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Infectious Diseases

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Equine Viral diseases

- Equine Infectious Anaemia
- Equine Influenza
- West Nile Virus
- African Horse Sickness Virus
- Rabies
- Equine Herpes Virus
- Equine Viral Arteritis

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Equine Infectious Anaemia

- “Swamp Fever”
- All equids affected
- Pyrexia
- Lethargy
- Inappetance
- Thrombocytopaenia
- Anaemia

Equine Infectious Anaemia

- First described in France – 1843.
- Lentivirus (*Retroviridae)*
- Closely related to Maedi visna virus (MVV), feline immunodeficiency virus (FIV) and human immunodeficiency virus (HIV)
- All lentiviruses cause persistent infections
- Usually they cause slowly progressive disease which results in death.
- EIA is different – it causes an acute phase, followed by recurrent clinical disease episodes which eventually subside in most horses.
- Persistantly infected, lifelong carriers.

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Equine Infectious Anaemia

- Worldwide disease
- Prevalence higher in warm climates (as EIA virus is transmitted by insect vectors)
- Notifiable disease in the United Kingdom – Code of Practice
- Wiltshire out break February 2010.
- USA – true prevalence unknown as testing occurs for horses where a negative serological test is required.

Transmission

- Blood from infected horses
- Blood – feeding insects, horseflies and deerflies
- Horses with a high titer viraemia and clinical disease are more likely to transmit the virus than horses with a low level of circulating virus
- Vector population and feeding behaviour of the insects can influence transmission between horses
  - Time between feeding on different horses
  - Distance between horses
  - Number of vectors

Equine Infectious Anaemia

- Vertical transmission can occur
  - In utero
  - At parturition
  - After ingestion of infected colostrum or milk
- Venereal transmission can occur
- Iatrogenic transmission by contaminated blood products, hypodermic needles, dental equipment and tattooing instruments

Equine Infectious Anaemia

- Clinical disease severity correlates with viral load.
- Virus infects and destroys macrophages
- Infectious virus in the serum of infected horses occurs in the form of immune complexes

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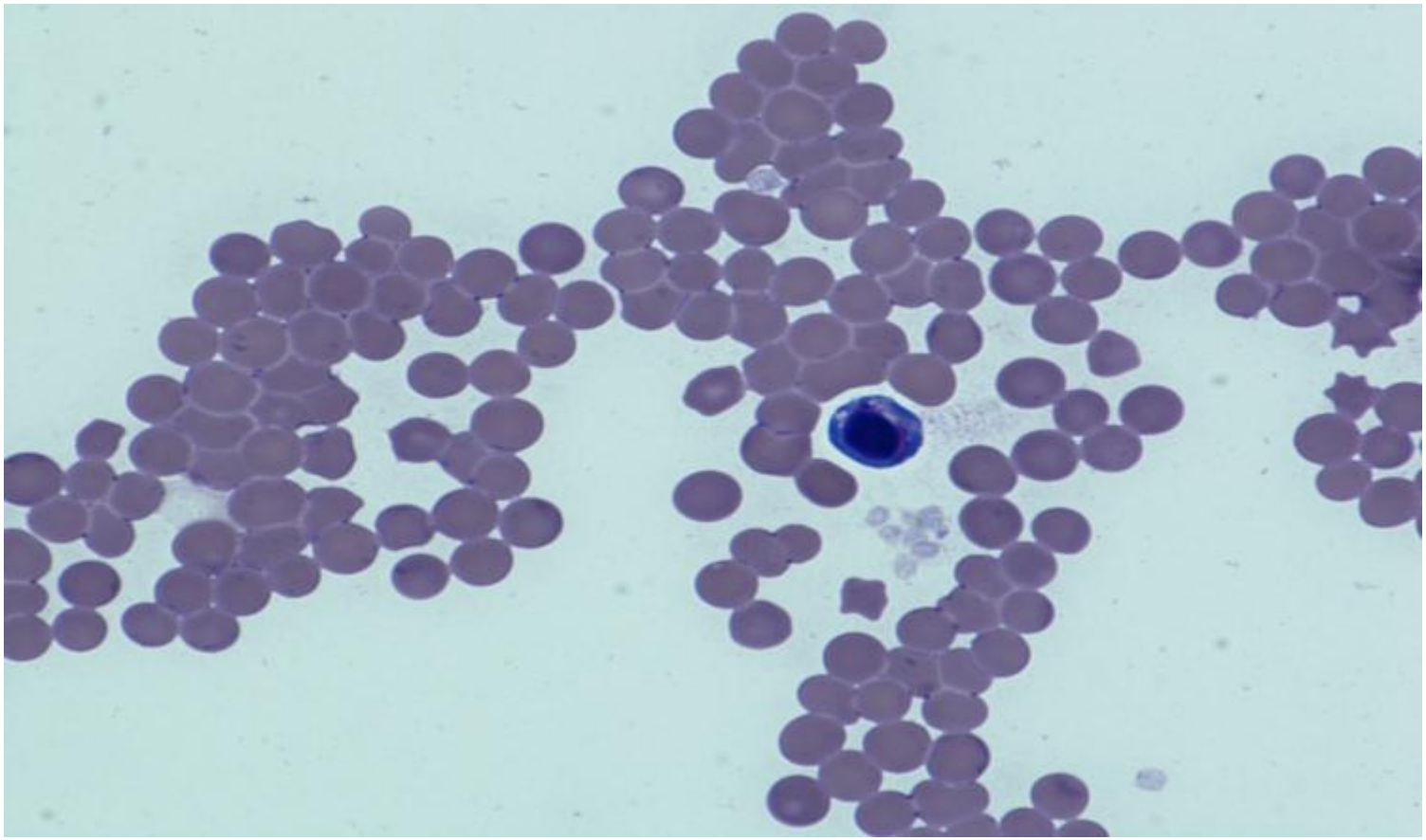
Equine Infectious Anaemia

- Thrombocytopaenia
- Earliest
- Most consistent detectable abnormalities
- Correlates with pyrexia and viraemia
- Suppression of platelet production is the main cause of thrombocytopaenia
- Also immune mediated mechanism
- Activated platelets during acute infection leads to platelet aggregates which are removed from the circulation
- Infection of endothelial cells could promote platelet adherence and aggregation

Equine Infectious Anaemia



Equine Infectious Anaemia

Pale mucous membranes

Petechiations

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Equine Infectious Anaemia

Epistaxis

Icterus

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Equine Infectious Anaemia

- Acute phase
- Recurrent episodes of acute disease
- Chronic phase or become an asymptomatic carrier

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Equine infectious Anaemia

- Diagnosis
- EIA needs to be ruled out in horses presenting with signs of recurrent pyrexia, thrombocytopaenia, anaemia, petechiation, weight loss or ventral oedema
- Haematology and biochemistry findings:
  - Monocytosis
  - Leukopaenia
  - Leukocytosis
  - Hypergammaglobulinaemia
  - Hyperbilirubinaemia
  - Haemoglobineamia
  - Elevated liver enzymes

Equine Infectious anaemia

- Diagnosis
- Definative diagnosis by serological testing
- A positive serological result indicates infection
- *Agar gel immunodiffusion (*AGID) test
- *Competitive enzyme-linked immunosorbent assay* (cELISA)
- *Vira-CHEK ELISA*
- *Synthetic antigen* ELISA (SA-ELISA)

Equine Infectious Anaemia

- Diagnosis
- Serological tests can be negative for 10-14 days after infection.
- Most horses seroconvert by 45 days
- Passively acquired antibody in foals can be detected by the AGID test for up to 11 months

Equine Infectious Anaemia

- Post mortem findings:
- Splenomegaly
- Hepatomegaly
- Generalised lymphadenopathy
- Ventral subcutaneous oedema
- Vessel thrombosis
- Mucosal and visceral haemorrhages

Equine Infectious Anaemia

- Therapy
- No specific therapy for EIA
- Reportable disease in the USA and UK
- Supportive therapy in endemic areas
- Isolation from other horses
- Minimise stress
- Good nursing care
- NSAIDS

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Equine Infectious Anaemia

- Prevention
- No approved vaccine
- Rigorous environmental and animal insect vector control - DEET
- New horses added to a herd/yard without EIA should be tested
- Blood and plasma donors should be screened for EIA
- Needles and syringes should never be used to inject more than one horse
- Dental equipment, surgical instruments, stomach tubes etc should be cleaned and then disinfected or sterilized between procedures

Equine Influenza virus

- One of the most important diseases in horses
- Orthomyxoviridae family
  - Influenza A, B and C viruses, thogotoviruses and isavirus
  - Influenza A affects wide variety of species
  - Influenza B affects mainly humans
  - Influenza C affects humans, dogs and pigs

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Equine Influenza Virus

- Outbreaks occur frequently throughout the world
- Outbreak in Australia in 2007
- Respiratory diseases spread easily between horses
- Clinical signs;
- Occur in 24 -48 hours after contracting the virus
- Pyrexia up to 41.1˚C (106 ˚ F).
- Nasal discharge – mucopurulent
- Coughing, retropharyngeal lymphadenopathy, tachypnea, inappetance and weight loss

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Equine Influenza Virus

- Clinical signs resolve in 7- 14 days
- Coughing may persist for slightly longer
- If severe, adventitious lung sounds can be heard
- Pneumonia is a common sequela
- Secondary bacterial disease
- Mortality is normally low, except in neonatal foals in which it can be fatal
- Morbidity is usually 100% in susceptible populations

Equine Influenza Virus

- Differential diagnoses:
- *Streptococcus equi equi* infection (Strangles)
- Equine herpes virus 1 & 4
- Equine rhinitis virus
- Equine adenovirus
- Equine Arteritis virus
- Hendra virus

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Equine Influenza Virus

- Diagnosis
- Presumptive diagnosis initially accompanied by paired serology
- (2 samples taken 10-14 days apart)
- Or virus isolation from nasal swabs
- Development of rapid stall-side tests are now available, but have not been validated yet.
- Polymerase chain reaction tests (PCR) have been validated for equine influenza and are more rapid than the traditional techniques

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Equine Influenza virus

- Vaccination is the key to prevention
- Mandatory for horses competing under Jockey Club rules and FEI rules
- Vaccination is sometimes not effective due to the many strains
- If a horse does contract Equine Influenza supportive treatment is advised
- Antiviral agents? Oseltamir and zanamivar
- Rimantadine

African Horse Sickness

- Infectious insect-borne disease of equidae
- Sub-saharan Africa
- Risk to UK and Europe is low however not impossible
- Caused by an *Oribivirus*
- Transmitted by *Culicoides* species
- Seasonal occurrence
- Influenced by factors affecting climate and *Culicoides* breeding

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African Horse Sickness

- Course of disease is usually acute – peracute
- 90% of horses infected die
- Clinical signs
  - Respiratory signs
  - Cardiac form
  - Mixed form and nervous form (rare)
  - Incubation period of 2-10 days
  - All forms have pyrexia (40-40.5 °C)

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African Horse Sickness

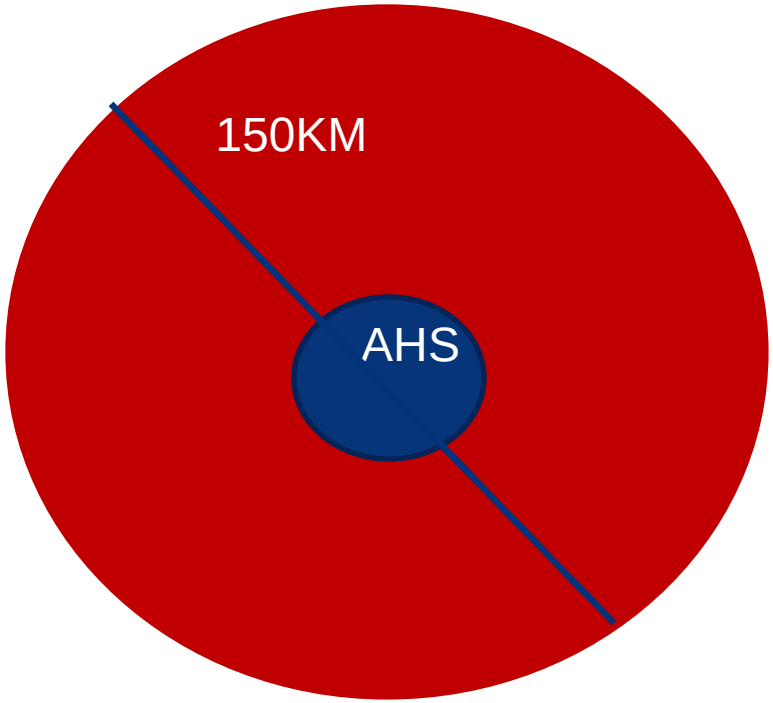
- Differential diagnosis
- Anthrax
- EIA
- EVA
- Purpura haemorrhagica

African Horse Sickness

- No treatment available
- Supportive therapy
- Nursing care
- Rest
- If survive, rest for one month before light exercise

African Horse Sickness

- Outbreak control –
- Quarantine
- Compulsory slaughter
- **Vector control**
- Possibly vaccination
- Compulsorily notifiable
- DEFRA recommends if a yard is infected, all horses infected with AHS or with clinical signs of AHS should be killed.



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African Horse Sickness

- It is illegal to vaccinate for AHS in the UK
- No vaccine is licensed in the EU
- EU has a central bank for emergency situations only

West Nile Virus

- *Flavivirus*
- Africa, Eastern Asia, Central and Northern Europe
- Hosts are birds
- *Culex* mosquitoes are the vectors
- Humans and horses are “dead end” hosts

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West Nile Virus

- Incubation period of 3-15 days
- Infection occurs asymptomatically, or as mild febrile illness
- Morbidity 10%, mortality 20-45 %
- Disease may occur in any area of the CNS
- Ataxia and weakness
- Recumbency
- Muscle fasciculations
- Pyrexia, lip droop, paralysis, teeth grinding or blindness

West Nile Virus

- Differential diagnoses:
- Botulism
- Cervical vertebral myelopathy
- Polyneuritis equi
- Equine Herpes virus
- Equine degenerative myelopathy

West Nile Virus

- Haematology and biochemistry unremarkable
- Serology to detect circulating antibodies
- Virus isolation – whole blood, serum, CSF and brain or spinal cord tissue
- CSF – may be unremarkable, may reveal mononuclear pleocytosis with normal protein or normal cytology with increased protein

West Nile Virus

- Prevention – Vaccination and vector control!!
- Duvaxyn WNV (Fort Dodge Animal Health).
- Inactivated whole virus vaccine
- 2 doses
- Given 3 -5 weeks apart, just before peak season in animals from 6 months of age
- Annual revaccinations

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Equine Herpes Virus

- EHV1-5 infect the domestic horse
- EHV6-9 infect the wild equid
- Latent phase
- EHV 1 and 4 are most well known causing respiratory signs and abortion and neurological disease
- Horses with EHV respiratory disease are contagious

Rabies

- Enveloped ribonucleic acid rhabdovirus
- Lethal polioencephalomyelitis and ganglionitis
- Universally endemic in mammals except UK, New Zealand, Iceland and Australia
- Rabies is usually transmitted via saliva from an infected animal into muscle tissue
- The virus replicates in the muscle near the site of inoculation
- The virus binds to nicotinic acetylcholine receptors at the neuromuscular junction and ascends into the central nervous system

Rabies

- Clinical signs
- Poor racing performance
- Bizarre behaviour
- Neurological signs
- Apparent lameness
- Gastrointestinal signs
- Genitourinary signs

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Equine Viral Arteritis

- Majority of infections are inapparent or subclinical infections
- Occasional outbreaks cause influenza-like illness in adult horses
- Abortion in pregnant mares
- Interstitial pneumonia in very young foals
- HBLB code of practice

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Equine Viral Arteritis

•Variability or the possible absence of signs of EVA
•Clinical diagnosis is not always possible.
•Laboratory diagnosis is essential.
•the presence and level of antibodies to the virus by
testing blood and screen for the actual virus in blood and other samples.

•Laboratories generally require blood serum for antibody detection and heparinised or EDTA blood (preferably heparinised) or semen for virus detection.
•Other samples may be required. If in doubt, veterinary surgeons should check with the laboratory.

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Conclusions

- An update on Equine Viral Diseases
- Always bear in mind exotic diseases – you don't want to be the veterinary surgeon that missed the first case before an outbreak!