





# **Infectious canine hepatitis (ICH)**

**Contagious hepatitis or Canine  
Adenovirus infection**

**By**

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# Definition

- Contagious disease of dogs (**fatal in puppies**) caused by Adenovirus
- Vary from a slight fever to severe depression, **abdominal pain, vomiting, diarrhea** with or without evidence of hemorrhage, corneal opacity known as "**blue eye**", marked **leukopenia**, coagulation disorders and death.

# Rabies

- Paralysis, coma & death.

## Canine distemper

- 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

- **CAV-1** (antigenically related only to CAV-2, one of the causes of ICT).
- **Non-enveloped DNA virus**
- **Resistant** to lipid solvents and acids & formalin.  
It survives outside the host for weeks or months.
- **Susceptible** to 1–3% solution of sodium hypochlorite (household bleach).

# Epidemiology

1. **Distribution:** Worldwide and **not** recorded in Egypt.
2. **Host rang:** (**Dogs, foxes, wolves**, coyotes, bears, lynx, and some pinnipeds).
  - Dogs less than one-year age are more susceptible and more severely affected.
3. **Seasonal incidence:** There is no seasonal prevalence.
4. **Transmission:**

**a. Source:** All body tissues and secretions of dogs during acute stages of the disease as **saliva, feces and urine** (**it may be present in kidney and excreted in urine for 6-9 months post infection**)

**b. Mode:**


- **Ingestion.**
- Inhalation (rare).
- Contact with fomites including feeding, utensils and hands.
- Ectoparasites may contain the virus.

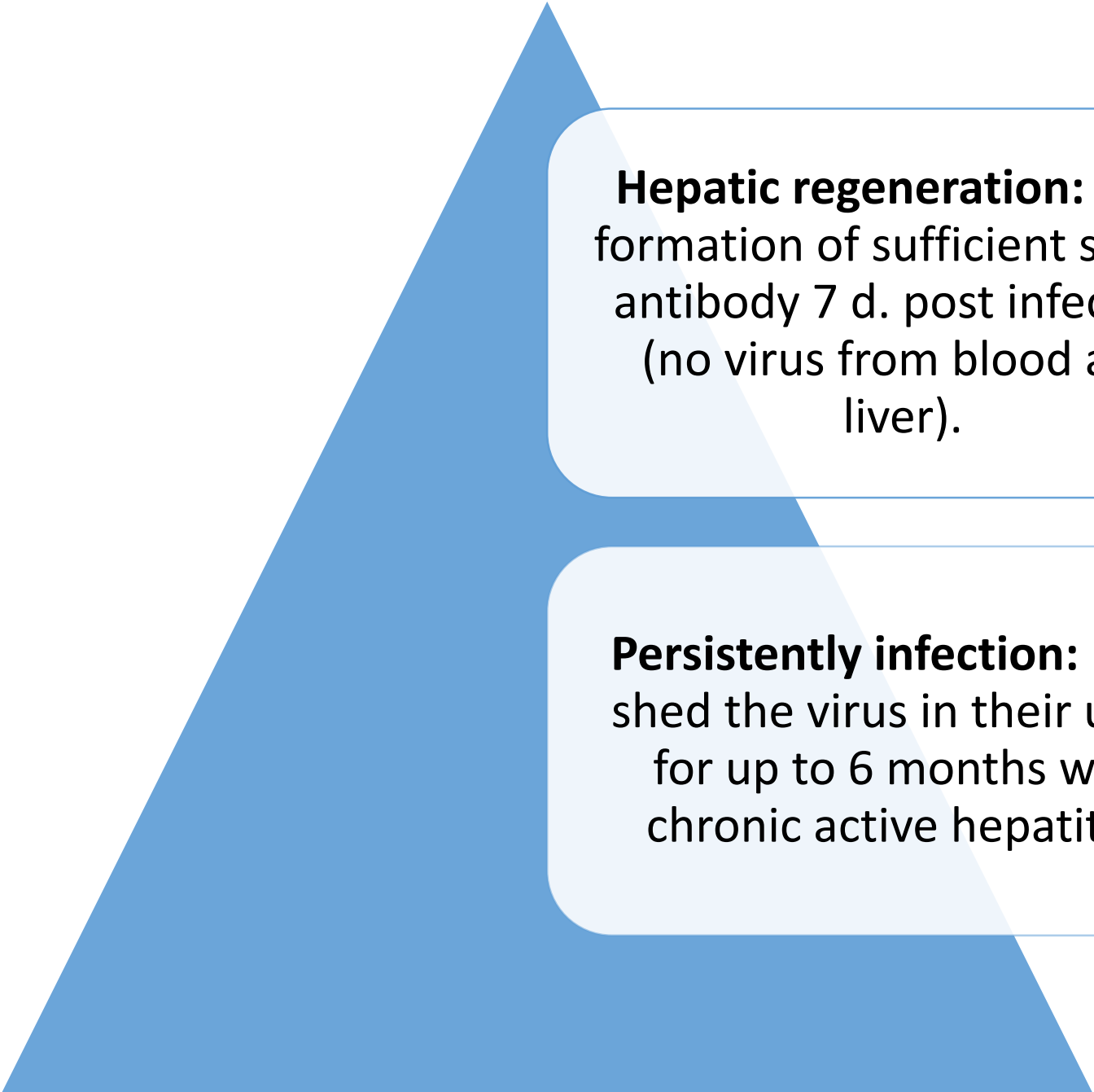


## **5. Economic impact:**

- ❖ Loss of dog's function and deaths of valuable dogs.

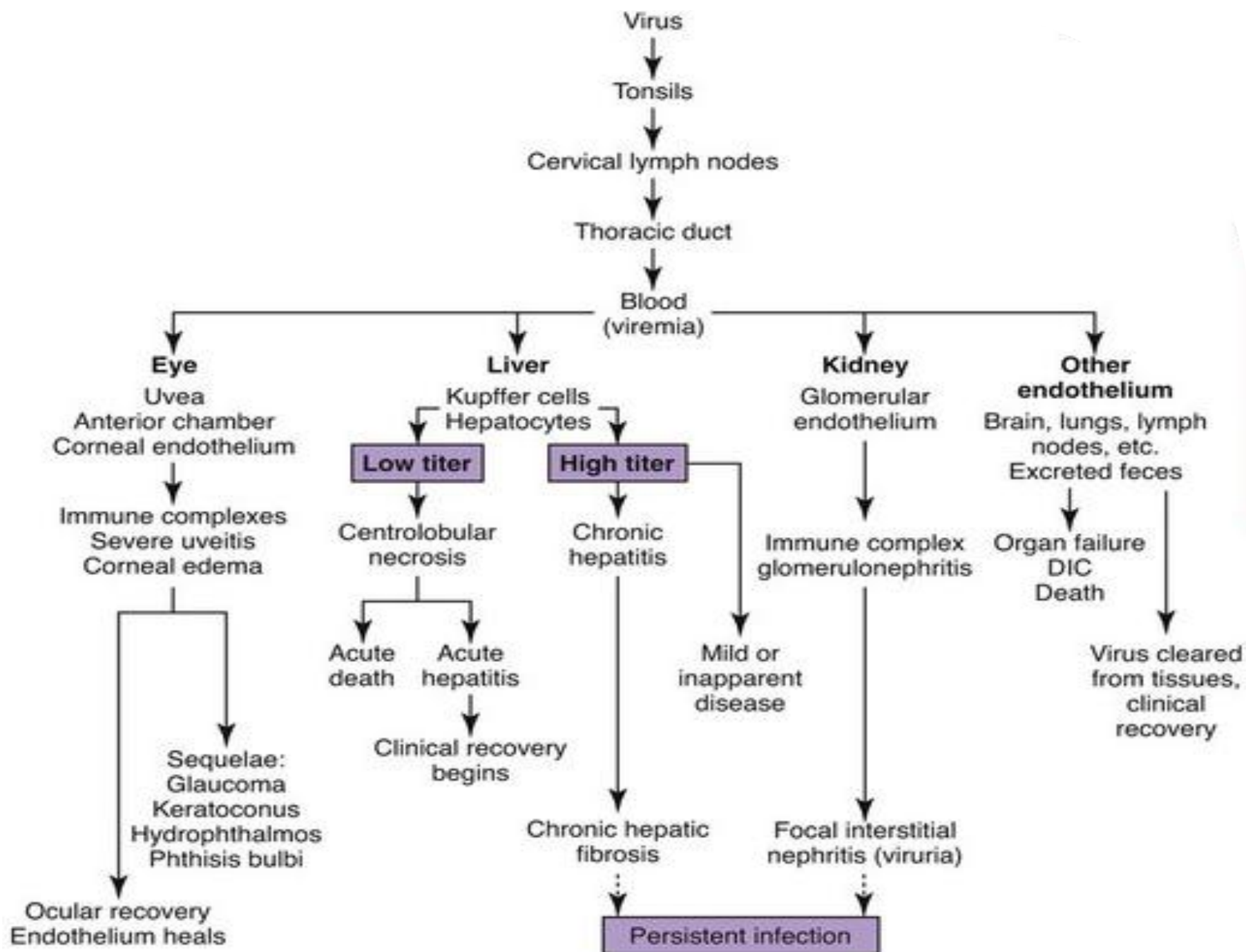
# Pathogenesis

- Infection is followed by replication in **tonsils and Peyer's patches**, other lymphatic tissues.
- **Blood**  **Viraemia** for 4 – 8 days.
- Virus then replicates in **vascular cells** in many organs, and in **hepatocytes, endothelial cells of renal glomeruli (Hepatitis and glomerulo-nephritis) and the cornea and uvea (Corneal and uveal inflammation ‘blue eye’) and others organs (organ failure and death).**



**Hepatic regeneration:** with formation of sufficient serum antibody 7 d. post infection (no virus from blood and liver).

**Persistently infection:** Dogs shed the virus in their urine for up to 6 months with chronic active hepatitis .



# Clinical signs

- I.P from 4-10 days.
- Course 5-7 days in uncomplicated cases and is long in presence of concurrent infection and in dogs with chronic active hepatitis.
- Morbidity rate (less than 5%)
- Mortality rate 10%–30% .

# Clinical forms

**1. Per acute form:** Sudden death due to **damage of vital organs** as brain and lungs or due to **shock or hepatic coma**.

**2. Acute form:**

- **Biphasic Fever** “Saddle type curve“, anorexia, and thirst.
- **Abdominal pain, vomiting and diarrhea.**

- **Petechiae** of the oral mucosa, as well as enlarged tonsils.
- **S/C edema** of the head, neck, and trunk.
- **Leukopenia.**
- **Hepatic involvement:** Abdominal tenderness, distention due to serosanguineous **ascites** and **hepatomegaly** & icteric mucous membrane.
- **Non-suppurative encephalitis** (**uncommon**) due to vascular damage of the brain tissue.

- **Eye involvement:** Corneal edema, ulceration or perforation and anterior uveitis result in blepharospasm, photophobia and serous ocular discharge (**transient uni or bilateral corneal opacity or blue eye**).
- **Conjunctivitis**, serous discharge from the eyes and nose.
- **Death** due to hepatic insufficiency and hepatoencephalopathy.

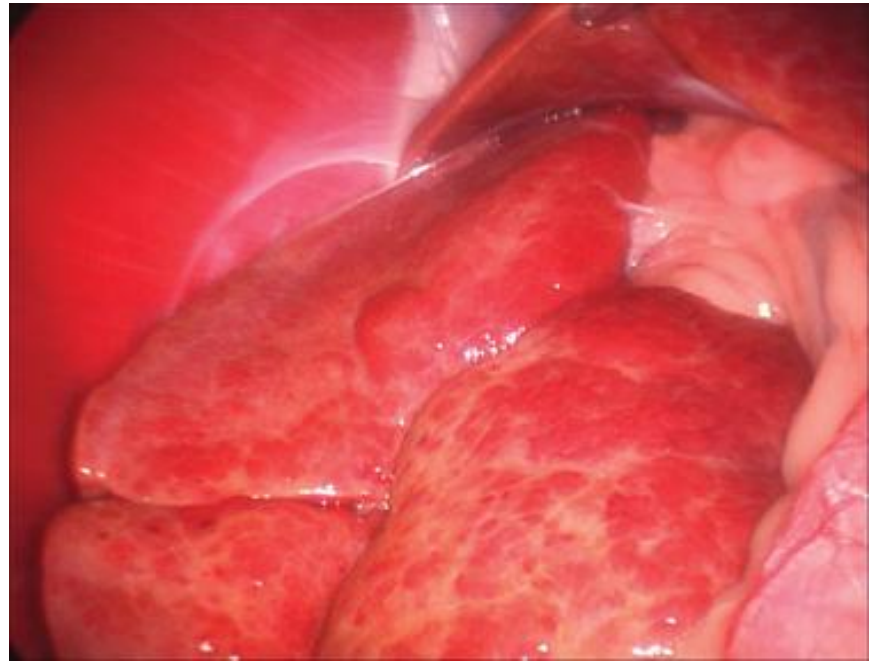
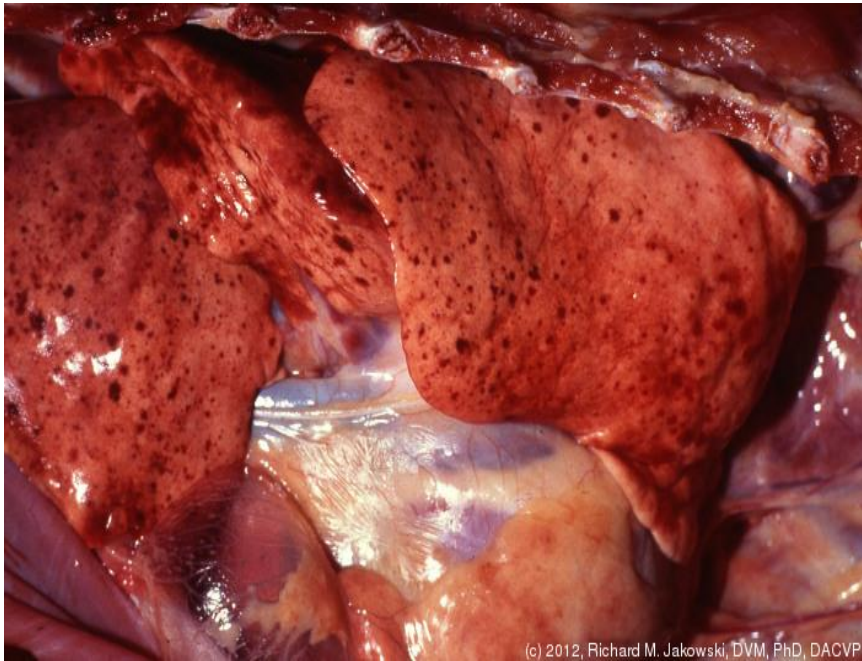




# P/M lesion

- **Abdominal cavity** contain clear to bright red fluid
- **Peticheal** and echymotic hemorrhage on all serosal surface.
- **The liver is enlarged**, dark, mottled in appearance and fibrinous exudate is present on liver surface and interlobar fissures
- **Gall bladder** is thickened edematous and has a bluish white opaque appearance.

- **Spleen** is enlarged and bulges on the cut surface.
- **Kidney:** Focal hemorrhage in **renal** cortex.
- Hemorrhage in **midbrain and caudal brain stem**.
- **Lungs:** Multiple gray to red areas of consolidation
- **Eye:** corneal opacification.
- Dogs **surviving** acute phase reveal: small, firm and nodular liver (**chronic hepatic fibrosis**) and **kidney have multiple white foci**.
- **I/N IB** in hepatic in endothelial cells





# Diagnosis

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

## **2. Lab. Diagnosis;**

### **A. Sample:**

- **Oropharyngeal secretions,** swabs from oropharynx-tonsillar crypt.
- **Feces or rectal swabs, urine**
- Liver, spleen, lymph nodes, kidney, brain, eye, bone marrow, CSF.
- **Serum and blood.**

## B. Laboratory procedures:

- **Virus isolation** on cell culture (CPE after 18-24.h) **“Cell clustering & detachment”**
- **Molecular assays:** using nested PCR and real-time PCR, (highly sensitive and specific).
- **Serological assays:** indirect fluorescent antibody test (IFAT), ELISA and SNT.
- **Histopathology:** I/N IB in hepatic and endothelial cells

- **Hematology:** leukopenia, lymphopenia and neutropenia and later on there are lymphocytosis and neutrophilia.
- **Serum biochemical analysis:** increase in activities of ALT, AST and ALP with moderate to marked bilirubinuria, proteinuria,
- **CSF analysis:** Increased in protein content.
- **Abdominal paracentesis** yields fluid that varies from clear yellow to bright red.

# Differential diagnosis

- With canine distemper and others causes of leukopenia.



# Treatment

- No specific treatment but symptomatic and supportive.
- Fluid therapy as ringer's 45 ml/kg, B/W, I/V,
- Broad spectrum antibiotic as ampicillin or gentamicin
- Glucose 50% in a dose of 0.5 ml/kg,
- Atropine ophthalmic ointment to decrease ciliary spasm.

# Treatment

- Decrease of protein intake, rectal enemas
- Non-absorbable oral antibiotic as neomycin to reduce ammonia producing bacteria in intestine.
- Oral potassium therapy and ascorbic acid.

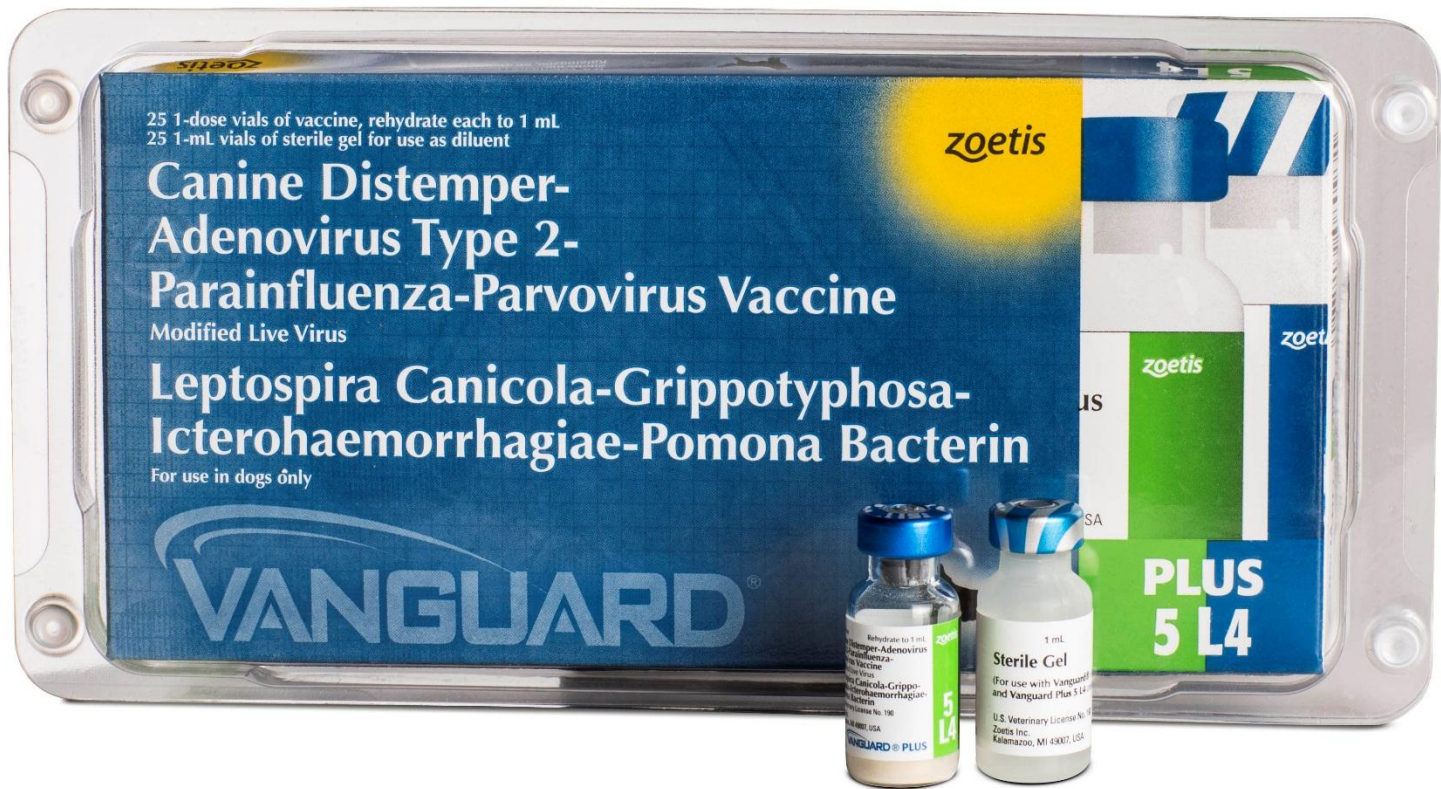
# Control

- **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 vaccinated for first time at **1-4 w.** age and at **6-16 w.** age if from vaccinated dam.

- **Live CAV-1** vaccine produce subclinical interstitial **nephritis** and persistent **shedding** of vaccinal virus in urine or respiratory signs.
- **Live CAV-2** vaccine, provide cross-protection against CAV-1 with very **little tendency** to produce corneal opacities or uveitis, and the virus is not shed in urine.
- Inactivated **CAV-1** vaccine doesn't produce any lesions in vaccinated dogs (short immunity).



25 1-dose vials of vaccine, rehydrate each to 1 mL  
25 1-mL vials of sterile gel for use as diluent

zoetis

# Canine Distemper- Adenovirus Type 2- Parainfluenza-Parvovirus Vaccine

Modified Live Virus

## Leptospira Canicola-Grippytyphosa- Icterohaemorrhagiae-Pomona Bacterin

For use in dogs only

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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**.




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**Publications [ Titles(4) :: Papers(4) :: Abstracts(4) ]**

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**News**

**[2017-06-18]**

Member of Animal infectious diseases and prevention department ( AIDP), University of Miyazaki, Japan (<http://www.agr.miyazaki-u.ac.jp/~vet/AIDP/members-students.html>)[more](#)

**Research Interests**

Veterinary infectious diseases

