

Student Paper Communication étudiante

Pseudomonas aeruginosa otitis media and interna in a chinchilla ranch

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Abstract — *Pseudomonas aeruginosa* has been associated with conjunctivitis, enteritis, pneumonia, septicemia, sudden death, and abortion in chinchillas. This case report describes an unusual clinical presentation and diagnosis of *P. aeruginosa* otitis media and interna with neurologic manifestations. To our knowledge, this clinical presentation has not been reported previously in chinchillas.

Résumé — L'otite moyenne et interne à *Pseudomonas aeruginosa* dans un ranch de chinchillas. *Pseudomonas aeruginosa* a été associée à la conjonctivite, à l'entérite, à la pneumonie, à la septicémie, à la mort soudaine et aux avortements chez les chinchillas. Ce rapport de cas décrit une présentation clinique inhabituelle et le diagnostic d'une otite moyenne et interne à *P. aeruginosa* avec des manifestations neurologiques. À notre connaissance, cette présentation clinique n'a pas été signalée auparavant chez les chinchillas.

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A chinchilla pet breeding operation of approximately 200 animals was reported to have had 4 animals die in a 12-hour period. Three were found dead at night and 1 in the morning; 3 females and 1 male. All dead animals had ear exudate, unilateral conjunctivitis, and neurological signs, such as head tilt, ataxia, and rolling, prior to death. The owner indicated that once neurological signs were present, the animals died within 24 h; he also reported that the chinchillas had accidentally been fed grain with “blue mold” 10 d earlier. All affected animals had been exposed to the contaminated feed.

Management of the barn included housing single animals in stacked wire cages, approximately 30 cm wide × 25 cm high × 30 cm deep, with tins of chinchilla sand for dust baths. The owner alternately used an unknown concentration of chlorine bleach and hydrogen peroxide, as well as a monthly low dose of tetracycline, in the watering system. The animals were fed a combination of grain and hay. The facility was air-conditioned, but there was a very pungent odor of ammonia upon entry.

A survey of the barn revealed 4 other animals with clinical signs. Three had unilateral conjunctivitis and unilateral nervous signs, including facial paralysis, head tilt, and circling on the affected side. One female had inadvertently smothered a recent litter that morning by rolling on them. A mild amount of crusting and exudate was observed in her left pinna. One male with unilateral conjunctivitis was bright, alert, and responsive. None of the animals were

observed or reported to have had nasal discharge, coughing, sneezing, diarrhea, or anorexia.

Eye and ear swabs were collected for culture from 2 chinchillas; 1 that had died that morning and 1 exhibiting clinical signs. These were submitted along with the 4 carcasses to the University of Guelph Animal Health Laboratory for postmortem evaluation. Pending laboratory results, the owner was advised to separate affected animals from the rest of the population and counseled on appropriate hygienic measures, including the use of separate cleaning equipment for sick cages, managing sick animals last, and washing hands between handling animals. On the day following the veterinary visit, the owner reported 4 more deaths overnight, including 1 kit.

Postmortem evaluation found that all animals were in good body condition with normal fat stores and muscle mass. In 1 female, the stomach contained watery contents and the external ear canal caseous yellow material. The lungs were mottled with reddened areas and there was frothy fluid in the trachea. Another female had liquid stomach contents and congested lungs, but no significant findings in the ear canals. No significant findings were noted in the other female and male, or in any of the animals with respect to the eyes, conjunctiva, or nasal cavity.

Bacterial culture in the ear and eye swabs and from an additional carcass sample taken at postmortem showed marked growth of *Pseudomonas aeruginosa* and beta hemolytica Lancefield Group C *Streptococcus* sp. Culture of liver samples from the 4 submitted carcasses had moderate to marked growth of *P. aeruginosa*.

The histopathologic report described lesions in the lung and liver, compatible with *P. aeruginosa* septicemia, as well as conjunctivitis and otitis externa. The tympanic bulla and inner ear contained marked neutrophilic infiltrates admixed with fibrin and rod and cocci bacteria, consistent with *P. aeruginosa* and *Staphylococcus aureus*, respectively. The membrane lining the tympanic bulla was edematous and congested, with vascular thromboses associated

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neutrophilic infiltrates. Intravascular and perivascular neutrophilic infiltrates were noted in the pons. No significant findings were reported in the trachea, intestine, kidney, spleen, or heart. Based on these findings, a diagnosis of septicemia and *P. aeruginosa*-otitis externa, media, and interna was made.

Little has been published in the scientific literature on chinchillas, but *Pseudomonas aeruginosa* has been recognized as causing a number of diseases, including conjunctivitis, enteritis, pneumonia, septicemia, abscesses, sudden death, and abortion (1–4). Inguinal and genital intradermal pustules in a male chinchilla, from which *P. aeruginosa* was cultured, has also been reported (5); pustules followed other clinical signs of anorexia, mild diarrhea, conjunctivitis, and corneal and oral ulcers.

It was suggested in 1962 that *P. aeruginosa*-induced otitis in chinchillas could occur (1), but, to the author's knowledge, the induction of neurological signs by otitis media and interna has not been documented for the chinchilla.

In this case, the reporting of accidental feeding of moldy grain to the chinchillas was somewhat of a red herring and led to listeriosis being considered initially because of the neurological signs. After *P. aeruginosa* had been isolated, treatment focused on investigating contamination of the water supply, since it is a recognized source of bacterial infection (4,5). Tetracycline (Onycin 1000; Vétoquinol, Lavaltrie, Quebec), 1 mg/mL in bottled drinking water, was administered until the watering system had been treated with hypochlorite solution and thoroughly dried out. Treatment was instituted 2 d after the report of the initial outbreak, but 2 more chinchillas died over the next 2 d. Subsequently, no new cases were reported.

Thirteen days after the initial outbreak, there was no bacterial growth from samples taken from parts of the watering system that had been sanitized, but *Stenotrophomonas maltophilia* was cultured from samples taken from the unsanitized part of the system. It is difficult to determine whether or not the water was the primary source of infection, as a water sample was not collected at the time of initial outbreak. Even when sterilized water bottles are used and filled from a clean water source, chinchillas can autoinfect themselves with *P. aeruginosa* (5). An important diagnostic aid may include culturing individual water bottles when bulk water cultures are negative (5).

We hypothesize that the pathogenesis of the otitis interna in this outbreak was due to water contaminated with *P. aeruginosa*, leading to infection of the eustachian tube, spreading to the inner ear, and resulting in infection with rupture of the tympanic membrane. The neurologic signs are attributable to involvement of the cranial nerves in the

middle and inner ear, specifically the vestibular branch of cranial nerve VIII, which would have caused the head tilt, rolling, and ataxia, and cranial nerve VII, which would have resulted in the facial paralysis (6).

The bacterial conjunctivitis may have also been exacerbated by the presence of dust baths in the cages. While chinchillas have a requirement for dust baths from a few times a week to daily, overuse may induce conjunctivitis, and the baths should be removed after use (3). A high airborne concentration indicated by the pungent smell of ammonia in this barn may also have contributed to the development of respiratory infection. Gastroenteritis may occur in chinchillas infected with *P. aeruginosa* (1,3–5,7), but these signs were not noted in this outbreak.

Appropriate management and husbandry are critical factors in preventing *P. aeruginosa* infections in chinchillas. *Pseudomonas aeruginosa* may grow in biofilms lining the inside of water lines, bottles, and reservoirs, and it is important that these items are adequately sanitized on a regular basis. Most strains of *Pseudomonas* do not grow below pH 4–5 and acidifying the water may be an effective strategy (5). In addition, vaccination with polyvalent bacterins has proven to be efficacious for prevention and treatment of *Pseudomonas* spp. infections (7). As *P. aeruginosa* is considered to be highly resistant to most antibiotics and many disinfectants, prophylactic use of these therapeutics in watering systems is likely less effective than ensuring a fresh, clean water supply (5,7).

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