

Short Communication

## *Pasteurella multocida* bacterial meningitis caused by contact with pigs

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### Abstract

*Pasteurella multocida* belongs to the normal flora of the respiratory and digestive tract of many animals. Animal exposure is a considerable risk factor for *Pasteurella* infection. *P. multocida* is the most common cause of local infection after an animal bite but is an unusual cause of meningitis. We present a case of bacterial meningitis by *P. multocida* in a 37-year-old man who worked in a pig farm and was bitten by a pig. The patient had a defect located in the lamina cribosa and this lesion could be the gateway of the infection, although in this case the infection could also be acquired through the pig bite. The bacteria was identified as *P. multocida* with the biochemical test API 20E (bioMérieux). In agreement with findings in the literature, the strain was susceptible *in vitro* to penicillin, ampicillin, cefotaxime, ceftriaxone ciprofloxacin, levofloxacin, imipenem and tetracycline.

**Key words:** *Pasteurella multocida*, bacterial meningitis.

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A 37 years-old male was admitted to the Hospital of Barbastro (Huesca) with a 12-h history of headache, vomiting and fever. At admission, neurological, abdominal, cardiac, and pulmonary examination findings were normal. Lumbar puncture revealed cloudy fluid, 5300 cells/mm<sup>3</sup> (100% polymorphonuclear), glucose 0 mg/dL (blood glucose 125 mg/dL) and protein 510 mg/dL. Gram stain revealed no bacteria. Blood cultures were then performed. Empirical treatment was started intravenously with ceftriaxone and vancomycin. By the next day he was afebrile and feeling better.

Within 24 h, blood cultures yielded catalase-positive, oxydase-positive, gram-negative coccobacillus. The organism grew under both aerobic and anaerobic conditions but failed to grow on MacConkey agar. It was identified as *P. multocida* with the biochemical test API 20E (bioMérieux). The strain was susceptible *in vitro* to penicillin, ampicillin, cefotaxime, ceftriaxone ciprofloxacin, levofloxacin, imipenem and tetracycline. After culture results, treatment was continued only with ceftriaxone.

The patient was working on a pig farm and he had received a pig bite eight days ago. Four months ago, he was hospitalized for frontal headache and he was diagnosed for meningitis by *Streptococcus suis*.

Computer tomographic (CT) scan of the head indicated a partial condensation and widening of right ethmoidal cells indicated ethmoid sinusitis.

The recurrent meningitis and the CT data suggested that the patient had a defect located in the lamina cribosa and this lesion could be the gateway of the infection, although in this case the infection could also be acquired through the pig bite.

*P. multocida* belongs to the normal flora of the respiratory and digestive tract of many domestic livestock and wild animals (Francis, 1975). They can produce a spectrum of human diseases and because these are frequently serious diseases, *P. multocida* infection is considered an important zoonosis (Kimura, 2004). Animal exposure is a considerable risk factor for *Pasteurella* infection. *Pasteurella multocida* is known to form part of the normal microbiota

in the nasopharynx or gastrointestinal tract in many domestic and wild animals (Armstrong, 2000). In the case reported here, the patient had contact with pigs because he worked in a pig farm and he was bitten by a pig few days ago. The patient suffered from chronic sinusitis and a defect located in the lamina cribosa confirmed by detection of beta-2 transferrin in nasal fluid. The pathogen might enter the body directly from the upper respiratory tract or cutaneous wound caused by animal bite as a result of salivary colonisation (Henderson, 2010). The clinical progression and the recurrent meningitis in the past four months supported the former pathway. *P. multocida* appears to be an opportunistic pathogen and there have been cases of meningitis in the literature after skull fractures, cranial surgery, etc. (Yagupski, 1985).

The usual antibiotic therapy for pasteurellosis relies on  $\beta$ lactams (Ruiz-Irastorza, 1995). The organism is usually well covered by most of the empirical treatments currently used. Treatment is optimized by the early identification of *P. multocida* and rapid effective treatment with penicillin, ampicillin or a third-generation cephalosporin.

*P. multocida* infections have been reported in compromised hosts as well as in healthy individuals and must be suspected in healthy patients who have a history of animal exposure and present with systemic symptoms. Increased contact with domestic animals might contribute to the increasing frequency of reports of *P. multocida* infection. Defects located in lamina cribosa may favour recur-

rent meningitis. In this case, *Pasteurella* is part of the environmental microbiota of the patient and his work can be considered a risk factor for developing severe infections such as meningitis. For diagnosis of *P. multocida* infections it is essential to obtain a detailed patient history about animal exposure and provide this information to the clinical microbiology laboratory.

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