

Isolated Pulmonary Valve Endocarditis due to Methicillin Resistant Staphylococcus aureus (MRSA) after Septic Abortion

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Citation

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Abstract

Infective endocarditis (IE) is a life-threatening infection with significant morbidity and mortality. Isolated Pulmonary valve endocarditis is an extremely rare infection that shares epidemiologic, clinical, radiologic, microbiologic, and prognostic features with tricuspid valve endocarditis. We report a case of 26-year-old female who after septic abortion developed pulmonary valve endocarditis caused by Methicillin Resistant Staphylococcus aureus (MRSA) and pulmonary embolism.

INTRODUCTION

The incidence of IE ranges from 1.7 to 6.2 cases per 100,000 persons annually and has increased over the past several decades.¹ Isolated pulmonary native valve infectious endocarditis (PNVIE) is an uncommon clinical entity accounting for 1.5–2.0% of all admissions for IE.¹ The most common pathogens reported in cases of PNVIE are Staphylococcus aureus and coagulase negative staphylococcus.² Pulmonary native valve endocarditis due to MRSA has been reported in literature as a rare case report.³ Intravenous drug use, alcoholism, sepsis and catheter related infections account for the majority of predisposing factors.^{4,5} We describe case of a 26 year old female who developed pulmonary embolism secondary to pulmonary valve endocarditis due to MRSA after septic abortion.

CASE REPORT

A 26-year-old female presented to casualty with high-grade fever and breathlessness. The fever has been present for more than 15 days and had not resolved after treatment with oral antibiotics. In past two days, she had developed progressive dyspnea. She gave a history of incomplete abortion one month back for which dilatation and curettage was performed.

On examination, the patient was drowsy and not well oriented to time, place and person. Vital signs revealed a

temperature of 40°C, a blood pressure of 96/64 mm Hg, a respiratory rate of 32/min, a heart rate of 100/min, and an oxygen saturation of 94% on room air. The jugular venous pressure was elevated. Chest examination revealed bilateral basal lung crepitation. On cardiovascular examination the first heart sound was normal, second heart sound was soft and there was a grade 2/6 ejection systolic murmur at the pulmonary area. On abdominal examination tender hepatosplenomegaly was detected. Pelvic examination revealed retroverted uterus and cervical tenderness. Multiple Roth spots were seen in both retinae on fundoscopy. Laboratory examination showed a white blood cell count of 28,000/mm³ with 80% neutrophils, hemoglobin-7.9gm/dl, Peripheral blood smear showed neutrophils leukocytosis with toxic changes, ESR was 150 mm at the end of 1 hour, blood urea-52 mg/dL, serum creatinine-1.7mg mg/dL and bilirubin-2.8 mg/dl. Further blood tests were within the normal range.

Three samples of blood for culture were obtained from different venepuncture sites and inoculated in culture bottle containing biphasic media (brain heart infusion (BHI) agar and broth) with 0.025% of sodium polyanethol sulphonate as anticoagulant. Colonies appearing on agar slope were picked up and processed by standard biochemical tests.⁶ Antimicrobial susceptibility testing was performed by Kirby-Bauer disk diffusion method as per NCCLS

guidelines.⁷ All the three blood samples yielded *Staphylococcus aureus* within first 24 hour of incubation. The isolate was resistant to penicillin, oxacillin, ciprofloxacin, gentamicin, erythromycin and sensitive only to vancomycin. Further confirmation of methicillin resistance of the isolate was done by oxacillin screen agar and minimal inhibitory concentration of the isolate was 8 µg/ml of oxacillin.

ECG at the time of admission showed sinus tachycardia and on 2nd hospital day ECG also showed S1Q3T3 pattern, suggestive of acute right ventricle strain. Transthoracic echocardiography showed a hypermobile tongue shaped vegetation, 4cm by 1.5 cm on pulmonary valve (PV). The PV was obscured by the vegetation and was causing significant turbulence across the PV with gradient of 45 mmHg. A satellite mass was attached on the anterior wall of the main pulmonary artery. There was no vegetation on any other cardiac valves. Mild pericardial effusion was present (Fig .1). Chest X-ray revealed infiltrates and cavities in bilateral lung fields suggestive of embolization of the vegetation into the pulmonary circulation (Fig.2) . Transabdominal sonography showed hepatosplenomegaly.

Figure 1

Figure 1: Transthoracic Echocardiogram - Parasternal short axis view.



Asterix * indicates a large vegetation on the pulmonary valve. AO= Ascending Aorta, LPA & RPA =Left and Right Pulmonary arteries

Figure 2

Figure 2: Chest X-ray AP view. Multiple septic emboli in lung fields.



Asterix * indicates the lesions seen predominantly in the right lower lung field

She was admitted in intensive care unit (ICU) and was started on intravenous ampicillin, gentamicin and metronidazole. On second day she developed hypotension and hypoxia requiring inotropic support and mechanical ventilation. On the third hospital day vancomycin, was added as blood cultures revealed MRSA that was sensitive only to vancomycin. The patient's clinical condition kept on deteriorating and on 6th day she had sudden cardiac arrest. In spite of the cardiopulmonary resuscitation the patient died.

DISCUSSION

Infective endocarditis is a life-threatening infection with significant morbidity and mortality. Tricuspid valve is the most common right-sided valve involved in endocarditis, either alone or in conjunction with pulmonic valve⁸, isolated pulmonary valve endocarditis is extremely rare condition and only few cases are reported in literature.⁹ The most common cause of PNVIE is intravenous drug use, however gynecologic infections have also been reported as the source of right-sided infective endocarditis.¹⁰ Pulmonary valve involvement in our patient was due to transmission of infection into venous system through pelvic veins from septic uterus. In such cases right-sided valves being on venous side of heart are more prone to be seeded with microorganisms and develop endocarditis. The reported culprit organisms causing endocarditis associated with abortion and gynecologic interventions includes *Staphylococcus aureus*, *Streptococcus viridians* and *Clostridium perfringens*.¹¹ In a previous study from this

center, septic abortion was found to be the commonest cause of infective endocarditis due to *Staphylococcus aureus*.¹² To the best of our knowledge this is the first case of pulmonary valve endocarditis with pulmonary embolism caused by MRSA after septic abortion.

Staphylococcus aureus is a common cause of acute IE and is a highly virulent pathogen. Left-sided native valve endocarditis with *Staphylococcus aureus* is associated with high mortality (35% to 40%), which is possibly due to this organism's ability to destroy normal and abnormal valve tissue and its propensity to embolize and cause metastatic infection at remote sites (spleen, spine, central nervous system). Right-sided (tricuspid valve) IE with *Staphylococcus aureus*, by contrast, carries only a 2% to 4% mortality rate; however septic pulmonary emboli occur in up to 75% of patients.¹

Antibiotic resistance in *Staphylococcus aureus* can be a particular challenge. More than 90% of clinical isolates are resistant to penicillin. Semi-synthetic β -lactamase-resistant agents such as nafcillin are the treatment of choice.¹

Unfortunately, as many as 40% of nosocomial *Staphylococcus aureus* isolates are now resistant to methicillin (MRSA) and has become the most prevalent pathogen causing hospital infection throughout the world, and its incidence is still increasing in many countries.¹³ MRSA is well-recognized as a major cause of endocarditis¹⁴ and is associated with increased morbidity, mortality, length of hospital stay, and represents a major burden on healthcare services.¹⁵

Our patient was admitted in ICU with poor clinical condition and she kept on deteriorating despite aggressive management and she died on the 6th hospital day. Thus in cases of IE whenever *Staphylococcus aureus* is isolated from blood, the isolate should be screened for oxacillin resistance otherwise the patient might continue to receive combination of β -lactam and aminoglycoside resulting in therapeutic failure.

We conclude that the suspicion of IE should be kept in mind whenever a patient presents with diverse and confusing clinical features with a history of septic abortion. During echocardiography, a careful evaluation of the pulmonary valve should be done even if vegetation is not detected in the tricuspid valve. Recent advances in diagnostic echocardiography and molecular detection method of drug resistance should be encouraged as early and appropriate

diagnosis plays a pivotal role in management of infective endocarditis.

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