Economically important Parasitic Diseases of Animals

Dr. V.V. Limaye.
Assistant Commissioner of A.H.
Parasites – A serious threat

- More attention – bacterial and viral diseases
  More mortality and morbidity

- Parasitic diseases pose a serious threat to animal health – more difficult to control.
  - Parasite has a better capacity to overcome host resistance.
  - Vectors if involved more difficult to control – on the animal and in the environment.

Resistance to Acaricides

Parasites remain viable in the vector for long time

Vaccines not available

Diagnostic techniques not very well developed.
Major Diseases of Economic Importance

- Theileriosis
- Trypanosomiasis
- Babesiosis
- Fascioliasis
- Coccidiosis
- Trichomoniasis
Theileriosis

- Theileriosis is an infectious disease of cattle caused by a protozoan parasite and characterised by enlargement of lymph nodes, pulmonary oedema, haemorrhages on kidney and liver, ulcers in abomasum and cattarhal enteritis.
Pathogenesis

- *Theileria annulata* and *Theileria parva*

- Transmitted through bite of ticks – *Hyalomma*

- Entry of the parasite – Sporozoite stage – remains in blood circulation - enters the erythrocytes - don’t multiply

- Multiplication – lymphocytes – schizonts
Pathogenesis

- Infected lymphocytes – diff. lymphoblast – macro - micro schizonts

- Schizonts differentiate to merozoites

- Merozoites infect the RBC – assume different forms.

- Rapidly multiplying - schizonts – massive destruction of lymphoid cells
Clinical Symptoms – Postmortem lesions

- High fever, anaemia,
- Enlargement of lymphnodes and spleen
- Erosions and ulcers in abomassum
- Pulmonary odema
- Hemorrhages on epicardium
- Catarrhal enteritis
Postmortem Lesions – Theileriosis
Pulmonary Odema
Enlargement of spleen
Diagnosis

- Blood smear examination
- Lymph node biopsy smear.
- Serological tests.
- PCR
Peripheral blood smear from a cow with *Theileriosis*. Arrow heads denotes piroplasms in erythrocytes – cigar shaped, diamond ring shaped.
Schizonts in lymphocytes and Piroplasms in red blood cells. — Giemsa stain
Wright’s-stained impression smear from an enlarged lymph node of a cow Theileriosis. Numerous large lymphoblasts with irregular nuclear outlines and prominent nucleoli
Treatment and Control

- Oytetracycline 15 -20 mg / Kg. B.W. 5 – 7 days
- Inj Buparvaquone (Butalex) 2.5 mg / Kg. B.W. I/M – single injection.
- Berenil 0.8 to 1.6 gm / 100kg B.W. I / M.
- Vaccine : Rakshavac T
Life Cycle of Theileria
Trypanosomiasis

- Trypanosoma is an infectious disease of cattle and buffaloes caused by protozoan parasite and characterised by intermittent fever, dullness, anorexia, anemia, ocular discharge, improper gait, circling, shaking of head, emaciation, ulceration on tongue and gastric mucosa and gelatinous exudate in subcutaneous region.
Dourine

- Horses – T. equinocardium

- Veneral disease transmitted through coitus

- Swelling of external genitalia

- Vaginal – urethral discharge
Pathogenesis

- Transmitted though bites of Tabanus flies. Stomoxys and Haematopota
- Carrier animals remain as a potential source of infection.
- Multiply by binary fission – Parasitaemia.
- Parasites – variable surface glycoproteins – continuous exposure of immune system – hyperplasia of spleen.
- Chronic cases – Ag + Ab complexes – glomerulonephritis and vasculitis.
Symptoms

- High fever
- Dyspnoea
- Paraplegia
- Emasciation
- Odema of dependant parts of the body
- Conjunctivitis and Keratitis
- Occular discharge
- Improper gait, circling, shaking of head
Postmortem Lesions

- Emasculated carcass
- Enlargement of spleen.
- Gelatinous exudate in subcutaneous region
- Congestion of abomassum and intestines
- Petechiae on kidney, liver and heart
- Ulcers on tongue.
Diagnosis

- Thick and thin blood smear examination
  Giemsa or Leishman’s stain.
- Concentration techniques
- Wet mount
- Mice inoculation
- IFA
- ELISA
Trypanosoma FITC – Stain.
Trypanosoma in blood smear – Giemsa stain.
Treatment

- Quinapyramine (Triquin, Tribexin) 20%, 3-5 mg/Kg B.W. S/c.
- Suramine (Naganol, Antrypol) 10%, 1 mg/kg B.W. I/V.
- Dimenazine (Berenil) 20%, 8 – 10 mg/kg B.W. I/M.
- Supportive treatment:
  - Dextrose Inj, 25%, I/V.
  - Liver extract, B.complex inj.
Control

- Detection, isolation and treatment of affected animals.
- Control of vectors – spraying of insecticides
- Preventive – antrycide prosalt
- Hygiene at the farms
- No vaccine available.
Babesiosis

- Babesia is an infectious disease of cattle and buffaloes caused by protozoan parasite and characterised by hemoglobinuria, anaemia, petechiae and echymoses on serous membranes, icterus, pulmonary oedema and gastroenteritis.
Etiology

- Cattle
  - Babesia bigemina
  - Babesia bovis

- Sheep and Goat
  - B. ovis
  - B. motasi

- Horses
  - B. equi
Pathogenesis

- Transmission through ticks – transovarian transmission.
- Incubation period – 5 to 10 days
- Parasite multiplies in peripheral blood.
- Intravascular hemolysis – hemoglobinuria
- Infected erythrocytes liberate some enzymes – interact with components of blood.
Symptoms and Postmortem findings

- High fever, Anaemia
- Icterus, Hemoglobinuria
- Enlargement of liver & spleen
- Odema in lungs
- Petechiae and ecchymoses in kidneys, lung, liver and spleen.
- Congestion in gastrointestinal tract.
Diagnosis

- Demonstration of parasite in blood smears
  Leishman, Giemsa stain

- Immunodiagnostic tests
  - IFA
  - ELISA
  - PCR
Babesia – parasite in RBCs
Babesia – parasite in RBCs
Life Cycle of Babesia

1. Tick vector
2. Ingestion of infected blood cells
3. Trophozoite injection
4. Ring stage (trophozoite)
5. Amoeboid form
6. Binary fission
7. Pyriform bodies (merozoites)
8. Cruciform bodies
9. Circulation of vertebrate host

Babesia
Treatment and Prevention / control

- Berenil (Diminazine) 0.8 – 1.6 gm / 100 kg B.W.
- Liver extract, B complex, iron preparations
- Blood transfusions
- No vaccines
- Control of ticks
- Timely treatment
Fascioliasis

- Caused by Fasciola gigantica and F. hepatica.
- F. gigantica common in India
- Most common and economically important disease of sheep.
- Large animals rarely infected clinically
Life stages

Pathogenesis

- **Acute hepatic Fascioliasis**
  - ingestion of large no. of metacerceraria
  - invasion of liver by masses of young flukes
  - Immature flukes tissue feeders
  - sufficient parenchyma destroyed
  - acute hepatic insufficiency.

- **Chronic hepatic fascioliasis**
  - Develops slowly due to adult flukes
  - cholangitis, biliary obstruction, destruct. of hepatic tissue and fibrosis.
Clinical Signs

- Acute Fasc.
  
  Sudden death, weakness, lack of appetite, pallour and oedema, pain when pressure exerted in area of the liver.

  Young sheep, death in 1-2 weeks

- Chronic Fasc.
  
  Small no. of metacercaria ingested over a long period. Loose weight, submandibular oedema, loose wool, death in 2-3 months.
Fascioliasis – Bottle jaw
Postmortem findings

- **Acute Fasc.**

  Badly damaged, swollen liver, capsules show many small perforations and subcapsular hemorrhages, parenchyma shows tracts of damaged tissue and liver and is much more friable than normal.

  **Chronic Fasc.**

  Presence of large leaf like flukes in grossly enlarged and thickened bile duct.

  Blockage of bile ducts – flukes and cellular debris

  Liver Parenchyma – extensive fibrosis and calcification
Diagnosis, Treatment

- Faecal sample examination, ELISA
- Oxyclozanide (Distodin) 10-15 mg / Kg. BW. Orally
- Nitroxynil (Inj. Trodex) 10 mg / Kg. B.W. S / C.
- Liver extracts, B. complex, other supportive
Control

- Faecal sample examination – treatment
- Control of snails – molluscicide – esp. summer.
- Stall feeding – avoid grazing in marshy areas, banks of rivers or ponds.
- Animals treated with approp. Flukicide just at the onset of rains.
Coccidiosis

- Coccidiosis is a contagious enteritis caused by infection with Eimeria spp., which occurs in all domestic animals. Subclinical infection may occur or there may be diarrhoea or dysentery.

  - E. zuernii, E. Bovis } Cattle
  - E. arloingi } Sheep.

Coccidia are host specific.

Cross immunity between diff. species of coccidia does not occur.

Coccidial life cycle is self limiting
Pathogenesis


- Cells containing schizonts and gamonts slough and cause hemorrhage
Normal and infected epithelium

- Intestine
Clinical signs

- Incubation period 15 – 30 days
- Sudden onset of foul smelling diarrhoea
- Fluid faeces containing blood and mucous
- Dark tarry staining of faeces – streaks or clots of blood.
- Perininium and tail smeared with faeces
- Decrease in appetite and poor feed conversion.
Postmortem findings

- Hemorrhagic enteritis
- Thickening of mucosa of caecum, colon, rectum and ileum.
- Ulceration and sloughing of mucosa
- Whole blood or blood stained faeces in lumen of large intestine.

- Diagnosis: Faecal sample examination
  - Intestinal scraping
Treatment & Control

- No vaccine. Those available – not efficient.
- Chemotherapeutic agents
  - Coccidiostatic
  - Coccidiocidal
    Affected animals isolated and treated
    Overcrowding be avoided
    Feed and water should be kept at a higher level
    Spreading of lime – shades be kept dry.
Trichomononiasis

Trichomoniasis is a protozoan parasitic disease of cattle and buffaloes caused by *Trichomonas* sp. and characterised by abortion, vaginitis, metritis and balanitis.

*Trichomonas foetus.*
Trichomonas - protozoa

Figure 1. Trichomonads exhibit three anterior flagella, a single posterior flagellum, and an undulating membrane.
Pathogenesis

- Confined to all regions of reproductive tracts.
- Trophozoites attach to surface of epithelial cells lining reproductive tract.
- Trophozoites multiply by binary fission
- Abortion due to cytotoxicity of maternal endometrium
- A battery of enzymes of the parasite acts against host proteins.
Clinical signs

- Abortion and pyometra – first signs noticed in the herd.
- Abortion in 1st third to half of gestation
- In bulls scant preputial discharge may be noted in first few days of infection.
Postmortem and Diagnosis

In aborted foetuses:
- Enlarged liver
- Non-inflated, enlarged, firm lungs
- Placenta oedematous

Diagnosis:
- Preputial washings or smegma.
- Vaginal or Uterine secretions
- Characteristic jerky, tumbling motion.
- CPLM or Diamonds medium – culture the parasite
Control

- Screen all the animals in the herd
- Bulls are carriers – cull infected ones
- Infected cows - give them breeding rest 6 mths
- A.I. chances of transmitting the infection are least
- TrichGuard – Fort Dodge, used to vaccinate cows. Two inj 2 to 4 weeks apart, prior to breeding
- Treatment not effective – Ipronidazole may be tried.
A Seroepidemiological and Parasitological Study of Prevalence of Trypanosomiasis in Animals in Maharashtra.

Objectives:

- Parasitological and serological study of incidence of trpanosomiasis in animals in Maharashtra.
- Parasitological study of Tabanus flies and rodent fleas.
- Study of prevalence of trypanosomiasis in rodents.
- Epidemiological study of trypanosomiasis in animals.
Action Plan:

- **Geographical area**
  - High risk areas
  - Low risk areas.

- **High risk areas comprise of:**
  - c. Andheri suburb, Mumbai.

  20% of animal population

- **II. Low risk areas comprise of:**
  - a. All talukas in Chandrapur, Gadchiroli, Hingoli, Beed, Amravati, Jalgaon, Pune and Raigad districts.

  100 blood samples and serum samples from each taluka showing clinical signs suggestive of Surra.

  30 C + 30 B + 20 G + 20 S
Methodology:

1. Screening of blood smears (thick & thin) for trypanosomes after staining them with Leishmans stain.

2. Biological Test: Detection of trypanosomes in blood samples by inoculation in mice.

3. Detection of antitrypanosomal antibodies in serum samples by IFA / ELISA or serum agglutination test.
Results anticipated:

The study will provide valuable data on the following aspects of the disease:

1. Incidence of trypanosomiasis in animals in High and Low risk areas.
2. Antibody profiles of trypanosomiasis in animals in High and low risk areas.
3. Species of Tabanus flies involved as biological vectors in active or passive transmission of the disease.
4. Prevalance of trypanosomiasis in rodents and rodent fleas.
5. Zoonotic aspect of the disease and possible vectors involved in transmission of the disease to human beings.
Thank You