

## Inside A 4-Year-Old Pug, a Tooth Extraction Cyst Totally Blocked the Nose

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### Abstract

A cat aged 11 appeared with dyspnea that had been present for one week. The cat has previously experienced allergies, which were being treated with cyclosporine. Upon physical examination, it was discovered that the cat was oxygen-dependent and had an elevated respiratory effort and rate. A severe diffuse nodular pulmonary pattern, suggestive of metastatic neoplasia, was seen on thoracic radiography. An abdomen ultrasound was carried out to check for any main masses or signs of a widespread illness. There was a 4.3 2.2 cm ileocolic mass present. Poor exfoliation was observed in intestinal mass fine-needle aspirates. IgM and IgG titres for *Toxoplasma gondii* were measured (IgM 1:20 and IgG >1:20,480). The pulmonary nodules were fine-needled aspirated, revealing neutrophilic and macrophagic inflammation along with numerous 2-4  $\mu$ m, crescent-shaped organisms that were consistent with *Toxoplasma gondii*. Clindamycin was prescribed in place of the drug cyclosporine. Three days later, the cat was released. Re-imaging showed that the intestinal and lung lesions were healed. Clinical recovery was made.

**Background:** Particularly when an abdominal mass is detected during an ultrasound examination, diffuse nodular pulmonary patterns found on radiographs are frequently thought to be cancerous tumours. A precise diagnosis frequently requires cytology since widespread protozoal or fungal illnesses might mimic neoplastic disease. If the right treatment is started as soon as possible, the prognosis for these differentials may differ. An indoor-only senior cat with dyspnea, a radiographically visible nodular pulmonary pattern, and a concurrent abdominal mass is described in this case. Toxoplasmosis was ultimately determined to be the cause of the cat's symptoms after an ultrasound-guided fine-needle aspirate of a pulmonary nodule revealed a significantly elevated IgG titre and a positive response to clindamycin therapy.

**Keywords:** Cat; Female domestic; Ultrasound; Pulmonary pattern

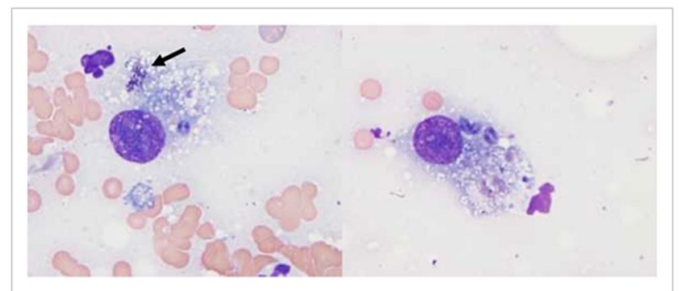
### Introduction

An emergency referral for an 11-year-old female domestic shorthair cat that was spayed, only kept indoors, and had a one-week history of increasing dyspnea and concomitant hyporexia to anorexia was made to Michigan State University. The cat resided in a home with other cats and divided its time between South Carolina (during the winter) and Michigan (summer months). The cat was being given cyclosporine at an unknown dose since it was thought to have a history of allergies. Two [1-4] months prior to presentation, the cat experienced a seizure episode, at which point an abnormal SNAP cardiac proBNP value was discovered. The primary care veterinarian began the cat on clopidogrel. The cat was started on furosemide for its laboured breathing about a week prior to the referral. With no clinical improvement, the cat remained hospitalised at the primary care vet. Although a single-view thoracic radiograph was taken, it couldn't be examined. Additionally, toxoplasmosis titres were submitted and awaited at the time the patient was brought to the referral hospital.

### Investigations

The cat's vital signs were within normal ranges upon examination, with the exception of tachypnea (T: 100.4°F, HR: 160 beats per minute, RR: 52 breaths per minute). The cat was oxygen-dependent, intellectually sluggish, and dehydrated. The cat weighed 5.8 kg and has a 7/9 bodily condition rating. A normal cardiac auscultation was performed, and there were more bronchovesicular lung sounds than usual. No signs of pleural effusion were found during a thoracic point-of-care ultrasound, and the left atrium to aorta ratio was normal (LA:Ao). An abdominal ultrasound and echocardiography were done the next day. There was no sign of heart disease found during the echocardiography. The goal of the abdomen ultrasound was to look for any main masses or signs of a widespread infectious illness. It showed a hypoechoic, mass-like lesion in the distal ileum's muscularis layer that

extended into the cecum. This lesion was 4.3 2.2 cm in size (Figure 1). A nearby colic lymph node was hypoechoic and 0.7 cm in size. The liver was hyperechoic and very slightly enlarged. Small hyperechoic debris was present in the gall bladder. The intestinal mass's ultrasound-guided fine-needle aspirations lacked sufficient cellularity and were hence non-diagnostic. The possibility of metastatic neoplasia was discussed with the owner, but it was also brought up that given the cat's past, it was also likely that disseminated infectious disease may produce



**Figure 1:** Cytologic results from a lung nodule in the periphery. In the cytoplasm of macrophages and extracellularly, large numbers of 2-4  $\mu$ m crescent-shaped organisms with light blue cytoplasm and a purple nucleus are visible (*Toxoplasma gondii*). There are such organisms present, as indicated by an arrow.

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comparable clinical indications. Following that, an IFA assay for toxoplasmosis revealed IgM titres of 1:20 and IgG titres of 1:20,480. To help identify the exact cause, pulmonary aspirates were advised. Under sedation (dexmedetomidine 3 g/kg IV with methadone 0.2 mg/kg IV once), ultrasound-guided [4-6] fine-needle aspirates of a peripheral lung nodule were carried out. High levels of cellularity were present in the samples, which were primarily made up of epithelial cells, significant numbers of degenerated neutrophils, significant numbers of macrophages, and minor amounts of blood. In the cytoplasm of macrophages and extracellularly, large numbers of 2-4 µm crescent-shaped organisms with light blue cytoplasm and a purple nucleus were observed. These species shared *Toxoplasma gondii*'s physical characteristics.

### Differential Diagnosis

Given the patient's signalment and indoor-only condition, the most likely differential diagnosis for the multifocal nodular pulmonary pattern with concurrent intestinal mass was metastatic neoplasia. The presence of widespread infectious disease, such as toxoplasmosis, histoplasmosis, or fungal agents, could not be ruled out solely on the basis of imaging results. This, along with the history of immunosuppression (cyclosporine), high toxoplasmosis IgG titre (despite normal IgM titre), and multi-cat household status, led to the advice to perform a pulmonary aspirate. As an alternative, liver cytology may have been tried initially, but it was thought to have a low yield.

### Treatment

Due to dyspnea with hypoxemia, the initial course of treatment comprised oxygen supplementation using an oxygen cage set at a FiO<sub>2</sub> of 40%. After initial stabilisation with oxygen, dehydration was treated with IV fluid treatment using a balanced isotonic electrolyte solution (lactated ringer solution) after inserting an intravenous catheter. Due to a possible bacterial lower airway condition, azithromycin (10 mg/kg IV every 24 hours) was recommended. The use of cyclosporine was stopped. A nasogastric [7-10] tube was also introduced to provide nutritional support due to the patient's anorexia. To promote oral meal intake, transdermal mirtazapine (1.5-inch strip on pinna) was also recommended. Azithromycin was stopped after *T. gondii* tachyzoites were found on a pulmonary aspirate and substituted with clindamycin (12.5 mg/kg orally [PO] every 12 hours). To increase tolerance for the enteral feeding regimen, maropitant citrate (2 mg/kg PO every 24 hours) was also administered. Within 3 days, the patient was able to wean themselves off of oxygen and showed significant clinical improvement. They were then discharged with continuing oral clindamycin (11.3 mg/kg PO every 12 hours). According to the European Advisory Board on Cat Diseases (ABCD) recommendations, clindamycin should be stopped after 4 weeks, yet the owner continued to administer it after this point. 3 Clindamycin withdrawals couldn't be timed with absolute certainty.

### Materials and Methods

Clinical improvement was seen while in the hospital after starting the proper antibiotic medication. Serial diagnostic imaging was also advised because concomitant metastatic neoplasia could not be ruled out. One week after being released, the cat went back for another exam. According to reports, the cat was doing well at home and was getting more active all the time. A persistent, severe pulmonary nodular pattern that had developed into a consolidating multifocal pattern was visible on thoracic radiographs. Although a mild pleural effusion was observed and was thought to be an inflammatory effusion, no sample could be

taken. The primary care veterinarian sequentially observed thoracic radiographs and saw gradual improvement over time. Approximately 9 months after the cat had left Michigan, a follow-up appointment was scheduled at the referral facility. Although there was a bronchial pulmonary pattern present, thoracic radiographs showed a marked to full clearance of the nodular pulmonary pattern. The abdominal mass-like lesion had disappeared, according to an abdominal ultrasound. At home, the cat remained clinically healthy.

### Learning Points/Take-Home Messages

*Toxoplasma gondii* exposure causes many cats to produce antibodies, but clinical illness is rare. When cats experience immunosuppression, such as that getting cyclosporine medication, clinical symptoms frequently appear. Nodular pulmonary patterns are a possible pulmonary manifestation of toxoplasmosis and may be confused for metastatic neoplasia. Toxoplasmosis must be definitively diagnosed by finding the parasite in bodily fluids or tissues. The preferred treatment for toxoplasmosis in indoor-only cats is clindamycin.

### Discussion

An obligatory intracellular parasite, *T. gondii*. 4 The only species in which the sexual phase of reproduction can take place and result in the transit of unsporulated oocytes in the faeces is the felid, which is regarded as the definitive host. 4 The consumption of sporulated oocytes found in food, water, or soil can turn other warm-blooded animals into intermediate hosts. 4 Cats can contract the disease in one of three ways: I congenital infection, (ii) eating diseased tissue, or (iii) drinking water or food contaminated with oocysts. 4 In our case report, the cat's initial infection path remains unknown. Cats are frequently exposed to toxoplasmosis, and regional differences in antibody prevalence exist. In the two areas where the cat lived, the seroprevalence of exposure to *T. gondii* in critically ill cats ranges from 37.4% to 42.4%. 5 Clinical illness, on the other hand, is uncommon and often only happens when a cat develops immunosuppression. 3 When evaluating the relative risk of toxoplasmosis in a patient, other crucial variables to take into account are their food habits (such as a raw diet), their way of life (such as hunting), the climate, and their geographic location (e.g., rural vs. urban). The cat in this report tested negative for both FeLV and FIV. However, cats taking cyclosporine medication have been observed to develop acute-onset toxoplasmosis. 6-8 During oral cyclosporine medication, cats who are *T. gondii*-unaware appear to be most at risk of contracting toxoplasmosis. 9 Toxoplasmosis serology testing may be beneficial even if it is not required prior to beginning cyclosporine therapy. The central nervous system, muscles, lungs, and eyes are the tissues that are most frequently impacted. 3 The cat that was the subject of this report had a pulmonary or disseminated *T. gondii* manifestation, which is what caused the 1-week history of deteriorating respiratory symptoms prior to presentation. The cat had a seizure event that was documented two months before to presentation, which may have been brought on by toxoplasmosis. IFA toxoplasmosis titres on the cat showed a normal IgM titre and a noticeably raised IgG titre. Depending on the assay used, seropositivity for IgM generally suggests recent infection, with titres peaking at 2-4 weeks following inoculation and reverting to normal levels by 16 weeks. IgM seropositivity suggests *T. gondii* exposure, but by the time a cat tests positive for IgG, the oocyte shedding period has typically ended and the public health danger has decreased. 4 Because high titres have been observed for several years after experimental infection, high IgG titres do not always signify current infection. Non-regenerative anaemia, hyperglobulinemia, and elevated liver enzyme concentrations

are common haematologic and biochemical abnormalities associated with toxoplasmosis, as was the case with the cat in this case report. Although a nodular pulmonary pattern can also be recognised, diffuse interstitial to alveolar pulmonary patterns are frequently visible on thoracic radiographs. Three-view thoracic radiographs in this case report displayed a severe diffuse pulmonary nodular pattern, with some nodules measuring up to 1.7 cm (Figure 1). An enlarged lymph node and mass-like region were visible on abdominal ultrasonography along with surrounding normal-sized lymph nodes. Initial suspicion was for metastatic neoplasia based on the presentation and test results. It was also thought about if there might be fungal, parasitic, or protozoal infections.

### Author Contributions

The diagnosis and treatment of this cat were handled exclusively by Jennifer Weng and Harry Cridge. This report was written by Jennifer Weng, and Harry Cridge gave it a critical appraisal. The final draught of the manuscript has received the approval of both Jennifer Weng and Harry Cridge.

### Conflict of Interest

According to the authors, there are no conflicts of interest that might be thought to compromise the objectivity of the research presented.

### Ethics Statement

The case described in this report was handled as part of the regular clinical caseload at the university teaching hospital; an IACUC or other

ethical approval was not necessary. All facets of this patient's care had the owner's consent.

### References

1. Murakami M, Mori T, Takashima Y, Nagamune K, Fukumoto J, et al. (2018 ) A case of pulmonary toxoplasmosis resembling multiple lung metastases of nasal lymphoma in a cat receiving chemotherapy. *J Vet Med Sci* 80: 1881–1886.
2. Hartmann K, Addie D, Belák S, Boucraut-Baralon C, Egberink H, et al. (2013) *Toxoplasma gondii* infection in cats: ABCD guidelines on prevention and management. *J Feline Med Surg* 15: 631–637.
3. Lappin M (2014) Toxoplasmosis. In: *J Sykes* 693– 703.
4. Voltaire MR, Radecki SV, Lappin MR (2005) Seroprevalence of *Toxoplasma gondii* antibodies in clinically ill cats in the United States. *Am J Vet Res* 66: 874– 877.
5. Maghsoudi M, Shahbazzadegan B, Pezeshki A (2016) Asymptomatic intracranial foreign body: an incidental finding on radiography. *Trauma Mon* 21: 22206.
6. Pelin Z, Kaner T (2012) Intracranial metallic foreign bodies in a man with a headache. *Neurol Int*. 4: 18.
7. Sturiale CL, Massimi L, Mangiola A, Pompucci A, Roselli R, et al. (2010) Sewing needles in the brain: infanticide attempts or accidental insertion? *Neurosurgery* 67: E1170– 179.
8. Abbassioun K, Ameli NO, Morshed AA (1979) Intracranial sewing needles: review of 13 cases. *J Neurol Neurosurg Psychiatry*. 42: 1046– 1049.
9. Bozkurt H, Arac DA (2019) Late onset adult seizure due to intracerebral needle: case-based update. *Childs Nerv Syst* 35: 593– 600.
10. Sucu HK, Gelal F (2006) Intracranial metallic foreign body presenting with a unique route of introduction into the brain. *Neurol India* 54: 224– 225.