MJF COLLEGE OF VETERINARY AND ANIMAL SCIENCE, CHOMU, JAIPUR

DEPARTMENT OF VETERINARY PATHOLOGY

African Horse Sickness

Perdesiekte, Pestis Equorum, La Peste Equina, Peste Equina Africana

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Iowa State University

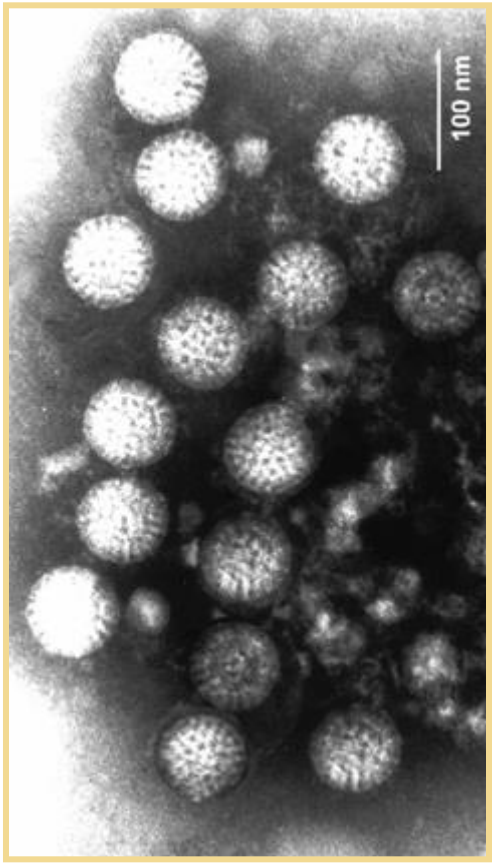
Overview

- Organism
- Economic Impact
- Epidemiology
- Transmission
- Clinical Signs
- Diagnosis and Treatment
- Prevention and Control
- Actions to take

The Organism

African Horse Sickness

- Virus
  - Double stranded RNA
  - Family Reoviridae
    - Genus Orbivirus
  - Arthropod-borne
  - Viscerotropic
  - Inactivated by low pH (6.3)
  - Serotype-9
  - Seven structural protein (VP1-7)
  - Four Non str. protein
  - List-A OIE



Importance

History

- 1780-1918: South Africa 7 epizootic
- Endemic in sub-Saharan Africa
- 1959-61: Middle East
  - 1st outbreak out of endemic Africa
- 1965-66: Morocco, Algeria, Spain
- 1987-91: Spain, Portugal
  - Imported zebra reservoirs
  - New *Culicoides* species
- 1989-91: Algeria, Morocco

SPAIN

Economic Impact

- 1989: Spain and Portugal
  - 137 outbreaks - 104 farms
  - 206 equines died or destroyed
  - 170,000 equines vaccinated
    - 82 of vaccinated equines died
  - Eradication program cost $1.9 million
- U.S. Horse Industry (1998)
  - Value of sales from equine: $1.75 billion
  - Equine inventory:5.25 million horses
  - Equine sold: 558,000
- U.S. has arthropod vectors for AHS

Epidemiology

Geographic Distribution

- Endemic in sub-Saharan Africa
- Outbreaks
  - Southern and Northern Africa
  - Near and Middle East
  - Spain and Portugal
- Peak: Late summer - early autumn
- Prevalence influenced by climate

Morbidity/Mortality

- Varies with exposure, species, immunity
- Horses: Mortality between 50-95%
    - Cardiac form 50-70%; Mixed form 80%
    - Pulmonary form always fatal
- Other Equidae
    - Mules: 50%
    - European or Asian donkeys: 5-10%
    - None in African donkeys and zebras

Transmission

Animal Transmission

- Not contagious
- Spread by arthropod vector
  - Biting midges: *Culicoides imicola;*
    C. bolitinos; C. variipennis
  - Other potential vectors: Mosquitoes, biting flies, ticks
- Viremia in Equidae
  - Horses: 12-40 days
  - Zebras, African donkeys: up to 6 weeks

Culicoides spp.

- Biting midges, “punkies”, “no-see-ums”
- Extremely small ~1/8”
- Distinct wing pattern
- Only females bite
- Greatest biting activity around dawn and dusk

Animals and African Horse Sickness

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Clinical Signs

- Incubation period: 2-14 days
  - Clinical signs typically seen 5-7 days
- Four forms of the disease
  - Pulmonary (peracute)
  - Cardiac (subacute edematous)
  - Mixed (acute)
  - Horsesickness fever

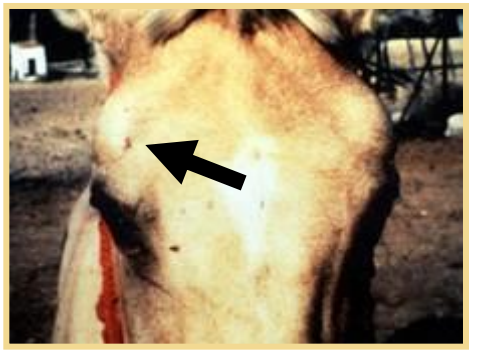
Pulmonary (Peracute) Form

- Acute fever
- Sudden, severe respiratory distress
- Dyspnea and tachypnea
- Profuse sweating
- Spasmodic coughing
- Frothy serofibrinous nasal exudate
- Rapid death

Foam from the nares due to pulmonary edema.

Cardiac (Subacute) Form

- Edema
  - Supraorbital fossae, eyelids, intermandibular space
  - Neck, thorax, brisket and shoulders
- Terminal stages
  - Petechiae: Ventral tongue, conjunctiva
- Death within 1 week



Mixed (Acute) Form

- Pulmonary and cardiac forms
- Cardiac signs usually subclinical
  - Followed by severe respiratory distress
- Mild respiratory signs
  - Followed by edema and death
- Diagnosed by necropsy

Horsesickness Fever

- Mild clinical signs
- Characteristic fever (3-8 days)
  - Morning remission (undetectable)
  - Afternoon exacerbation
- Other signs
  - Mild anorexia or depression
  - Congested mucous membranes
  - Increased heart rate
- This form is rarely fatal

Post Mortem Lesions

- Pulmonary form
  - Hydrothorax
  - Severe pulmonary edema
- Cardiac form
  - Yellow gelatinous infiltrate
    - Fascia of head, neck, shoulders
  - Hydropericardium
- Mixed form
  - Mixture of above findings

Excessive fluid in the thoracic cavity and pulmonary edema; note the distended interlobular septa.

Differential Diagnosis

- Anthrax
- Equine encephalosis
- Equine viral arteritis
- Equine infectious anemia
- Equine morbillivirus pneumonia
- Purpura hemorrhagica
- Equine piroplasmosis

Sampling

- Before collecting or sending any samples, the proper authorities should be contacted

- Samples should only be sent under secure conditions and to authorized laboratories to prevent the spread of the disease

Diagnosis and Treatment

- Clinical signs
  - Supraorbital swelling is characteristic
  - History
- Laboratory diagnosis
  - Virus isolation & identification
  - Serology (tentative)
  - Necropsy: spleen, lung, lymph node
- No efficient treatment

AHS and Other Species

- Dogs
  - Experimentally
  - Ingestion of infected horse meat
  - Not usually by insect bites
  - No role in spread or maintenance
- Camels, Zebras
  - Inapparent infection

African Horse Sickness in Humans

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AHS in Humans

- No natural infection in humans
- Transnasal infection with certain neurotropic vaccine strains
  - Encephalitis
  - Retinitis

Prevention and Control

Recommended Actions

- Notification of Authorities
  - Federal:

    Area Veterinarian in Charge (AVIC)
    www.aphis.usda.gov/vs/area_offices.htm
  - State veterinarian
    www.aphis.usda.gov/vs/sregs/official.htm
- Quarantine

Disinfection

- Inactivation of virus
  - Formalin, β-propiolactone, acetyl-ethyleneimine derivatives
  - Radiation
- Disinfectants
  - Sodium hypochlorite (bleach)
- Killed
  - pH less than 6
  - pH greater than 12

Prevention

- Quarantine
  - Equidae from endemic areas
    - Asia, Africa and Mediterranean
  - Minimum 60 days at point of entry
- Vaccination
  - In infected areas
  - Surrounding protection zone
  - Not available in the U.S.

Control

- Vector control and protection
  - Insect repellants
  - Stable in insect-proof housing from dusk to dawn
- Monitor temperature of all Equidae
- Euthanize or isolate febrile Equidae
  - In insect-free stable until cause is determined
- Vaccination

Vaccination

- Attenuated live vaccine available for horses, mules and donkeys
- Recovering animals
  - Lifelong immunity to that serotype
- OIE International Animal Health Code
  - All AHS vaccinated Equidae must be permanently marked at time of vaccination

Additional Resources

Additional Resources

- World Organization for Animal Health (OIE) International Animal Health Code
  - www.oie.int
- USAHA Foreign Animal Diseases – "The Gray Book"
  - www.vet.uga.edu/vpp/gray_book
- USDA – APHIS
  - www.aphis.usda.gov/vs/ep/fad_training/bibpage.htm

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