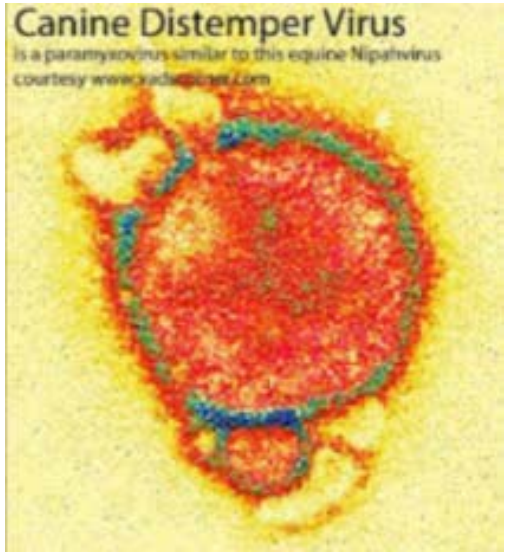
Rapid Canine Distemper Virus Test
User Guideline

20161018

Bohae Kang, DVM

Etiology

- Paramyxovirus
- Fragile, enveloped, single-strand RNA virus
- Sensitive to lipid solvents(ether, phenols, quaternary ammonium)
- Unstable outside the host



http://www.epidemiologyandtoxicology.org/canine-distemper.html

https://www.google.co.kr/search?q=distemper+virus&espv=2&biw=1600&bih=775&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjMlZHUr6TOAhVJPl8KHbzFDwcQ_AUIBigB#imgrc=penLwnNLbfJxkM%3A

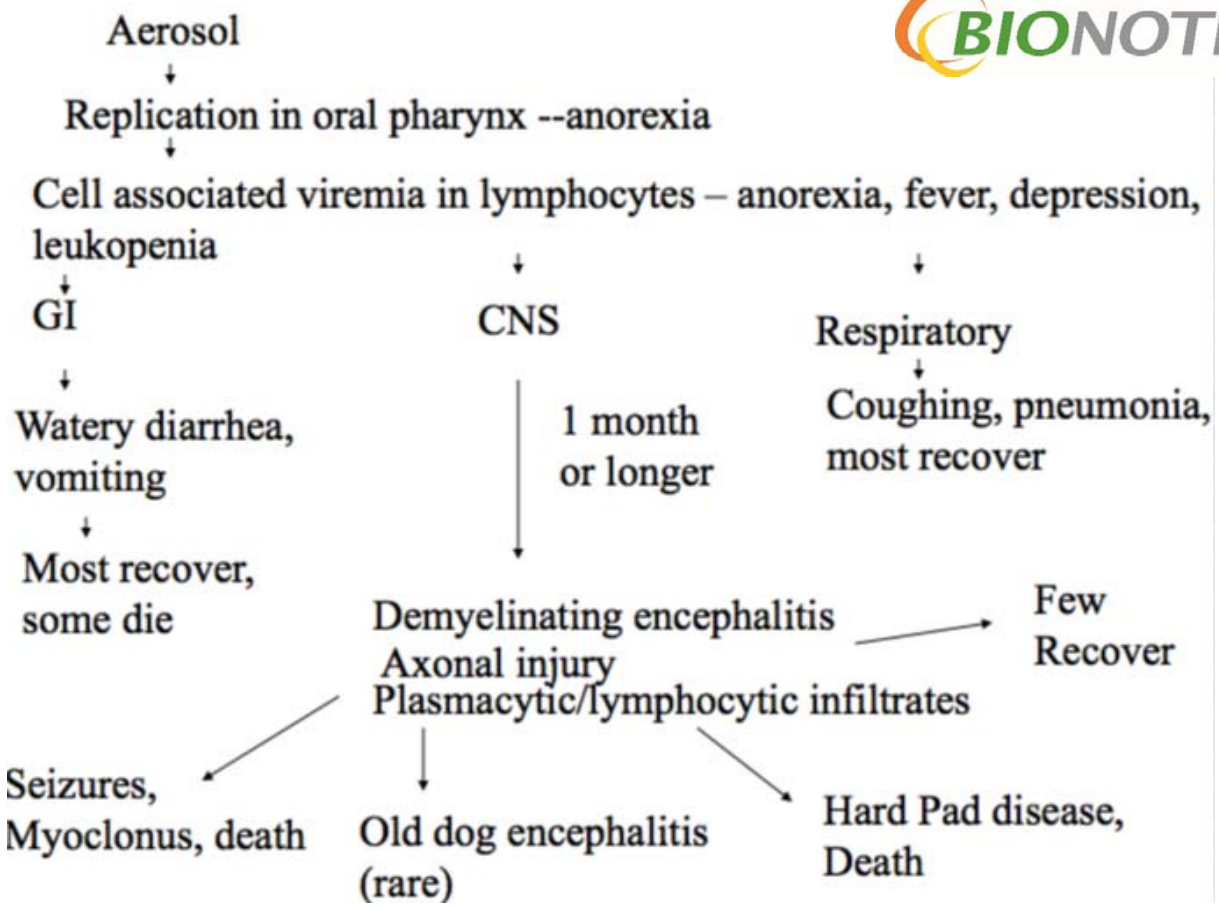
Transmission

- Transmission
  - aerosol droplet spread by sneezing and coughing
  - other body secretions and excretions
  - food and water
  - Vertical transmission available
- Viral shedding: several months
- Incubation period: 14~18 days (1~4 weeks or more)
- Puppies younger than six months and unvaccinated dogs are at the great risk

http://www.merckvetmanual.com/mvm/generalized_conditions/canine_distemper/overview_of_canine_distemper.html

Pathogenesis

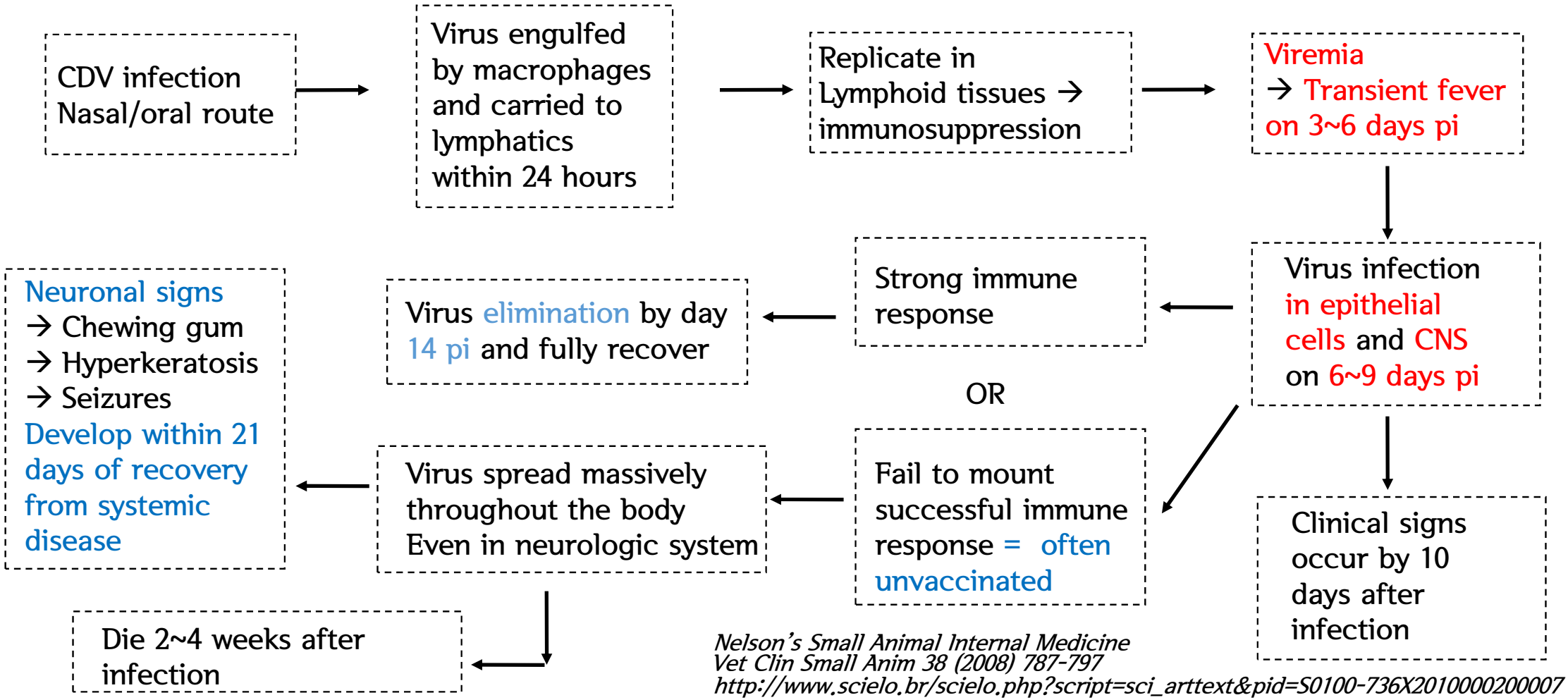
- Virus replication in local lymph nodes of the respiratory tract
- Immune cell-mediated viremia resulting in infection of all lymphoid tissues
- Virus replication in various organs; respiratory, gastrointestinal, and urogenital epithelium, CNS, and optic nerve
- Viremia and viral spreading depend on degree of the antibody response during viremic period



https://www.studyblue.com/notes/note/n/paramyxoviruses/deck/4133159

http://www.merckvetmanual.com/mvm/generalized_conditions/canine_distemper/overview_of_canine_distemper.html

Pathophysiology



Nelson's Small Animal Internal Medicine
Vet Clin Small Anim 38 (2008) 787-797
http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-736X2010000200007

Clinical signs

- 3~6 days post infection : transient fever, leukopenia (lymphopenia), anorexia (Transient fever reaches a peak 3~6 pi)
- 10 days pi : Biphasic fever can be seen several days post infection with serous nasal discharge, mucopurulent ocular discharge, lethargy, and anorexia, secondary infection on GI and respiratory system
- 20 days pi : Neurologic signs with weak immunity (head tilt, nystagmus, partial or complete paralysis, convulsions etc)
- Old-dog encephalomyelitis
- Hyperkeratosis of foot pads and epithelium of nasal planum
- Enamel hypoplasia

Vet Clin Small Anim 38 (2008) 787-797
http://www.merckvetmanual.com/mvm/generalized_conditions/canine_distemper/overview_of_canine_distemper.html

Clinical signs

Pulmonary form	Nasal discharge / pharyngitis / bronchopneumonia / dyspnea
Digestive form	Abdominal pain / Loss of appetite / Vomiting / dehydration / diarreha
Occular form	Conjunctivitis / swollen eye lids / purulent discharge / ulceration / keratitis / retinitis / blindness Combination of retinochoroiditis and encephalitis detected in 40% of infected
Nervous form	Restlessness / excitement / chewing movements / excessive salivation / muscular spasm / seizures /
Cutaneous form	Rash / vesicles / pustules / hyperkeratitis (hard pad disease) / lameness / vesicopustular eruptions on the ventral aspect of abdomen and inner parts of thigh known as distemper exanthema / enamel hypoplasia

Nelson's Small Animal Internal Medicine

http://animalhealthcareveterinary.blogspot.kr/2009/06/canine-distemper-in-dogs.html

Neurologic signs

- CNS signs: circling, head tilt, nystagmus, paresis to paralysis, focal to generalized seizures
- Involuntary twitching of muscle: myoclonus, chorea, flexor spasm, hyperkinesia
- Convulsions: salivation, chewing movements of the jaw (Chewing-gum)

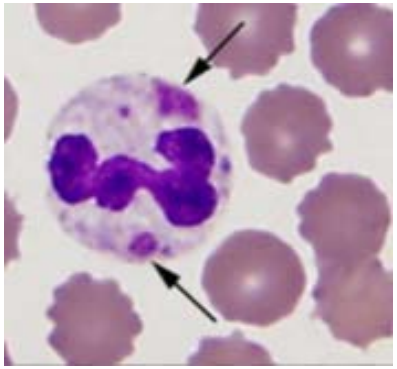
→Onset of neurologic signs can be delayed from several weeks to months as a result of chronic pregressive demyelination of CNS

- Old dog encephalitis (ODE) (Rare) = Chronic distemper encephalitis ; Usually older than 6 years
- Ataxia, compulsive movements (head pressing, continual pacing, incoordinated hypermetria may be seen in fully vaccinated adult dogs without a history suggestive of systemic canine distemper infection)
- From CDV infection with microglial proliferation and neuronal degeneration in the cerebral cortex

Nelson's Small Animal Internal Medicine

http://www.merckvetmanual.com/mvm/generalized_conditions/canine_distemper/overview_of_canine_distemper.html

Clinicopathologic findings



- Lymphopenia and mild thrombocytopenia
- Eosinophilic viral inclusion bodies inside immune cells can be observed very early phase (2~9 day pi)
- Formation of giant cells (syncytia)
- Interstitial pattern due to viral pneumonia
- Lymphoid tissue necrosis
- Neuronal degeneration, gliosis, non-inflammatory demyelination, perivascular cuffing, non-suppurative leptomeningitis, intranuclear inclusion bodies within glial cells
- Mononuclear cell pleocytosis(increased WBC in CSF) and increased protein concentration in CSF
- Ratio of serum and CSF IgG and albumin is high with encephalitis
- Virus particle detection with immunofluorescent with cells from tonsil, respiratory, urinary tract, conjunctival scraping and CSF for 5~21days after infection.

Nelson's Small Animal Internal Medicine
https://quizlet.com/81096872/abnormal-leukocytes-flash-cards/
http://www.merckvetmanual.com/mvm/generalized_conditions/canine_distemper/overview_of_canine_distemper.html
Vet Clin Small Anim 38 (2008) 787-797

BIONOTE

Lesion

- Thymic atrophy seen during necropsy
- Hyperkeratosis of nose and footpad in dogs with neurologic signs
- Bronchopenumonia, enteritis, skin pustules due to secondary bacterial infection

http://homepage.usask.ca/~vim458/virology/studpages2009/architecture/clinicalsigns.html

http://www.merckvetmanual.com/mvm/generalized_conditions/canine_distemper/overview_of_canine_distemper.html

Differential Diagnosis

- Differential diagnosis with other febrile disease
  - Leptospirosis
  - Infectious canine hepatitis
  - Rocky mountain spotted fever
  - Intoxicants (lead, organophosphates causing GI, neurologic signs)

Diagnosis

- IFA
- RT-PCR
- ELISA and Ab detection with CSF and blood

- Necropsy: histology and IFA

Sampling sites

* Samples from different sampling sites can be mixed together		
Infected organs	Clinical signs	Sampling site
Respiratory system	Nasal discharge Dyspnea Bronchopneumonia	Nasal / pharyngeal swab Conjunctival Swab Whole blood
Gastrointestinal system	Vomiting Diarrhea Dehydration	Fecal sample Nasal / pharyngeal swab Conjunctival Swab Whole blood
Neurological system	Ataxia Myoclonus Circling, head tilt, nystagmus, paresis to paralysis, focal to generalized seizures	CSF sample

* Shedding of virus begins within **seven** days of infection and may continue for up to **three months**.

CDV Ag Rapid Test Kit

Rapid CDV Ag Test Kit(RG1103DD)

- Conjunctival, and nasal smear, urine specimen can be used within 3 weeks post infection
- Blood, serum can be used up to 6 days post infection

Description : Detection of Canine Distemper virus antigen

Specimen: canine conjunctiva, urine, serum or plasma

Cat.No : RG1103DD

Vet Clin Small Anim 38 (2008) 787-797

CDV Ab Rapid Test Kit

Rapid CDV Ab Test Kit 2.0(RB2152DD)

- Sera raised against field CDV isolates may have neutralizing titers up to 10-fold higher against the homologous virus than against vaccine strains
- Dog anti-CDV IgM persists for at least 3 months post infecetion

Description : Titration of Parvovirus antibody for vaccination & prognosis

Specimen: Canine whole blood, serum, or plasma

Cat.No : RB2152DD

Vet Clin Small Anim 38 (2008) 787-797

Eye discharge / nasal discharge / vomiting / diarrhea
Up to 60~90 days after natural infection

CDV Ag Rapid Test

Conjunctival
Nasal
Feces
swab

Positive

Rapid CDV Ab Test
&
Supportive care

Four-fold increase over 2~3 week or detection of IgM → recent infection

Ab Negative

Bad Prognosis

Negative

Differential diagnosis with other disorders is required

Virus hidden in neuro system

Chewing-gum movement / seizures
Hyperkeratosis on footpads and nose

CDV Ag Rapid Test
with CSF

Positive

Bad Prognosis especially with CNS signs
&
Supportive care

False positive due to blood contami nation

Negative

Differential diagnosis with other neurologic disorders is required

- CDV Ag Rapid Test with blood → Positive → Early infection
- Increased protein, pleocytosis, anti-CDV Abs in CSF → CDV encephalitis

BIONOTE

Treatment

- Symptomatic, supportive
- Antibiotics for limiting secondary bacterial invasion
- Supporting fluid balance
- Controlling neurologic manifestation
- Broad-spectrum antibiotics, balanced electrolyte solution,
- Parenteral nutrition
- Antipyretics
- Analgesics
- Anticonvulsants

Evaluation Data

- Positive samples from Che-Ju National University, South Korea, and animal hospitals were confirmed with RT-PCR and nested PCR

Table 4. Total Results

		Nested PCR		
		Positive	Negative	Total
Anigen Rapid CDV Ag	Positive	85	3	88
	Negative	1	129	130
	Total	86	132	218

Sensitivity: 98.8%

Specificity: 97.7%