Important equine viral diseases

Equine Infectious Anemia
E.I.A. or Swamp Fever

EIA

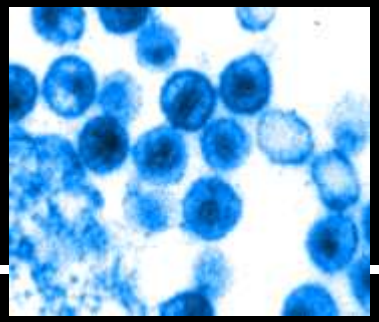
- Persistent infectious viral disease of Equidae (horses, mules, donkeys and zebras),

- EIA is a blood borne disease that is typically transmitted by biting insects,
- such as horseflies, deerflies and mosquitoes.
- There is no cure for EIA, so prevention is the key to controlling the disease,”

- caused by a retro-virus similar to Aids in humans (not known to infect man) and it is characterized by recurrent episodes of fever, anemia, icterus, weakness, weight loss and thrombocytopenia ..

Deadly case of EIA, horse is euthanized (USA)

- EIA is also called "swamp fever" because the disease has been associated with warm, wet regions. The virus is endemic in the Americas, parts of Europe, the Middle and Far East, Russia, Japan and South Africa.

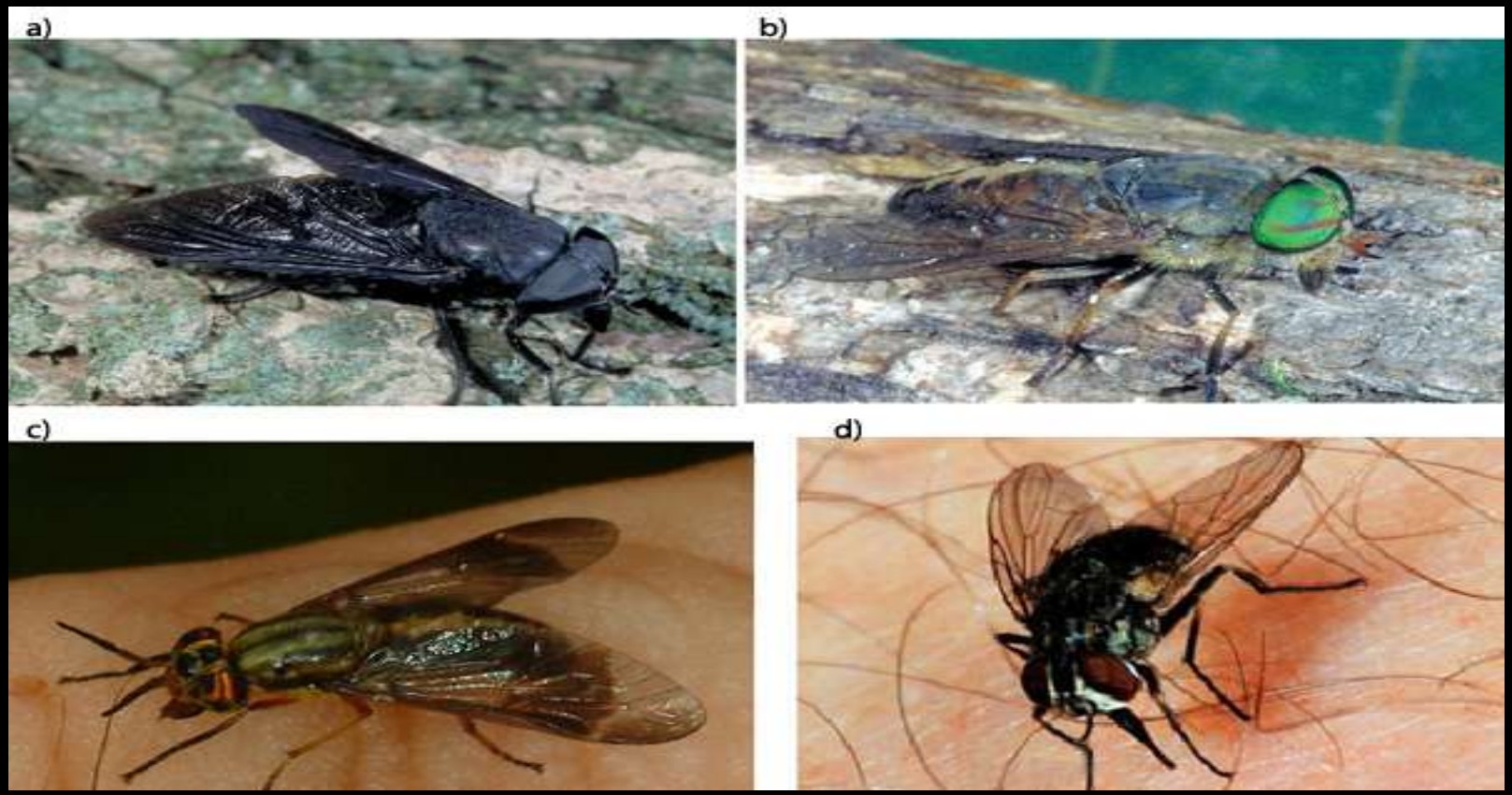


- Family: Retroviridae,
- Sub- Family: Lentiviridae.
- Retrovirus; single Strand (+) RNA virus
- Latent or active viral states spread by blood and other body fluids.
- Long lived virus leading to reservoir for persistent infection.

Transmission

- Mechanical transmission by needles(treatment or vaccination) or
- Insect bites. Horseflies and deer flies are the most significant transmitters.
- Foals can be infected *in utero(vertical transmission)*.

Insect vectors of EIA Virus.(a & b) Horse fly (Tabanus sp), (c) Deer fly (Chrysops sp), d) Stable fly (Stomoxys calcitrans sp).




It's cold out
Bring your pets inside
quickmeme.com

- The use of biological products infected with the EIA virus.

Pathogenesis (virus replication)

- Infection----EIAV multiply in organs or tissues with plenty of macrophages (liver, spleen, lymph nodes. Bone marrow and kidneys)----------(2-7 d) fever with severe viremia------resolved when viremia subsides (persistent low level viremia for whole life)

..... Relapse of clinical signs as

viremia returns (virus isolated is different from original one antigenically ,mutant)....escaping immune response.....

Multiply ....clinical disease... frequency of relapse decreases after the first year of infection.

Pathogenesis (immune response)

- It is responsible for controlling viral replication.
- Plays important role in pathogenesis of the disease.
- Most lesions and clinical signs of EIA is due to

* Host response to the virus and not direct damage of virus to tissues.

Replication of virus……. Strong immune response (7-10 days of infection)……..

Hyper gammaglobulinaemia……..antibody dependent cellular cytotoxicity….

Immuno-complexes of free virus with antibodies – deposited in different tissues+ complement phagocytosis by resident macrophages……

....kidney causing glomerulonephritis.....on mature RBC's.... destroyed by immune system(IMHA)..... Maturation of RBC precursor cells prevented.....

.....Virus is sensitizing erythrocytes and thrombocytes to the action of complement so non regenerative haemolytic anemia develops with petechiation, icterus, heart failure, oedemas and Splenomegaly

- ….. associated inflammation can damage vital organs, such as bone marrow, liver, heart and kidney……Because the horse's immune system is impaired….. Increase susceptibility to secondary infections(bronchopneumonia)… EIA-infected horses can die from the virus or from related secondary infections.
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Primary Pathology

- Mature RBC's destroyed by immune system
- Maturation of RBC precursor cells prevented

Factors that determine the type of clinical disease

Both viral and host factors are thought to be
important in determining the clinical outcome of EIAV infection.

1. Viral factors include the virulence of different isolates, antigenic variation to escape host immune surveillance.

2.Host factors include the age, immune competence

Clinical forms

- EIA occurs in three forms:
  - Acute
  - Chronic
  - In apparent

Acute EIA

- Fever and hemorrhages 7 to 30 days following exposure.
- With this form of EIA the virus replicates rapidly and rapid destruction of infected macrophages occurs.
- Animals become very sick and may die.

Chronic EIA

- Anemia, pale – icteric mucosa.

- Intermittent fever.
- depression, hemorrhages, progressive, profound weakness, the horse get tired easily and is unsuitable for work with loss of condition.
- Weight loss and oedematous swelling of the legs, brisket, scrotum and lower abdomen.
- Enlargement of lymph nodes.
- **Nasal discharge.**
- **Ataxia.**

- Abortion in pregnant mares at any time during the pregnancy if there is a relapse when the virus enters the blood
- . Most infected mares will abort, some give birth to healthy foals. Foals are not necessarily infected.

- Chronic form of EIA, weak depressed animal

- Edema (fluid retention) may appear under the skin & in the chest, abdomen, legs & scrotum

- Animals that have the chronic form or survive the acute form usually have recurring attacks with the time between attacks and severity varying. Some animals will die during these recurring attacks.

Inapparent EIA

- Infected animals appear normal, however all remain carriers of the virus for life serving as a source of infection for other animals.

- A horse may also not appear to have any symptoms, yet still tests positive for EIA antibodies. This horse can still pass on the disease.

Diagnosis of EIA

- Equidae infected with EIA will be carriers for life and develop antibodies against the virus 15 to 45 days following exposure.
- There are several serologic tests that detect the presence of antibodies in the blood.
  - Coggins test (AGID), named for Dr. L. Coggins who developed it.
  - Eliza test.

THE COGGINS TEST

- The most commonly used method is the Coggins test, also known as the agar gel immunodiffusion (AGID) test. The test was developed 25 years ago by veterinary researcher, Dr. Leroy Coggins. Each year more than a million horses are screened for EIA by this test. The test is consistently reliable and detects the presence of EIA-specific antibodies in the blood. A negative reading means there are no detectable antibodies at the time of testing. A positive reading indicates the horse is infected and a carrier of the virus.
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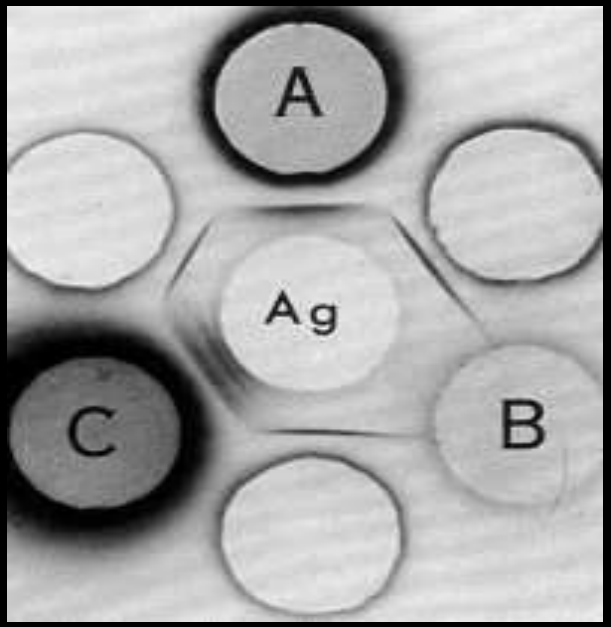
Serologic Testing for EIA

- Agar Gel Immuno-Diffusion or Coggins test
  - Tests for antibody against the p26 antigen
  - Correlated with horse inoculation test
- ELISA tests
  - Antibody against p26; 1 also gp45
- Immunoblot test
  - Research test: α-p26, gp90 & gp45

Majority of AGID Test Reactors : Line of identity with POS control

- Virus antigen is placed in the central well and diffuses outwards. Wells A and C contain positive sera, well B contains a negative sample. The black areas show where antibody in the positive sera have bound to virus antigen and formed a precipitate.



- An alternative test, ELISA (enzyme-linked immunosorbent assay) offers an advantage in that results can be assessed more quickly, especially with the C-ELISA (competitive) test. However, ELISA may not be as accurate as the Coggins test. A positive ELISA reading is verified by a standard Coggins test

Lesions

- In acute cases, the spleen and splenic lymph nodes are enlarged.
- In chronic cases, necropsy reveals emaciation, pale mucous membranes, petechial hemorrhages, subcutaneous dependent edema, splenomegaly, and enlarged abdominal lymph nodes. There is also marked extramedullary hematopoiesis.

Mucous membranes of a horse with equine infectious anemia.

control

- Equine infectious anemia is a serious disease that threatens the world's horse population. Despite testing and measures to eradicate the disease, approximately 500 new cases are reported each year in the U.S

- The disease is often fatal to horses. Infected animals are humanely destroyed to control its spread. Although horses mount a strong humoral and cell-mediated immune response, they are unable to completely clear the virus and are infected for life.

- A vaccine is available, called "Chinese Live Attenuated EIA vaccine", developed in China and widely used there since 1983. Another attenuated live virus vaccine is in development in the United States