Erysipelothrix rhusiopathiae pneumonia in an immunocompetent patient

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Introduction

Erysipelothrix rhusiopathiae is a non-motile, non-sporulating Gram-positive bacillus that is commonly found in nature. E. rhusiopathiae causes infections primarily in animals; in humans it usually causes occupational diseases in people in contact with infected animals (Reboli & Farrar, 1989; Brooke & Riley, 1999; Wang et al., 2010). There are three well-defined clinical categories of the human disease: (i) a localized cutaneous form, erysipeloid, (ii) a generalized cutaneous form and (iii) an invasive septic form which is often associated with endocarditis. Over the last 15 years, some new disease manifestations have been reported; these include persistent bacteraemia, endocarditis, septicemia, septic arthritis and brain infarction (Wang et al., 2010).

Here we report a case of pneumonia with isolation of E. rhusiopathiae from bronchoalveolar lavage and sputum. To our knowledge, this is the first report of a pneumonia case caused by E. rhusiopathiae confirmed by culture.

Case report

A 43-year-old man was admitted to our clinic with symptoms of weakness, fever, cough and weight loss. His symptoms had started 3 months before admission, and during that time he had lost 4 kg in weight. He had been admitted to a hospital and had been diagnosed as having pneumonia, after which he had been given empirical ampicillin/sulbactam treatment for 10 days. Although he responded well, his symptoms relapsed after the end of therapy. He was admitted to our hospital out-patient clinic of pulmonary diseases with these symptoms. Bronchoscopy was performed. During bronchoscopy, bronchoalveolar lavage (BAL) samples were obtained and sent for cytological and microbiological analysis.

According to the patient history, he had smoked 20 cigarettes per day for 30 years. He was a stockyard worker and had been feeding a cow for two months. During this time he spent 4 or 5 h every day in the cow barn. He smoked while he was in the barn.

On admission to our infectious disease clinic, his vital signs were stable. His body temperature was 38.4 °C. Physical examination revealed a decrease in respiratory sounds and crepitant rales in the left lower lung area. Other physical examination findings were normal. Laboratory findings were as follows: white blood cell (WBC) count, 14,100 mm⁻³ (80 % neutrophils) (normal: 4600–10200 mm⁻³); erythrocyte sedimentation rate (ESR), 76 mm h⁻¹ (normal: <20 mm h⁻¹); C-reactive protein (CRP), 9.6 mg dl⁻¹ (normal: 0–0.8 mg dl⁻¹). Chest radiography revealed infiltration in the basal segment of the left lower lung. Thorax computed tomography (CT) showed peribronchial thickness and pneumatic infiltrations in the basal segment of left lower lung.

Gram staining of sputum and BAL samples revealed numerous polymorphonuclear leukocytes and Gram-positive bacilli (Supplementary Fig. S1). Sputum and BAL samples were cultured on blood and eosin-methylene blue (EMB) agar. α-Haemolytic, circular colonies grew on the blood agar after 24 h incubation at 35 °C. Gram staining of bacteria from the cultures of sputum and BAL samples showed the organisms to be Gram-positive bacilli. They were non-motile, and negative for catalase, oxidase and indole reactions. The isolates were identified as E. rhusiopathiae by the VITEK 2 system (bioMérieux). This result was confirmed by the API Coryne V2.0 (bioMérieux) identification kit with a probability value of 96 %. Throat swab cultures were evaluated as normal bacterial flora growth. Two blood cultures on admission were negative

Abbreviation: BAL, bronchoalveolar lavage.

A supplementary figure is available with the online version of this paper.
after 3 weeks incubation in the BACTEC 9240 blood culture system (Becton Dickinson).

Testing for antimicrobial susceptibilities by the VITEK 2 system showed that the E. rhusiopathiae isolate was susceptible to penicillin, amoxicillin/clavulanate, cefotaxime, chloramphenicol, erythromycin, gentamicin and tetracycline. Based on the antibiogram results, amoxicillin/clavulanate (1 g every 8 h) treatment was started. Trans-thoracic echocardiography to evaluate possible endocarditis due to this organism was normal. Cytological investigation of BAL samples showed nonspecific inflammation.

On the third day of treatment, the patient’s fever fell to 36.4 °C. One week later, his symptoms, including cough and weakness, subsided. The laboratory tests were repeated on the 10th day of treatment and the results were found to be in the normal ranges: WBC 8200 mm$^{-3}$ (62 % neutrophils), ESR 20 mm h$^{-1}$, CRP 0.245 mg dl$^{-1}$. The treatment of the patient was continued for 1 month. Thorax tomography was repeated and it revealed that all infiltrations detected previously on the left lower lung were fully resolved. His symptoms did not relapse during the 6 month follow-up.

Discussion

E. rhusiopathiae and infections caused by this bacterium are worldwide in distribution. It is ubiquitous in nature, being found as a saprophyte in most animals. Human E. rhusiopathiae infections can occur from contact with infected animals, their secretions or waste products, or organic matter contaminated by any of these (Reboli & Farrar, 1989; Brooke & Riley, 1999; Wang et al., 2010).

E. rhusiopathiae can enter the human body by penetration of skin or through the gastrointestinal system (Brooke & Riley, 1999). There appear to be no reports in the literature of this organism entering the body via inhalation and causing disease. In the case presented here, the route of infection seemed to be the respiratory system. Our patient said that he had been healthy previously and his symptoms had appeared after he started to feed his cow. He had spent most of his time in a small covered cow barn and he had smoked in the barn. Therefore, we thought that he might have been infected with E. rhusiopathiae by deep inhalation of contaminated dust in the barn.

Other human infections associated with E. rhusiopathiae include chronic arthritis (Ehrlich, 1946), cerebral infection (Silberstein, 1965), meningitis (Kim et al., 2007) and intra-abdominal abscess (Feasi et al., 2010). We could not find any reports of pneumonia cases confirmed by positive E. rhusiopathiae culture in the literature. One case of E. rhusiopathiae bacteremia following aspiration pneumonia has been described, but the patient had oropharyngeal cancer and E. rhusiopathiae growth could not be detected in sputum culture (Sheng et al., 2000). Since E. rhusiopathiae was isolated from both sputum and BAL cultures in our case, we believe this to be the first report of a confirmed E. rhusiopathiae pneumonia case.

In reports of systemic infections, the typical predisposing factors are immunosuppression and underlying diseases such as chronic alcoholism and renal failure (Brooke & Riley, 1999). In our case, E. rhusiopathiae growth could not be detected in blood cultures. The reasons for there being no bacteremia despite long-lasting pneumonia might be that our patient was immunocompetent, the absence of other risk factors and the previous antimicrobial treatment given.

E. rhusiopathiae is resistant to vancomycin despite being Gram-positive (Reboli & Farrar, 1989). In treatment of E. rhusiopathiae infections, penicillin and cephalosporins are commonly recommended. Currently, there is no agreement about the duration of treatment, which varies according to clinical form. For example, 1 week treatment is enough for the localized cutaneous form, whereas in the septicaemic form associated with endocarditis, treatment duration is generally 4–6 weeks. Different treatment periods were practised for other rarely seen clinical forms and they were found to be successful (Kim et al., 2007; Feasi et al., 2010; Cooke et al., 2006). Our patient was treated for 10 days as clinical symptoms of pneumonia started, but his symptoms relapsed after cessation of therapy. Therefore, treatment was prolonged to 4 weeks and his symptoms did not relapse during the 6 month follow-up.

To conclude, although systemic E. rhusiopathiae infection is rare and pneumonia in particular is extremely rare, we should consider this bacterium as one of the possible causes of pneumonia, especially in cases with a history of animal contact.

References


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