Dr. Joerg Mayer
Dipl. ABVP (Exotic Companion Mammal) Dipl. ECZM (Small Mammal), Dipl. ACZM

Associate Professor of Zoological and Exotic Animal Medicine
USA

mayerj@uga.edu

PARASITES IN RABBITS

Encephalitozoon cuniculi

- Encephalitozoon cuniculi is an obligatory intracellular primitive fungus that can infect a wide range of mammals, including rodents, rabbits, horses, carnivores and humans, in which the organism is known as an opportunistic pathogen of immuno-compromised individuals.

Encephalitozoon cuniculi

- This parasite may be transmitted in body exudates or trans-placentally.
- The infective form of microsporidia is a resistant spore which can survive for a long time in the environment.
- Approximately one month after the rabbit is infected it begins to shed *E. cuniculi* spores via its urine.
- Spores continue to be shed for approximately 3 months, but can be shed throughout the rabbit's life
- Most often, *E. cuniculi* remains dormant within rabbits, never causing any problems upon initial infection.
- On occasions E. cuniculi reaches nervous tissue, rabbits can experience neurological impairment, characterized by partial or complete paralysis, loss of coordination, seizures, and head tilting.
- As the central nervous system, the kidney and the eye are predilection organs for the organism, predominant histopathological alterations comprise granulomatous meningoencephalitis, chronical interstitial nephritis and phacoclastic uveitis.
- A definitive diagnosis of encephalitozoonosis in vivo is difficult, but it is important for specific treatment and the determination of possible zoonotic risks
- Antibodies to E. cuniculi can be detected through serology (a blood test).
- A rabbit who has been exposed to E. cuniculi will produce antibodies as a result of this exposure.
- Seroprevalence rates are usually high in pet rabbit populations with 37% to 68% of the population.
- A positive titer tells you that the rabbit has been exposed to this parasite at some point in its life.
- Note that this does not allow one to differentiate between simple exposure and an active infection.

The Diagnosis

- A tentative clinical diagnosis is usually obtained by a combination of clinical, neurological and ophthalmological examinations, serological tests and by the exclusion of differential diagnosis
- otitis media/interna is the main differential diagnosis for rabbits showing vestibular signs.

Nystagmus

- Horizontal
- Otitis

Clinical signs

- As lesions are caused within the central nervous system, kidney or eye, rabbits suffering from encephalitozoonosis may demonstrate neurological symptoms, signs of kidney failure or phacoclastic uveitis.

Treatment

- Rabbits that were infected experimentally during their oral treatment with fenbendazole (20 mg/kg/day) did not seroconvert, and spores could not be isolated from their brain tissue.

Avoid overdose

- Bone marrow lesions are reported in rabbits which received regular doses but many were overdosed.
- Cases are usually fatal.

Zoonotic potential

- While the disease has a zoonotic potential, the vast majority of human cases are in severely immune compromised individuals.
- Often the infections are traced back to dogs.

Human with E. cuniculi

Eimeria in rabbits

- Coccidiosis is a disease of animals kept in crowded conditions and occurs in many breeding establishments.

- Wild rabbits can be affected and, theoretically, are a potential source of infection to pet rabbits that are fed on grass.
- Long grass picked by hand is less likely to be contaminated then short grass grazed by large numbers of wild rabbits.
- Eimeria are parasites of epithelial cells. They invade the mucosa of the intestine, colon and caecum and the epithelium of various ducts.
- Infected rabbits void oocysts that require oxygen and a period of a several days to become infective.
- Ingestion of the oocyst releases sporozoites into the duodenum after the oocyst has been broken down by digestive enzymes.
- Eimeria species are host and site specific.
- Oocysts can survive for many years in the environment but are susceptible to dry conditions.
- Recovered rabbits become immune to infection.

Size matters:
Compare and measure

- Have micrometer installed on your scope!
- One species, Eimeria steidae, inhabits the epithelial cells of the bile ducts and causes 'hepatic coccidiosis'.
- Ingested oocysts hatch in the duodenum and sporozoites penetrate the intestinal mucosa before being transported to the liver.
- Replication takes place in the mesenteric lymph nodes before transport via the hepatic portal circulation to the liver where they enter bile duct epithelial cells.
- The key is to detect early!
- Signs are associated with the lesions in the liver and bile ducts, and include weight loss, ascites, jaundice, diarrhoea and hepatomegaly.
- Weanling rabbits are most commonly affected.
- Toltrazuril (Baycox, Bayer) in the drinking water is highly effective in reducing oocyst output of intestinal and hepatic Eimeria species. A regimen of 2 days treatment repeated after 5 days.

Nematodes

- Passalurus ambiguus is an oxyurid that is found in the caecum and large intestine.
- The adult worms measure 5–10 mm and are not pathogenic in the adult animal.
- Heavy infestations in young rabbits can be a contributory factor to the enteritis complex of diseases that occur around weaning.
- The small, thread-like worm is seen in the faeces of affected animals. Passalurus ambiguus is susceptible to most anthelmintics.

Tapeworms

- The rabbit is the intermediate host for several tapeworms that affect dogs and cats.
- Cysticercus pisiformis is the larval stage of Taenia pisiformis, which is a tapeworm that affects dogs and foxes with rabbits acting as the intermediate host.
- Grazing rabbits ingest eggs that pass into the small intestine where the onchosphere emerges and migrates to the peritoneal cavity via the liver.
- The cysts contain the inverted scolex of the tapeworm. Heavy infections cause abdominal discomfort and distension. In severe cases, they can cause intestinal obstruction. Migration through the liver results in the development of fibrous tracks and necrotic foci.

Summary

- Early detection is key to prevent big problems.
- Offer routine testing (fecal exam, serum titers) in young rabbits.
- All rabbits should be considered infected until proven otherwise.
- Zoonotic potential is low.