

Monograph

Fri, 01/21/2011 - 15:07 — Anonyme **definition:**

An infectious, virulent disease inoculated mainly through a bite. The disease causes fatal encephalomyelitis.

The disease is of significant medical importance: human rabies originating from animals warrants rigorous prophylactic measures. It is however of less economic importance than other diseases except where cattle farms in certain South American countries are concerned.

Situation in America:

Enzootic in several countries around the world and in Latin America. It was declared to the OIE in 2004 by the following countries: Argentina, Belize, Bolivia, Brazil, Canada, Chili, Columbia, Ecuador, Costa Rica, Cuba, Dominican Republic, Guatemala, Guyana, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, USA and Venezuela.

Susceptible species:

All domestic or wild mammals.

Man (major zoonosis).

Etiological agent:

An RNA virus from the family *Rhabdoviridae*, *Lyssavirus* genus, serotype 1 (rabies in the strict sense).

The virus is inactivated by heat, light and chemical agents thus the importance of washing / disinfecting cuts (quaternary ammonium, bleach, soap solutions).

The virus can be preserved in 50% glycerol (for long-distance sample transport).

Methods of transmission Source:

The dog is the main rabies reservoir and vector in Tropical America. A parallel cycle exists in certain countries where haematophage bats (*Desmodus rotundus* especially) infect both bovines and humans

Sources of the virus include excreting animals in the pre-clinical and clinical stages of the disease.

Virulent matter: mainly saliva. Other secretions are of little or no epidemiological significance.

Saliva remains virulent for long periods before symptoms appear (2 weeks in dogs).

Transmission:

- Direct: mainly through a bite, scratch or licking
- Indirect (more anecdotal): through carcass consumption or aerosols in a colony of infected bats.

Method of contamination:

The virus penetrates into the organism through a break in the skin (bite wound or scratch). The virus multiplies at the inoculation point then travels along nerve endings into the central nervous system. The virus continues to replicate and affects surrounding tissue (salivary glands, cornea, retina).

Receptivity and susceptibility factors

Receptivity varies according to animal species (age, sex, individual status), virus strain, etc.

Symptoms:

Incubation period: long and of variable length. From 15 to 60 days on average but it may extend to several months or years. Once declared rabies is 100% fatal.

Clinical presentation is dominated by nervous disorders which vary according to species and depending on which parts of the nervous system are damaged. There are no pathognomonic symptoms: "rabies is all, rabies is nothing else".

In enzootic areas the elements leading to suspicion of rabies are:

- any abnormal change in behavior
- any difficulty in chewing or swallowing

Two forms exist. The aggressive form and the paralytic form but any intermediate combination of the two may be encountered. Rabies assumes protean form in humans and only paralysis is constant at the end of the disease.

Carnivores

Behavioral changes.

Difficulty in swallowing, salivation, changes in the voice.

Paralysis.

Bovines

Changes in behaviour (mooring, anxiety, yawning)

Hypersalivation, dysphagia, anorexia, interrupted rumination, tenesmus, constipation.

Flaccid paralysis.

Small ruminants

Milder symptoms.

Anorexia, behavioural disorders, digestive disorders.

Abnormal salivation, motor loss of coordination, paresis.

Equids

Anxiety, excitation and hyperesthesia (violent reactions to stimuli: noise, light, contact). Salivation, biting of the inoculation wound, pharyngeal paralysis followed by overall paralysis.

Suidae

Variable symptoms:

- excitation (biting of the inoculation wound, abnormal cries, etc.)
- or: paralysis and rapid death.

Man

Clinical polymorphism

Psychomotor excitation, hydrophobic spasm, sensory hyperesthesia.

Death in 3 to 6 days.

Lesions**Macroscopic lesions:**

No characteristic lesions are visible on autopsy.

Microscopic lesions:

Non-specific viral encephalomyelitis lesions and vascular and perivascular lesions.

The only specific lesions are eosinophilic oval inclusions, of 4-5 μ m, within cell cytoplasm = Negri bodies. These are rabid virus clusters which are mainly found in the hippocampus.

Diagnostics**Clinical diagnosis:**

Epidemiological data is important and enables prediction of possible contamination (enzootic areas, presence of susceptible species, farming conditions, etc.)

In the absence of specific symptoms and lesions, a firm diagnosis can only be made by a laboratory.

Differential diagnosis:

Carnivores

Distemper (dogs), Aujeszky's disease, Tetanus, metaldehyde or organochloride poisoning (cats), digestive obstruction, etc.

Bovines

BSE, mild fever, grass tetany, listeriosis, poisoning, throat obstruction, etc.

Small ruminants

listeriosis.

Equids

encephalomyelitis, colic, tetanus

Suidea

Aujeszky's disease, swine fever.

Virological diagnosis:

In animals

Samples: brain and medulla oblongata samples to be carried out with great care so as not to contaminate the handler. It is best to handle a whole head if possible. Possibility of using the "straw technique" via the foramen magnum if sampling is difficult or if several samples are required.

- Detection of nucleocapsid by direct immunofluorescence, the method of reference as it is rapid, inexpensive and highly specific.

- Rabies immunoenzymatic diagnosis ("Rapid Rabies Enzyme Immuno Diagnosis": RREID) of the "ELISA-sandwich" test type.

- Identification of Negri bodies is a technique which is less feasible and increasingly abandoned.
- PCR
- Cell culture (diagnosis in biting animals), highly sensitive

In man

Virus detection by immunofluorescence on corneal impressions, a method which can be carried out on the infected subject. Antibody detection in cerebrospinal fluid or serum.

Confirmation of the disease after death (the same techniques as for animals).

Serological diagnosis:

In animals

- Post-vaccine testing of animals but this does not enable diagnosis (post-infectious antibodies are rarely detectable before death).
- Neutralization test. Rapid Fluorescent Focus Inhibition Test (RFFIT)
- Fluorescent Antibody Virus Neutralization test (FAVN)
- ELISA test

Treatment:**In animals**

No treatment exists to date.

On clinical suspicion the animal concerned should be isolated.

The only really effective method to protect animals is vaccination.

In man

Treatment known as "post exposure" treatment exists in the form of a set of anti rabies vaccine injections immediately after contamination +/- serotherapy

Prophylaxis:**Sanitary prophylaxis**

In disease-free countries: avoidance measures

Prohibition of importation of animals in the rabies incubation stage (vaccination and/or quarantine).

Wild animals: awareness of the sanitary status of vector animals in neighbouring countries and preventive measures in border regions (reduction of vector populations, mass oral vaccination campaigns, etc.)

In affected countries: fight against rabies caused by vector animals.

Stray cat and dog population management, monitoring of wild animal vectors, reduction, immunisation (vaccinated bait).

Medical prophylaxis

Regular anti-rabies vaccine administration to vector species (domestic or wild carnivores) is effective.

Vaccines:

Two methods of administration exist

Parenteral: inactivated virus vaccines replace modified virus vaccines as they are more effective.

Oral: reserved for carnivores (ERA, SAD, SAG2 strains, recombinant rabies vaccine). The liquid vaccine is placed in a plastic capsule inside meat or fish meal bait.

Links: [CDC : rabies portal](#) [1]

[OIE : rabies portal](#) [2]

[Global alliance for rabies control](#) [3]

[WHO : rabies](#) [4]

[World rabies day](#) [5]

[PAHO : surveillance rabies](#) [6]

[Rabies blue print](#) [7]

Files:  [oie_recommendation_2011.pdf](#) [8]

- [Rabies](#) [9]

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Links:

[1] <http://www.cdc.gov/rabies/>

[2] <http://www.oie.int/en/animal-health-in-the-world/rabies-portal/>

[3] <http://www.rabiescontrol.net/>

[4] <http://www.who.int/mediacentre/factsheets/fs099/en/>

[5] <http://www.worldrabiesday.org/>

[6] <http://www.paho.org/english/ad/dpc/vp/rabia.htm>

[7] <http://www.rabiesblueprint.com/?lang=fr>

[8] http://www-old.caribvet.net/en/system/files/oie_recommendation_2011.pdf

[9] <http://www-old.caribvet.net/en/diseases/rabies>