Case Report

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 × 10⁹ 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

Abbreviations: IE, infective endocarditis; i.v., intravenous; TEE, transoesophageal echocardiography.
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

Fig. 1. Vegetation measuring 2.0×1.4 cm in the mitral valve anterior leaflet and 0.8×0.7 cm in the posterior leaflet together with mitral insufficiency jet flow murmur at TEE at time of diagnosis.

Fig. 2. Vegetation 2.6 cm in size exhibiting branching in the mitral valve anterior leaflet and vegetation continuing in the posterior leaflet at control TEE at the end of the second week of penicillin G therapy.
immune system defects, such as leukaemia, chronic liver
disease, corticosteroid or cytotoxic therapy, alcohol use or
drug dependency, in women and particularly in occupu-
tional 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 immunosup-
pressive 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 aminogly-
cosides 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.

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