Sepsis and multi-organ failure in a patient infected with Pasteurella multocida

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Abstract - Objective: To report a case of a fast-developing sepsis in a patient infected with Pasteurella multocida. A 44-year-old, female presented with high-grade fever, drowsiness and complaining of a headache since the night before presentation at the emergency room. Shortly after being admitted to the intensive care unit the patient’s situation deteriorated. She became hypotensive and a chest x-ray showed progressive diffuse pulmonary oedema. Mechanical ventilation and inotropic support were started. P. multocida was isolated from blood cultures and from cultures taken from both of the patient’s cats. One of the cat’s isolates and the patient’s isolate were genotypically related.

Keywords - Pasteurella multocida, sepsis, multi-organ failure, high-grade fever

Introduction

Pasteurella multocida is a small aerobic Gram-negative coccobacillus, which is mainly found as a commensal of the upper respiratory tract of animals. This organism can cause a diversity of infections in humans, usually as a result of a bite or a scratch from an animal. We present a patient with sepsis and multi-organ failure after being infected with P. multocida.

Case report

A previously healthy 44-year-old woman, with no history of pulmonary disease except for pneumonia three years earlier, presented at our emergency room with fever, drowsiness and complaining of a headache since the night before admission. On admission her body temperature was 41.3 °C, blood pressure 120/50 mm Hg, heart rate 133/min and respiration rate approximately 30/min. Physical examination did not show lymphadenopathy, cyanosis, petechiae or neck stiffness. On auscultation of the heart, no murmurs were heard. Crepitations were heard basally in both lungs. On abdominal examination, there were no abnormal findings. There were no signs of pulmonary infiltrations on the chest x-ray taken on admission (Fig. 1). Laboratory results showed a white blood cell count of 7.8 x 10⁹/l (4.3-10.0 x 10⁹/l) and a C-reactive protein of 30 mg/l (0-10 mg/l). Haemoglobin was 8.4 mmol/l (8.5-11.0 mmol/l), with a platelet count of 75 x 10⁹/l (150-400 x 10⁹/l). Liver and kidney tests were normal, bilirubin was 9 umol/l (0-17 umol/l) and lactate was 4.5 mmol/l (0.5-2.2 mmol/l). Blood cultures were taken.

A thoracic and abdominal CT scan showed infiltrations in the lower fields of both lungs and some lymphomas in the mediastinum. A small amount of fluid was observed around the liver, and the gall bladder wall was thickened. Shortly after being admitted to the intensive care unit (ICU) the patient’s condition deteriorated. She became hypotensive and the chest x-ray showed progressive diffuse pulmonary oedema (Fig. 2). Mechanical ventilation and inotropics were started. After she was stabilized her gall bladder was surgically removed, because it was suspected to be the focus of her sepsis. Subsequent examination of the gall bladder revealed a thickened wall, but no signs of severe inflammation.

Figure 1. Chest x-ray on admission.
Gram stains of the peripheral blood showed gram-negative coccobacillary bacteria. The following day cultures showed aerobic, oxidase-positive bacteria, which were later identified as P. multocida susceptible to cefotaxim, which had been started on admission. The patient recovered quickly and was extubated on day 9. Two days later she was discharged from the ICU.

The family history revealed that as well as her husband and two children, the patient had a rabbit, a dog and two cats. The dog had had diarrhoea in the weeks preceding presentation. Two weeks before attending the hospital the patient was bitten by the rabbit. This rabbit was euthanized by a veterinarian because of its behavioural problems and the suspicion of the patient’s family that it had caused the disease.

Cultures were taken from the throats of both cats and the dog. The cultures of both cats were positive for P. multocida, the culture from the dog was not. Both P. multocida isolates from the cats were compared with the patient’s blood isolate, using amplified fragment length polymorphic (AFLP) analysis. One of the cat’s isolates and a blood isolate from the patient were closely related (Fig. 3).

In 1878 Pasteurella species were first isolated from the blood of birds with fowl cholera. P. multocida (“killer of many species”) was first characterized in 1880 by the French microbiologist and chemist Louis Pasteur, as being the causative agent of this disease. Brugnatelli reported the first human P. multocida infection in 1913 [1,2].

Pasteurella species can normally be found as commensals in the nasopharynx and gastrointestinal tract of a variety of animals including dogs, cats and horses. In humans, infections with P. multocida are most commonly found in superficial skin abscesses, sometimes with cellulitis, following an animal bite or scratch. However, case reports suggest that transmission may occur via animal secretions [3].

Although uncommon, respiratory tract infection is the second most common infection by Pasteurella species. It may present as pneumonia, tracheobronchitis, abscess or empyema [4,5]. Upper respiratory infections such as sinusitis and pharyngitis are also seen. Rarer presentations include osteomyelitis, intra-abdominal infections, septic arthritis, sepsis, meningitis and endocarditis [2,6]. Serious systemic infections due to Pasteurella species occur particularly in those with underlying disease and in the immunocompromised [2,3].

The patient in this case developed a rapidly evolving sepsis and multi-organ failure. She had high-grade fever. This high body temperature has not been described previously as specific for infections due to P. multocida.

Although she was bitten by her rabbit, we isolated the infecting strain only from one of her cats. Transmission of the pathogen was presumably caused by normal contact with the cats, since no bite or scratch was recalled, though we can never exclude the rabbit as the cause of the infection.
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References