

# Mitro-Aortic Infective Endocarditis Produced by *Erysipelothrix rhusiopathiae*: Case Report and Review of the Literature

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Endocarditis produced by *Erysipelothrix rhusiopathiae* is an uncommon disease in humans. This bacterial species is found worldwide as a commensal or a pathogen in many animals. Infection in humans is usually due to occupational exposure. The case is reported of a 43-year-old male parrot breeder with native aortic and mitral valve endocarditis and NYHA class II heart failure at six months after

wound infection. The patient was discharged after six weeks' treatment with intravenous penicillin G and replacement of the mitral and aortic valves due to severe regurgitation. At one year after surgery the patient was asymptomatic and infection-free.

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*Erysipelothrix rhusiopathiae*, a pleomorphic Gram-positive bacillus, is found widely in nature as a commensal or a pathogen, and infects domestic animals such as swine, which may be the major reservoir of the organism. *Erysipelothrix* is also found in sheep, horses, cattle, chickens, crabs, dogs and cats, and is also encrusted in fish scales for long periods (1,2).

Infection in humans is mainly due to occupational exposure. Thus, abattoir workers, butchers, fishermen, farmers, housewives and veterinarians are at risk of infection (3-7). Little is known about the pathogenesis of human infection, but the clinical presentation is most often sub-acute, with an average duration of symptoms before manifestation of seven weeks (3). However, in-vitro and animal studies suggest that virulent organisms have an antiphagocytic capsule which may also contribute to intracellular survival (8). Care must be taken in identifying *E. rhusiopathiae*, as the organism may easily be mistaken for a streptococcus or dismissed as a 'diphtheroid skin contaminant' (3).

## Case report

A 43-year-old man with a history of tobacco and alcohol abuse, heterosexual promiscuity and unhygienic living conditions, was admitted because of

increasing dyspnea on exertion, tachypnea and weight loss experienced for the last two months. He made a living as a parrot breeder, and had had no contact with other animals or with uncooked animal products. Six months before admission he wounded his hand, after which he presented with anorexia, fever and malaise. He was hospitalized because of increasing dyspnea on exertion, tachypnea of 2 months' evolution, and weight loss.

On admission his temperature was 37.8°C, and he had paleness and asthenia. The systolic blood pressure was 110 mmHg, the electrocardiographic sinus rhythm was 80 beats per minute, and the respiratory rate ca. 30 per minute. Physical examination findings were remarkable only for heart diastolic aspirative murmur on aortic focus and systolic murmur on mitral focus. The leukocyte count was 12,000 per mm<sup>3</sup>, and hemoglobin level 9.1 mg/dl. C-reactive protein levels were within normal limits. He had a positive hepatitis antibody. A physical examination and abdominal ultrasound showed no evidence of either splenomegaly or hepatomegaly.

Two-dimensional Doppler and color echocardiography showed severe aortic regurgitation with a vegetation and destruction of the non-coronary leaflet (Fig. 1) as well as severe mitral regurgitation and perforation of the septal leaflet (Fig. 2). The ejection fraction was 56%, with slight left ventricular dilatation. A scar on the back of one hand was reported to have been caused six months before. Thus, the apparent portal of entry was the hand wound, with a subsequent general decline in health. Three blood culture samples (Bact-

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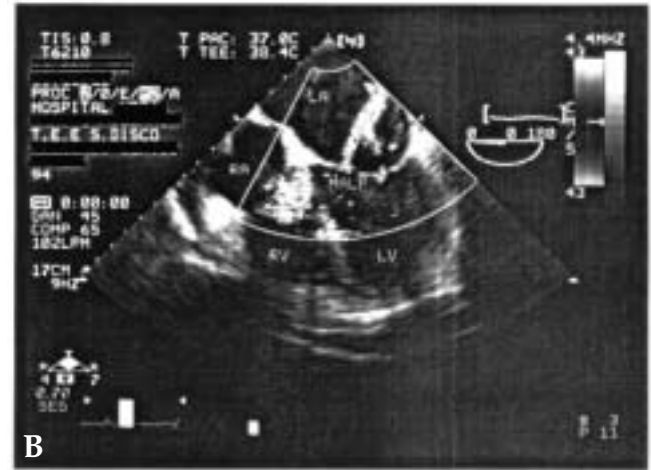
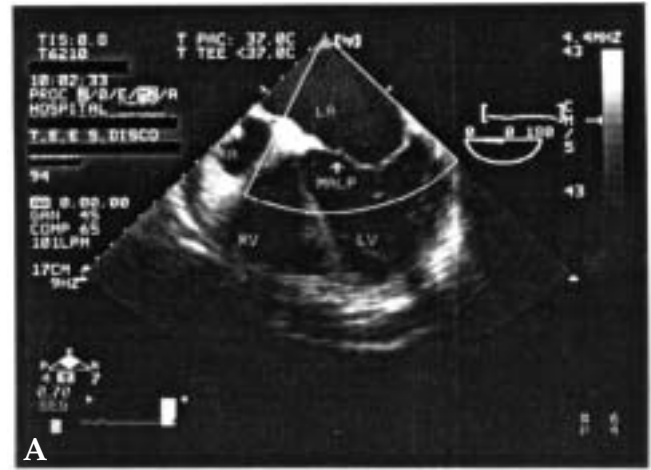


Figure 1: Transesophageal echo-Doppler image showing aortic destruction and Doppler color image showing aortic regurgitation.

Figure 2: Transesophageal echo-Doppler image showing mitral perforation and Doppler color image showing mitral regurgitation.

alert; Organon Teknica) proved positive at 24 h, and were identified as *E. rhusiopathiae* according to Bille's classification (2). The antimicrobial susceptibilities of *E. rhusiopathiae* were inhibitory at concentration of 0.01 or below for penicillin and of 32 for both gentamicin and vancomycin. Minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) were reported by Venditti et al. (9).

The patient was administered 20 million units of penicillin G each day for eight days before surgery and during six weeks after surgery. Mitral and aortic valve replacement was performed with mechanical valve implantation. Postoperative blood cultures and valve tissue cultures were negative. A histopathologic study showed degenerative and calcification areas with inflammatory polymorphonuclear infiltration. The patient was discharged on day 49, and at one year after the operation was symptom-free with no signs of infection.

## Discussion

*Erysipelothrix rhusiopathiae*, a pleomorphic Gram-positive bacillus, was first isolated by Koch in 1878, and later identified by Rosenbach in 1909 as a human pathogen. The localized cutaneous form of the illness, termed Rosenbach's erysipeloid, is the most common form of human infection (10). Since 1912, about 60 cases of *Erysipelothrix*-related endocarditis have been reported (3).

In 1977, Freland published the first updated review of the literature on patients with septicemia and endocarditis (11). Curiously, endocarditis is not mentioned in the main published series of patients infected by *E. rhusiopathiae*, such as that of Nelson (12) and Gilchrist (13), but this may reflect sub-estimation of the real incidence (14). A few cases of endocarditis related to this organism have been reported by European authors (14-16).

Gorby and Peacock (3) considered endocarditis by *E.*

*rhusiopathiae* as an occupational illness because 89% of cases were linked to high-risk epidemiologic situations. Bacteremic infection, with or without endocarditis, is usually a primary infection rather than dissemination from localized cutaneous lesions. However, approximately one-third of patients with systemic infection do have skin lesions suggestive of erysipeloid. Infection is transmitted from animals by cutaneous contact (1-3). Persistent bacteremia or endocarditis have been reported after the ingestion or manipulation (occupational exposure) of contaminated seafood or undercooked pork (1,2).

A clinical presentation, resembling Gram-negative sepsis, may be seen in patients with severe underlying liver disease or heart disease (17). More than one-third of patients with systemic infection are alcohol-dependent.

Drug dependence, immunosuppression and chronic liver disease are important predisposing factors (3,6,18). *E. rhusiopathiae* bacteremia is also seen in other immunocompromised patients, especially those receiving corticosteroid or cytotoxic drug therapy for collagen vascular disease or malignancy (17,19,20). In addition, male gender is another predisposing risk factor (1,4).

*E. rhusiopathiae* bacteremia is usually associated with severe clinical illness, and is often complicated by endocarditis. Gorby and Peacock (3) reported that 90% of patients with this bacteremia developed acute or sub-acute endocarditis as a complication. In addition, 60% of endocarditis cases caused by this organism affect previously normal heart valves, especially the aortic valve (1,4,15), with endocarditis affecting the mitral or tricuspid valve being less frequent (21,22). The echocardiographic demonstration of a large vegetation attached to the aortic valve and perforation of the anterior mitral leaflet is typical for so-called 'mitral kissing vegetation'. This is a secondary involvement of the mitral valve by a large vegetation protruding into the left ventricular outflow tract during diastole, and subsequently contacting the anterior mitral leaflet, with consequent secondary infection (23). Associated complications include renal failure due to proliferative glomerulonephritis (24), meningitis (25) or septic shock (17).

When *E. rhusiopathiae* endocarditis occurs, it frequently produces extensive destruction of the cardiac valves, especially the aortic valve. Surgery or autopsy revealed that 30% of these patients were complicated with valve or myocardial abscess or perforation (26,27).

Despite correct antibiotic therapy, one-third of these patients die, and an additional one-third require surgical treatment with cardiac valve replacement. Gorby and Peacock (3) reported a mortality rate of about 40%,

mainly due to complications of endocarditis such as mycotic aneurysm, valve perforation, myocardial abscess, glomerulonephritis, meningitis or septic shock. Heart failure was present in 80% of cases.

According to the American Heart Association, the treatment of choice for valve abscess is surgical excision (28). However, cases have recently been reported where aortic abscess was resolved with medical treatment (22,27,29). Transesophageal echocardiography is an important tool for determining the degree of heart valve damage, and is also recommended for definitive diagnosis (30,31).

The initial absence of typical clinical or echocardiographic features of endocarditis by *Erysipelothrix* does not exclude this possibility in patients with positive blood cultures. Errors in identification can occur, and the organism may be misidentified as *Lactobacillus* spp. or even *Enterococcus* sp. (32). Sulfuric acid production and growth inhibition in Mann-Rogosa-Sharp medium help in the correct identification of this organism (33).

Erysipeloid skin lesion may resolve spontaneously within three weeks (5); appropriate antibiotic therapy shortens the clinical illness and prevents relapse (1).

Penicillin and imipenem are the most active antibiotics against *E. rhusiopathiae* in vitro (34), whilst penicillin has proven historically to be clinically effective for all forms of *Erysipelothrix* infection (9). Other beta-lactam antibiotics, fluoroquinolones and clindamycin are also active against this organism. Macrolides, tetracyclines and chloramphenicol are not consistently active against *Erysipelothrix* and should not be used in treatment of the disseminated infection. The organism is resistant to sulfamides, trimethoprim-sulfamethoxazole, vancomycin and aminoglycosides (3,34,35). Parenteral treatment is needed for patients with systemic infection or severe diffuse cutaneous disease. Penicillin G is most often used, but other options include ceftriaxone, imipenem and fluoroquinolones. Patients with bacteremia or endocarditis should be treated for at least four weeks with parenteral antibiotics (1,3).

*In conclusion*, whilst *E. rhusiopathiae* is a rare organism causative for infective endocarditis, *E. rhusiopathiae* bacteremia/septicemia is coincident with infective endocarditis in the majority of cases. Endocarditis presenting in patients habitually exposed to animals, including birds, should alert the physician to the possibility of prior infection by *Erysipelothrix*, which is easily mistaken for other Gram-positive  $\alpha$ -hemolytic bacteria

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