

Infective endocarditis caused by *Erysipelothrix rhusiopathiae* involving three native valves

Infekcyjne zapalenie wsierdzia trzech własnych zastawek
wywołane przez *Erysipelothrix rhusiopathiae*

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Abstract

Human infection with *Erysipelothrix rhusiopathiae* is extremely rare and occupationally related. This paper presents for the first time a case of a 47 year-old male with endocarditis involving three valves simultaneously.

Key words: infective endocarditis, *Erysipelothrix rhusiopathiae*

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INTRODUCTION

Erysipelothrix rhusiopathiae (*E. rhusiopathiae*), a rod-shaped Gram-positive bacillus, is an important animal pathogen, but rarely reported in humans. This bacterium is found as a commensal or a pathogen in animals, particularly wild animals, pigs, birds, and fish [1]. Human infection with *E. rhusiopathiae* is occupationally related and mainly a risk for farmers, butchers, fishermen, veterinary surgeons, and housewives. The most frequent route of transmission of infection from animals is cutaneous contact. A few papers have also reported endocarditis caused by *E. rhusiopathiae* after consumption of infected food [2]. There are three clinical forms of human disease described: a localised, self-limited cutaneous lesion termed Rosenbach's erysipeloid, which is the commonest manifestation in humans; a diffuse cutaneous form; and systemic infection which manifests as septic arthritis, meningitis, endocarditis, and diffuse glomerular nephritis [3]. Bacteremia occurs in less than 1% of all cases of *E. rhusiopathiae* infection, but 90% of these cases demonstrate an association with endocarditis [4]. When preliminary identification shows the presence of Gram-positive rods in blood cultures, and when the patient is a member of a population at risk, this organism should be considered as a potential causal agent. We are aware of approximately 80 cases of endocarditis caused by *E. rhusiopathiae* that have been re-

ported in the literature to date. Those previous reports described aortic and/or mitral valve endocarditis. This paper presents a patient with endocarditis involving aortic, mitral, and tricuspid valves simultaneously.

CASE REPORT

A 47 year-old farmer with a history of alcohol abuse (on average, 2 L units per week recently) was admitted to the Gastroenterology Department with a two month history of abdominal pain primarily in the right epigastric region, lower back pain, loss of appetite, significant weakness, and weight loss (about 10 kg). For two weeks before admission, he had been experiencing night sweats and daily-recurring chills.

Clinical examination showed cachexia, signs of haemorrhagic diathesis on the skin of the lower extremities and trunk, blood pressure 120/80 mm Hg, heart rate 95 bpm, tenderness during deep palpation in right and middle epigastric region and hepatomegaly (6 cm below right costal arch). Auscultation of the heart revealed loud systolic murmur at the apex and over the tricuspid valve area. Laboratory data showed anaemia (haemoglobin: 8 g/dL, erythrocyte count 2.6 mln/ μ L), leucocytosis (white cell count 23 000/ μ L), elevated blood level of C-reactive protein (170 mg/L), hypoproteinemia (total protein: 5.1 g/dL), slightly elevated liver enzymes (AspAT 55 IU/L, AlAT

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Figure 1. Massive vegetations (arrow) on tricuspid valve seen on two-dimensional echocardiographic examination

32 IU/L) and suggested disseminated intravascular coagulation: thrombocytopenia ($21\,000/\mu\text{L}$) and decreased level of fibrinogen. Prothrombin time was 45%, international normalised ratio 1.45. Glomerular filtration rate was decreased (50 mL/min) and creatinine was 1.58 mg/dL. According to a consultant gastrologist, a diagnosis of liver cirrhosis could not be established. During hospitalisation, signs of biventricular heart failure and fever of 39°C with chills were observed.

The two-dimensional echocardiographic examination showed infective endocarditis. Vegetations were found on the mitral, aortic, and tricuspid valves. The vegetations on the mitral valve were seen protruding into the left atrium. The medial segments of both leaflets (A2 and P2) were involved in an infection, while on the aortic valve, the non-coronary leaflet was damaged.

The tricuspid valve vegetations were massive and extremely mobile. The huge abnormal echoes (one of them 35×25 mm) bouncing in the 'right heart' were recorded in the right ventricle in diastole and in the right atrium in systole (Fig. 1). Fortunately it did not produce an obstruction of the tricuspid orifice. The disruption of the leaflets was not evident, but significant regurgitation was observed. No presence of an abscess was recorded. The dimensions and contractility of both ventricles were normal. The patient was transferred to the Cardiology Department, where blood cultures were obtained. According to the guidelines of the European Society of Cardiology (ESC) for infective endocarditis [5], empiric antibiotic therapy (vancomycin *i.v.* and gentamycin *i.v.*) was immediately started. *E. rhusiopathiae* was isolated from blood cultures. Blood was taken for BacT/ALERT FA media (bioMerieux, France) and BacT/ALERT FAN media (bioMerieux, France), then the samples were incubated in BacT/ALERT analyser (bioMerieux, France). After achieving a positive result, samples were put on various media. Growth of bacteria was observed on COLUMBIA AGAR (bioMerieux, France) basis containing 25% sheep blood. Eventually the bacterium was identified on a VITEK-2 analyser (bioMerieux, France) on a GP card.

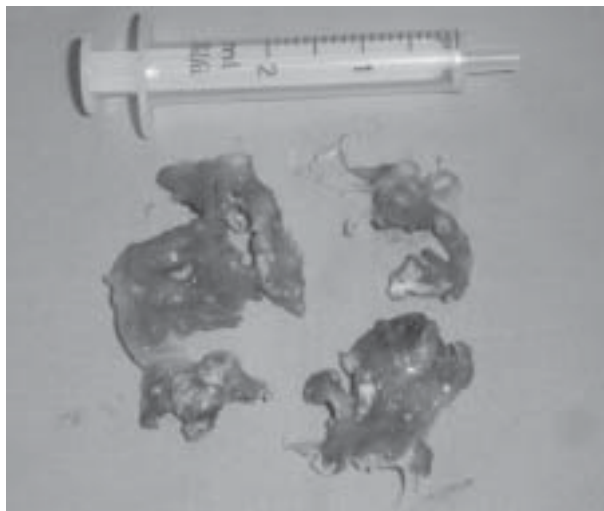


Figure 2. Damaged leaflets of tricuspid valve due to infective endocarditis caused by *Erysipelothrix rhusiopathiae*

According to an antibiogram (susceptibility to penicillin, piperacillin, ciprofloxacin, teicoplanin, and vancomycin and resistance to amikacin, gentamycin, and tetracycline), therapy was modified and piperacillin plus vancomycin *i.v.* were administered. Despite the signs and symptoms of heart failure due to significant regurgitation of the mitral and tricuspid valves, surgical intervention was performed after 30 days of pharmacological therapy (furosemide, spironolactone, metoprolol). The reason for such late intervention was lack of informed consent from the patient. Mitral and aortic valve replacement was performed with mechanical valve implantation, and the tricuspid valve was excised and a bicuspid-like valve was constructed with bovine pericardium. Huge vegetations from the tricuspid valve are shown in Figure 2. No organisms could be detected in Gram stains of various parts of the aortic, mitral or tricuspid valves, and all cultures taken from them remained negative. Postoperative blood cultures were also negative. The histopathology of the aortic and mitral valve demonstrated a purulent inflammation. Postoperative treatment consisted of vancomycin administered intravenously twice daily.

Three weeks after the operation, an echocardiography scan revealed normal ventricular function and no pathological findings. The patient was discharged 23 days after the operation. Two weeks later (probably after alcohol abuse) the patient was admitted to the Intensive Care Unit due to respiratory and heart failure in a very poor condition. Minimal perivalvular aortic leakage was found on echocardiography scan. The patient was mechanically ventilated, on three *i.v.* catecholamines and antibiotics according to antibiogram of sputum culture, but without improvement. Blood cultures were three times negative. On the 16th day of hospitalisation, the patient died despite resuscitation in the mechanism of asystolia. An autopsy was not performed, because the relatives did not consent.

DISCUSSION

Acute endocarditis with significant valvular destruction is the commonest form of endocarditis due to *E. rhusiopathiae*. The most commonly infected valve is the aortic valve. This is affected in 60% of all cases. In our patient, three native valves, the aortic, mitral and tricuspid, were involved [6]. The tricuspid valve was the most seriously damaged, with huge mobile vegetations bouncing around the whole 'right heart'. In about 80 cases of endocarditis caused by *E. rhusiopathiae* reported in the literature to date, we found no similar description of this disease.

Underlying structural valvular disease is less common in patients with *E. rhusiopathiae* endocarditis (43%) than in endocarditis due to other organisms (60–80%). Valve-replacement surgery is necessary in more than 36% of cases [7]. Our patient did not have any history of valve disease.

E. rhusiopathiae endocarditis is strongly occupationally-related, with 89% involving occupations at risk [8]. The present patient was a farmer with evident animal source of infection. The clinical presentation is usually subacute and a skin lesion of erysipeloid is present in 36% of patients [7].

The main complaint of the patient was lower back pain. There have been similar reports of *E. rhusiopathiae* endocarditis in men where the initial manifestations of the disease were fever and back pain of a few months' duration. The back pain in our patient was most likely related to an embolism of a renal, spleen or mesenteric artery; unfortunately it was not ruled out in imaging techniques. In several cases of patients who have died in the course of *E. rhusiopathiae* endocarditis, the autopsy has revealed multiple infarcts in the spleen and kidneys. Associated complications include renal failure due to proliferative glomerulonephritis, meningitis or septic shock [9].

Routine blood culture techniques are adequate for the isolation of *E. rhusiopathiae*. However, it is often misidentified as *Streptococcus viridans* or dismissed as a contaminant when a Gram-positive rod is identified. Prompt microbiological differentiation of *E. rhusiopathiae* from other Gram-positive organisms is necessary to avoid delays in the initiation of appropriate antibiotic therapy [10].

According to the literature, *E. rhusiopathiae* is susceptible to penicillin, ciprofloxacin and ofloxacin, but resistant to vancomycin and aminoglycosides which present the first-line empiric therapy for a presumed endocarditis [6]. It leads to delayed administration of appropriate drugs. In the present case, *E. rhusiopathiae* was susceptible to penicillin, piperacillin, ciprofloxacin, teicoplanin, and vancomycin and resistant to amikacin, gentamycin, and tetracycline. The results of an antibiogram allowed the continuation of therapy with vancomycin and the replacement of gentamycin with piperacillin. Despite the administration of drugs according to the antibiogram, 36% of patients need valve replacement due to significant valve destruction. The complications, such as mycotic aneurysm, valve perforation, and myocardial abscess, are the same among patients with endocarditis due to *E. rhusiopathiae* as other organisms, but the mortality rate is much higher (38% vs 20%) [6]. Preventing infection by washing hands,

wearing protective gloves, and regularly disinfecting contaminated sources is important for high risk occupations.

Depression of the immune system, observed among patients suffering from cancers and leukemias, chronic liver disease, corticosteroid and cytotoxic therapy for rheumatologic disease or malignancy, and drug dependence, predisposes to the development of the most serious clinical form of *E. rhusiopathiae* infection: its systemic form. Male gender is another predisposing risk factor. More than a third of patients with a systemic infection are alcohol-dependent [9]. The presented patient admitted to alcohol abuse. *E. rhusiopathiae* endocarditis, at least in part, results from lack of hygiene and alcohol dependence, which are often found among patients affected with the bacterium. In this group of patients, the time from the onset of symptoms to the contact with the doctor is remarkably longer, but a delay in diagnosis and treatment can have devastating consequences even despite potent antibiotics and complex surgery.

CONCLUSIONS

Endocarditis due to *E. rhusiopathiae* is extremely rare, but should be taken into account in patients with risk factors such as an occupation involving animals, depression of the immune system, lack of hygiene, and alcohol dependence. Delay in diagnosis and treatment can have devastating consequences, even despite potent antibiotics and complex surgery.

Conflict of interest: none declared

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