

Rabbits who recover from myxomatosis are often left with scarring

Photo: A. Anderson

FATAL VIRAL DISEASES IN RABBITS - Myxomatosis, RVHD1 and RVHD2

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Rabbits can be affected by a variety of viruses. The most important viral diseases to be aware of in pet rabbits are: myxomatosis and rabbit viral haemorrhagic disease (strains 1 and 2).

Myxomatosis

Myxomatosis is caused by the Myxoma virus, which is a poxvirus. In the wild, the hosts are wild lagomorphs in south and central America (tapeti) and brush rabbits in North America. In these animals it only causes mild disease; however, when the virus affects the European rabbit (wild or pet), it can cause severe and even fatal disease. In the 1950s, myxoma virus was intentionally introduced in several countries, including Australia, France, and Chile, to control the population of wild rabbits. Myxomatosis is primarily transmitted by biting insects such as mosquitos, fleas, flies, lice, and some mites. In the UK, the main insect vector is the European rabbit flea (*Spilopsyllus cuniculi*). Another form of transmission is via direct contact or inhalation, eye and nasal secretions of infected rabbits, or via genital secretions. This virus is also quite stable in the environment and so can be transmitted by fomites (water bottles, bowls, owner's hands etc.).

The course of the disease is generally quick, with death ensuing around 10-12 days post infection in unvaccinated rabbits. Initial signs will include a fever, swelling of the eyelids, face, base of the ears, and the anogenital area. Ocular and nasal discharge appears slightly later, beginning as clear and becoming mucopurulent (thicker and more mucous), eventually causing the eyes to be completely shut. If the rabbit survives this initial stage, respiratory signs occur, including gasping, noisy breathing, and extension of the head and neck as the rabbit attempts to get oxygen in. Secondary bacterial pneumonia happens in many affected rabbits. Eventually it leads to death of the

animal due to starvation or bacterial septicaemia.

Clinical signs in previously vaccinated rabbits can be much milder and include scabby lesions, especially on the bridge of the nose and around the eyes or in other parts of the body. These rabbits are generally bright and alert and survive with some degree of nursing care.

The clinical signs of this disease are very classic, so most veterinarians will make a diagnosis just from these; however, confirmation can be found using laboratory tests.

Treatment

Some rabbits can recover from mild forms of myxomatosis; however, there is no successful treatment for rabbits affected with the acute form of the disease and euthanasia is advised to avoid suffering. As previously mentioned, vaccinated rabbits with mild clinical signs can be treated

Swollen eyes with discharge is a sign of myxomatosis



Photo: R Saunders

supportively with fluids, pain relief, and nutritional support. Antibiotics may be prescribed if required.

Prevention

The main prevention for this disease is vaccination. In the UK, there is a combined vaccination licensed for rabbits that includes myxomatosis and rabbit viral haemorrhagic disease strains 1 and 2. This is a yearly vaccination that rabbits can have from 5 weeks of age. Like any vaccine, it doesn't offer 100% protection so other preventative measures to limit exposure are also advised, including limiting contact with wild rabbits and insect vectors, by using mosquito screens and rabbit safe anti-parasitics to protect against fleas, lice, and mites.

Due to the ability of the virus to be transmitted via contaminated utensils and insect vectors, vaccination is recommended for all pet rabbits, even if kept indoors or far from possible contact with wild rabbits.

Rabbit viral haemorrhagic disease (RVHD)

RVHD is caused by a lagovirus within the family of Caliciviruses. This virus seems to have evolved from a previously non-virulent rabbit calicivirus that was present in wild rabbits in Europe, Australia, and New Zealand. Two main strains exist: RVHD1 and RVHD2.

RVHD1 or classical RVHD only affects European rabbits. It was described for the first time in China in the early 80's and then spread to Asia, Europe, and Australia.

A new lagovirus was identified in France in 2012 and named RVHD2. This appeared to be a much more virulent strain, affected rabbits previously vaccinated for RVHD1, and also affected hares. Since its appearance in France, it has now spread to the majority of Europe and well as Australia, Canada, and USA.

Both strains are very contagious and spread through direct contact with infected animals, carcasses, urine, faeces, respiratory secretions, and hair. Similarly to myxomatosis, fomites such as cages, bedding, feeders etc. also spread the disease. Insects (flies, fleas and mosquitoes) can carry the virus between rabbits. In the wild, predators or scavengers that feed on affected animals can spread the disease by shedding it in their faeces.

Classic RVHD has a high (100%) morbidity (the rate of disease in a population), but the death rate can vary



Signs in vaccinated rabbits can be much milder, including scabby lesions on the bridge of the nose and around the eyes

Photo: R. Walters



Photo: A. Anderson

Vaccination against myxomatosis, RVHD1 and RVHD2 is recommended for all pet rabbits, even if they are house rabbits

between 40-100% in adult European rabbits. Young rabbits between 6-8 weeks old are less likely to become infected and very young kits (<4 weeks) do not exhibit clinical signs. Infected young rabbits survive and become immune. On the contrary, RVHD2 can cause disease and death in very young rabbits (15 days old) and death rates vary between 5-70%.

These viruses mainly attack the liver, causing a necrotising hepatitis. This then leads to disseminated intravascular coagulation (DIC). Death occurs due to DIC causing clots in most organs, or due to liver failure.

Clinical signs vary depending on the course of the disease. In the severe forms, the rabbits are usually found dead with no previous clinical signs. In acute cases, the rabbits are quiet and have a fever and increased respiratory rate and usually die within 12-36 hours. They generally present bleeding from orifices, including bloody urine or faeces, bloody vaginal discharge, and bleeding from the nostrils. If clots happen in the brain, they can present with neurological signs such as convulsions before death. If they survive the initial phase, they generally die a few days later due to liver failure. This is generally the course of disease that RVHD1 exhibits.

RVHD2 can exhibit a more subacute or chronic course. Rabbits will present lethargic, not eating, losing weight and with yellow mucous membranes (jaundice). Other symptoms such as gastrointestinal or cardiac issues can also be seen. If death happens, it is usually 1-2 weeks after the symptoms start and caused by liver failure.

Not all rabbits exposed to RVHD will become ill and can become asymptomatic carriers (show no signs) and spread the disease.

Suspicious should arise when we have sudden death, especially if more than one rabbit in the household. On bloods we can see low platelets, low lymphocytes, and multiple organ failure. On post-mortem the liver is always affected, and it will be large, friable, and pale. The spleen tends to be big as well. Haemorrhages will be found in any organ but especially in the lungs. Typical histopathological changes can be seen in the liver and other laboratory tests can also be performed to detect the presence of the virus.

Treatment

There is no treatment for affected rabbits with RVHD. If symptoms are severe, euthanasia is advised.

Prevention

Caliciviruses can remain in the environment for prolonged periods of time as they can survive freezing for prolonged periods. RVHD can survive for 22-35 days at 22C but only 3-7 days at 37C. Effective disinfectants include 10% bleach solution, with 10 minutes contact time, and Virkon.

The mainstream prevention is through yearly vaccination. In the UK there are multiple vaccines available:

- The combined myxomatosis/RVHD1/RVHD2 vaccine
- Single RVHD2 vaccines
- Combined RVHD1/RVHD2 vaccine (this may be difficult to get or unavailable now)
- Combined myxomatosis/RHDV1 vaccine (this will soon be discontinued).

Preventing insect bites and contact with wild rabbits is also important and quarantining and vaccinating any new rabbits.