

***Corresponding author**

Ecler Ercole Jaqua, 1200 California
Street, Suite 240, Redlands, CA 92374,
USA. Office: 909.558.6688; Fax:
909.558.6656.

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A Potentially Fatal Inflammation of the Heart: A Case Report

Van-Dai Ly¹, Mary Safaeipour¹, Jade Deschamps¹, Mai-Linh N Tran², Ecler Ercole Jaqua^{2*}

¹Loma Linda University School of Medicine, USA

²Loma Linda University Health, USA

Abstract

At the beginning of the COVID-19 pandemic, many people delayed care for major medical conditions, leading to more severe complications. There was a pervasive fear of being exposed to COVID-19 when going to a hospital emergency department. In this case, a 35-year-old female patient that had scheduled monthly appointments presented by video telehealth visit with almost a week of body aches associated with fever, chills, finger swelling, and dehydration. Her vitals were consistent with sepsis, and she was immediately instructed to go to the emergency department. At the hospital, she was found to have sepsis secondary to bacteremia from her port-a-cath, leading to infective endocarditis and organ abscesses. She eventually had to undergo major cardiac surgery for aortic valve replacement. Even though she realized her symptoms were concerning, she was afraid of going to the hospital and contracting COVID-19. Instead, she waited for her outpatient appointment, and this resulted in her having more severe complications. However, not a diagnosis of COVID-19, the delays in care from fear of contracting this novel disease led to many adverse outcomes in other medical conditions.

Introduction

Infective Endocarditis (IE) is an infection of the endocardium that can affect the heart valves. This condition is typically caused by bacteremia from dental procedures, surgery, primary peripheral infections, and non-sterile needles [1]. In IE, the damaged valvular endothelium exposes the subendothelial layer, which allows adherence of platelets and fibrin to form sterile vegetations [1]. This vegetation becomes a focus of infection. Fibrin clots encase the vegetation and can cause valve destruction, resulting in valvular regurgitation [1].

Frequently, the mitral valve is involved, followed by the aortic, tricuspid, and pulmonary valves in order of frequency. The tricuspid valve is most commonly affected by intravenous drug users [1].

Case Presentation

A 35-year-old female with a past medical history significant for deep vein thrombosis (not taking Apixaban for the past two months), cyclic vomiting syndrome (requiring a port-a-cath), chronic abdominal pain, chronic opiate use presented to the outpatient clinic over video visit due to a five-day course of body aches. She also reported right-hand swelling, fluctuating fever to 103F, shortness of breath, substernal chest pain, dry lips and mouth, cyanosis, and port-a-cath site swelling not relieved with opiates.

Her vital signs from her home nurse showed a temperature of 101.9F, BP 90/56, HR 138, RR 20, and SpO2 94%. On a visual, physical exam, she was found to have shortness of breath, dry lips and mouth, red-brown marks and swelling on both hands, and left upper chest with port-a-cath with minimal erythema. Since this was a video visit, auscultation for the cardiac and pulmonary exam was not done. Despite the severity of her symptoms, she was reluctant to go to the hospital due to fear of COVID-19. Finally, her primary care physician encouraged her to seek urgent care at the Emergency Department (ED).

Emergency Department

In the ED, she was febrile with a temperature of 101.2F, tachycardic in her 120s, normotensive systolic blood pressure of 100-110 mm Hg, and tachypneic with RR 20-27. Lab results were significant for WBC 24.3, elevated troponin, urine analysis with positive nitrite and moderate bacteria, lactate level of 1.6, procalcitonin of 130, ESR of 66, CRP of 45.7.

Physical exam was significant for subcutaneous nodules at the tips of the 3rd and 4th digit of the right hand, a cluster of papules on the right lateral wrist and right palms, and splinter hemorrhages. In addition, the right wrist was swollen, erythematous, and painful—no lesions on bilateral feet.

IV fluids, broad-spectrum antibiotics, and heparin drip were started. Therefore, the patient was admitted to the medicine service for treatment and further evaluation of the source of severe septicemia.

Diagnostic Workup
EKG negative for ischemic changes.
Blood and urine cultures were positive for MSSA.
CT chest without contrast showed no evidence of pulmonary embolism, but there was multifocal consolidation concerning pneumonia, predominantly involving the right middle lobe and bilateral lower lobes.
Duplex ultrasound of upper extremities veins bilaterally showed no evidence of deep vein thrombosis in upper extremities.
Right wrist aspiration showed no organism and ruled out a septic joint. In addition, the x-ray bone survey showed no other joint involvement.
TTE showed findings concerning infective endocarditis, and subsequent TEE confirmed vegetation (3 x 0.3cm) on the right coronary cusp and left coronary cusps with perforation in left coronary cusps and severe aortic regurgitation.
MRI brain showed punctate micro hemorrhage in the posterior left parietal lobe, but MRA of head and neck shows no mycotic aneurysm.
Abdominal ultrasound showed hepatomegaly.

EKG: Electrocardiogram

MMSA: Methicillin-susceptible *Staphylococcus aureus*

CT: Computerized tomography

TTE: Transthoracic echocardiogram

MRI: Magnetic resonance imaging

MRA: Magnetic resonance angiography

Inpatient Management

The patient was treated with ceftriaxone on the first day and switched to vancomycin, cefazolin, and ertapenem. Cardiothoracic surgery was consulted to evaluate for aortic valve replacement surgery due to severe aortic regurgitation. However, they were concerned about first clearing bacteremia due to the risk of re-infecting the mechanical valve once repaired. Therefore, repeat blood cultures were suggested to be done every 24 hours to monitor for clearance before surgery.

While waiting for clearance of bacteremia, the patient developed new intra-abdominal lesions on the liver and spleen concerning abscesses, most likely originating from the aortic valve vegetation. Interventional radiology was then consulted for ultrasound-guided aspiration of a possible splenic fluid collection; however, there was no fluid. The patient was finally cleared for an aortic valve replacement with cardiothoracic surgery. She tolerated the surgery well and recovered appropriately in the ICU.

Summary

When the patient arrived at the ED, she was urgently treated for severe sepsis with unclear etiology and admitted to the medicine service for treatment and further workup of the source.

Her presentation of shortness of breath, chest pain, and past medical history of DVT raised concerns for pulmonary embolism; however, it was ruled out with chest CT. In addition, physical exam findings of Osler nodes, Janeway lesions, and splinter hemorrhages, along with blood and urine culture positive for MSSA and TEE results, confirmed the diagnosis of infective endocarditis due to severe MSSA bacteremia. The infection was complicated by endovascular sepsis, most likely from the port-a-cath. Surgery oncology was then consulted for port-a-cath removal after confirmation of infectious endocarditis.

In addition to these findings, multifocal consolidation on the CT chest was concerned for potential septic emboli. However, per the radiology consult, CT findings are more likely due to pneumonia than septic emboli based on presentation. We would not expect septic emboli from left-sided endocarditis without patent foramen ovale/atrial septal defect unless embolized from the right side. The patient then developed swollen, erythematous, and painful right wrist raised suspicion of a potential septic joint in the setting of *Staphylococcus aureus* bacteremia. Orthopedic surgery was consulted for joint aspiration that ruled out the right wrist septic joint, and the bone survey showed no other joint involvement. On brain MRI, the patient was also found

to have punctate microhemorrhages, but MRA of head and neck showed no mycotic aneurysm; therefore, the patient was cleared by neurology for anticoagulation.

Discussion

As in our case, the most common pathogens include *Staphylococcus aureus*, *Viridans streptococci*, and *Staphylococcus epidermidis* [2]. *S. aureus*, in particular, accounts for 35-40% of native valve IE cases and is usually fatal within six weeks if left untreated [2]. *S. viridans* accounts for nearly 20% of native valve IE cases and is the most common cause of subacute IE in pre-damaged native valves, usually the mitral valve [2]. This pathogen is a common cause of IE following dental procedures. *S. epidermidis* accounts for <15% of native valve IE cases and is usually from bacteremia caused by infected peripheral venous catheters [3]. It is more common in patients with prosthetic heart valves, pacemakers, or implantable cardioverter defibrillators [3].

Demographically, IE tends to affect males over 60 [1,3]. Cardiac risk factors include acquired valvular diseases like rheumatic heart disease and aortic stenosis, prosthetic heart valves, and congenital heart defects (VSD, bicuspid aortic valve), previous IE, and cardiac implantable electronic devices (CIED) [1,3]. Non-cardiac risk factors include poor dental hygiene, dental procedures, intravenous drug use, intravascular devices, surgery, chronic hemodialysis, immunocompromised (HIV, diabetes), and other bacterial infections like urinary tract infections [1,3].

Constitutional symptoms include fever, chills, tachycardia, general malaise, and weakness. Patients may also lose weight, have night sweats, and have dyspnea. Seventy-five percent of patients develop a new heart murmur or a change in a preexisting murmur [4]. If the mitral or tricuspid valve is affected, IE manifests as mitral or tricuspid regurgitation, characterized by holosystolic murmurs at the apex and left sternal border, respectively [4]. If the aortic valve is affected, aortic regurgitation will manifest as an early diastolic murmur that is loudest at the left sternal border [4]. IE can also lead to heart failure secondary to valve insufficiency and would manifest with symptoms such as dyspnea and lower limb edema [4]. IE can also have extra-cardiac manifestations such as Janeway lesions, Osler nodes, and Roth spots. Valvular vegetations can also embolize intra-abdominal organs and cause acute renal injury, splenomegaly, and arthritis [4].

The modified Duke criteria are commonly used to determine the diagnostic likelihood of IE and are based on major and minor criteria [5]. Major criteria include positive blood cultures, characteristic echocardiographic findings, and a new valvular regurgitation [5]. Minor criteria include having a predisposing condition, fever, vascular abnormalities, immunologic phenomena, and positive blood cultures that do not meet the major criteria [5]. Routine lab studies that support the diagnosis of IE include leukocytosis with left shift and elevated inflammatory markers (CRP, ESR) [5]. Transthoracic echocardiography is the initial test of choice and would help demonstrate the presence of valvular vegetations and regurgitation [6,7]. Other differential diagnoses include non-bacterial thrombotic endocarditis and prosthetic valve thrombosis [6,7].

If IE is suspected, blood cultures must first be obtained, and infectious disease must be consulted to plan empiric antibiotic therapy [5]. Common empiric antibiotic regimens include vancomycin and beta-lactam for native valve endocarditis [5]. Prosthetic valve endocarditis requires gentamicin and rifampin to be added to the regimen. Once the culture results are available, antibiotic therapy can be narrowed [5].

Conclusion

Infectious endocarditis is a life-threatening condition seen in patients with long-term catheter use, such as a port-a-cath in patients with cyclic vomiting syndrome. Infectious endocarditis demands urgent recognition and early medical treatment to minimize morbidity and mortality. If care is delayed, there is a significantly increased risk of long-term cardiac valve damage, as seen in this patient, along with many complications, such as septic emboli, mycotic aneurysms, liver, and splenic abscesses, etc.

Because of delayed medical treatment, this patient with infectious endocarditis had no other option but to undergo aortic valve replacement at a very young age. This case demonstrated the critical need for recognizing a high risk of severe septicemia in patients with a long-term catheter that might lead to infectious endocarditis. As a primary care physician, this should prompt urgent consideration for hospitalization for evaluation and treatment without delay.



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