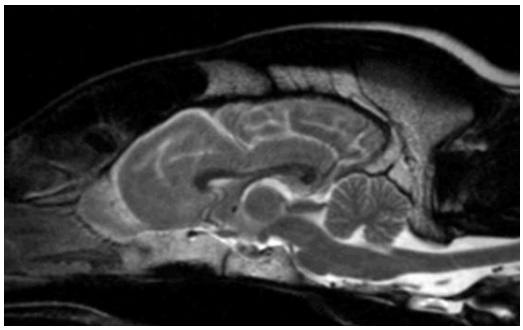
Neospora caninum

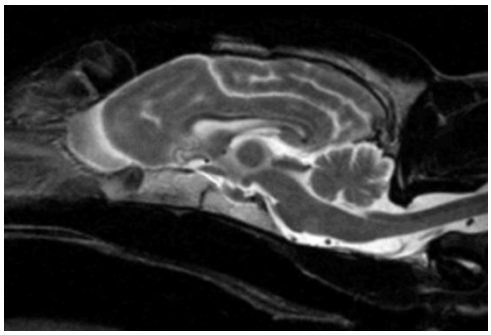
Neosporosis

Background

Although exposure to the protozoal parasite *Neospora caninum* is common, clinical disease is rare, and when it occurs it tends to be seen in puppies and young dogs. Older dogs are occasionally affected. Cases have not been reported in cats, and there is no zoonotic risk.

Dogs become infected either transplacentally from the dam or via the ingestion of organisms in the tissues of an intermediate host (e.g. raw infected bovine muscle or fetal membranes). Usually, the host immune system limits the infection and causes the parasite to encyst in tissues (typically in brain and muscle). Pregnancy can lead to reactivation of encysted *Neospora* organisms, resulting in transplacental infection in ~50% of offspring. Outcomes of fetal infection include abortion or clinically neosporosis. Reactivation of tissue cysts (e.g. following immunosuppression) can also result in clinical disease in older dogs but is uncommon.





The left image shows a normal dog. The right image shows cerebellar atrophy on MRI with marked cerebellar sulci in a dog with *Neospora* infection.

When should I suspect neosporosis?

Neosporosis should be suspected in young dogs (<6 months of age) with signs of myositis (*muscle inflammation*) and polyradiculoneuritis (a*xial muscular weakness due to nerve root inflammation*). This is seen as an ascending paralysis and gradual muscle atrophy. The pelvic limbs may be hyperextended with loss of patellar reflexes. In very severe cases, respiratory difficulties and dysphagia can develop, which may be fatal.

Neospora caninum

In older dogs signs of a polymyositis and/or meningoencephalitis are seen, as well as signs neurolocalising to the cerebellum (e.g. nystagmus, loss of menace). Nodular dermatitis due to neosporosis has also been reported.

How is neosporosis diagnosed?

Diagnosis usually relies on serology (a single high titre or rising titre) and/or identification of the organism, in conjunction with typical clinical signs. Quantitative PCR is the most sensitive and specific technique for identification of the organism in tissues, however *N. caninum* DNA can be detected in the tissue of healthy dogs, so qPCR should be interpreted in the light of clinical findings.

What samples can I submit for *Neospora* qPCR?

A small volume (0.2 ml) of CSF (EDTA or a plain tube is fine), or a small amount of fresh or frozen (ideally not formalin-fixed) tissue from a clinically affected organ such as muscle or brain (e.g. cerebellum) is required. A cube of tissue (0.5 cm x 0.5 cm x 0.5 cm) is adequate, so for the brain is most likely collected at post-mortem examination. To maximise sensitivity fresh samples (i.e. within three days of sampling) are required.

How do I treat neosporosis?

Clindamycin (10 mg/kg orally three times daily for at least 4 weeks) is the first line of treatment, and courses of over 8 weeks are sometimes required. The prognosis for puppies, once contracture has occurred, is poor. If neosporosis is confirmed in a puppy, consideration should be made to test its littermates for neosporosis to allow early treatment to be instigated. Some advocate empirical treatment of all puppies in the litter, as response to treatment is better if therapy is started before the onset of clinical signs; however, this is less ideal from an antimicrobial stewardship point of view. Alternative treatment options include trimethoprim-sulfadiazine and pyrimethamine (these agents are more difficult to source).

In some cases, corticosteroids or other immunosuppressive agents are required to reduce the inflammation associated with the presence of the organisms. However, use of these agents has also been associated with the recrudescence of infection.

Updated July 2021 by Dr Emi Barker