

Erysipelothrix rhusiopathiae endocarditis and presumed osteomyelitis

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Erysipelothrix rhusiopathiae is known to cause infections in humans following exposure to decaying organic matter or animals colonized with the organism, such as swine and fish. Invasive infections with this organism are unusual and are manifested primarily as infective endocarditis. The present report is believed to be the first to report a case of *E rhusiopathiae* endocarditis and presumptive osteomyelitis. *E rhusiopathiae* appears to have intrinsic resistance to vancomycin. Because vancomycin is often used empirically for the treatment of endocarditis, rapid differentiation of *E rhusiopathiae* from other Gram-positive organisms is critical. In patients with endocarditis caused by a Gram-positive bacillus and epidemiological risk factors for *E rhusiopathiae* exposure, empirical treatment with vancomycin should be reconsidered.

Key Words: *Endocarditis*; *Erysipelothrix rhusiopathiae*; *Osteomyelitis*

Endocardite à *Erysipelothrix rhusiopathiae* et ostéomyélite présumée

RÉSUMÉ : C'est un fait connu, *Erysipelothrix rhusiopathiae* cause des infections chez les humains après une exposition à de la matière organique en décomposition ou à des animaux colonisés par le micro-organisme, comme le porc ou les poissons. Il est rare que le bacille donne lieu à une infection envahissante et, dans ce cas, la maladie se manifeste surtout sous la forme d'endocardite infectieuse. Voici le premier cas déclaré, croit-on, d'endocardite à *E. rhusiopathiae* et d'ostéomyélite présumée. Il semble que le bacille offre une résistance intrinsèque à la vancomycine. Comme c'est le médicament le plus souvent utilisé de façon empirique pour le traitement de l'endocardite, il importe de distinguer très rapidement *E. rhusiopathiae* des autres germes Gram positif. Le traitement empirique à la vancomycine devrait être reconsidéré chez les patients qui souffrent d'une endocardite à bacille Gram positif et qui présentent des facteurs de risque épidémiologiques d'exposition à *E. rhusiopathiae*.

Erysipelothrix rhusiopathiae is a Gram-positive bacillus that has long been recognized as a pathogen in animals, particularly swine (1). It is ubiquitous in nature and has been reported to be a colonizer of fish, shellfish, birds and even insects (2). In humans, infections with *E rhusiopathiae* are most commonly associated with occupational exposure to contaminated meat or fish. The majority of human infections fall into three categories: a mild cutaneous form (erysipeloid),

a generalized cutaneous form and an invasive septic form (infections of the blood and/or other sterile sites). Invasive *E rhusiopathiae* infection, unlike the cutaneous form, is uncommon – there are approximately 60 case reports in the literature. Invasive infections with this organism are unusual and are manifested primarily as infective endocarditis. The present report is believed to be the first to report a case of *E rhusiopathiae* endocarditis and presumptive osteomyelitis.

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CASE PRESENTATION

A 67-year-old aboriginal woman from northern British Columbia was admitted to her local hospital because of four weeks of exacerbated lower back pain. She had been complaining of lower back pain for approximately two years and had been diagnosed with lumbar spine osteoarthritis. Before admission, there had been no history of fever or active infection. About three days after being admitted to hospital, however, the patient developed spiking fevers up to 39.0°C. Three of three sets of blood cultures were positive for Gram-positive bacilli. The patient was empirically started on intravenous vancomycin, and both the patient and the organism were sent to a tertiary care hospital for further investigation.

At the time of transfer, the patient complained of midline lower back pain, which was further characterized as a dull ache radiating to the left buttock region. She reported fevers and chills, and denied any bowel or bladder symptoms. Her past medical history included noninsulin-dependent diabetes mellitus, a partial left mastectomy for an unclear cause and a remote cholecystectomy. Before admission, she had been taking an oral hypoglycemic and acetaminophen with codeine. The patient reported an allergy to penicillin and had previously developed an urticarial reaction following ingestion of the antibiotic.

The patient apparently drank 385 mL of 'hard liquor' per day, but claimed to have stopped drinking five months before being admitted to hospital. She denied smoking cigarettes and injection drug use. She had no known tuberculosis exposure and did not report any recent history of travel. There was no recent history of significant trauma. She did, however, report participating in Native fish preparation rituals on an annual basis.

At the time of consultation, she was found to be obese and had a temperature of 37.5°C. There was no head or neck lymphadenopathy. Her cardiovascular examination revealed normal heart sounds and no murmurs. There were no peripheral stigmata of infective endocarditis. On examination of the musculoskeletal system, she was found to have tenderness and warmth in the lower lumbar spine area. There was also vague tenderness in her left buttock area but no palpable mass. The straight leg raise test was negative. Apart from a few facial telangiectasias, her skin examination was normal. Neurological examination was normal.

The patient's white blood cell count was $8.5 \times 10^9/L$, and she had an erythrocyte sedimentation rate of 90 mm/h. A computed tomography scan of the lumbar spine revealed extensive disc disease as well as a 'destructive' lesion involving the left pedicle of L3, consistent with infection or malignancy. The lesion was eventually biopsied by fine needle aspiration and reported to show fragments of degenerate osseous tissue. No evidence of malignancy or inflammation was detected. Gram stain of the biopsy revealed Gram-positive bacilli; fungal, mycobacterial and bacterial cultures failed to grow.

A transthoracic echocardiogram revealed thickened and calcified mitral leaflets with commissural fusion, suggesting previous rheumatic involvement. Furthermore, a vegeta-

tion on the anterior mitral leaflet was seen. Doppler examination revealed severe mitral regurgitation. The Gram-positive rods from her original blood cultures were initially identified as 'possible lactobacillus' and soon thereafter were identified as *Erysipelothrix rhusiopathiae* susceptible to penicillin, clindamycin, cloxacillin, ampicillin and cefazolin, and resistant to vancomycin. Skin tests with major and minor determinants of penicillin were negative, and the patient was started on 4,000,000 U of intravenous penicillin G every 4 h. She was transferred back to her community hospital and was treated for a total course of six weeks. Repeat blood cultures confirmed sterilization of her blood. A repeat computed tomography scan of the lumbar spine performed six weeks after the completion of antibiotic treatment failed to show evidence of active infection. The patient has been symptom-free for 12 months.

DISCUSSION

E rhusiopathiae is a nonmotile, nonspore-forming, facultatively anaerobic, Gram-positive bacillus. It is commonly alpha-hemolytic on blood agar and may be misidentified as a viridans streptococcus (2). *Erysipelothrix* and *Bacillus* species can be differentiated by the absence and presence of spores, respectively. Unlike other Gram-positive nonsporulating rods (*Lactobacillus* species, *Listeria monocytogenes*, *Corynebacterium* species), *E rhusiopathiae* produces hydrogen sulphide on triple sugar iron media (3).

E rhusiopathiae is ubiquitous and is commonly found in decaying nitrogenous waste (4). In humans, it is primarily associated with occupational exposure – butchers, slaughterhouse workers, farmers and fish handlers have the highest risk of acquiring infection (3,5-7). Infections following dog scratches and bites have also been reported (8,9). Our patient had a history of alcohol abuse, which appears to be an important independent risk factor (2). The incubation period is typically one to four days (1). There have been no reported cases of human-to-human transmission.

Bloodstream infections with *E rhusiopathiae* are not common, and a strong association exists between bacteremia and the development of infective endocarditis (1). The clinical presentation is often of a subacute nature; the mean duration of symptoms was reported to be 6.6 weeks in one case series (2). *E rhusiopathiae* appears to have a greater affinity for the aortic valve and often causes significant valvular destruction. Even with appropriate treatment, mortality rates approach 40% and are much higher than in cases of endocarditis caused by other organisms (2). Metastatic complications do occur; however, to our knowledge, the present paper is the first to report a case of osteomyelitis following *E rhusiopathiae* bacteremia. In this case, we suspect that the patient came into contact with the organism while preparing fish. A break in the skin or, alternatively, ingestion of contaminated fish followed by gastrointestinal colonization allowed the organism to gain access to the patient's circulation. The patient's mitral valve was seeded, which was followed by bacteremia and metastatic spread to the L3 vertebrae.

Diagnosis of invasive infection is made after the recovery of the organism from a sterile site, usually blood. Gram-positive rods that are recovered from blood cultures may not always be diphtheroids, and further identification is warranted when *E rhusiopathiae* is suspected based on the epidemiological setting. Biochemical differentiation of *E rhusiopathiae* from other Gram-positive rods may be aided by a positive test for hydrogen sulphide on triple sugar iron agar. Although polymerase chain reactions have been used with some success in veterinary medicine, the use of molecular diagnostic techniques for identifying *E rhusiopathiae* in human specimens is still under investigation (10). In vitro susceptibility testing of a series of isolates indicates that penicillin and imipenem are highly active against *E rhusiopathiae*, followed by piperacillin, cefotaxime, ciprofloxacin and clindamycin; activity is poor or absent with vancomycin, gentamicin and trimethoprim/sulphamethoxazole (11).

Based on clinical experience, *E rhusiopathiae* has been found to be sensitive to penicillins and carbapenems but resistant to vancomycin. The drug of choice for invasive infections, including endocarditis, is 12×10^6 to 20×10^6 U of penicillin G per day for four to six weeks (2). At present, there is insufficient experimental and clinical evidence to recommend routinely adding an aminoglycoside to penicillin for cases of *E rhusiopathiae* bacteremia. The apparent intrinsic resistance of the organism to vancomycin is not to be overlooked. *E rhusiopathiae* should be added to the group of known vancomycin-resistant organisms (*Pediococcus* species, *Leuconostoc* species, *Lactobacillus* species). Because vancomycin is often used empirically for the treatment of presumed endocarditis, rapid differentiation of *E rhusiopathiae* from other Gram-positive organisms is critical. In patients with endocarditis caused by a Gram-positive bacillus and epidemiological risk factors for *E rhusiopathiae* exposure, empirical treatment with vancomycin should be reconsidered.

CONCLUSION

The present report describes a case of invasive *E rhusiopathiae* infection following exposure to fish. The patient developed endocarditis with bacteremia, which presumably was followed by metastatic spread to the spine, resulting in osteomyelitis. Following a six-week course of intravenous penicillin, she experienced a full recovery and was free of any relapse one year after presentation to hospital.

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