CASE REPORT

Gram-negative infection as an unusual cause of endocarditis in a hemodialysis patient

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SUMMARY

Gram-negative endocarditis is rare and it has high mortality if there is a delay in diagnosis and treatment. Gram-negative organisms should be considered in the differential diagnosis of IE in hemodialysis patients. Central line-associated bloodstream infections (CLABSIs) can be prevented by following sterile measures during catheter insertion and proper management of catheter site.

KEY WORDS:
Gram negative infective endocarditis, Klebsiella pneumoniae, centrial line-associated blood stream infections

CASE REPORT

A 60 year old nursing home resident with a significant medical history for end-stage renal disease (ESRD) on hemodialysis and diabetes mellitus type II presented with accidental removal of a temporary (right intra-jugular catheter) hemodialysis access line. Patient noticed frank pus at the catheter site post dislodgement and had subjective fever. However, in the emergency department, patient was afebrile without leukocytosis. Additional workup showed serum potassium of 7.2mmol/L and serum creatinine was 7.2 mg/dl. A temporary catheter access for emergent dialysis was obtained and the patient was admitted to intensive care unit.

On the third day of admission, the patient spiked a 39.5° C fever accompanied with leukocytosis (WBC count 25,170 with a differential of 97% neutrophils). Patient was started on broad spectrum antibiotics (Vancomycin and Cefepime) while blood cultures were obtained that resulted positive for gram-negative rods 48 hours later, which speciated *Klebsiella pneumonia* (susceptibility testing demonstrated sensitivity to most antibiotics except for Ampicillin).The patient remained afebrile for 4 days and was transferred to medicine floor. However, leukocytosis persisted (23,000 with 94% neutrophils). On fifth day of admission, patient spiked another fever of 39.1° C. Subsequent set of blood cultures continued to grow *Klebsiella pneumoniae* with the same susceptibility pattern. The temporary dialysis catheter was taken out and catheter tip was sent for culture that grew another gram negative rod (*Providencia stuartii* sensitive to cephalosporin). Transthoracic echocardiography (TTE) showed a 1.2 cm mobile mass consistent with vegetation along the posterior aspect of mitral valve leaflet as depicted in Figure (A), which was new finding compared to prior TTE a month ago. Patient remained afebrile for the rest of hospitalization with gradual resolution of leukocytosis and showed no growth on subsequent three sets of blood cultures over one week. After consultation with the infectious disease service, the antibiotic coverage was changed initially to ceftriaxone 2 gram daily and later switched to Cefazolin 2 gram IV three times a week with HD at discharge to finish a total of 6 week course. A follow-up echocardiogram after four weeks of antibiotics showed complete resolution of vegetation Figure (B).

DISCUSSION

Incidence of hospitalization for infective endocarditis in the US is 12.7 per 100,000 annually.[1] The most common organisms causing IE are Gram-positive bacteria like *Staphylococci*[2], but occasionally Gram-negative organisms can also cause IE. Central line-associated bloodstream infections (CLABSIs) are among the top ten causes of death in hospitalized patients in the US. In 2007, the CDC reported that CLABSIs had a high case fatality rate of 25%.[3]

An analysis by International Collaboration on Endocarditis-Prospective Cohort Study (ICE-PCS) revealed that more than half of Gram-negative endocarditis cases are related to healthcare-associated infections, contrary to traditional thought of relating gram negative endocarditis to intravenous drug abuse only.[4]

The overall incidence of IE among hemodialysis patients is 74 times higher than that in the general population (483 cases per 100,000). However, despite this enhanced risk, gram-negative organisms like Klebsiella, Salmonella and Pseudomonas rarely cause IE in hemodialysis patients.[5]

In our case, IE was preceded by infection of temporary catheter site for dialysis. Positive blood cultures and continuous bacteremia with K. *pneumoniae* indicates diagnosis of IE. A delay in diagnosis may result in death, seen in 49% of patients despite efficient therapy with cephalosporins and aminoglycosides. 42% of these patients

This article was accepted: 30 March 2016
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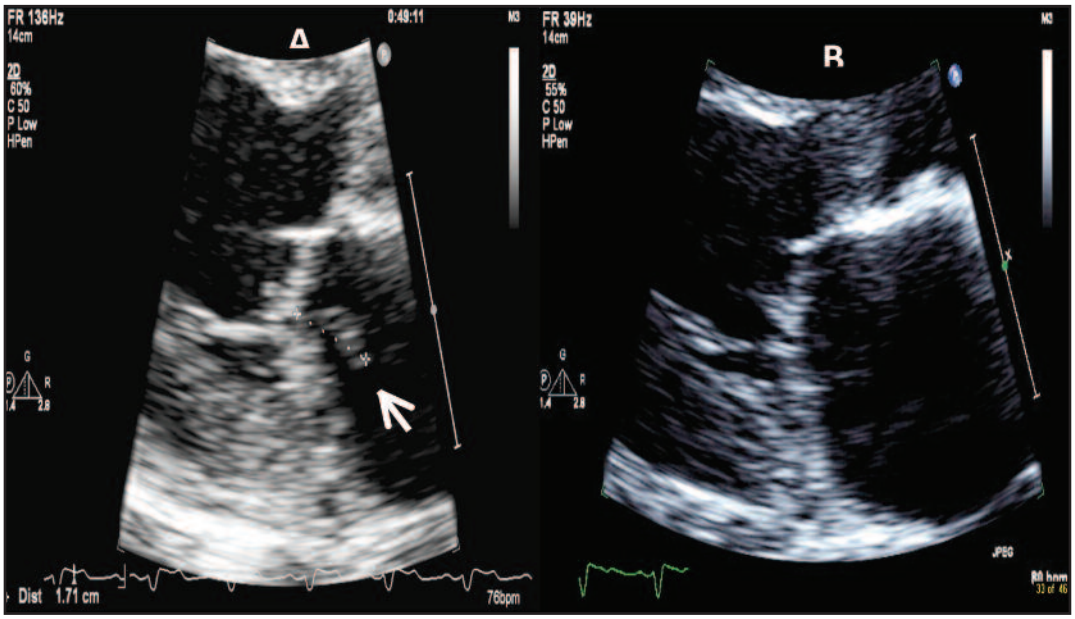

(A) (B)

Fig. : Transthoracic echocardiogram image showing 1.2cm mobile vegetation sitting on the posterior aspect of the Mitral valve leaflet (A) and complete resolution of the mitral valve vegetation post-treatment (B).

may need a valve replacement. A prompt diagnosis requires a detailed history, careful physical examination, and work up with blood cultures and echocardiography. Ceftriaxone sodium 2g/24h IV for 4-6 weeks or a combination of ampicillin and sulbactam is recommended for treatment. Antibiotic therapy completion should be followed up with echocardiography to evaluate the resolution of vegetation.

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