



**CASE OF INTEREST**

**A Case of Rabbit Haemorrhagic Disease**

By Richard Fox, Veterinary Pathologist  
Case kindly donated by Malcolm Silkstone, Veterinary Pathologist

Two four month old domestic rabbits (one male and one female) were presented for post-mortem examination with a history of sudden unexpected death. Neither of the rabbits were vaccinated but no disease was evident clinically in the previous four months of life. Post-mortem examination did not reveal any obvious abnormalities and multiple tissues were sent for histopathology including lung, liver, kidney, intestine, myocardium from both rabbits.

Histologically major changes were limited to the liver and kidney. There was marked periportal to mid-zonal to diffuse hepatocellular coagulation necrosis, with individualised necrotic hepatocytes (shrunken and hypereosinophilic and karyorrhectic). Multifocal haemorrhages were noted in areas of necrosis with occasional heterophilic infiltrates.

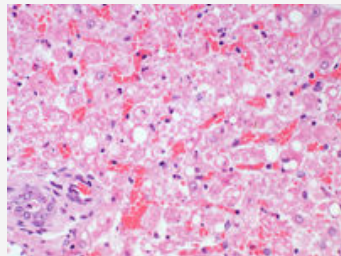


Figure 1. Liver. Mid zonal to periportal hepatocellular vacuolation, cellular swelling and single cell necrosis. obj. x40. HE Stain.

Within the kidney sections there was moderate diffuse cortical and medullary interstitial and glomerular congestion with numerous glomeruli displaying capillary fibrinous thrombosis. Moderate amounts of hyaline eosinophilic material was evident in proximal, distal and collecting tubules within the cortical and medullary parenchyma (signs of proteinuria).

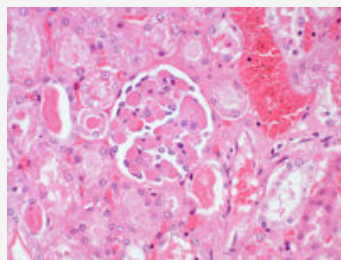


Figure 2. Kidney: Prominent fibrin thrombi are present in the majority of glomeruli as seen above. obj. x40. HE Stain.

Rabbit haemorrhagic disease is an extremely contagious and often fatal viral disease of domesticated and wild rabbits. Severe losses are common in unvaccinated animals. The causative agent is rabbit haemorrhagic disease virus, a member of the genus *Lagovirus* and family *Caliciviridae*. The disease is transmitted by direct contact with infected animals, as well as on fomites.

Infected animals acquire the infection through oral, nasal or conjunctival routes. The virus is excreted in the urine, faeces and respiratory secretions, and affected animals may remain infectious for up to one month. All rabbits can become infected with RHDV, but young animals are resistant to the disease, with symptoms typically only occurring in rabbits that are more than eight weeks old.

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**JOURNAL Reviews(with e-links)**

1. Young BC, Strom AM, Prittie JE, Barton LJ. Toxic pneumonitis caused by inhalation of hydrocarbon waterproofing spray in two dogs. *J Am Vet Med Assoc.* 2007 Jul 1;231(1):74-8. [Link](#)

This is a report of 2 dogs which were evaluated because of vomiting and lethargy and acute respiratory distress, vomiting, and anorexia. One dog had been exposed to a commercial hydrocarbon waterproofing spray 24 hours before the development of clinical signs, and the other examined 18 hours after exposure to a waterproofing spray containing heptane, a highly flammable liquid hydrocarbon. In both dogs, major gastrointestinal tract abnormalities were ruled out but respiratory status worsened. Thoracic radiography revealed a diffuse interstitial pulmonary pattern, and hypoxemia was detected. Hospitalization for monitoring and care was required for both dogs. The dogs recovered with supportive care, which included administration of oxygen, fluids, and bronchodilators. The severity of the adverse effects associated with exposure may have been amplified because the dogs were physically small and were exposed to a relatively large amount of aerosolized spray within small areas. Development of chemical pneumonitis in pet animals is best prevented by application of waterproofing sprays in well-ventilated or outdoor areas from which pets have been excluded. With prolonged hospitalization and considerable monitoring and care, affected dogs can recover from these exposures.

2. Aguirre AL, Center SA, Randolph JF, Yeager AE, Keegan AM, Harvey HJ, Erb HN. Gallbladder disease in Shetland Sheepdogs: 38 cases (1995-2005). *J Am Vet Med Assoc.* 2007 Jul 1;231(1):79-88. [Link](#)

A recent report to determine risk, clinical features, and treatment responses for gallbladder disorders in Shetland Sheepdogs was undertaken. 38 Shetland Sheepdogs with gallbladder disease were assessed in this study. Medical records were reviewed for signalment, history, physical findings, laboratory results, imaging features, coexistent illnesses, histologic findings, treatments, and survival rates. Mature dogs with gastrointestinal signs were predisposed (odds ratio, 7.2) to gallbladder disorders. Gallbladder mucocele was confirmed in 25 dogs. Concurrent problems included pancreatitis, hyperlipidemia, corticosteroid excess, hypothyroidism, protein-losing nephropathy, diabetes mellitus, cholelithiasis, and gallbladder dysmotility. Mortality rate was 68% with and 32% without bile peritonitis. Nonsurvivors had high WBC and neutrophil count and low potassium concentration. Although preprandial hypercholesterolemia, hypertriglyceridemia, and high serum liver enzyme activities were common, gallbladder disease was serendipitously discovered in 11 of 38 dogs. Histologic examination revealed gallbladder cystic mucosal hyperplasia in 20 dogs, cholecystitis in 16, periportal hepatitis in 9, and vacuolar hepatopathy in 7. Surgery included cholecystectomy and cholecystoenterostomy. In 1 hyperlipidemic dog without clinical signs, gallbladder mucocele resolved 6 months after beginning use of a fat-restricted diet and ursodeoxycholic acid. Shetland Sheepdogs are predisposed to gallbladder disorders, with mucoceles and concurrent dyslipidemia or dysmotility in many affected dogs. Most dogs were without clinical signs during mucocele development. Low survival rate after cholecystectomy in clinically affected dogs suggested that pre-emptive surgical interventions may be a more appropriate treatment strategy.

3. Little L, Patel R, Goldschmidt M. Nasal and nasopharyngeal lymphoma in cats: 50 cases (1989-2005). *Vet Pathol.* 2007 Nov;44(6):885-92. [Link](#)

Most rabbits dying of RHD are in good condition. Post-mortem lesions are usually often confined to hepatic necrosis and splenomegaly which are the primary lesions. The liver can also be pale, with fine outlining of each individual lobule due to the underlying necrosis (reticular like pattern). Extensive necrosis leads to the liver being diffusely pale. The spleen is usually black and engorged, with rounded edges. The kidneys can also be dark brown. Disseminated intravascular coagulation (DIC) is common in the terminal stages of disease. This results in haemorrhages (mostly petechial grossly) in a variety of organs including the lung. Haemorrhages are also common in the thymus, and petechiae may be found on the serosal membranes or viscera. Infarcts can be seen in most organs. Hemorrhages are not necessarily present in rabbits euthanased before the terminal stage. In subacute disease, catarrhal enteritis of the small intestine and jaundice may also be seen. It is not unusual however for little or no pathology to be seen at post mortem in per-acute cases.

Interestingly, a recent report indicated a calicivirus infection associated with a hemorrhagic-like disease leading to significant mortality in cats. The clinical signs are similar to those observed with the calicivirus of rabbit hemorrhagic disease. This study characterized 2 FCV isolates associated with hemorrhagic-like disease. Nucleotide sequencing of the complete genome has been done for these 2 isolates as well as for 4 additional isolates representing other disease syndromes. Data suggested that the virulence may have genetic determinants on the basis of phylogenetic clustering of the isolates associated with hemorrhagic-like disease.

References:

1. Abd-Eldaim M, Potgieter L, Kennedy M. Genetic analysis of feline caliciviruses associated with a hemorrhagic-like disease. J Vet Diagn Invest. 2005 Sep;17(5):420-9.
2. Campagnolo ER, Ernst MJ, Berninger ML, Gregg DA, Shumaker TJ, Boghossian AM. Outbreak of rabbit hemorrhagic disease in domestic lagomorphs. J Am Vet Med Assoc. 2003 Oct 15;223(8):1151-5, 1128.

Links:

[www.cfsph.iastate.edu/Factsheets/pdfs/rabbit\\_hemorrhagic\\_disease.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/rabbit_hemorrhagic_disease.pdf)

Lymphoma is the most common nasal cavity tumour in cats, yet few reports specifically address the anatomic, immunohistologic, and cytologic features of this neoplasm. Fifty cats were diagnosed with lymphoma at necropsy, via biopsy or by cytology alone. Ten cats displayed multiorgan involvement, and in 2 of these the involvement was limited to the cerebellum and frontal cortex, respectively. Of the tumours, 41 of 50 (82%) were classified as nasal lymphoma, 5 of 50 (10%) were classified as nasopharyngeal lymphoma, and 4 of 50 (8%) involved both nasal and nasopharyngeal tissue. Histologically, all were considered diffuse lymphoid neoplasms and no cats displayed features of follicular lymphoma. Of the 44 cases available for slide review by the pathologist, 40 of 44 (91%) were classified as immunoblastic lymphoma, 2 of 44 (5%) as diffuse large cell, and 1 as diffuse mixed; 1 was unclassified. Of the 45 cats for which immunohistochemical stains were available, 32 were uniformly positive for CD79a, 7 were uniformly CD3 positive, and 6 had a mixed population of CD79a and CD3 cells. Epitheliotropism was exhibited in 4 of 5 (80%) cats in which there was sufficient epithelium present for evaluation. Of those 4, 3 were B-cell and 1 was a granulated T-cell lymphoma. In the 21 cats which nasal cytology was performed, 15 were cytologically diagnosed with lymphoma; the diagnoses in the remaining five cats were inflammatory (n = 4), normal lymphoid tissue (n = 1), or nondiagnostic (n = 1). The most common biochemical abnormalities were panhyperproteinemia in 26/46 (57%) of cats and hypocholesterolemia in 11/46 (24%) of cats.

LATEST NEWS

**Suspected link between household chemicals and feline hyperthyroidism in the US.**

High levels of common flame retardant chemical are found in tested cats in the US.

A possible connection between feline hyperthyroidism (FH) and a flame-retardant chemical found in common household products, house dust and some food items may exist, concludes a recent Environmental Protection Agency (EPA) study in the US.

Polybrominated diphenyl ethers (PBDE) were introduced into household materials nearly 30 years ago, coinciding with the dramatic increase of FH cases.

The research confirmed high levels of PBDEs in cats from 20 to 100 times greater than the median levels in adult people but this does not conclusively prove the role of these chemicals in FH. Further research is likely to indicate whether there is a definitive relationship between PBDE's and FH.

Full Article: [External Link](#)

SIDE STORY

**Specific canine pancreatic lipase**

Recently a new test called the SPEC cPL ("specific canine pancreatic lipase") test has come to be the test of choice. This test is a newer generation immunological test for canine pancreatic lipase and can be run overnight by a reference lab. This test is able to detect 83% of pancreatitis cases (the test is 83% sensitive) and excludes other possible diseases in 98% of cases (i.e. the test is 98% specific for pancreatitis). There is no comparable test for the cat at this time.

This test is available both as a laboratory service in some labs but also as a "snap test" for in-house diagnostics.

BIOSPY TIPS - Spleen

- Biopsies of spleen are often non-diagnostic especially in cases of splenic haemorrhage. This is often because the lesion is peripheralised by the expanding area of haemorrhage.
- Rapid fixation can be achieved by making multiple parallel incisions in the tissue no thicker than 2cm.
- If splenectomy is performed and representative sections are sent the spleen can be kept in a bucket of fixative until a diagnosis is made.
- Formalin is the recommended fixative. Immunohistology on tissue fixed by other means is often not possible. Abundant amounts of fixative (10% formalin, 5-10 times the volume of the specimen) should be used.
- Old solutions, greater than 1 year of age, are often ineffective and new solutions should be made.

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