

Giant Vegetation in the Right Ventricle Caused by *Staphylococcus aureus* and *Candida mycoderma*

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ABSTRACT

Introduction: Infective endocarditis (IE) is considered a multifactorial disease. Providing an early diagnosis and invasive treatment together with effective antibiotic treatment remain critical tasks for the cardiologist and the surgeon. Right ventricular endocarditis is a rare type of endocarditis usually caused by *Staphylococcus aureus* and *Candida mycoderma*.

Case Presentation: We present a 25-year-old male patient who presented with persistent malaise, fever, cough, and anorexia after 55 days of antibiotic treatment. Lung computed tomographic scanning excluded severe lung infection. Transthoracic and transesophageal echocardiography revealed a giant vegetation in the right ventricle. Blood culture was positive for *S. aureus* and *C. mycoderma*, and antibiotic therapy was immediately applied. Considering the large burden of infected tissue, an early surgical intervention was planned. The cultures of the vegetation specimen were negative. Intraoperative and histological findings confirmed the echocardiographic diagnosis of IE.

Conclusions: Giant vegetations in the right ventricle caused by *S. aureus* and *C. mycoderma* are rare. In addition to medical treatment, more attention should be paid to early surgical consultation.

INTRODUCTION

The clinical manifestations of endocarditis are very diverse. Although patients with prosthetic heart valves are at highest risk, new high-risk groups include elderly populations with degenerative valve disease, patients with prosthetic materials in the heart, patients on hemodialysis, and intravenous drug abusers [Miro 2003]. Right-sided infective endocarditis (IE) constitutes 5% to

10% of all cases of endocarditis [Musci 2007]. Active IE is diagnosed when echocardiograms reveal vegetations or abscess formation and blood cultures are positive [Cabell 2003]. Endocarditis of the atrial septum can occur following percutaneous closure of atrial-septal defects. No data are currently available that describe the prevalence or clinical impact of active IE. Whether this complication is truly rare or underestimated remains to be determined.

CASE PRESENTATION

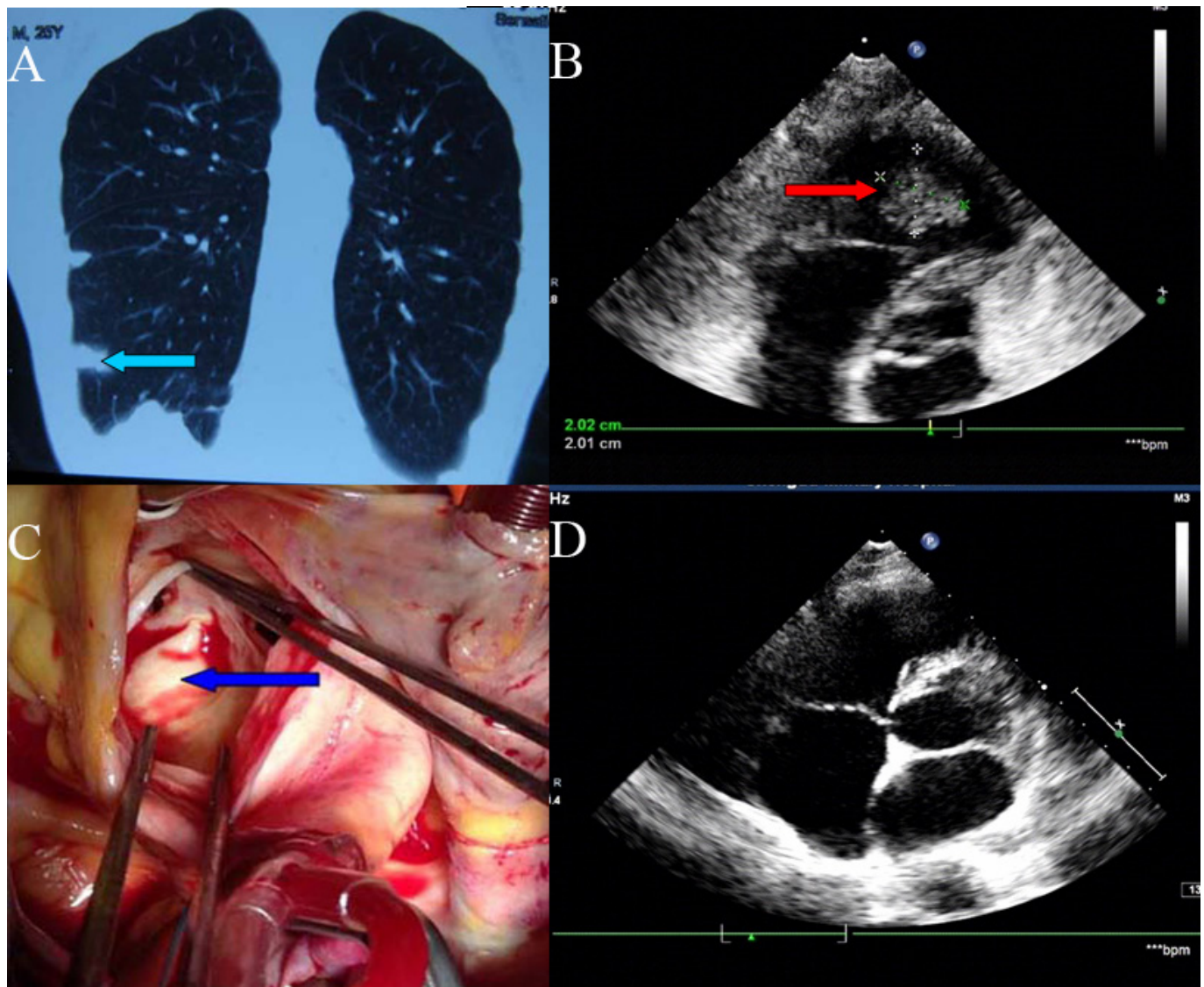
A 25-year-old man with a history of mild asymptomatic mitral regurgitation was admitted to the infectious-respiratory department in our hospital because of persist malaise, fever, jaundice, and peripheral edema. He developed a cough and went to an inexpensive clinic for treatment. He was diagnosed with an upper respiratory tract infection and treated with antibiotic injections. He developed high fever after 5 days of this treatment. He then went to a community hospital for uncontrolled fever and underwent 50 days of antibiotic treatment. However, his fever persisted intermittently. He was then transferred to our tertiary care hospital without any blood culture results. He and his family denied any history of nausea, dental extraction, recent weight loss, or use of recreational drugs. He had a temperature of 39°C, a pulse rate of 120 beats/min, and blood pressure of 95/58 mmHg. Other notable findings were the presence of anemia, Osler's nodes in the palms, and lower-limb edema. Routine laboratory exams showed mildly abnormal results (aspartate aminotransferase, 28.6 $\mu\text{mol/L}$; alanine aminotransferase, 49.1 $\mu\text{mol/L}$; leukocytosis ($9.0 \times 10^9/\text{L}$); hemoglobin, 87g/L; hematocrit, 26.9%; and elevated C-reactive protein (81.54 mg/L). Results of renal function tests were normal. Electrocardiography and lung computed tomographic (CT) scanning were unremarkable except for some lung infection (Figure, A). Transthoracic echocardiography (TTE) revealed a giant vegetation in the right ventricle (Figure, B).

The patient received only nutritional supportive treatment without any antibiotic treatment for 6 days before the blood culture and drug sensitivity test results were obtained. The blood culture was found to be positive for *Staphylococcus aureus* and *Candida mycoderma*, and antibiotic treatment was started immediately with cephadrine and fluconazole and other supportive medications such as a hematoplasma infusion. After 8 days of antibiotic therapy, the patient was

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Received September 15, 2013; received in revised form January 15, 2014; accepted January 28, 2014.

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A. Lung CT scanning was unremarkable except for signs of lung infection. B. TTE revealed a giant vegetation planted in right ventricular. C. The operation was performed through median sternotomy and the vegetation was removed out after cardioplegic arrest on CPB (blue arrow). D. No vegetation was found by TTE 3 months after the operation, and the patient's body temperature was normal.

hemodynamically unstable and had a temperature of 40°C. He was then referred for surgical management.

The operation was done through a median sternotomy and the vegetation was excised after cardioplegic arrest on cardiopulmonary bypass (CPB) (Figure, C, blue arrow). After weaning from CPB, the patient was transferred to the intensive care unit. Culture of the vegetation was negative for any bacterial growth. The main treatments in the postoperative course were intravenous antibiotics for 6 weeks and respiratory support. Three months after the operation, TTE showed

no abnormal growths and the patient's body temperature was normal (Figure, D).

DISCUSSION

IE is a multifaceted problem that is continuously changing, with new high-risk patients and new micro-organisms. There have been increases in infections in patients with intracardiac devices, infections in intravenous drug abusers, and iatrogenic infections. Isolated

giant right-sided IE is often found in patients with intracardiac lesions, patients with artificial materials in the right side of the heart, and drug abusers [Mylonakis 2001]. The patient we describe probably became infected due to the use of nonsterile injections and ineffective antibiotic treatment.

The most common microorganisms responsible for IE are coagulase-negative staphylococci (52%), *S. aureus* (10%), enterococci (8%), *Streptococcus viridans* (5%), Gram-negative organisms (6%), and fungi (10%) for prosthetic valve endocarditis and *S. viridans*, *S. aureus*, *Staphylococcus epidermidis*, and enterococci for native valve endocarditis [Lytle 1995]. Fungal endocarditis is an uncommon occurrence. Previously published series [Karchmer 2000] reported fungi as causes of infective endocarditis in 1.3% to 6% of cases. Advances in medical and surgical therapies, including reconstructive cardiovascular surgery, implantation of intracardiac prosthetic devices, prolonged use of intravenous catheters, exposure to multiple broad-spectrum antibiotics, and immunosuppression, have been implicated as causes of the perceived increase in the number of cases of fungemia and fungal endocarditis seen during the last 2 decades [Rubinstein 1995]. Cases are rare case in which the pathogenic bacteria are *S. aureus* and *C. mycoderma*. In our case, there is a high probability that staphylococcal endocarditis resulted from nonsterile intravenous catheters and that fungal infection resulted from prolonged treatment with antibiotics.

Many patients with right-sided IE benefit from conservative therapy with antibiotics; however, approximately 20% require surgery. If surgery is necessary, the goal is to eradicate the infection and achieve hemodynamic correction [Cabell 2003]. The operative indications for this case were (1) uncontrolled fever that persisted longer than 3 weeks despite antibiotic therapy, (2) right-sided fungal IE, and (3) vegetation diameters that exceeded 20 mm [Horstkotte 2004]. The prognosis with invasive treatment is better before cardiac function deteriorates [Moreillon 2004]. Our patient had an uneventful recovery in the 20 days after surgery.

CONCLUSIONS

Giant vegetation in the right ventricle caused by *S. aureus* and *C. mycoderma* is rare. The surgical treatment can help patients recover more smoothly through thorough debridement of the vegetations, minimization of the presence of foreign materials in the infected area, and implementation of aggressive antibiotic therapy postoperatively. Treatment and therapy should be tailored to the needs of each patient.

ACKNOWLEDGMENTS

This work was supported by the Chendu Military Science Fund (C12039). The authors thank Ph. Robert Detrano and Heng Zhao, Qin Yue for critical review and assistance with the manuscript preparation.

Author contributions: Xiaochen Wu, Hui Ouyang, Jinbao Zhang participated in the surgery. Xiaochen Wu took care of patients during the term of surgery, and drafted the manuscript. Hui Ouyang and Jinbao Zhang took the ultrasound graph of all patients. All authors read and approved the final manuscript.

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