

Trypanosoma evansi

1. First trypanosoma shown to be pathogenic for mammals.
2. Identified by **Griffith Evans** (1881).
3. Name of the disease in Horse is '**Surra**' in Hindi it means rotten.
4. Intercellular Parasite occur in blood plasma and lymph of various mammals & causes **trypanosomiasis**.
5. Sub clinical or Carrier state is common.
6. The infection in camel is called '**Teberse**' in India **Guifer / Gufar** in Sudan.

Distribution :

Widely distribution in India, Pakistan, Malaysia, Indonesia, China, Philippines, USA, USSR, Egypt, Sudan, Israel, Lebanon, Turkey, Iraq, Iran, Algeria etc.

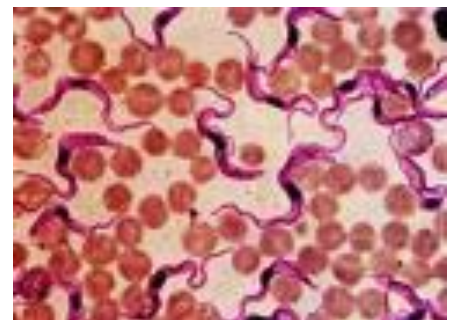
In India infection more common where insect vector *Tabanus* are common, where considerable rains & flood. Worse affected areas in northern India are Punjab, U.P., Gujarat & Rajas than. In Eastern part of India – Bengal, Assam also in Maharashtra & M.P. In other state incidence are low. More common near the end of August to mid winter

Host

Camel, Horse, Donkey, Mule, Cattle, Buffalo, Elephant, Goat, Sheep, Dog, Cat, Deer & other mammals. Tiger, Fox, Hyena etc. are also harbour the parasite.

Morphology

1. Monomorphic but polymorphism occur sporadically.
2. Slender & thin, 15 – 34 um in length (24um).
3. Kinetoplast sub terminal.
4. Undulating membrane well developed.
5. Prominant free flagellum.



Life cycle:

T. evansi transmitted mechanically by *Tabanus*, *stomoxys* and *Haematopota*, *chrysops*, *Lyperosia* and *Hippobosca*. Interrupted feeding of flies act as an essential factor as parasite do not survive more than 15 min in the proboscis of the fly. No cyclical development occurs. Non

blood sucking fly also transmit by picking the infection from infected meat to open lesion or mucous membrane of susceptible animals. Vampire bat in America also can transmit the infection. The infection may be transmitted during mass vaccination. Dog may get infection by ingestion of infected meat

Pathogenesis

Pathogenesis depend on 3 main factor :

Anaemia, tissue lesions like myocarditis & myositis and immuno suppression.

Progressive anaemia with reduction in the numbers of RBC & haemoglobin upto 25% of normal level.

- Anaemia due to:
- 1) Haemolysis produce by parasite (Toxin) – Haemolysis of RBC.
 - 2) Immunoglobulin and antigen bound to RBC – erythrophagocytosis .
 - 3) Haemodilution due to increase production of plasma.
 - 4) Dishaemopoiesis
 - 5) Dessiminated intravascular coagulation - Leads to anaemia & death

Muscle fiber degeneration, mononuclear cell infiltration, oedema & sarcolemma proliferation are responsible for significant myocardial damage and ematiation. The infection in horse and dog is severe. The factors like progressive anaemia and intravascular coagulation, hypoglycaemia are suspected to be the cause of death of animals in trypanosomiasis. Increase in globulin (Immunoglobulin) and decrease in albumin fraction. Albumin Globulin ratio decreases by 14.49%.

Symptoms & course of the infection :

Horse : ‘Surra’ is fatal to horses if treatment are not applied, death occurring in a few days to a few months depending on the virulence of the strain of organism. In horse the course of the disease is more serious than that seen in cattle and buffalo. Donkey and mule are resistant. Intermitted fever with temperature often arising to 44⁰C & anaemia are main symptoms. Transient local or general urtecarial eruptions may accompany or follow febrile paroxym. The plaques are usually seen on the neck and flanks, oedema of legs and lower parts of the body may be seen. The plaques may necrosed in the center & haemorrhage may occur at the junction of the skin and mucous membrane especially at the nostrils, eyes and anus. The animal becomes dull,

listless and leg-weary. Gait becomes staggering & ultimately paraplegia supervenes. Respiration rapid and laboured, and pulse frequent and small.

PM : Marked anaemia, emaciation, enlargement of lymph nodes and splenomegaly. Petechiae occur on the serous surface and in the parenchyma of liver and kidneys.

Cattle & Buffalo : Course of the disease varies from symptom less carrier to per acute infection. Cattle and Buffalo main reservoir of infection. Occasional outbreaks of acute disease may occur due to :

- (1) Introduction of the parasite as a new strain of it into a new area
- (2) Additional stress Vaccination with FMD or hard work

In acute condition

Dull and sleepy, staggering gait, eyes staring and wide open, breathing problem, encircling movement, nervous excitement, press head against hard object, apparent blindness, stamping of feet bellowing, groaning, frequent micturation, profuse salivation, shivering of body followed by coma & death in 6-12 hours. Temp rises to 39.4⁰C - 40.6⁰C.

Per acute condition

Die in 2 – 3 hrs. Nervous form occur and die in convulsion. Mostly confused with snakebite, anthrax, pasteurellosis, poisoning etc.

Sub acute & chronic :

Dull, sleepy, lacrimation from both eye, progressive emaciation, intermittent fever, oedema of legs, diarrhoea & death from exhaustion. Abortion in buffalo also reported.

P.M. Examination : Splenomegaly, Hepatomegaly, enlargement of lymph nodes and kidney. Petecheal hemorrhages at the junctions of the mucous membrane with the skin.

Camel: The disease is known as **Gufar** in Sudan and **Tebersa** (a 3 years duration) in India and the course of the disease is of about 3 years.

Intermittent fever, appear dull and listless, anaemia, hump disappear, oedema of pads, abdomen, sheath and scrotum (male) & breasts (female) which may suppurate. Cerebral

symptoms like periodic convulsion occasionally. The animal become progressively weaker & emaciated. Death may occur within a few months of infection.

Dog

Fever, anorexia, oedema of head, thorax, corneal opacity or even blindness. Oedema of larynx changes the voice of the dog which can be confused with that is rabies. Muscular spasm of limbs, staggering gait & excitement like biting of kennel bars etc. Parasitaemia fluctuate with temperature. Untreated dogs will die in 12 months.

Cat : Chronic, may be sometime fatal.

Sheep & Goat : Rare & intensity of symptom moderate, emaciation and anaemia may occur.

Elephant : Intermittent fever, dullness, listlessness, disinclination to move, anaemia & oedema of face and dependent parts. Mortality also observed.

Pig : Not pathogenic.

Diagnosis

Based on (1) History of prevalence of infection and biting by Tabanid fly.

(2) Clinical symptoms.

(3) Laboratory examination :

i) Blood & body fluid by direct examination

ii) Chemical tests

iii) Animal Inoculation test

iv) Imminodiagnostic tests.

A) Direct examination

1. Diagnosis of acute infections is relatively easy as organisms are readily demonstrated in freshly stained blood smear. In Chronic cases parasitaemia become low. Thick & thin smear on consecutive days or lymph node puncture smear should be attempted. Blood smear taken at height of temperature may be positive for the parasites. Trypanosomes can be detected under 40x. and also under 100X. But it should be differentiate from *T. theileri*.

2. Wet smear

3. Lymph node puncture smear : Inject small quantity of normal saline solution into lymph gland with the help of syringe subsequently massage & fluid aspirated and prepared a smear on a glass slide, stained with Giemsa and examined under microscope.

B. **Chemical test** : Detect changes in chemical composition of blood. Alteration of serum proteins can be detected. These are non specific & far less reliable.

(a) Mercuric chloride test :

Take one drop of serum + 1ml of 1:30,000 solution of HgCl_2 in dH_2O in a tube and then shaken gently to mix the two. Appearance of white precipitate after 15 min in positive cases.

(b) Stilbamidine test (In India, Ray 1950)

One drop of serum to a 0.3% solution of stilbamidine in dH_2O (0.5-25 ml).

Appearance of an opalescence of precipitate in positive cases after 1 – 2 min.

(c) Formal gel test :

2 drop formalin + 1ml of serum in a test tube, shaken & allow to stand.

Formation of gel after 1hr. in (+)ve cases. Distinct opalescence will develop if take reading after 24 hrs keeping at 4°C .

(d) Thymol turbidity test :

1 drop serum + 3 ml alkaline thymol buffer → inactivated at 56°C temp. for 30 min.

↓
Immediate white turbidity in (+)ve cases.

(C) **Animal inoculation test** :

Rat & guinea pigs are satisfactory laboratory animals. In Albino mice 0.5 ml suspected blood with anticoagulant inoculated intra peritoneally. *Trypanosoma* appear in its blood 2 – 3 days after inoculation in positive cases. To make it confirm better to go for sub inoculation.

(D) **Immunodiagnosis** : IHA, IFAT, CFT, ELISA and Allergic test

Treatment :

A. Quinapyramine (Antrycide)

1. Antrycide methyl sulphate