

CASE REPORT

Feline Chlamydial Infection

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Introduction

Chlamydia psittaci infection was first recognized in cats in 1942 (1). At that time, and for some period afterward, the organism was considered a significant respiratory pathogen, the cause of "feline pneumonitis". With the discovery of the importance of feline viral rhinotracheitis (FVR) and calici viruses in the feline respiratory disease syndrome, the significance attached to chlamydiae declined. Although rarely associated with pneumonia or upper respiratory infection today, this organism has been reported in cases of feline conjunctivitis in the United States (7, 14, 15, 16). This report documents chlamydial infection in three Canadian catteries.

Case Number One

History

On August 25, 1977 seven Siamese cats, varying in age from five months to three years, were presented to the Small Animal Clinic of the Ontario Veterinary College. These were from a cattery of ten cats, all of which had shown varying degrees of conjunctivitis within the previous five months.

The infection began after the importation of a young female from New York state in March of that year. At that time she was affected with a relatively mild bilateral conjunctivitis which responded to treatment with polymyxin B-neomycin¹ ointment, but recurred shortly after cessation of therapy. In the ensuing months all other contact cats became infected, a chronic or recurring pattern being characteristic in several of these animals. All cats had been vaccinated against panleukopenia, FVR and calici virus. None had received feline pneumonitis (*Chlamydia psittaci*) vaccine.

At the same time the owner had developed conjunctivitis and keratitis in the left eye which had proven refractory to treatment with gentamycin² ophthalmic ointment. There was clinical suspicion of *Herpes simplex* virus infection but specific treatment with iododeoxyuridine was ineffective.

Clinical Signs

The conjunctivitis varied from an acute hyperemia with marked chemosis and mucopurulent discharge in recently affected animals to a hyperemic condition with little chemosis and some serous or mucoid discharge in chronic and recurrent cases. None of the cats had evidence of corneal involvement.

Laboratory Findings

Conjunctival swabs were taken from all cats. These samples were negative on culture for FVR and calici viruses and for mycoplasmas and pathogenic bacteria. However, chlamydiae were recovered from all seven cats. Five samples were positive on initial inoculation of embryonated eggs; the remaining two were positive on a second passage. The organism was identified as *Chlamydia psittaci* on the basis of resistance to sulfadiazine (15). Although yolk sac smears of originally inoculated eggs contained some particles suggestive of elementary bodies, a positive isolation could not be made from the owner's eye because of bacterial contamination on passage.

Giemsa-stained conjunctival smears contained neutrophils and occasional mononuclear cells or macrophages. No typical chlamydial inclusions were seen; however, this is not expected in chronic cases (8).

Experimental Verification

To verify that the organism isolated was capable of producing a conjunctivitis, four nine week old DSH kittens were infected experimentally with 0.1 ml of an $10^{3.3}$ ELD₅₀/ml yolk sac suspension of chlamydiae propagated from an isolate of one adult male cat and instilled as drops into both eyes and nostrils of each kitten. Four uninoculated kittens served as controls. Within five days, all four inoculated kittens had developed mild conjunctivitis characterized by hyperemia, increased lacrimation and the accumulation of mucoid material at the medial canthus. By eight to ten days this syndrome resembled the acute disease seen in the naturally infected cats: marked chemosis, mucopurulent discharge and adherence at the lid margins. This persisted for two weeks then gradually began to resolve. Ocular swabs taken from these kittens three days after the onset of signs were culturally negative for FVR, calici virus

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¹V-Sporin ophthalmic ointment, Burroughs Wellcome Ltd., LaSalle, Quebec.

²Garamycin, Schering Corporation, Pointe Claire, Quebec.

and pathogenic bacteria. However, samples taken at the same time were positive for chlamydiae on primary egg inoculation.

Treatment

All the original Siamese cats responded to topical tetracycline³ ointment as did the owner herself. It was advised that treatment be continued for two weeks after disappearance of clinical signs, to minimize the induction of an inapparent carrier state (6). However, two adult cats suffered relapses and were euthanized at the owner's request. One queen gave birth to a litter of kittens approximately two months later. These developed neonatal conjunctivitis at about ten days of age. Unfortunately, they were not available for cultural examination; however, they did respond to topical tetracycline therapy.

An eight week old Balinese kitten was introduced into the cattery shortly after the episode with the neonatal kittens. This kitten developed very mild conjunctivitis one week later. The owner treated this with V-Sporin and it responded in four days. However, ten days later a more severe conjunctivitis developed. From this chlamydiae were isolated. Tetracycline treatment was apparently successful.

Case Number Two

History

In August 1977, a nine month old male Abyssinian was referred to the Ontario Veterinary College. The cat had been obtained from the north-eastern United States at six months of age. The owner was told that as a young kitten he had an ulcer on the left cornea, subsequent to suspected FVR infection, which has healed. Shortly after acquiring the cat, the owner presented him to a veterinarian because of mild bilateral conjunctivitis. Bilateral distichiasis was reported and a central corneal opacity with vascularization was noted in the left eye. The distichia were removed and treatment with antibiotics and steroids was instituted. Approximately two months later, the cat developed severe conjunctivitis in the right eye; the left eye was again involved but to a lesser extent. Steroid ointment employed at this time controlled the inflammation but did not resolve the condition. Corneal ulceration was not apparent during any of the examinations made by the referring veterinarian.

Clinical Signs

When presented at O.V.C. the cat had marked bilateral conjunctivitis, characterized by hyperemia, vascular injection and mucopurulent discharge. The left eye was more involved with neovascularization of the cornea apparent, but without opacity or ulceration.

Laboratory Findings

Conjunctival swabs taken for culture at this time were negative for bacteria and FVR and calici viruses. However, *Mycoplasma felis* was identified, and chlamydiae were isolated in embryonated eggs from the left eye on primary inoculation and from the right eye on fourth passage.

Treatment

The cat was treated initially with chloramphenicol⁴ ophthalmic ointment. This was not completely satisfactory. Tetracycline ointment was substituted, in view of the positive chlamydial isolation. Response to this antibiotic was favorable. Local steroids were recommended to reduce corneal vascularization. This treatment was to commence after the cessation of antibiotic therapy. The animal responded well and had no relapse of the conjunctivitis.

Case Number Three

History

One dead three day old kitten was sent to O.V.C. for postmortem and virus isolation. This kitten was one of a litter of six, three of which died in the first few days after birth. The surviving kittens had mucopurulent ocular discharge. Previous litters in this cattery had been affected with neonatal conjunctivitis; abortion was also reported. Adult cats were vaccinated for FVR and calici viruses, as well as for panleukopenia and rabies.

Laboratory Findings

A chlamydia isolation was made on egg inoculation of lung tissue from the submitted kitten. Liver and spleen suspensions were negative for chlamydiae. Similar samples were checked for virus, mycoplasmas and bacteria. These were all negative. Postmortem revealed generalized lung consolidation but no other gross lesions. The eyes and conjunctiva appeared normal. Histology was not feasible because of autolysis of tissues.

Discussion

The first case illustrates that chlamydial conjunctivitis may become endemic in a cattery if not recognized early and properly treated. Whether recurrent attacks represent reinfection or activation of a latent infection is not clear, although a latent or "carrier" state is recognized (8, 15). The organism has been associated with neonatal conjunctivitis in kittens (7) and was the probable cause of this disease in this cattery. In addition, the zoonotic implications of this case should not be overlooked. Human infection with the agent of "feline pneumonitis" was reported previously (14). That case also involved a household where several cats were affected with chlamydial conjunctivitis. Although it could not be proven, it is very likely

³Terramycin ophthalmic ointment, Pfizer Co. Ltd., Pointe Claire-Dorval, Quebec.

⁴Rogar-mycine ophthalmic ointment 1%, Rogar/STB, London, Ontario.

that the owner in the present case was infected with the feline organism. This assumption is based on the clinical signs observed, the suspicious particles seen in original egg inoculations and the rapid response to tetracycline therapy.

The etiology in the second case is less clear than the first. Most probably the syndrome seen in this particular cat was a reflection of the action of several agents, including FVR infection, distichiasis and antibiotic and steroid treatment. The importance of *Mycoplasma felis* isolation is equivocal. Although mycoplasmas have been identified in cases of feline conjunctivitis, bacteria, viruses and chlamydiae have been isolated concurrently (5, 7). Furthermore, many consider mycoplasmas part of the normal conjunctival flora of the cat (3, 4, 10). The positive chlamydial isolation is considered significant, not only because of the reported association of this organism with conjunctivitis, but also because of the subsequent excellent response of this particular animal to tetracycline. However, it is impossible to say whether the chlamydia was a primary pathogen, or whether it invaded opportunistically. It should be noted that keratitis is not a usual feature of feline chlamydial infection, either naturally or experimentally (6, 7, 11, 13). Therefore, it seems reasonable to assume that the corneal neovascularization was due to either the FVR infection (2) or the distichial irritation or both.

It would be premature to draw conclusions based on the single isolation of chlamydiae from the dead kitten's lung. However, it is interesting to speculate on the possible link between this, the conjunctival disease of the littermates, and, indeed, the recurrent neonatal conjunctivitis.

These three cases indicate that chlamydial disease does exist in cats in Canada. Previous North American reports have originated in the United States. In this respect, it should be noted that the first two cases involved importation of cats from the U.S. and that the breeder in the third case had several imported animals in her cattery. In the adult cats no respiratory disease was reported. This agrees with previous reports (7, 11, 15) which suggest that conjunctivitis is the most prominent feature of this infection. The fact that an isolation was made from the kitten's lung might indicate that respiratory disease is more likely in very young animals. However, this was not observed clinically, and it must be remembered that the littermates were affected with mucopurulent conjunctivitis.

All treated animals responded well to tetracycline ophthalmic ointment locally. This antibiotic is recommended to eliminate infection (6, 15). Other antibiotics may have some effect in relieving clinical signs, but the conjunctivitis invariably returns shortly after cessation of treatment. Use of this antibiotic should be continued for two weeks after clinical signs disappear to ensure complete removal of the organism from the conjunctival epithelium.

In catteries especially, vaccination should be considered as a means of control. Although vaccinated animals may still contract the infection, clinical signs are usually less severe and of much shorter duration (11, 13). When the infection is suspected in a cattery all new animals should be vaccinated three weeks prior to introduction.

At the present time positive diagnosis of chlamydial conjunctivitis requires the identification of typical chlamydial inclusions in conjunctival scrapings or the isolation of the organism in embryonated eggs. In many clinical situations, neither of these techniques is feasible. In such cases a presumptive diagnosis may be made on the basis of clinical signs and rapid response to tetracycline ointment.

Chlamydial infection should be considered in all cases of persistent or recurrent conjunctivitis, particularly those which recur shortly after cessation of antibiotic therapy. The conjunctivitis may be bilateral, unilateral, or alternating (7). Chlamydial infection is also highly suspect in catteries with a history of reproductive failure or abortion. Although not yet isolated from such cats, chlamydiae have been associated with these syndromes in other species of animals and humans (9, 15). Neonatal conjunctivitis is a frequent complication of venereal chlamydial infection in humans (9). This may be the route of transfer to neonatal kittens as well, although to date attempts to isolate chlamydiae from the vagina of these dams have been unsuccessful (7).

Summary

Chlamydial infection in three Canadian catteries is reported. This is the first report of such infection in Canada.

The first case describes recurrent conjunctivitis in a Siamese cattery. *Chlamydia psittaci* but no other organisms were isolated from conjunctival swabs. The owner suffered conjunctivitis and keratitis, and although no chlamydial isolation was made, a zoonotic relationship is suggested. All cases responded to tetracycline locally. A second case of persistent conjunctivitis is presented. *Mycoplasma felis* and chlamydiae were isolated from this animal. The relative importance of these isolations is discussed. A further chlamydial isolation was made from the lung of a dead neonatal kitten. The possible relationship of this finding to recurrent neonatal conjunctivitis in that cattery is considered.

Résumé

Les auteurs rapportent qu'une infection à *Chlamydia* sévissait dans trois élevages de chats. Il s'agit là du premier rapport d'une telle infection, au Canada.

Le premier cas décrit une conjonctivite récurrente qui sévissait dans un élevage de Siamois; on n'isola que *Chlamydia psittaci*, à partir d'écouvillons conjonctivaux. L'éleveur souffrait également

d'une kérato-conjonctivite; même si on ne réussit pas à en isoler de *Chlamydia*, il semble néanmoins exister une certaine relation entre l'infection de ces chats et celle de leur propriétaire. Un traitement local à la tétracycline se révéla très efficace.

Le deuxième cas concerne un chat qui souffrait d'une conjonctivite persistante de laquelle on isola *Mycoplasma felis* et des chlamydies. Les auteurs commentent l'importance relative de l'isolement de ces micro-organismes.

Le troisième cas se rapporte à un chaton nouveau-né des poumons duquel on isola des chlamydies, après sa mort. Les auteurs commentent la relation probable entre cette observation et l'incidence de conjonctivite néo-natale et récurrente, dans cet élevage de chats.

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