Rabies

Definition

Rabies is a 100% fatal viral disease of mammals that occurs infrequently in horses. The Centers for Disease Control and Prevention report that equids account for 3-5% of all domestic animal rabies cases in the USA, with the total number of equine cases in recent years ranging from 13-47 horses annually.

Clinical Signs

- Clinical signs of equine rabies are highly variable, with insidious onset as the hallmark. Frequently reported initial clinical signs include colic, choke, lameness, dysuria, priapism, and neurologic abnormalities.
- In unvaccinated horses, rabies is rapidly progressive with death occurring 5–7 days following the onset of clinical signs.
- Physical signs may include:
    - Choke
    - Colic
    - Fever
    - Anorexia
    - Blindness
    - Dysphagia
    - Hyperesthesia—manifesting as self-mutilation or intense pruritus
    - Lameness
    - Paresis and/or ataxia
    - Incontinence
    - Muscle twitching
    - Paralysis—ascending
    - Sudden death
- Behavioral signs may include:
    - Variable behavior changes at onset
    - Dumb form: depression/stupor; more common in horses
    - Furious form: mania; less common in horses but extremely dangerous

Incubation Period

Typically, 2–6 weeks, although incubation periods up to 6 months have been reported.

Risk Factors

- Unvaccinated horses
- 24-hour access to pasture
- Horses residing in regions with endemic wildlife vectors (skunks, raccoons, fox, bats, domestic animals)

Transmission

- Exposure occurs primarily through a bite wound from an infected animal. Transmission can occur prior to the development of clinical signs in the biting animal.
- Exposure occurs through contact of mucous membranes or open wounds with infected animal CNS tissues, including innervated organs.
- Virus replicates locally in muscle tissues, then travels up peripheral nerves into the spinal cord and brain. This process may take days to weeks, but longer incubation periods even up to 6 months have been reported.
- Virus-laden aerosols produced during mechanical dissection of nervous system tissues are a potential source of infection, thus, practitioners performing necropsies on rabies suspects should take additional precautions to prevent contact with tissues and bodily fluids through inhalation and/or direct contact with the eyes and mouth.

Diagnostic Sampling, Testing and Handling

Correct sampling and testing are imperative for a definitive diagnosis in rabies. Direct Fluorescent Antibody (DFA) test on brainstem and cerebellum is the recommended diagnostic method and is performed in designated state public health laboratories. Confirmatory testing may be performed at the Centers of Disease Control and Prevention (CDC) by DFA and other methods such as immunohistochemistry and RT-PCR. Positive cases are reported to the State Public Health Department and CDC.

Saliva and other body tissues become virus positive by the time clinical signs are evident, but there remains no fully reliable antemortem diagnostic test for rabies. Viral secretion in the saliva may precede clinical signs.

NOTE: Practitioners performing necropsies in the field are encouraged to contact the veterinary diagnostic laboratory to which they plan to submit samples for further testing such as histopathology and pathogen identification to ensure appropriate samples are collected and correctly handled, thereby optimizing the likelihood of a definitive diagnosis. For some situations involving neurologic cases, submission of the entire carcass or whole head to the diagnostic laboratory for post-mortem examination is recommended due to the time and labor required to perform a complete exam and collection of samples from the equine CNS.

Sample Collection and Submission for Rabies Testing:

- Personnel performing necropsies on suspected rabies cases should be vaccinated against rabies and use appropriate personal protection equipment including gloves, goggles and masks or face shields.

	• Suspected rabies cases should be euthanized without causing damage to the brain or head. The head may then be removed from the body and submitted intact for examination. • Alternatively, practitioners may remove and submit the entire brain and brainstem OR a complete cross-section of the brain stem (through the medulla, pons, or midbrain area) and cerebellum (through each hemisphere and the vermis). ○ *Note: Obtaining both sides of the brainstem and cerebellum is critically important, as unilateral lesions are common in infected animals.* • Samples should be shipped refrigerated in a leak proof container so appropriate sections of the brain can be identified by the laboratory. DO NOT FREEZE SAMPLES. • It is acceptable to formalin-fix the remaining portion of the brain for eventual histological examination. • Many laboratories will not start ancillary testing until negative rabies results have been received. Contact the laboratory for specific policies and procedures. • Some veterinary diagnostic laboratories will test for rabies on necropsy only when specifically requested to do so. Be sure to request rabies testing when submitting the carcass of any neurologic case for necropsy. Additional resources for rabies sample collection and testing recommendations: • New York State Health Wadsworth Center: Rabies Laboratory • Centers for Disease Control and Prevention – Rabies Testing • CDC State and local rabies contact information
Post-mortem	Rabies virus does not cause gross lesions. Self-inflicted wounds may be observed on the body.
Shedding of Organism Following Resolution of Clinical Signs	N/A
Environmental Persistence	Rabies virus is sensitive to drying, ultraviolet radiation, and detergent. It is inactivated and removed by standard decontamination practices which include washing instruments and environment with common disinfectants such as quaternary ammonium compounds. Instruments should be sterilized by autoclaving.

Specific Control Measures

Prevention

- The rabies vaccine is an **AAEP core vaccine** that should be administered **annually (every 12 months**) to all equids regardless of breed, region, or intended use. More detailed information can be found in the AAEP Rabies Vaccination Guidelines.
- **Vaccination by a licensed veterinarian may be required by state law in most states for rabies vaccine to be considered valid. Most states require rabies to be administered by or under the supervision of a licensed veterinarian. Although it is legal for owners to purchase rabies vaccine and vaccinate their own animals, many states will not recognize an animal as vaccinated unless a licensed veterinarian or a licensed veterinary technician who is under the immediate and direct supervision of a veterinarian on the premises administered the vaccine with appropriate certificates or veterinary records.**
- Several vaccines are licensed for rabies prophylaxis in horses. All are inactivated tissue culture-derived products. Some are labeled for mixed animal species and some for horses only. They are available as a monovalent vaccine or in combination with other antigens. Rabies is an excellent immunogen, and these vaccines induce a strong serologic response after a single dose in adult horses and are licensed for 12-14 months of protection.
- In adult horses, a single dose is sufficient for inducing a protective antibody response regardless of vaccine history.
- The use of titers to determine vaccination intervals is **not recommended** in horses as significant variability of titers has been observed in challenge studies. Further information regarding the use of titers in horses with histories of **life-threatening vaccine reactions** can be found in the AAEP Serology Guidelines.
- Post-exposure vaccination of previously unvaccinated horses is of dubious value.
- Feeding and/or housing of wild animals as pets is discouraged, as these animals may serve as vectors for rabies transmission.

Management of Rabies SUSPECT cases

- Any horse exhibiting neurologic signs compatible with rabies should be considered a rabies suspect.
- Veterinarians should contact their local/state public health and animal health officials for quarantine guidance.
- Local/state public health and animal health officials should be notified of confirmed rabies cases immediately.
- Suspect and confirmed horses should be handled using contact precautions. Gloves and protective eyewear must be worn, and appropriate biosecurity measures should be adhered to by all in-contact personnel.

	● Minimize the number of personnel in contact with a suspect case. When possible, limit personnel to those who have been vaccinated. ● Establish records of all individuals having handled the suspect horse beginning 48 hours prior to onset of clinical signs. ● Local/state public health and animal health officials should be notified of confirmed rabies cases immediately. ● **Horses exhibiting signs of rabies for which other differentials have been ruled out should be euthanized immediately and submitted for postmortem rabies testing**. **Management of horses EXPOSED to rabies:** ● Any horse exposed to a known or suspected rabid animal should be reported immediately to the local health department and local/state animal health officials. ● Exposed animals may be eligible for booster vaccination and observation in quarantine. Quarantine regulations vary depending upon state as well as vaccination status of the exposed horse and should be carried out only under the guidance of state animal health officials. ● If signs suggestive of rabies develop, the animal should be euthanized, and the head or entire brain (including brainstem) should be submitted for testing Detailed guidance for recommended responses to potential rabies exposures including humans, domesticated animals and potentially rabid wildlife can be found in the National Assoc. of State Public Health Veterinarians (NASPHV) Rabies Compendium (2016
Disinfection	N/A
Zoonotic Potential	**Rabies is a serious zoonotic risk; thus, identification of potential rabies suspect cases is essential and should be promptly reported to public health authorities**. See A Review of Equine Zoonotic Diseases: Risks in Veterinary Medicine.
Further reading	National Assoc. of State Public Health Veterinarians (NASPHV) Rabies Compendium (2016) Advisory Committee on Immunization Practices for Rabies (ACIP)

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