal left ventricular function and mild tricuspid regurgitation. Infectious Diseases recommended 28 days of intravenous ceftriaxone for presumed uncomplicated bacteraemia and repeat surveillance blood cultures were sterile. Magnetic resonance imaging of the spine was negative and the patient was diagnosed with sciatica.

The patient was maintained on intravenous antibiotics as an inpatient due to concern for outpatient adherence. The patient's fever recurred on day 16 and repeat blood cultures while on ceftriaxone confirmed MSSA. Other sources of infection were excluded by exam and head/neck imaging. A second transthoracic echocardiogram revealed moderate to severe tricuspid regurgitation and a 1.5 cm × 1.8 cm mobile density on the anterior leaflet of the tricuspid valve. A transoesophageal echocardiogram was then performed for confirmation (Figure 1). Antibiotic regimen was changed to 28 days of intravenous nafcillin. A computerized tomographic scan of the chest, ordered due to a new complaint of chest pain, demonstrated septic emboli. Cardiothoracic surgery was consulted to address possible surgical intervention were she to remain bacteraemic

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Figure 1 Transoesophageal echocardiogram image showing a 1.5 cm × 1.8 cm vegetation on the anterior leaflet of the tricuspid valve

despite antibiotic coverage and/or require resection of a valvular abscess. Conservative management with intravenous antibiotics was recommended. Follow-up blood cultures became sterile and a repeat transthoracic echocardiogram eight days later showed a slightly thickened tricuspid valve without the evidence of residual vegetation and improvement in tricuspid regurgitation.

During the admission, the patient was diagnosed with hepatitis C and anaemia of chronic disease requiring transfusion of four units of packed red blood cells. The patient left against medical advice on hospital day 37 despite the recommendation to remain hospitalized until completion of the antibiotic course. She was discharged on oral dicloxacillin with instructions to return for outpatient follow-up with Maternal Fetal Medicine, Cardiology, and Infectious Diseases. A follow-up transthoracic echocardiogram at 33 weeks showed mild tricuspid regurgitation.

The patient underwent a primary caesarean at term due to breech presentation. She delivered a live neonate weighing 3505 g with normal Apgar scores. The patient received ampicillin and gentamicin perioperatively. The neonate had an uncomplicated postnatal course. Mother and baby were doing well at the postpartum evaluation.

DISCUSSION

Infective endocarditis, a microbial infection of the endocardial surface of the heart, most commonly involves heart valves.¹ This condition is rare during pregnancy, with an incidence of 6:100,000.³ There are three reported cases of tricuspid endocarditis in pregnant intravenous drug users, two with staphylococcal endocarditis and one with polymicrobial endocarditis.⁴ One pregnant patient with staphylococcal endocarditis was treated only with intravenous antibiotics.⁴ The second patient required debridement and repair of ruptured chordae tendinae at 26 weeks gestation, and five weeks of antibiotics.⁴ A fetal demise was diagnosed a day after surgery. The patient with polymicrobial endocarditis received intravenous antibiotics and delivered a healthy term neonate.⁴ A recent report described streptococcal tricuspid endocarditis in a pregnant non-intravenous drug user

with a ventricular septal defect (VSD), which required preterm caesarean delivery, surgical tricuspid valve and VSD repair.⁵ Maternal and fetal mortality rates from infective endocarditis are reported to be 22.1% and 14.7%, respectively.⁵ Mortality rates for right-sided endocarditis in intravenous drug users approximate 10%.⁶

Historically, rheumatic heart disease was the major contributor to infective endocarditis. More cases are now related to degenerative valvular disease, prosthetic valves and exposure to nosocomial bacteraemia.¹ Over 50% of endocarditis involving native but damaged or abnormal valves are caused by *Streptococcus viridans*. The more virulent *S. aureus* organisms found on skin can invade healthy or deformed valves, are responsible for 10–20% of cases and are the major aetiology of tricuspid endocarditis in intravenous drug users.¹ Recent series show that staphylococci, particularly *S. aureus*, have surpassed viridans as the most common cause of infective endocarditis.¹ *S. aureus* endocarditis with right-sided involvement predominates among intravenous drug users, whereas left-sided involvement is most common among non-drug users.⁷

Tricuspid endocarditis symptoms include fever, dyspnoea, pleuritic chest pain and cough. As in our case, a cardiac murmur may be absent. Over half of chest radiographs at presentation show pulmonary infiltrates compatible with emboli. This case emphasizes the importance of persistence in pursuing an endovascular source in intravenous drug users with bacteraemia. The patient met Duke's criteria for possible endocarditis based on one major criteria (*S. aureus* bacteraemia) and one minor criteria (intravenous drug use).⁸ A transoesophageal echocardiogram should have been performed earlier in the course based on those criteria. Our patient's response to antibiotics and lack of cardiac decompensation allowed her to avoid surgical debridement or valve repair. Such treatment may be required during pregnancy, understanding that cardiopulmonary bypass is associated with both a cumulative fetal risk of 17.4%⁹ (risks depending on the gestational age at the time of surgery) and a significant maternal morbidity and mortality.¹⁰ Non-pulsatile blood flow and hypotension associated with bypass impact uteroplacental blood supply, placing the fetus at risk for demise. Some authors suggest using high-flow and high-pressure normothermic cardiopulmonary bypass for cases performed during pregnancy,^{11,12} but others have not found duration and temperature of bypass to influence fetal outcome.¹⁰ Anaesthetic considerations include left uterine displacement to avoid aortocaval compression after 20 weeks gestation and avoidance of prolonged hypotension.

A multidisciplinary team with Maternal Fetal Medicine, Infectious Diseases, Cardiology, Cardiothoracic Surgery and Anesthesia specialists is vital in caring for these patients. Management of endocarditis during pregnancy requires aggressive treatment as in non-pregnant adults. Our case provides relevant information to the literature given that among pregnant women aged 15–44 years, an average of 5.2% reported using illicit drugs in the past month.¹³ A strong index of suspicion is important in making a prompt diagnosis of infective endocarditis in pregnant patients to hopefully avoid the increased maternal and neonatal complications associated with the condition.

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