









Case Report

Unusual mediastinal abscess to *Pseudomonas aeruginosa* in a cat in southern Brazil

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Abstract

A two-year-old male Siamese cat was submitted for necropsy. The animal had been anorexic, exhibited aggressive behavior, and had collided with objects around the house. Radiographic evaluation revealed an opaque abscess in the thoracic mediastinal region, and the cat died two days later. At necropsy, a slightly irregular abscess was found in the mediastinal region, varying from white to yellow, measuring 6 x 4 cm. The cut section contains yellow, irregular, and poorly defined areas interspersed with discrete red areas of firm consistency, along with hard areas. Histologically, the mediastinal abscess showed proliferation of poorly collagenized fibrous connective tissue, intense angiogenesis, and a marked infiltration of macrophages and epithelioid macrophages surrounding extensive areas of liquefactive necrosis with cellular debris, as well as abundant viable and degenerated neutrophils and areas of mineralized bone matrix formation. Aseptically collected fragments of the mediastinal abscess were submitted for bacterial culture, which isolated *Pseudomonas aeruginosa*. The anatomopathological and microbiological findings confirmed a diagnosis of mediastinal abscess due to *Pseudomonas aeruginosa* in a cat. We highlight the importance of both pathological and microbiological evaluation in such cases, expanding the differential diagnoses of mediastinal masses in cats.

Keywords: anatomopathological, bone, mediastinal mass, microbiological.

Introduction

Mediastinal abscesses are rarely reported in veterinary medicine and are often associated with specific underlying causes. In animals, abscess formation in the mediastinum is commonly linked to the ingestion and migration of foreign bodies such as grasses and needles. These abscesses typically present as fluctuant lesions containing yellow-green purulent material surrounded by a fibrous connective tissue capsule (1, 7, 10).

In cats specifically, neoplastic processes such as mediastinal lymphoma are a more frequent cause of masses in this region. These tumors, often associated with feline

leukemia virus (FeLV), present morphological features that differ significantly from those of abscesses (4). In human medicine, mediastinal abscesses are most frequently reported as a consequence of esophageal perforation following the ingestion of sharp objects such as fish bones, leading to localized infection and abscess formation in the mediastinum (9, 11).

Given the variety of potential causes, thorough investigation and differential diagnosis are essential when evaluating nodular lesions in the mediastinal region, especially when clinical or morphological features do not conform to the more common patterns. The objective of this study is to report an uncommon case of a mediastinal abscess caused by *Pseudomonas aeruginosa* in a cat.

Case description

A two-year-old male Siamese cat was submitted for necropsy at the Laboratory of Veterinary Pathology, Universidade do Estado de Santa Catarina (UDESC), in Lages/SC, Brazil. The animal had been under clinical care, and it was reported to be anorexia, aggressive, and had collided with objects in the house. The cat was treated with fluid therapy and received ampicillin 20 mg/kg, omeprazole 1 mg/kg, dipyron 25 mg/kg, and maropitant 1 mg/kg. Radiographic evaluation revealed a radiopaque abscess in the mediastinal thoracic region, and the cat died two days later.

At necropsy, fragments of all organs were collected in 10% buffered formalin, routinely processed, and stained with hematoxylin and eosin. Fragments of the mediastinal abscess were collected aseptically and sent for bacterial culture and antibiogram. Histological sections of the bone marrow were submitted to immunohistochemistry (IHC) for FeLV and FIV.

Initially, the paraffin-embedded bone marrow sections were placed on positive slides, followed by endogenous peroxidase blocking using 10% hydrogen peroxide diluted in methanol for 10 min; subsequent antigenic recovery, which consisted of incubation in 10% Tris-EDTA buffer (pH 9) for FeLV and 10% citrate buffer (pH 6) for FIV during 40 min in a water bath at 100 °C, was conducted. Non-specific reactions were blocked using a 5% solution of powdered skimmed milk (Molico®) in distilled water for 20 min, at room temperature (20 °C approximately). The primary antibody used on the bone marrow sections was anti-FeLV gp70 (monoclonal, AbD Serotec, Kidlington, UK) and anti-FIV p24 gag (monoclonal, AbD Serotec, Kidlington, UK) was diluted at a concentration of 1:500 in phosphate-buffered saline. The slides were incubated in a humidity chamber for 1.5 h at 37 °C.

Thereafter, the sections were incubated with a polymer (MACH 4 HRP® Kit, Biocare Medical, Concord, California, USA) for 15 min in the first stage (probe) and 30 min in the second stage (polymer). The 3,3'-diaminobenzidine (DAB) chromogen (Dako, Glostrup, Denmark) was used for development, and Harris hematoxylin was used for counterstaining. The bone marrow sections from a cat previously tested for FeLV and FIV were inserted as the positive control.

At necropsy, an abscess was observed in the thoracic cavity, in the mediastinum, extending from the thoracic entrance to the cardiac base. It had a slightly irregular surface, varying from white to yellow, and measured 6 x 4 cm in diameter. The cut section contains yellow, irregular, and poorly defined areas interspersed with discrete red areas of firm consistency and hard areas (Fig. 1).

Histologically, the mediastinal abscess exhibited proliferation of poorly collagenized fibrous connective tissue and intense angiogenesis, consistent with a chronic reparative response. A marked inflammatory infiltrate was present, composed predominantly of macrophages and epithelioid macrophages, which surrounded extensive areas of liquefactive

necrosis containing cellular debris and numerous viable and degenerated neutrophils. This combination of cellular components indicates a chronic-active purulent inflammatory process. In the necrotic areas, marked dystrophic calcification was evident with areas of mineralized bone matrix formation (Fig. 1).

In microbiological analysis, bacterial culture isolated *Pseudomonas aeruginosa* from the sample of the analyzed mediastinal mass. Antibiogram testing revealed resistance to 10 of 17 antibiotics tested, including amoxicillin, amoxicillin/clavulanic acid, ampicillin/sulbactam, cephalotin, cefepime hydrochloride, cefotaxime, cefoxitin, ceftriaxone, florfenicol, and sulfamethoxazole/trimethoprim. Enrofloxacin demonstrated intermediate susceptibility, while six antibiotics showed sensitivity: ceftazidime, ciprofloxacin, gentamicin, imipenem, meropenem, and tetracycline. The FeLV and FIV IHC of bone marrow were negative.

Thus, macroscopic, histopathological, and microbiological findings allowed for the diagnosis of a mediastinal abscess in a cat caused by *Pseudomonas aeruginosa*.

Discussion

The development of mediastinal abscesses is poorly described in cats and, when reported, is often associated with intrathoracic foreign bodies that perforate the esophagus, such as needles and grasses of the genus *Hordeum* spp (1, 7). In the reported cases, cats were submitted to surgery, but only one case resulted in euthanasia. Notably, esophageal lesions were not observed in those cases, nor in the present report. However, in our case, the origin of the abscess is uncertain, it is possible that it was caused by a previous external trauma to the thorax, considering that the cat was aggressive and had previously collided with objects inside the house.

Clinical signs may vary depending on the origin, location, and size of the mass, as well as the presence of compression or infiltration of surrounding mediastinal and thoracic structures, and the occurrence of pleural effusion (8). A complication associated with mediastinal abscesses is the displacement and external compression of the esophagus, which can lead to anorexia and vomiting, as observed in a case where the patient presented with a caudal mediastinal paraesophageal abscess (6). In the present case, although esophageal lesions were not identified, anorexia was observed.

Due to this case's lesion location and epidemiological factors, mediastinal lymphoma was the primary differential diagnosis. In a study conducted in the same region where we report our case, mediastinal lymphomas were highly prevalent, affecting 33.96% (18/53) of cats. They were the second most frequent subtype, only behind multicentric lymphomas (43.4% [23/53]); additionally, lymphomas showed a high association with FeLV in 56.6% of cases through IHC, being commonly observed in young male cats (4).

The cat tested negative for FeLV and FIV by IHC. Similarly, in another report of a cat diagnosed with a caudal

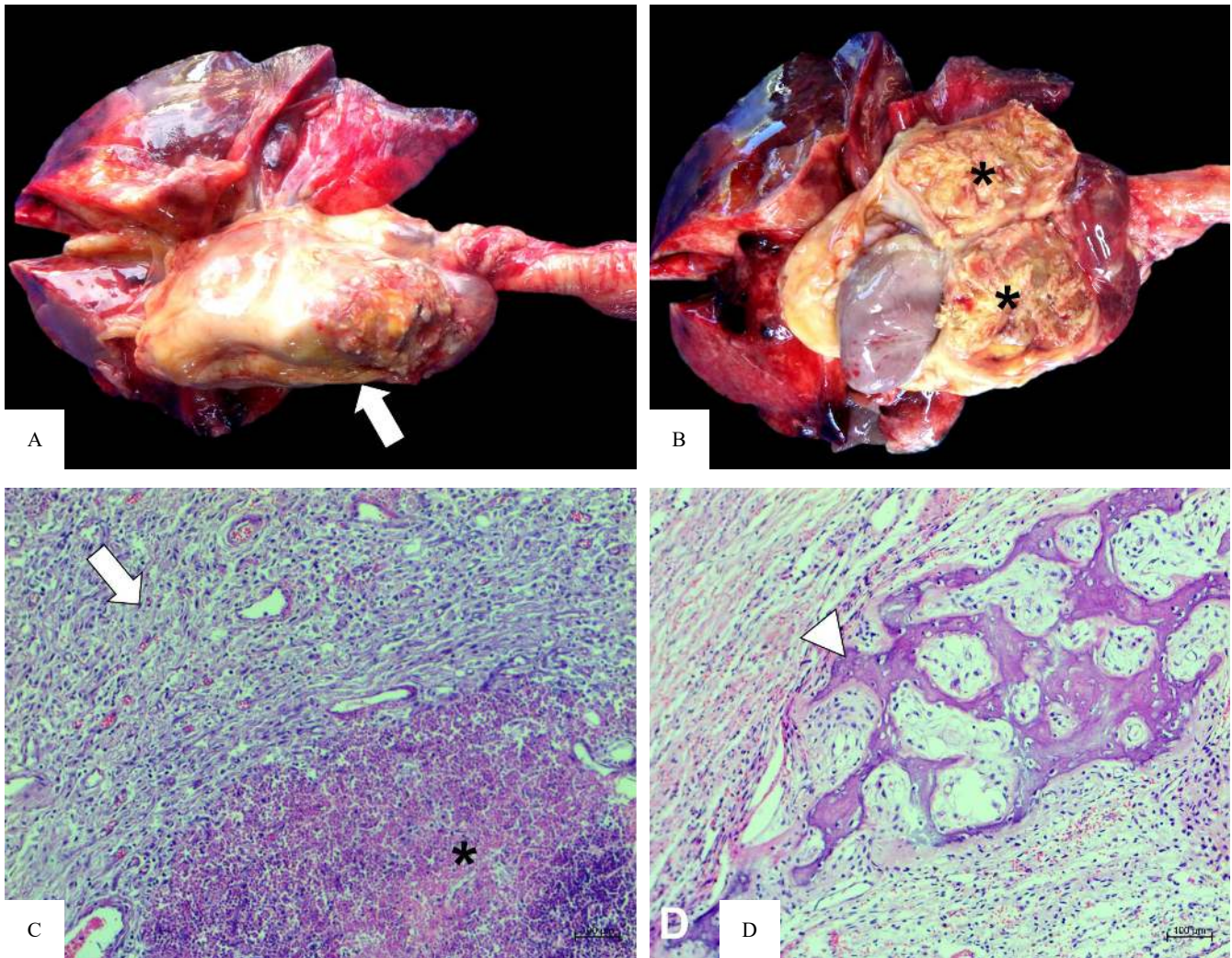


Figure 1. Unusual mediastinal abscess caused by *Pseudomonas aeruginosa* in a cat. A. Mediastinal region: abscess with a slightly irregular surface, white to yellow, measuring 6 x 4 cm (arrow). B. On cut surface, irregular, yellow areas with poorly defined areas interspersed with discrete red areas (*). C. Mediastinal abscess: liquefactive necrosis with intact and degenerate neutrophils (*) surrounded by infiltration of macrophages, epithelioid macrophages, and a fibrous connective tissue capsule (arrow). D. Showing areas of mineralized bone matrix formation (arrowhead) within the mediastinal abscess.

mediastinal abscess caused by a grass awn (*Hordeum* spp.), the animal tested negative for FeLV but was FIV-positive by enzyme-linked immunosorbent assay (ELISA) (7).

In the United States, another study revealed that cats treated for bite wounds and cutaneous abscesses were twice as likely to be positive for FeLV and FIV compared to cats without such a history, with a combined prevalence of 19.3% (5). However, it is important to emphasize the need for testing for both viruses in feline patients, as these diseases have a high prevalence in the Plateau region of Santa Catarina, where this case report was conducted, being detected through both enzyme-linked immunosorbent assay and polymerase chain reaction (2, 3).

Initially, radiographic imaging suggested mediastinal lymphoma. However, macroscopically, the lesions were

distinct, with different consistency and color. In lymphomas, the nodule is white and soft due to the large number of lymphocytes and scant fibrous connective tissue support, ruling out its occurrence in this case (4). In contrast, abscesses, usually resulting from acute inflammation, consist of a fluctuating, thin-walled structure containing yellow-green purulent material surrounded by a fibrous connective tissue capsule (1, 10). In some cases, chronic abscesses may develop, exhibiting features similar to those found in this report. In this case, the pathological pattern differs from those previously described, with the abscess already in a chronic stage and showing mineralized bone matrix formation, which is uncommon.

Pseudomonas aeruginosa is not typically associated with mediastinal abscesses in cats. In a report involving a mediastinal abscess due to grass of the genus *Hordeum* spp., aerobic

culture of the purulent material yielded no bacterial growth on blood agar (7). In another case involving septic pericardial disease and a mediastinal abscess caused by an intrathoracic needle, *Actinomyces* sp. was isolated from the pericardial fluid (1).

This case report describes an unusual occurrence of a mediastinal abscess caused by *Pseudomonas aeruginosa* in a cat. The macroscopic, histopathological, and microbiological findings, supported the diagnosis of a mediastinal abscess with marked dystrophic calcification and bone matrix formation, features not typically reported in feline mediastinal abscesses. The identification of *Pseudomonas aeruginosa*, a pathogen not previously associated with this condition in cats, highlights the importance of microbiological evaluation in such cases and broadens the differential diagnoses for mediastinal masses in cats.

Conflict of Interest

The authors declare no competing interests.

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