

CASE REPORT

Yersinia pseudotuberculosis Infection in a Cat

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Summary

A diagnosis of *Yersinia pseudotuberculosis* in a cat was established by microbiological and histological means. Clinical signs were general malaise, anorexia and vomiting. Significant laboratory findings included a serum glutamicpyruvic transaminase elevation and the presence of urine bilirubin and urobilinogen. Histological examination of liver biopsies revealed numerous varying-sized foci of caseation necrosis containing large numbers of Gram-negative coccobacilli. Bacteriological techniques, treatment and control measures are discussed.

Résumé

Infection à *Yersinia pseudotuberculosis* chez un chat

Des épreuves bactériologiques et histologiques ont permis de diagnostiquer une infection à *Yersinia pseudotuberculosis*, chez un chat. Les signes cliniques se caractérisaient par un malaise général, de l'anorexie et des vomissements. Les résultats de la pathologie clinique révélèrent une élévation de la glutamate-pyruvate-transaminase et la présence de bilirubine et d'urobilinogène, dans l'urine. L'examen microscopique de biopsies hépatiques révéla la présence de plusieurs foyers de nécrose caséuse qui contenaient de nombreux coccobacilles gram-négatifs. Les auteurs commentent les techniques bactériologiques, le traitement et les mesures de prévention de cette maladie.

Introduction

Yersinia pseudotuberculosis infection of the cat has been infrequently reported in the veterinary literature, mostly in Europe, with one recent case in Australia (12). *Yersinia pseudotuberculosis* has been isolated from many species of mammals, reptiles and birds.

Rats, mice and birds are known carriers (11) and have been linked to a high incidence of outbreaks among laboratory animals consuming contaminated feed (13). Carriers such as ticks, lice and fleas are not considered as important vectors since transmission appears to occur rarely (1, 8). Human infections, some fatal, have been associated with cats found to be carrying *Y. pseudotuberculosis* (10). Natural infection or vaccination produces a short-lived immunity of three to four months in the absence of continued exposure (9).

Systemic infection of *Y. pseudotuberculosis* may be related to impaired integrity of the intestinal mucosa. Experiments involving cats (6) and canaries (7) showed a greater ease of disease reproduction subsequent to enteric disease. Organisms spread via the portal venous system and lymphatics to cause pan-systemic disease (11).

This paper describes the first reported diagnosis and subsequent successful treatment for *Y. pseudotuberculosis* in a cat in North America.

History

A four year old, neutered male, domestic short-haired cat was presented to the clinic with complete anorexia, lethargy and occasional vomiting of one week's duration.

Physical examination revealed a dull hair coat, dehydration, icteric conjunctiva and anterior abdominal discomfort. Temperature, pulse and respiration were above normal values.

Clinical Pathology

Pertinent laboratory findings are presented in Tables I and II. On day 1 the cat was mildly anemic with elevated serum glutamicpyruvic transaminase (SGPT), urine bilirubin and urobilinogen levels. On day 7, the SGPT, urine bilirubin and urobilinogen levels were

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TABLE I
HEMOGRAMS AND CLINICAL BIOCHEMISTRY OF A CAT WITH *Y. PSEUDOTUBERCULOSIS*

	Normal Values ^a	Hospital Day No.	
		1	7
Hemoglobin (g/dL)	8-15	9.0	7.1
Packed Cell Volume (%)	37-55	25.5	24.0
RBC (10 ¹² /L)	5.0-10.0	5.5	5.1
WBC (10 ⁹ /L)	5.5-19.5	6.5	18.6
Neutrophils (%)	35-75	80.0	44.0
Band cells (%)	0-3	2.0	6.0
Lymphocytes (%)	20-55	18.0	48.0
Eosinophils (%)	2-12	—	1.0
Monocytes (%)	1-4	—	1.0
BUN (mmol/L)		20.3	49.6
SGPT (IU)		110.0	86.0

^aAdult Values (14)

TABLE II
URINALYSIS OF A CAT WITH *Y. PSEUDOTUBERCULOSIS*

	Hospital Day No.	
	1	7
Colour	dark	light
Turbidity	4+	1+
Specific Gravity	1.042	1.030
pH	6.0	6.0
Protein	30 mg%	30 mg%
Glucose	Negative	Negative
Ketones	Negative	Negative
Blood	Negative	2+
Bilirubin	3+	Negative
Urobilinogen (Ehrlich units)	4	Negative

decreasing, but the blood urea nitrogen (BUN) level was elevated.

Pathology

Exploratory laparotomy revealed numerous yellowish-white, slightly raised, 1-2 mm subcapsular nodules, uniformly distributed throughout all lobes of the liver. Biopsy of these nodules was carried out and tissue submitted for histopathological and microbiological examination.

Tissues were fixed in 10% unbuffered formalin, processed routinely and embedded in paraffin. They were sectioned at 6 μ and stained with hematoxylin and eosin. Brown and Brenn stains for bacteria were utilized.

Histologically, the yellowish-white nodules consisted of varying-sized foci of caseation necrosis surrounded by a zone of neutrophils. In some cases entire lobules were involved. Bipolar, Gram-negative bacteria were present in hepatic sinusoids near the lesions.

Bacteriology

Five percent sheep blood agar, MacConkey's agar and chocolate agar plates were inoculated with ground material from the hepatic necrotic foci then incubated at 37°C aerobically and in 10% CO₂. After 48 hours of incubation, there was heavy growth on all three plates under both aerobic and CO₂ atmospheric conditions. Bacteriological identification was carried out according to previous publications (2, 3).

The isolate was a Gram-negative, small, pleomorphic, nonspore forming and noncapsulated coccobacillus that was motile in broth culture at 22°C, but not at 37°C. On blood agar plates, the colonies were round, finely granular, greyish-yellow, centrally opaque with a flat periphery and nonhemolytic. Glucose, maltose, mannitol, salicin, arabinose and xylose were fermented without gas formation. Nitrates were reduced, esculin was split and urea was decomposed. This micro-

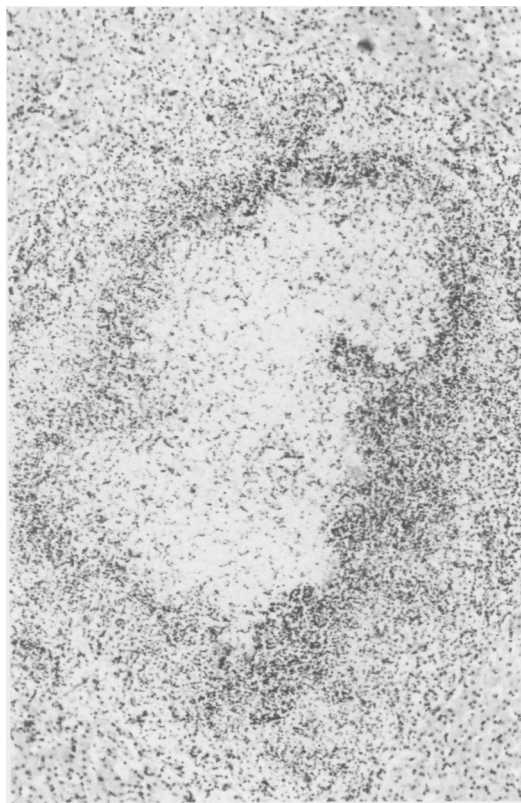


FIGURE 1. Typical foci of caseation necrosis in liver from a cat with *Y. pseudotuberculosis*. Note the large numbers of neutrophils surrounding the necrotic debris. H&E. X20.

organism did not produce cytochrome oxidase but was positive for the enzyme catalase. The morphological and biochemical characteristics were thus identical to those of *Y. pseudotuberculosis*.

Treatment

One hundred and ten mg of hetacillin¹ was given orally twice daily for 20 days. Intravenous electrolytes² were maintained until hydration was normal. A homemade hepatic diet (5) was force-fed three times daily for two days. One digestive tablet³ was given at each feeding.

Icterus was inapparent ten days after presentation. Hepatic dietary therapy was continued for six weeks. Appetite, vitality and stamina returned to normal within three months.

Discussion

The anorexia, vomiting, dehydration, dull hair coat, lethargy, icterus and abdominal discomfort seen in this cat are characteristic signs, observed in most mammals, as reported in the literature. Diarrhea is also reported as a common finding (10, 11).

The organism, after entering via the intestinal tract and spreading through the portal venous system and lymphatics, appears to replicate in organs with extensive vascular systems, such as liver, spleen and lung. The resulting necrosis and toxemia account for most of the clinical signs. The elevated serum SGPT, urine bilirubin and urobilinogen levels can be directly attributed to hepatocellular damage. Icterus is a physical manifestation of an elevated serum bilirubin. Excessive tissue protein breakdown accompanied by a febrile and toxic condition may have caused the rise in the BUN (4).

Diagnosis is based on isolation and identification of the organism and on the demonstration of large numbers of Gram-negative coccobacilli at the periphery of the lesions. Most broad-spectrum antibiotics are effective in treatment.

Rodents, insects and birds are potential reservoirs of the organism and hence a possible public health hazard. In this case, the public health authorities and the owners were advised of the possible implications. After ten days of hospitalization, the cat returned home. To date, no illness attributed to *Y. pseudotuberculosis* has occurred on the premises. Preventive measures must include the elimination of potential carriers, prevention of food contamination and maintenance of hygienic isolation procedures in animal holding areas.

Acknowledgments

The authors would like to thank Mrs. Jill Davies for typing the manuscript.

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²Lactated Ringer's Injection, U.S.P., Diamond Laboratories, Calgary, Alberta.

³Festavital, Hoechst Pharmaceuticals, Montreal, Quebec.

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LETTER TO THE EDITOR

A Plea for Broader Advertising of Positions in International Veterinary Medicine

DEAR SIR:

I was interested in Dr. Maxie's letter on International Development in the August issue (*Can. vet. J.* 20: 215, 1979). The concept of using the Canadian Veterinary Medical Association for distributing information on positions in international veterinary medicine would be far more equitable than what exists at present.

A few years ago I was actively interested in such positions. However, despite having applications on file with CIDA, WHO, FAO and the Department of External Affairs it appeared that when positions became available they were advertised in a very narrow area, specifically the area containing Ottawa, Guelph and Montreal. In many cases, on following up on an opening, the position had been filled before it had been generally advertised through-

out the interest group specified. While I realize that in many cases qualification for such positions involved more than the specific training, I found it quite frustrating that while personal contact was actively practiced in the area mentioned above, little advertising was undertaken in other areas of Canada.

There are usually many members of the veterinary profession who could make valuable contributions to international work who are not recognized or known because of limited access to such information. Any steps that CVMA could take to alleviate the present situation, and broaden the advertising and knowledge of such work, would be of value, both to the profession and the ultimate consumer.

Yours very truly,

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