**Pasteurella multocida Septicemia in a Newborn without Scratches, Licks or Bites**

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*Pasteurella multocida* infection in newborns is associated with significant morbidity and mortality [1,2]. The bacteria are usually transmitted to humans from domestic animals by bites. This report emphasizes the risk of infection on exposure to household pets in the neonatal period, even without direct contact.

**Patient Description**

A 4 week old girl presented with fever of 1 day's duration, irritability and decreased appetite. She had been born at term, after an uncomplicated pregnancy and delivery. Birth weight was 3150 g. On admission, temperature was 39.4°C, heart rate 210/minute, respiratory rate 40/minute, and blood pressure 87/50 mmHg. Physical examination, including neurologic examination, was unremarkable. Laboratory tests showed a white blood cell count of 6700/mm$^3$ with 4600/mm$^3$ neutrophils; hemoglobin 11.9 g/dl, and platelets 365,000/mm$^3$. C-reactive protein level was 1 mg/dl (normal 0–0.5 mg/dl); blood chemistry (SMA-18) and urinalysis revealed no abnormalities. Cerebrospinal fluid analysis yielded 6 WBC/mm$^3$ with normal glucose and protein concentrations. Blood, CSF, and urine cultures were taken. The patient was treated with the usual empiric regimen of ampicillin (100 mg/kg/day) and garamycin (5 mg/kg/day).

On the third hospitalization day, there was no alleviation of the fever, the patient was irritable and refused to eat, and the anterior fontanel became prominent. Urine and CSF cultures were found to be negative, but blood culture yielded a gram-negative Cocccobacillus. WBC count increased to 22,000/mm$^3$ with 60% neutrophils, and C-reactive protein level increased to 18 mg/dl. A second lumbar puncture yielded turbid CSF containing 2900 leukocytes (predominantly polymorphonuclear cells), with glucose 35 mg/dl (normal 40–75) and protein 122 mg/dl (normal 5–60). Gram staining and cultures of the CSF were negative.

A diagnosis of gram-negative sepsis with partially treated meningitis was made. In addition, the possibility of meningo-encephalitis due to herpes simplex virus was considered. Therefore, treatment was changed to cefotaxime (200 mg/kg/day), ampicillin (200 mg/kg/day), and acyclovir (60 mg/kg/day). Polymerase chain reaction analysis for herpes type 1 and 2 was negative, and the acyclovir was stopped. The gram-negative Cocccobacillus in the blood was identified as *Pasteurella multocida*. At that point, re-questioning of the parents revealed that they owned a dog and a cat, but there had been no direct contact between the infant and the animals, not licking, biting, or scratching. However, the mother and grandmother who took care of the child also tended to the animals.

On the sixth hospitalization day, the patient's condition improved. Temperature normalized, C-reactive protein level decreased to 1.5 mg/dl, and WBC count returned to normal levels. Repeated lumbar puncture showed 80 WBC/mm$^3$, and CSF culture was negative. Antibiotic treatment was discontinued after 2 weeks. There was no evidence of sequelae on neurologic examination or imaging tests, including brain ultrasonography and magnetic resonance imaging. Findings on electroencephalography and auditory brainstem response were normal. At the 6 month follow-up no neurologic disorders were observed.

**Comment**

*Pasteurella multocida* is a gram-negative Cocccobacillus that is part of the normal flora of the nasopharynx of many domestic and wild animals. Carriage rates are high among cats (70–90%), dogs (55%), and pigs (50%) [3,4]. Human infection with *Pasteurella multocida* is usually the result of transmission from animals, especially in children. It is most commonly recognized as a cause of cellulitis following animal bites [3].

Cellulitis due to a cat bite is more common than from a dog bite because cats inflict puncture-like skin lesions whereas a dog bite usually tears the skin [3]. In addition to wound infection, *Pasteurella multocida* infection can also cause serious systemic diseases, such as septicemia, septic arthritis, osteomyelitis, endocarditis, meningitis, and brain abscesses [1-4]. Meningitis occurs more frequently in infants and the elderly [5]. In the present case, we assumed that meningitis, which was discovered in the second lumbar puncture, might also be infection with *Pasteurella multocida* caused by hematogenous dissemination from the blood.

No route of transmission of the infection was demonstrated in our patient. The family denied direct contact between the pets and the baby. We suggest that the bacteria became colonized on the infant after contact with the hands of a family member, and then progressed to septicaemia and meningitis.

Apart from the present patient, 25
cases of Pasteurella multocida meningitis in children under age 1 year have been reported in the literature to date [1-4]; 18 were newborns and 17 were males. Twelve of the affected infants were exposed to dogs, 9 to cats, and 4 to both. It is important to emphasize that only 2 of the infants had a history of animal bites or scratches and 16 were known to be exposed to the saliva of the animal by licking. There are some reports of neonatal meningitis caused by vertical transmission of Pasteurella multocida from vaginally colonized mothers. The youngest reported infant with Pasteurella multocida infection was 2 days old at diagnosis, and he was assumed to have been infected at birth, since the bacteria were isolated from the maternal vaginal secretions.

Neurologic sequelae were common after Pasteurella multocida meningitis, including seizure disorders, hemiparesis, and hydrocephalus. Two of the infants died. Unlike these cases, however, our patient, who received antibiotic treatment very early in the course of the disease, recovered fully and had no short-term neurologic complications.

Third-generation cephalosporin is the drug of choice for Pasteurella multocida meningitis. However, prevention is always better. Simple hygienic measures such as hand washing may prevent the transmission of the organism from colonized animals to young infants.

References

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**Capsule**

**Keeping the gut flora in place**

All mammals rely on a factory of symbiotic microorganisms living in the gut to help process nutrients into usable forms, but if these bacteria escape containment, they can trigger damaging inflammatory responses. Mammals use several adaptive and innate systems to keep the gut flora in check, including microbicidal peptide defensins, lysoyzmes, and lectins. Cash et al. have discovered that the expression of a carbohydrate-binding protein – a lectin – is induced by the intestinal microbial population from Paneth cells in the crypts. This lectin is among the most highly expressed proteins in the small intestine, recognizes peptidoglycan, and is directly bactericidal. Indeed sufferers of inflammatory bowel disease tend to express elevated levels of C-type lectins.

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**Capsule**

**Genetic basis for melanoma risk**

Exposure to ultraviolet radiation is a well-established risk factor for melanoma in light-skinned populations, but genetic factors also play a role. Studying melanomas that occur on skin with little chronic sun damage, Landi and associates discovered an interaction between two genes that contributes to cancer risk. Individuals with allelic variants of the gene encoding the melanocortin-1 receptor (MC1R), which contributes to phenotypic traits such as fair skin, freckling and red hair, have a much greater risk of developing melanomas with mutations in the BRAF oncogene. The mechanism underlying this association is unclear but appears to be independent of MC1R’s effects on pigmentation.

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