Encephalitozoonosis in rabbits: Review and retrospective study of the HCV casuistry in the period 1999-2019

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OBJECTIVES

To find out which lesions related to encephalitozoonosis are the most recurrent in HCV rabbit necropsies and to check if this coincides with the existing literature.

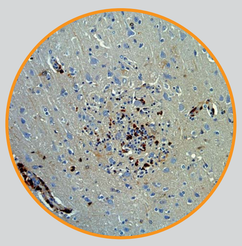
INTRODUCTION AND TRANSMISION

Encephalitozoon cuniculi is an obligatory intracellular microsporidian parasite that can infect a wide range of mammals, mainly rabbits, but also rodents, horses, carnivores and primates, including humans. That's the reason why it's considered as a zoonosis that affects immunosuppressed people. There are three strains of *E. cuniculi*, strain I is the one that affects rabbits.
It occurs in high seroprevalences in rabbits of many countries, between 37% and 68% of the population. No predisposing factors were found.

There are two ways in which *E. cuniculi* can be transmitted:
- Horizontal: the spore is ingested to be taken later, thanks to the reticuloendothelial cells, to the brain and kidneys, although they will also reach the heart, lungs, liver and spleen. The spore is eliminated through the urine.
- Vertical: in the first trimester of gestation, the spores are introduced into the lens of the offspring, before the closure of the capsule.

CLINICAL SIGNS AND LESIONS

The most common form of encephalitozoonosis is ASYMPTOMATIC. Clinical signs are produced as a result of tissue inflammation, the most common being neurological signs and lesions, along with kidney involvement. In addition to those seen in the Figure 1, they can also show unspecific signs: weight loss, muscle weakness, polyuria/ polydipsia.



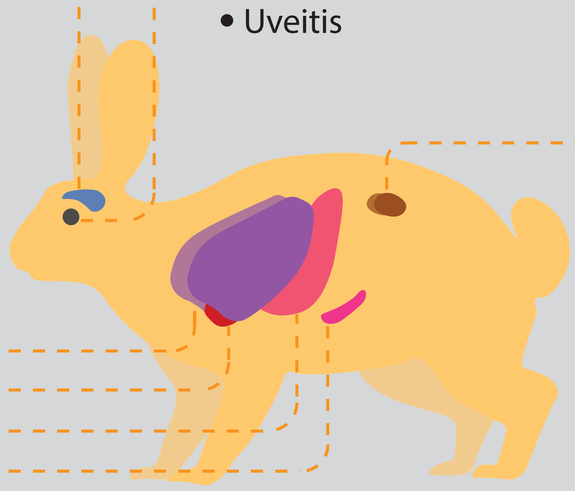
Granulomatous encephalitis/ meningoencephalitis

Vestibular disorders
- Head tilt
- Ataxia
- Nystagmus
- Circling
- Rolling

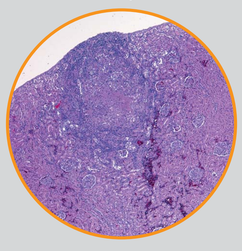
Other neurological signs
- Paresis, paralysis
- Seizures
- Facial paralysis
- Deafness
- Swinging
- Depressed mental status, hiperactivity, desorientatión, absence seizure, aggressiveness

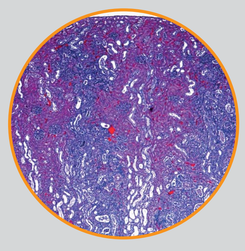
Phacoclastic uveitis
- Intraocular mass
- Cataract
- Uveitis

Fig. 1. Relationship between lesions and clinical signs



Granulomatous nephritis/ Interstitial nephritis
- Chronic kidney disease
- Kidney failure





Interstitial/ granulomatous pneumonia
Granulomatous/ lymphoplasmocytic miocarditis
Granulomatous/ lymphoplasmocytic hepatitis
Granulomatous splenitis

Necropsies of 30 rabbits were evaluated. They found lesions in the CNS, kidneys, eyes, liver, heart, lungs and spleen in different amounts and severity, as shown in Figure 2.

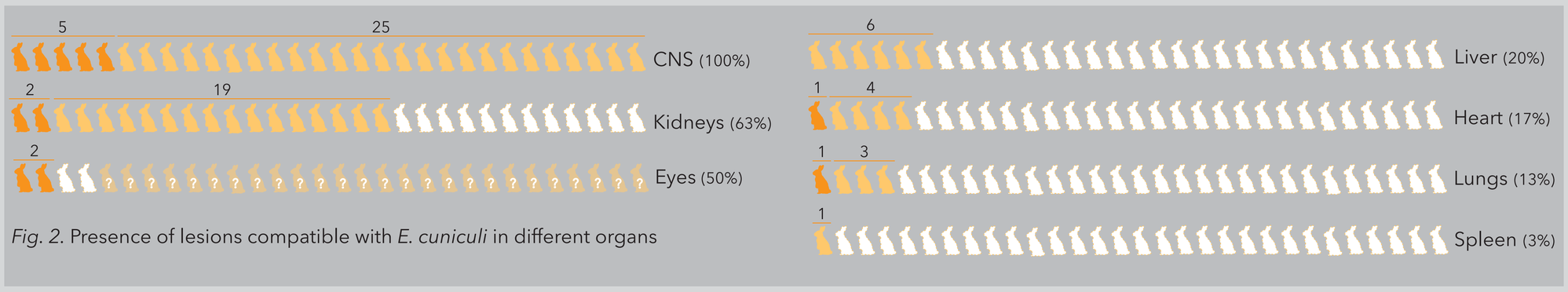


Fig. 2. Presence of lesions compatible with *E. cuniculi* in different organs

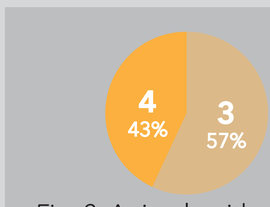


Fig. 3. Animals with severe lesions in CNS and Kidney

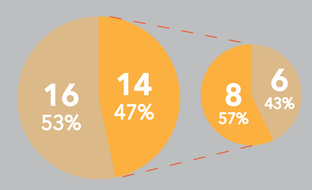


Fig. 4. Deaths caused by encephalitozoonosis

Of all the animals with severe lesions, 4 died due to CNS and kidney issues, and the remainder did so for various reasons beyond encephalitozoonosis. (Fig 3). Encephalitozoonosis was the leading cause of death in 14 of the 30 animals studied. Of these 14, the majority (8) of the rabbits died or were euthanized by renal causes (Fig 4).

DIAGNOSIS

Obtaining the diagnosis in the live animal is complicated, so it is usually achieved by combining different factors.

Physical, neurological, ophtalmological signs

+

Positive serology

+

Ruling out other differential diagnoses

Neurological signs
OTITIS MEDIA/ INTERNAL (*Pastaurella multocida*)
Neoplastic lesions (lymphoma)
Traumatic lesions
Cardiovascular, metaboli-toxic, degenerative lesions
Toxoplasma gondii
Viral infections

Kidney failure
Nephrolithiasis

Phacoclastic uveitis
P. multocida infection, keratitis, traumatic lesions, foreign body

Definitive diagnosis can only be obtained in the dead animal, when the tissue is examined by immunohistochemistry or other techniques.

TREATMENT AND CONTROL

There is no treatment protocol for encephalitozoonosis. The drugs eliminate the parasite and possible concomitant infections, reduce inflammation and relax the animal to avoid neurological signs.

FENBENDAZOLE	Antibiotics (fluoroquinolones)
Anti-inflammatory	Benzodiazepines

Most rabbits with neurological signs can lead to a normal life, while kidney problems are a poor prognosis.

The infection is difficult to avoid, but it is possible to minimize the risk of urinari transmission by disinfection of the environment with chemicals or high temperatures.

CONCLUSIONS

- The results of the study coincide with those of the consulted bibliography.
- CNS lesions are the most frequent, with the renal ones in second place and an anecdotical percentage of lesions in other organs.

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