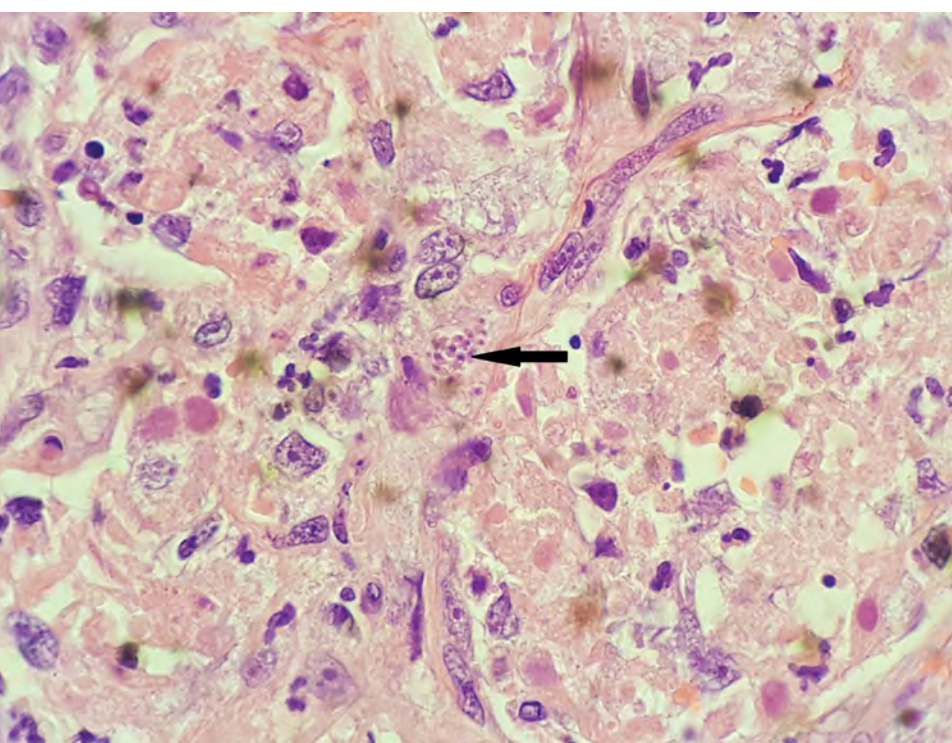


Pulmonary toxoplasmosis in a puppy

Geoff Orbell, Veterinary Clinical Director at Gribbles Veterinary Laboratories Palmerston North, tracks the source of *Toxoplasma gondii* infection in a puppy.



A 10-WEEK-OLD HEADING Dog puppy presented to a veterinary clinic moribund with severe respiratory distress. Three days previously the puppy had stopped eating, and a day later had developed laboured breathing. The puppy had been born on farm and two litter mates were clinically normal. The puppies were being fed a commercial diet as well as raw mutton.

Clinically, differential diagnoses included hypoxia due to severe

FIGURE 1: Lung (400x magnification). Necrosis of alveolar septa with haemorrhage, fibrin, degenerate neutrophils and karyorrhectic debris with intralveolar protozoal zoites (arrow).

haemolytic anaemia, streptococcal pneumonia, aspiration pneumonia, pneumonia secondary to kennel-cough complex and a toxic insult of some description. Due to the severity

of the clinical signs, the puppy was euthanased and a postmortem examination was performed.

The most significant findings on gross postmortem examination were the lungs, which were diffusely firm, rubbery and discoloured and partially sank in formalin. Histologically there was a severe interstitial pneumonia with marked Type 2 pneumocyte hyperplasia. Multifocally septa were disrupted by necrosis associated with a low number of protozoal tachyzoites (Figure 1). PCR (polymerase chain reaction) of the fixed tissue identified *Toxoplasma gondii*. No other tissues were submitted for histology.

Toxoplasma gondii is an apicomplexan, intracellular, protozoal parasite

TOXOPLASMA GONDII IS AN APICOMPLEXAN, INTRACELLULAR, PROTOZOAL PARASITE FOR WHICH THE DEFINITIVE HOST IS THE DOMESTIC CAT AND OTHER FELIDS.

for which the definitive host is the domestic cat and other felids. All other mammalian species, as well as cats, serve as intermediate hosts. Intermediate hosts are infected by ingestion of oocysts from feline faeces, consumption of tissue containing infective cysts containing bradyzoites or congenital infection. In domestic cats and other felids, consumption of infected prey is most commonly believed to be the cause.

Following ingestion of oocysts or tissue cysts, asexual and sexual reproduction occurs in the feline intestine, resulting in oocyst shedding.

IN THE LAB

Only asexual reproduction occurs in intermediate hosts with no oocyst production. Oocyst shedding is highest in young kittens, immunosuppressed or retroviral infected adult cats and those infected by ingestion of infected intermediate host tissue.

Clinical toxoplasmosis in dogs is rare and is most commonly seen in immunosuppressed dogs or those with concurrent disease. Most commonly it presents as neuromuscular disease similar to *Neospora caninum* infection, which is more common in dogs but can also affect horses and ruminants. Less commonly, it presents as respiratory disease, which is more often seen in cats with congenital or systemic infection. In the current case, there would likely have been other organs infected but these were not submitted for histology.

This puppy could have been infected by eating raw meat or ingesting oocysts. On further questioning the owner said the meat the puppy was fed had been frozen at -18° Celsius for more than 24 hours, which should have been enough to kill encysted toxoplasmosis bradyzoites.

The owner also reported they had two healthy adult cats, but in the previous two weeks had noticed a stray kitten around the puppy's kennel. In this case the wild kitten would have been the most likely source of *Toxoplasma gondii* infection for the affected puppy. ¹³

FURTHER READING:

Calero-Bernal R, Gennari SM. Clinical toxoplasmosis in dogs and cats: An update. *Frontiers in Veterinary Science* 6, 54, 2019

Pepper A, Mansfield C, Stent A, Johnstone T. Toxoplasmosis as a cause of life-threatening respiratory distress in a dog receiving immunosuppressive therapy. *Clinical Case Reports* 7, 942–8, 2019

Shapiro K, Bahia-Oliveira L, Dixon B, Dumètre A, de Wit LA, VanWormer E, Villena I. Environmental transmission of *Toxoplasma gondii*: Oocysts in water, soil and food. *Food and Waterborne Parasitology* 15, 2019. <https://doi.org/10.1016/j.fawpar.2019.e00049>