CANINE DISTEMPER

Hard pad disease

By

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Definition

➢ Highly contagious poly-systemic viral disease of dogs.

➢ Ch. By diphasic fever, leukopenia, skin hyperkeratosis, GIT & respiratory tract and neurological complication.

➢ 25-75% of susceptible dogs become sub-clinically infected (long lasting immunity).
Etiology

- CDV genus Morbillivirus” PPR and cattle plague” family Paramyxvo.
- Large ssRNA virus (one serotype).
- Sensitive to UV radiation, heat, detergents and lipid solvents.
- Survive for several days at temp. below zero and at -65 °c for at least 7 years.
Predisposing factors

- Immunosuppression, poor feeding, debility, Vit A deficiency, parasitism and air draughts.
1. **Distribution:** Worldwide and recorded in Egypt.

2. **Host range:** (“Wide range Carnivora” dogs, foxes, raccoon, ferret, wolves, mink and skunk).
   - 3-6 months age are more susceptible (weaning & loss of maternal immunity).
   - Cats and pigs may be infected (bronchopneumonia).
   - Reported in non-human primates with high mortality rates (potential zoonotic risk of CDV in humans).
3. **Seasonal incidence:** No.

4. **Transmission:**
   
a. **Source:** Body tissues and secretions “respiratory (abundant) and conjunctival exudate, saliva, feces and urine for up to 2-3 m. post infection”.

b. **Mode:**
   
   - Primary, inhalation.
   - Contact with contaminated objects.
   - Mechanically by flies and insects
   - Transplacental or in utero infection of puppies
5. Economic impact:

❖ Loss of dog’s function and deaths of valuable dogs.
Pathogenesis

- After infection by inhalation, the virus multiplies in tissue macrophages.
- Spreading within 1 d via the lymphatics to the tonsils and respiratory lymph nodes, resulting in severe immunosuppression.
- Within 2-4 d., other lymphoid tissues become infected.
- By day 6, the gastrointestinal mucosa, hepatic Kupffer cells and spleen are infected.
• Further spread occurs by cell-associated viraemia to other epithelial cells and the CNS.

• Viral virulence, host age and immunity play important role in the outcome of infection:

A. **Strong immunity**, the virus fails to infect epithelial tissues and viremia ceases with elimination of the virus within 14 d and complete recovery occurs.

B. **Weak immunity**, rapid dissemination of the virus occurs to epithelium of most organs as respiratory, GIT, eye and CNS.
PATHOGENESIS OF CANINE DISTEMPER

VIRUS

Local lymphoid tissue

Systemic lymphoid tissues

Humoral and cellular immune response

Respiratory tract

Alimentary tract

Urogenital tract

CLINICAL SIGNS

RECOVERY

Subacute Encephalitis

DEATH

WEEKS PI

1

1-2

2-3

2-12

APPEL '95
Clinical signs

- I.P from 2-9 d.
- Course (10 d.- several months)
- Morbidity and mortality rates variable.
1. Acute systemic form

- Occurs 2–3 weeks post-infection.
- **fever**, depression, anorexia, mucopurulent oculo-nasal disch., coughing, dyspnoea, vomiting and diarrhoea (may be bloody).
- The virus is found in every secretion and excretion of the body.
2. Chronic nervous disease

- Concurrent or follow systemic disease within 2–3 weeks.
- Abnormal behavior, convulsions or seizures, blindness, paresis or paralysis, incoordination and circling.
- "Chewing gum fits" type convulsive seizures cha. by chewing movements of the jaw with salivation occurs in dogs developing polioencephalomalacia
• Most animals die 2–4 w. after infection.
• Hyperkeratosis of nose and foot pads with pustular dermatitis of lower abdomen (dandruff throughout the coat) is common in dogs suffering from neurological disease.
• Chorea **myoclonus**: force involuntary neuromuscular twitching (jerking) of the muscles as in the legs or facial muscles, (specific).
• It occurs due to local irritation of lower motor neurons of spinal cord or cranial nerve.
• Can be present while dogs is walk or commonly while sleeping with involuntary defecation and urination.

• It can be present in absence of other neurological signs.
3. Neonatal infection form

- Occurs with or without neurological signs.
- Infection of puppies before eruption of permanent dentition: severe damage of their enamel.
- Dental enama become irregular in appearance or there is enamel hypoplasia.
4. Transplacental infection form

- Bitch may show inapparent infection, abortion, or the birth of weak puppies.
- Young puppies infected transplacentally may develop CNS signs during first 4-6 w.
- Permanent immunodeficiencies occurs in survival puppies.
5. Ocular form

- The virus in the optic nerve and retina.
- Optic neuritis: Ch. by blindness with dilated unresponsive pupils.
- Dege. & necrosis of retina produce gray to pink irregular densities on the eye, with atrophy and complete retinal detachment.
• Circumscribed hyper-reflective areas termed "gold medallion" lesions which are considered characteristic of previous CDV infection.
Figure 1: (a) Serous ocular discharge, (b) Blepharitis along with cloudiness of eye, (c) Scanty nasal discharge (d) Hyper keratinization of Pads in dog suffering from nervous form of canine distemper.
Complications

➢ Secondary viral, bacterial and or parasitic infections of the skin, digestive and respiratory tract “Immunosuppression”.
P/M lesion

- Thymic atrophy in young puppies.
- Catarrhal enteritis.
- Conjunctivitis, rhinitis and inflammation of tracheobronchial tree and pneumonia.
- Hyperkeratosis of nose and foot pads.
- Meningeal conge. & ventricular dilatation.
- Neuronal and myelin degeneration (demyelination).
Diagnosis

1- Field diagnosis; depends on case history, clinical signs and P/M lesions.

2. Lab. Diagnosis;

A. Sample (on ice or formaline):
   - Transtracheal or pharyngeal washing.
   - Smears or scrapings from conjunctiva & hard Pad.
   - Urine, CSF, tonsils, skin, uveal tissues.
   - CNS, spleen, lymph nodes, stomach, lung, duodenum, bladder, respiratory and genital epithelium.
   - Blood & serum.
B. Laboratory procedures:

➢ Virus isolation on cell culture (CPE after 2-5 d) “Giant cell formation”.

➢ Molecular assays: Using (RT) PCR assay, nested PCR and real-time PCR, (highly sensitive and specific).

➢ Serological assays: (IFAT), ELISA and SNT.

➢ Serum biochemical analysis: Decrease in albumin and increased in alpha and gamma globulin in adult. Marked hypoglobulinemia in puppies.
- Hematology: lymphopenia, thrombocytopenia, regenerative anemia,
- CSF analysis: Increased in protein and cell count especially lymphocytes and anti-CDV antibody (IgG or IgM).
- Animal inoculation: I/C injection in mice, ferrets and hamster producing CNS signs.
- Radiology: secondary bronchopneumonia.
Intracytoplasmic inclusion body in lymphocyte

Distemper - IN inclusion

Differential diagnosis

➢ All causes of encephalitis or neurological diseases as rabies, infectious canine hepatitis, trauma and brain abscess or tumors.

➢ Also, Leptospirosis, lead poisoning, toxoplasmosis, bacterial gastroenteritis, ehrlichiosis, coccidiosis.
Treatment

➢ Hygienic treatment:

a. Infected animal kept in clean warm and free of drafts.

b. Oculonasal discharges should be removed.

c. Food and water should be discontinued if vomiting and diarrhea is present.

d. Cleaning and disinfection of dog kennel.

e. Dead animal should be hygienically disposed.
Medicated treatment: *(No specific treatment).*

a. Broad spectrum antibiotic as ampicillin, and synulox.

b. Ringer's solution given I/V or S/C.

c. Vit.B to replace those lost and to stimulate appetite.

d. I/V ascorbic acid, immune sera (10-30 ml),

e. Antiemtic, antipyretic, antifilmatory, and antidiarrheal drugs.
f. Analgesic and anticonvulsants after onset of systemic disease and prior to development of neurologic seizures.

g. Glucocorticoid (cortisol) may have variable success in controlling blindness and pupillary dilation.

h. Prognosis of the disease is generally bad.
Control

- Segregation of infected dogs and treat them symptomatically and destruction all source of infection.
Vaccination

- Living attenuated or inactivated vaccines singly or in combination with other canine vaccines.
- Two doses with 3-4 weeks intervals, giving immunity 6 m -1 years.
- Puppies from non-vaccinated bitch are vaccinate for first time at 1-4 w. age and at 6-16 w. age from vaccinated dam.
Canine Distemper-Adenovirus Type 2-Parainfluenza-Parvovirus Vaccine Modified Live Virus Leptospira Canicola-Grippotyphosa-Icterohaemorrhagiae-Pomona Bacterin
For use in dogs only

Vanguard®
live attenuated canine distemper virus, live attenuated canine adenovirus 2 and live attenuated parainfluenzavirus, live attenuated canine parvovirus1&2, inactivated Leptospira canicola and inactivated Leptospira icterohaemorrhagiae.
Thank You
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News

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Research Interests
Veterinary infectious diseases