Canine Distemper Virus

VMC 321
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Canine Distemper
Classification

Family  PARAMYXOVIRIDAE
Subfamily  PARAMYXOVIRINAe
Genus  MORBILLIVIRUS
Species  CANINE DISTEMPER VIRUS
Paramyxoviridae

Nucleocapsid extruded from ruptured envelope

Nucleocapsid with helical symmetry ("Herringbone" pattern)

Intact virion

All animal viruses with helical nucleocapsids are enveloped
Canine Distemper
Canine distemper virus

Terrestrial carnivores

Canidae
- Dog
- Fox
- Coyote
- Wolf
- Jackal
- Dingo
Canine distemper virus
Terrestrial carnivores

Procyonidae
- Raccoon
- Kinkajou
- Coati
- Panda

Felidae
- Lion
- Leopard
- (Cat)
- (Tiger)
Canine distemper virus
Terrestrial carnivores

Mustelidae
• Mink
• Ferret
• Weasel
• Skunk
• Badger
• Stoat
• Marten
• Otter
Canine distemper in ferrets and mink

Ferret with distemper
Transmission

- Transmission occurs via
- An aerosol-droplet
- Direct contact,
- By contact with contaminated objects
Canine distemper

Pathogenesis

- Replication in lymphoid tissue: 7-10 days
- Tonsils, lymph nodes, spleen, bone marrow
- Replication in alveolar macrophages
- Immune suppression

Inclusion bodies - especially in Lung, Urinary bladder, Stomach, Intestine
Pathogenesis of CDV

- **Infection**
  - Aerosol
  - Alveolar macrophages and macrophages and lymphoid cells of tonsils
  - Local lymph nodes
  - Bone marrow, spleen
- **7-10 days**
- **Asymptomatic**
- **GI and respiratory signs**
- **Recovery**
- **Death (sec. inf.)**
  - Non-inflammatory damage
    - Demyelination
    - Neuron degeneration
- **Acute neurological signs**
- **Death**
- **Chronic neurological signs**
  - Inflammatory damage
- **Recovery**
  - "Old dog" encephalitis
- **Viral persistence**
- **Viral replication without infectious virus**
- **Cell-cell spread**
- **Inflammatory immune response causes damage**
Canine distemper

Pathogenicity

- Epitheliotropic and neurotropic
- Replicate in cytoplasm
  - Eosinophilic inclusion bodies in cytoplasm and nucleus

Multisystem affected

- Respiratory system
- Neurological system
- Alimentary tract system
- Persistent infection (e.g. old dog encephalitis)
- Immunosuppression

Inclusion bodies especially in Lung, Urinary bladder, Stomach, Intestine
Canine distemper in dogs

Acute disease

• Encephalitis
• Pneumonia, Rhinotracheitis, Conjunctivitis
• Gastroenteritis

Chronic disease

• “Old dog” encephalitis
• “Hardpad”
Canine distemper

Histopathology

• Inclusion bodies
  • Eosinophilic
  • Intranuclear and cytoplasmic

• Formation of Syncytia
  • Multinucleate cells
  • Macrophages, Epithelial cells
  • Lungs, lymph nodes
Pathogenicity

- The pathological lesions of canine distemper include
- pulmonary congestion and consolidation leading to focal pneumonitis.
- Eosinophilic rounded or ovoid bodies with refractile particles are found in the epithelial cells of skin, bronchi, intestinal tract, urinary tract, bile duct, salivary glands, adrenal glands, central nervous system, lymph nodes and spleen.
- Splenomegaly
Canine distemper

Nervous tissue

• Brain

  • Neuronal degeneration
  • Demyelination
  • Nonsuppurative encephalomyelitis
  • Viral persistence in central nervous system
  • Reactivation → cell-cell spread
  • Immune response → “Old dog encephalitis”
Signs and Symptoms of Distemper

1. Fever - BIPHASIC FEVER
2. (often one episode a few days after infection that may not be noticed, followed by a second episode a few days later when the other symptoms begin to show up)
3. Discharge from the eyes and nose
4. Loss of appetite
5. Lethargy
6. Vomiting and diarrhea
7. Coughing
8. Labored breathing
9. Hardening of footpads and nose (distemper has sometimes been called hard pad disease)
10. Inflammation of various parts of the eye
11. Secondary bacterial infections
Clinical Signs

- Anorexia;
- Depression;
- Listlessness;
- Fever;
- Upper respiratory tract infections;
- Thick, yellow discharge from the nose and eyes; coughing; dyspnea;
- Vomiting; and diarrhea.
- Hyperkeratosis of the nose and pads of the paws can occur.
- In young dogs, enamel hypoplasia of the teeth is seen in neonatal infections.
Neurological symptoms includes:

- Seizures,
- Paraparesis or tetraparesis,
- Hyperesthesia,
- Myoclonus,
- Death
Canine distemper

Conjunctivitis, nasal discharge
Canine distemper

Skin

• Footpads: Hyperkeratosis: “Hardpad”
Canine distemper virus

Diagnosis

- Virus isolation
- Serology:
  - Virus neutralisation test
  - Acute and convalescent serum
- Histopathology
- Polymerase chain reaction
Prevention

- Vaccination of puppies between 6 and 16 weeks old
- CDV vaccines provide prolonged immunity
- Efficacy of CDV vaccines approaches 99% and dogs develop protective immunity.
Acknowledgement

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Any questions???

Thanks for listening