An unusual case of meningitis

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CASE REPORT

Pasteurella multocida is a rare cause of bacterial meningitis. A 56-year-old man with several pets developed a profoundly decreased level of consciousness following left tympanomastoidectomy. Lumbar puncture produced cerebrospinal fluid with the typical findings of meningitis (low glucose, high protein, high leukocytes). Cultures from the cerebrospinal fluid and a swab of the left ear revealed Gram-negative coccobacillus identified as *P. multocida*. The organism was sensitive to ceftriaxone, ampicillin and penicillin, and a 14-day course of intravenous penicillin was used as definitive treatment, resulting in full recovery. Although rare, *P. multocida* should be considered as a potential cause of meningitis in patients with animal exposure, particularly in the setting of recent cranial surgery.

**Key Words:** Pasteurella multocida; Meningitis; Tympanomoastoidectomy; Zoonosis

Un cas inhabituel de méningite

Le Pasteurella multocida est une rare cause de méningite bactérienne. Un homme de 56 ans propriétaire de plusieurs animaux a présenté une importante diminution de son niveau de conscience après une tympanomastoidectomie gauche. Le liquide céphalorachidien prélevé par ponction lombaire présentait les caractéristiques classiques de la méningite (glycémie basse, protéine élevée, leucocytes élevés). Les cultures du liquide céphalorachidien et un écouvillon de l'oreille gauche ont révélé un coccobacille à Gram négatif, le *P. multocida*. L'organisme était sensible à la ceftriaxone, à l'ampicilline et à la pénicilline. Un traitement de pénicilline administré par voie intraveineuse pendant 14 jours a favorisé un rétablissement complet. Même si c'est rare, le *P. multocida* doit être envisagé comme cause de méningite chez des patients exposés à des animaux, particulièrement après avoir subi une opération crânienne.

**Key Words:** Pasteurella multocida; Meningitis; Tympanomastoidectomy; Zoonosis

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TABLE 1
A list of cases of Pasteurella multocida meningitis published in the English literature after 1999

| Author (reference), Year, (sex) | Predisposing factors | Animal exposure | Clinical findings | Treatment (duration) | Outcome |
|--------------------------------|----------------------|-----------------|------------------|---------------------|---------|
| Brossier et al (13), 2010      | 46 (F)               | Contact with cats | Headache; fever, nuchal rigidity; epistaxis | Cefotaxime and ofloxacin (1 week) | Recovered |
| López et al (14), 2013         | 37 (M)               | Pig bite         | Headache; vomiting; fever                      | Ceftriaxone               | Recovered |
| Kawashima et al (15), 2010     | 44 (F)               | Kissing her dog  | Headache; fever, nausea; neck stiffness        | Meropenem (1 week)        | Recovered |
| Per et al (16), 2010           | 15 (M)               | Pet rabbit       | Headache; weakness; confusion; lethargy; neck stiffness | Cefotaxime, ceftazolin, penicillin | Recovered |
| Tjen et al (17), 2007          | 44 (F)               | Face licked by pet dog | Headache; vomiting; fever, drowsy; neck stiffness; right-sided paralysis | Chloramphenicol           | Recovered |
| Tattevin et al (18), 2005      | 60 (F)               | Cat bite         | Fever; chills; rigors; nuchal rigidity; agitation; decreased responsiveness | Benzylpenicillin (2 weeks) | Recovered |
| Jordan et al (19), 2007        | 66 (M)               | Dog exposure     | Not reported                                                                                         | iv levofoxacin aztreonam (1 week); oral levofoxacin (18 days) | Recovered |
| O'Neill et al (20), 2005       | 72 (F)               | Pet cat          | Fever; jaundice; decreased level of consciousness; neck stiffness                                | Cefotaxime ceftazidime (14 days), penicillin (27 days) | Obstructive hydrocephalus requiring shunt and eventual recovery |
| Proulx et al (21), 2003        | 33 (F)               | Dog scratch      | Headache; neck pain; photosobia; fever; tachycardia                                     | Penicillin (14 days)      | Recovered |
| Armstrong et al (22), 2000     | 52 (M)               | Pet dog, animal feces indoors | Found dead at home                                                                                     | –                             | Death     |

P Female; M Male

DISCUSSION
Meningitis is an uncommon outcome of P multocida infection (3), making P multocida a rare cause of adult bacterial meningitis. Two reviews spanning 1950 to 1999 report only 29 cases published in the English literature during that time period (4,5). Animal contact was a major risk factor, present in 89% of cases, and a history of a bite was much less common, occurring only 15% of the time (4). Previous cranial/facial surgery or skull fracture has been reported as a cause of P multocida meningitis (5-13). Table 1 summarizes adult cases of P multocida meningitis published in the English literature after 1999 (13-22). Animal contact was present in all cases, while only two (20%) reported a history of a bite. One patient had a history of cranial surgery (13).

The current report presents one of only a handful of cases of P multocida meningitis ever documented in the literature from a Canadian site (5,6,9,21,23). The patient developed a severely decreased level of consciousness after tympanomastoidectomy. The patient had the typical CSF findings of bacterial meningitis (low glucose, high protein, high leukocytes). Penicillin is the most commonly used antibiotic to treat P multocida meningitis (4,15), and our patient recovered fully with a course of IV penicillin G. Many of the more recent cases describe treating with third generation cephalosporins (Table 1).

P multocida meningitis has been reported following mastoidectomy (11,12), and the pathogenesis of infection is hypothesized to involve contiguous spread of the organism from a colonized ear canal. Supporting this theory, a swab of our patient’s ear canal grew P multocida. Our patient had experienced chronic otorrhea. Local extension to the surgical site is the likely mechanism in this case. A preoperative ear swab has been proposed for patients having a mastoidectomy that have a history of exposure to animals (12), and may be supported by the present case.

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