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COWPOX VIRUS INFECTION IN CATS

ABCD guidelines on prevention and management

Karin Möstl, Diane Addie, Sándor Belák, Corine Boucraut-Baralon, Herman Egberink, Tadeusz Frymus, Tim Gruffydd-Jones, Katrin Hartmann, Margaret J Hosie, Albert Lloret, Hans Lutz, Fulvio Marsilio, Maria Grazia Pennisi, Alan D Radford, Etienne Thiry, Uwe Truyen and Marian C Horzinek



Virus

'Cowpox' virus is a member of the family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Orthopoxvirus*. Poxviruses are among the largest animal viruses. They are the only animal DNA viruses that induce 'viroplasma' zones in the cytoplasm of infected cells, which appear as inclusion bodies by light microscopy. Orthopoxviruses show broad antigenic relatedness.

Overview: The misnomer 'cowpox' has historical roots: cats rather acquire the virus from small rodents. It has a wide host spectrum (including man) and causes skin lesions, predominantly on the head and paws. Progressive proliferative ulcerations in kittens and immunosuppressed cats may take a fatal course. Cat owners should be informed about the zoonotic risk.

Epidemiology

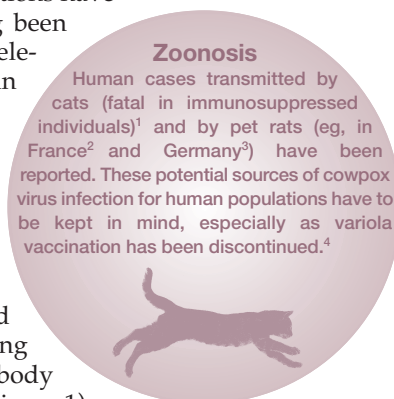
Poxviruses are ubiquitous among mammals; 'cowpox' is a misnomer, the virus occurs as an inapparent infection predominantly in small rodents, which are considered the natural reservoir.

The host spectrum is wide. Infections have been seen in exotic felids (having been fed laboratory rats), anteaters, elephants, rhinoceroses and okapis in zoos in Europe.

The infection occurs sporadically, but transmission between cats has been reported.

Pathogenesis

Infection usually starts with head lesions inflicted by the struggling rodent and then spreads to other body parts, notably the paws and ears (Figure 1), during grooming. After local replication, the virus causes a generalised infection with viraemic spread and multiple skin lesions. Virus has been isolated from the thoracic and peritoneal cavities. Neutralising and haemagglutination-inhibiting antibodies appear 2 weeks after infection.



'Cowpox' is a misnomer – the virus occurs predominantly in small rodents, which are considered the natural reservoir.



Figure 1 Cowpox virus induced skin lesions on the ear. Note that gloves should be worn when examining a cat with a suspected poxvirus infection. Courtesy of Marian C Horzinek

Clinical signs

In most cases, rodent (rat) contacts are reported anamnestically. Cats display skin lesions, which are followed by inflammation, the foci later being covered by crusts (Figure 2). Often itching and poorly resolving ulcers (diameter 3–5 mm) with hard margins are noted.⁵ Lesions are predominantly found on the face and paws; in severe cases progressive proliferative ulcerations ensue. The animal appears healthy if lesions are not superinfected by bacteria. Sometimes the mucosae of the pharynx and oesophagus are affected. Pneumonia, at times with exudative pleuritis and atelectasis, has been described.^{6–8}

Lesions are predominantly found on the face and paws; in severe cases, progressive proliferative ulcerations ensue.



European Advisory Board on Cat Diseases

The European Advisory Board on Cat Diseases (ABCD) is a body of experts in immunology, vaccinology and clinical feline medicine that issues guidelines on prevention and management of feline infectious diseases in Europe, for the benefit of the health and welfare of cats. The guidelines are based on current scientific knowledge of the diseases and available vaccines concerned.

The latest version of the cowpox virus infection in cats guidelines is available at www.abcd-vets.org



Figure 2 Skin lesion covered by crusts. Courtesy of Marian C Horzinek

EBM grades

The ranking system for grading the level of evidence of a statement within this article is described on page 533 of this Special Issue.

Solitary superficial lesions usually heal spontaneously within 4–5 weeks in well-fed animals.⁵ Generalised cowpox infections are fatal in kittens, and in cats being treated with corticosteroids.

Diagnosis

Cells from biopsy material taken from the marginal zones of inflammation contain Cowdry type-A inclusions (homogeneously dense, intracytoplasmic eosinophilic bodies); immunofluorescence tests are specific, quick and reliable. For virus isolation (using embryonated eggs or cell culture) scab material can be shipped dry (cooling is not necessary) or small quantities of exudate can be dried onto cover slips for shipping. Using negative-stain electron microscopy, evidence of brick-shaped virions is sufficient for diagnosis. Polymerase chain reaction allows the detection of viral nucleic acids and subsequent genetic and phylogenetic analyses. Paired serum samples can be used for retrospective diagnosis (sero-conversion). Evidence of antibody in an 'acute' sample of serum from animals with characteristic lesions is strongly indicative of recent infection.⁵

Disinfection

The virus is rather resistant to physical and chemical inactivation. For disinfection, sodium hydroxide solution (0.8%), sodium hypochlorite (1%), quaternary ammonium compounds, chloramine T (0.2%), iodine and phenolic compounds (3%), as well as detergents (sodium deoxycholate, Nonidet P40) and in general all disinfectants which have been tested for their efficacy (such as DVG-listed commercial products) are recommended. Alcohol (and also ethyl ether) is not suitable. In dry scabs and crust material, viral infectivity is maintained for months.⁵ Heating to >80°C leads to rapid inactivation.

Disease management

Therapy should focus on cleaning and treating the ulcerated areas, with the primary objective of preventing secondary infection. The use of corticosteroids must be avoided [EBM grade IV].^{5,9} The prognosis is good, except when the lungs are affected.

Owners of affected cats and pet rats need to be alert to the risk of infection for humans.

There are no vaccines available.

KEY POINTS

- ❖ Cowpox virus has a wide host spectrum, including man, and occurs predominantly in small rodents.
- ❖ Cats with rodent contact are at risk of becoming infected.
- ❖ Skin lesions are predominantly found on the head and paws. They usually heal spontaneously; in severe cases progressive proliferative ulcerations ensue.
- ❖ In kittens and immunosuppressed cats generalised cowpox infections take a fatal course.
- ❖ Corticosteroids facilitate virus generalisation and are contraindicated.
- ❖ Biopsy and/or scab material is suitable for diagnosis.
- ❖ Owners of affected cats (and affected pet rats) should be informed about the zoonotic risk.



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Conflict of interest

The authors do not have any potential conflicts of interest to declare.

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