



Aortic Valve Endocarditis with Perforation of Cusps and Severe Aortic Regurgitation Caused by *Erysipelothrix rhusiopathiae*

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Erysipelothrix rhusiopathiae is a rare causative agent of infective endocarditis in humans and is sometimes misidentified as contaminating *Lactobacillus*. It mostly infects people via occupational contact with animals including swine, birds and fish. People with alcoholism are at high risk. We present a man with aortic valve endocarditis with severe aortic regurgitation and congestive heart failure who was finally diagnosed with an *Erysipelothrix rhusiopathiae* infection. After antibiotic treatment with oxacillin and surgical intervention with aortic valve replacement, the patient recovered well and there were no signs of recurrence in an eight-month outpatient department follow-up. This is the first case of endocarditis induced by *Erysipelothrix rhusiopathiae* reported in Taiwan.

Key words: *Erysipelothrix rhusiopathiae*, endocarditis

INTRODUCTION

Erysipelothrix rhusiopathiae-induced endocarditis is extremely rare and it usually infects people who have occupational contact with infected animals¹. There are only a few cases reported around the world^{2,3}. We report a patient with aortic valve endocarditis caused by *Erysipelothrix rhusiopathiae* and the diagnosis and treatment are discussed briefly. To our knowledge, this is the first case reported from Taiwan.

CASE REPORT

A 50-year-old man presented at our hospital with fever, shortness of breath and chest pain that had persisted for about three to four days. He was a farmer and had a history of alcoholism and chronic hepatitis B infection. He also had a history of hypertension and diabetes without regular

medication. On the morning of admission, he drank some liquor and chest discomfort developed with shortness of breath. He called the emergency medical system for help and was admitted to St. Mary's hospital in Lotung at 10 AM. Blood tests and X-rays were done initially, which revealed leukocytosis and acute pulmonary edema. Echocardiography showed severe aortic regurgitation with vegetation formation. These growths measured 7×8 mm over the right coronary cusp and 9×11 mm over the noncoronary cusp. Based on a diagnosis of infective endocarditis, empirical antibiotic treatment with 2 g oxacillin was given intravenously after two sets of blood cultures had been collected. He was then transferred to our hospital for surgical intervention and arrived at 9 PM.

On admission, a physical examination showed cold sweating, dyspnea (33/min) and tachycardia (127 beats/min). His blood pressure was 126/53 mmHg and dropped to 85/60 mmHg despite fluid resuscitation. His body temperature was 37°C. Chest auscultation revealed generalized wheezing and rales over both lungs and a continuous murmur over the left sternal border. Grade I — II pitting edema was noted over both lower legs.

Diffuse patchy opacities and peribronchial infiltrations in both lungs and engorgement of both pulmonary trunks were noted on chest radiographs, which was compatible with acute pulmonary edema (Fig. 1). Laboratory blood tests showed leukocytosis with a white blood cell count of 11,900/μL and severe thrombocytopenia with a platelet

Received: July 25, 2007; Revised: October 17, 2007;
Accepted: December 24, 2007

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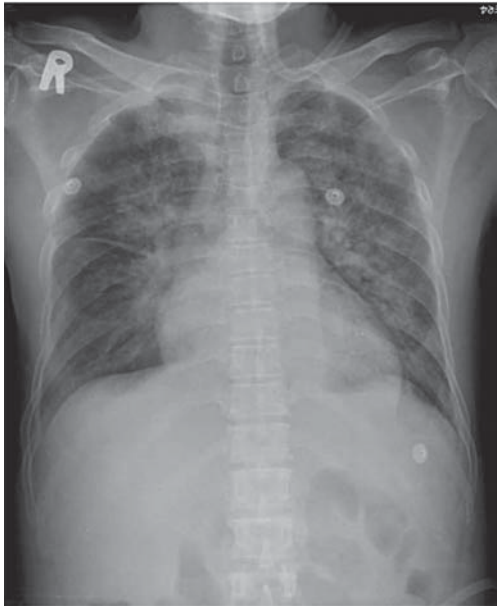


Fig. 1. Acute pulmonary edema while admission.

count of only 18,000/ μ L. Renal function impairment with a blood urea nitrogen level of 55 mg/dL and serum creatinine of 3.4 mg/dL were also noted. Arterial blood gas analysis showed a pH of 7.43 with a low PaCO₂ (arterial partial pressure CO₂) and a low bicarbonate level, compatible with acute metabolic acidosis with respiratory compensation.

Intravenous inotropic agents with dopamine and dobutamine were given to maintain cardiac output. Because of the patient's oligouria and acute renal failure, continuous venous—venous hemodialysis was performed to rectify his fluid balance. Antibiotic treatment with 2 g ceftriaxone and 200 mg teicoplanin given intravenously every 24 h was initiated after three sets of blood cultures had been collected. Emergency transesophageal echocardiography (TEE) revealed vegetation growth over all three leaflets of the aortic valve, measuring 10, 9 and 4 mm, with severe regurgitation. Moderate mitral valve regurgitation without vegetation was also noted (Fig. 2). Three hours after admission, the dyspnea became more pronounced and the patient could not tolerate a nonrebreathing mask with 100% O₂, so an endotracheal intubation was performed at midnight.

Surgical aortic valve replacement with a 21 mm tissue valve (St. Jude Medical, St. Paul, Minnesota, USA) was performed two days after observation and treatment in the intensive care unit. Intraoperative TEE was also performed. There were three vegetation growths over each cusp of the



Fig. 2. Short-axis view of echocardiography: severe aortic regurgitation and vegetation formation.

aortic valve, measuring 8–9 mm in diameter. Perforations of the right coronary and noncoronary cusps were found. The excised native valve tissue was sent for pathology and microbiology.

We removed the endotracheal tube the day after surgery and the patient was transferred to an ordinary ward after five days. No growth of organism was found in any of the three sets of blood cultures collected at admission. The tissue culture taken from the excised valves revealed a *Lactobacillus* spp., thought to be contamination. After discussion with clinicians from our division of infectious disease, we informed St. Mary's hospital and obtained the results of the initial blood culture, which showed *Erysipelothrix* spp. We informed the department of clinical pathology about the result from St. Mary's hospital and the tissue culture was performed again. The initial report of *Lactobacillus* spp. was revised to *Erysipelothrix* spp. because of the weak H₂S production of this Gram-positive bacillus. Susceptibility using the E test was also evaluated (Table 1). The putative *Erysipelothrix* spp. was sent for molecular biological examination and DNA sequence analysis, which confirmed *Erysipelothrix rhusiopathiae*. Treatment with 2 g ceftriaxone and 200 mg teicoplanin intravenously once daily was discontinued at the 10th day of admission and replaced by 3 million U of penicillin G intravenously every 4 h. Reddish itching rashes over both thighs developed, so 2 g oxacillin was given intravenously every 4 h instead of penicillin G. After three weeks of treatment, the patient was discharged at the 31st day of hospitalization. No evidence of recurrence was noted during an eight-month follow-up at the outpatient department.

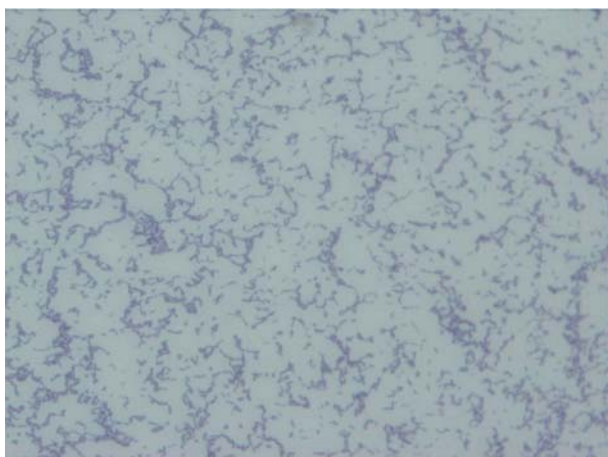


Fig. 3. Gram stain of *Erysipelothrix rhusiopathiae*

DISCUSSION

Erysipelothrix rhusiopathiae is a Gram-positive rod bacillus (Fig. 3). It was first isolated by Koch in 1878 and first reported as a pathogen of endocarditis by Gunther in 1912². This organism colonizes the digestive tract of various animals and may contaminate water and soil through the excrement of sick or asymptomatic animals. Domestic swine form the major reservoir but it may be isolated from birds, fish and reptiles. Infections are prevalent in veterinarians, farmers and especially butchers, and most occur after professional contact with infected animals³. Routes of infection are by cutaneous contact, either directly or after cuts, bites or abrasions. There are three types of human infections: a localized erysipeloid form, a generalized cutaneous form and a septic form usually associated with endocarditis. Erysipeloid infections often occur on the hands or fingers with violet or purple-red color and well-defined, raised margins. These are usually self-limiting even without medical treatment³. Bacteremia and systemic infections happen in less than 1% of all patients with *Erysipelothrix rhusiopathiae* infections, but 90% of these may have an association with infective endocarditis⁴. Alcohol abuse is known as the most common risk factor followed by immunosuppression, chronic debilitating diseases and intravenous drug abuse^{3,5}.

E. rhusiopathiae-induced endocarditis is approximately occupational associated, and subacute endocarditis with significant valvular destruction is the most common presentation. The aortic valve is affected in 60% of all patients and surgery for valve replacement is necessary in more than 36%. The mortality rate associated with *Erysipelothrix* endocarditis is 38% compared with the 20% for other pathogens³.

Table 1 Comparative activity of various antibiotics against *Erysipelothrix rhusiopathiae* by E-test

Antimicrobial agent	MIC(μ g/ml)*
Ampicillin	0.25
Clindamycin (CC)	0.032
Erythromycin (E)	0.125
Chloramphenicol (C)	12
Oxacillin (OX)	1.5
Penicillin G (P)	0.125
Daptomycin (DPC)	0.19
Vancomycin (VA)	48

*Resistant: MIC > 32 μ g/ml

Blood cultures are necessary for isolating *Erysipelothrix rhusiopathiae* but it is often missed and identified as a contamination with *Lactobacillus* when a gram-positive rod bacillus is identified from blood culture. Careful interpretation of Gram stains and testing for the production of H₂S must be checked cautiously⁶.

Although *E. rhusiopathiae* is susceptible to penicillin, oxacillin, cephalosporins, clindamycin and fluoroquinolones, the resistance to vancomycin and aminoglycosides is important for empirical treatment before the results of blood cultures are available. The drug of choice is intravenous penicillin G (12-24 million U/day given in divided doses every 4 h) for 4-6 weeks. *E. rhusiopathiae* endocarditis must be considered when occupational exposure and risk factors such as alcoholism and immunosuppression are noted. Proper antibiotic selection and microbiological differentiation is necessary.

This patient received bactericidal antibiotic treatment initially, and aortic valve replacement was performed after his vital signs stabilized. The combination of medical treatment and surgery resulted in complete remission of the infection. To our knowledge, this is the first reported case of infective endocarditis caused by *E. rhusiopathiae* in Taiwan.

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