Native valve endocarditis caused by *Erysipelothrix rhusiopathiae* in an immunocompetent individual

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Infective endocarditis is a very rare clinical form caused by *Erysipelothrix rhusiopathiae*. It is rarely seen in immunocompetent individuals. Even after surgery it may entail mortality rates as high as 30–40 %. This report describes a case of native valve endocarditis caused by *E. rhusiopathiae* and cured with crystallized penicillin G and surgery.

### Introduction

*Erysipelothrix rhusiopathiae* is an immobile, pleomorphic, non-sporulating, aerobic or facultative anaerobe widely present in nature. It is a Gram-positive bacillus producing long, thin filaments (Artz *et al.*, 2001). The bacterium is found as a commensal or pathogen in wild animals, such as pigs, birds and fish (Artz *et al.*, 2001). Human infections generally develop in high-risk groups such as farmers, butchers, fishermen, veterinary surgeons and housewives, as a result of skin contact with animals (Reboli, 2010). The bacterium is a rare agent of infection in humans, and infection can take one of three clinical forms: erysipeloid, a diffuse cutaneous form and systemic infection such as septic arthritis and diffuse glomerulonephritis (Sheng *et al.*, 2000). Erysipeloid is the most common form, while infective endocarditis (IE) is very rare (Sheng *et al.*, 2000).

IE developing in association with this agent generally takes the form of natural valve endocarditis and frequently involves the aortic valve. Mortality levels are high if appropriate treatment is not provided (Nassar *et al.*, 2005). Surgical as well as medical treatment is often required (Nassar *et al.*, 2005; Tomaszuk-Kazberuk *et al.*, 2011). This report describes a case of natural valve endocarditis caused by *E. rhusiopathiae* and cured with appropriate treatment and a multidisciplinary approach.

### Case report

#### History

A 44-year-old woman presented to our hospital with fever, chills/shivering and lethargy persisting for 5 days. The patient had a history of feeding birds at home.

#### Examination

Physical examination revealed a 2/6 degree systolic murmur at the apex and fever rising to 39 °C. IE was suspected. Transoesophageal echocardiography (TEE) revealed medium-advanced mitral insufficiency and vegetation of 2.0 × 1.4 cm in the anterior mitral leaflet and 0.8 × 0.7 cm in the posterior leaflet (Fig. 1).

#### Pathological findings

The patient’s laboratory values were: serum white cell count 4700 mm⁻³, haemoglobin 6.4 g dl⁻¹; haematocrit 19.1 %, platelets 146 × 10³ μl⁻¹, sedimentation 81 mm h⁻¹, C-reactive protein 6.7 mg dl⁻¹ and procalcitonin 0.1 ng ml⁻¹. Toxic granulation was present in peripheral smear, and polymorph nuclear leukocytes predominated at 77 %. Serum biochemistry examination revealed: total protein 5.5 g dl⁻¹, albumin 2.6 g dl⁻¹ and lactate dehydrogenase 517 U l⁻¹, but no other abnormality. Proteinuria and haematuria were determined at full urine test. Hepatosplenomegaly was present at abdominal ultrasound. Roth’s spots were seen at ocular fundus examination. In the light of these findings, intravenous (i.v.) ceftriaxone 2 × 1 g and vancomycin 4 × 500 mg i.v. were initiated with a preliminary diagnosis of IE. Fever persisted at follow-up in the first 4 days. *E. rhusiopathiae* growth was determined in two blood cultures collected before treatment. IE was thus diagnosed with one major and three minor findings based on the modified Duke criteria. Immunoglobulin and complement levels in blood investigated in order to evaluate the patient’s immune system were within normal limits, and antibodies for human immunodeficiency virus were negative.

Identification of the bacterium growing in cultures and analysis of its antibiotic sensitivities were performed using...
a BD Phoenix automated microbiological system (Becton Dickinson). Sensitivity to penicillin (MIC 0.023 μg ml⁻¹) was determined at growth antibiogram, and the patient’s treatment was modified to i.v. 6 × 4 MU crystallized penicillin G day⁻¹; MIC was 0.094 μg ml⁻¹ for ceftriaxone and 0.064 μg ml⁻¹ for daptomycin. Fever was brought under control at the end of the 48th hour of penicillin G therapy. No growth was determined in control blood cultures. TEE performed for recurrence of fever on day 14 of penicillin G therapy revealed an increase in vegetation dimensions; the length of vegetation exhibiting branching in the mitral valve anterior leaflet reached 2.6 cm, and vegetation also persisted in the posterior leaflet (Fig. 2). The coronary artery surgery department was consulted, and the decision was taken to operate. Advanced insufficiency in the mitral valve and IE-associated vegetation were observed during surgery. The vegetative masses were resected and a metallic valve replacement was installed. No growth was determined in culture of material removed during surgery. The patient was discharged in a healthy condition after 42 days.

**Discussion**

*E. rhusipathiae*-associated endocarditis is a relatively rare condition (Nassar et al., 2005). Transmission to humans is generally through skin contact with infected animals, although cases of IE developing through consumption of infected foodstuffs have also been reported (Nassar et al., 2005; Reboli, 2010). The majority of systemic infections developing through this agent are seen in patients with...
immune system defects, such as leukaemia, chronic liver disease, corticosteroid or cytotoxic therapy, alcohol use or drug dependency, in women and particularly in occupational high-risk groups (Nassar et al., 2005; Tomaszuk-Kazberuk et al., 2011). Our patient had a history of feeding birds and was female, but had no identified immunosuppressive disease or condition.

Very few of the systemic infections developing in association with this agent are seen in the bacteraemia form, while more than 90% take the form of endocarditis. The most commonly involved valve is the aortic, although mitral, tricuspid and sometimes multiple valve involvement may also be seen (Brooke & Riley, 1999; Nassar et al., 2005). Ours was a case of native valve endocarditis, in the form of mitral valve involvement, described as rarer in the literature. In agreement with the literature, as with the majority of cases of IE developing with this agent, there was significant destruction in the relevant valve (Nassar et al., 2005).

Fever and backache persisting for several months are the most common clinical symptoms in these cases. It has been reported that embolisms of the kidney, spleen and mesenteric artery may develop in some cases with backache (Nassar et al., 2005; Tomaszuk-Kazberuk et al., 2011). Continuous fever, chills/shivering, sweating and lethargy persisting for 5 days were the main symptoms in our case.

Routine blood cultures are sufficient to isolate the agent. However, the agent may occasionally be misidentified as Streptococcus viridans, and may sometimes be overlooked, being regarded as a skin contaminant because of its Gram-positive nature (Umana, 2003). Gram-positive cocci were identified in two blood cultures taken before treatment in our study. Identification and antibiogram procedures were performed with the help of an automated system. The most effective antibiotic against *E. rhusiopathiae in vitro* is penicillin G, while sensitivity to ofloxacin is frequently reported (Nassar et al., 2005; Tomaszuk-Kazberuk et al., 2011). Intrinsic resistance to glycopeptides and aminoglycosides is also seen (Nassar et al., 2005; Tomaszuk-Kazberuk et al., 2011). The bacterium isolated in our study was sensitive to penicillin and cephalosporin.

Due to significant valve destruction being seen in these patients, treatment requires surgical intervention in 36% of cases. Although the incidence of such complications as mycotic aneurysm, valve perforation and abscess is similar to that for IE developing with other agents, the mortality levels are higher (38 vs 20%). Mortality is seen in 30–40% of these cases even after surgery (Artz et al., 2001). Crystallized penicillin G therapy was administered for 6 weeks in our case. However, the patient was operated on due to recurrence of fever at the end of the second week and because of an increase in vegetation exhibiting branching at control TEE, reaching 2.6 cm in size. During surgery, the severely damaged mitral valve was resected and replaced. Our case shows that *E. rhusiopathiae*-associated IE can be treated successfully with surgery accompanied by antibiotherapy.

**References**


