



Canine Parvovirus

Extended Version

Classic case:

Unvaccinated 7-wk old Rottweiler puppy lethargy, anorexia, vomiting, hemorrhagic diarrhea

Presentation:

- **Signalment and History**
 - **Puppy < 8 mos** or unvaccinated adult
 - Breed predisposition: Doberman pinscher, Rottweiler, pit bull, German shepherd, dachshund.
 - Lower than normal risk: Toy poodles and cocker spaniels
 - Unvaccinated puppy or less than 7 week of age with poor maternal immunity
 - More **common in warmer, wetter seasons** – esp. in the **spring**
 - Immunosuppression
 - **Intact males** more common than intact females
- **Clinical signs** (acute onset: 3-14 days after exposure)
 - **Lethargy** (usually first sign)
 - **Anorexia, vomiting, diarrhea (usually hemorrhagic)**
 - **Dehydration**
 - Abdominal pain
 - Palpable fluid-filled intestines
 - Fever, tachycardia
 - Hypovolemic shock
 - Hypothermia



Three month-old puppy, vomiting & diarrhea secondary to parvovirus.

Image courtesy of Uwe Gille

DDX:

Helminthiasis, giardiasis, coccidiosis, coronavirus, any severe gastroenteritis, distemper, salmonella, foreign body/intussusception

Test of choice:

- CBC: **Neutropenia, lymphopenia**
- Blood chemistry: Hypoglycemia, hypokalemia, hypoalbuminemia, possible prerenal azotemia and elevated liver enzymes
- **Fecal ELISA – parvovirus antigen**
 - Sensitive and specific
 - False-positive: recent vaccination (5-12 days after vaccination)
 - False-negative: outside period of shedding; profusely hemorrhagic diarrhea (dilution of antigen)
- **Fecal flotation** and wet prep: to **rule out concurrent helminthiasis** (common)
- **Abdominal radiography**: avoid missing foreign body; abnormalities 2ndary to parvo (intussusception)

Rx of choice:

- **General principles- ISOLATE parvo suspects**
 - **Rehydrate**
 - Treat / prevent sepsis
 - Correct potassium and glucose imbalances
 - Normalize blood pressure
 - Stop vomiting
 - Control pain
 - Nutritional support

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- **Acute treatment**

- **Admission**

- **Place IV catheter**
 - IV antibiotics (cefazolin or ampicillin)
 - Check hematocrit (Hct)/Total Protein (TP)/glucose
 - IV crystalloid fluid bolus if hypovolemic shock

- **First 2 hours**

- **Calculate fluid needs**
 - **Rehydration + maintenance + ongoing losses for 1st 12 hr**
 - Rehydration = % dehydration X body weight in kgX10
 - Maintenance is 65 ml/kg/d (30 ml/lb/d)
 - Give **1/4 to 1/2 of fluid needs in 1st 2 hrs** to correct blood pressure
 - **Warm** fluids to body temperature
 - If shock or hypoalbuminemia – use colloids at 10-20 ml/kg IV

- **After first 2 hours**

- Give **rest of fluid allotment over next 10 hours**
 - Check Hct, TP, K⁺, glucose
 - Add glucose to fluids if needed
 - If hypoalbuminemia add plasma or polymerized hemoglobin (Oxyglobin)
 - If anemia (< 20% hct) add blood transfusion or polymerized hemoglobin
 - Warm patient on heating pad if needed
 - Don't do this before this point as it will dilate peripheral vasculature

- **At approximately 2-3 hours**

- **Metoclopramide** constant rate infusion (CRI) to treat ileus and vomiting
 - **Pain control** with buprenorphine
 - **Amikacin/gentamicin** (A/G) if blood pressure (BP) improved
 - If concerned about nephrotoxicity with A/G
 - Can safely use enrofloxacin for up to 5-8 days and won't cause cartilage problems
 - Check blood pressure, presence of urine in bladder, capillary refill time (CRT)

- **Approximately 4-5 hours**

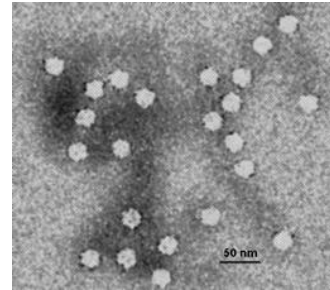
- **Start to feed** (aim for at least 1/3 of requirements over next 24 hours)
 - Use high protein, high calorie food
 - Energy requirement (kcal) = [(body weight (kg) X 30) + 70] X illness factor (1.25-1.5)

- **Approximately 12 hours**

- Reassess hydration (weigh patient often): continue rehydration as needed
 - Titrate fluid rate to hydration, perfusion, and vomiting and diarrhea.

- **Chronic treatment**

- Continue IV fluids, antibiotics, pain control, antiemetic, and nutrition as above
 - Repeat blood, plasma, or synthetic colloid transfusions as often as needed
 - Continue antiemetics (if certain there is no obstruction (eg, intussusception)
 - Metoclopramide CRI
 - Maropitant (Cerenia)
 - Ondastetron or dolasetron
 - Prochlorperazine (often used as suppository)
 - Monitor body weight, glucose, Hct, TP, K⁺ - (use very small quantities of blood for these tests) until puppy is eating well



Electron microscopy of canine parvovirus. Image courtesy, [PhD Dre](#)



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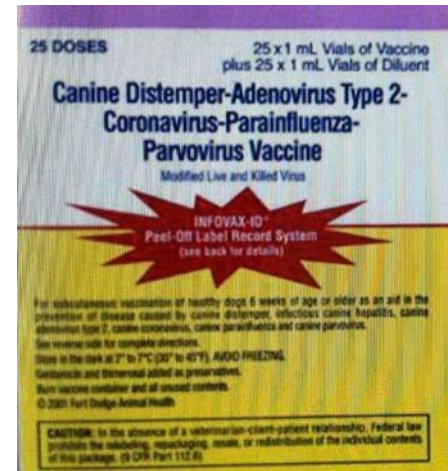
Prognosis: Good with above described treatment (**93-95% success rate**), otherwise 68-92% reported

Prevention:

- Vaccination
 - Use **modified-live** vaccine at 6-8 wks, 10-12 wks, & 14-16 wks, booster at 1 yr, then every 3 yrs
 - Potential damage to cerebellum and myocardium with modified-live vaccines
 - Use **inactivated** vaccine in:
 - Pregnant dogs
 - or-
 - Colostrum-deprived puppies vaccinated before 6-8 weeks of age
- Limit environmental access of puppies until fully vaccinated
- Dogs that survive parvovirus infection will likely have **lifelong immunity**
- Disinfectants
 - Parvovirus is **extremely resistant**
 - **Diluted** bleach 1:32 (full-strength is ineffective)
 - Quarternary ammonium disinfectants

Pearls:

- **Unvaccinated dogs 12.7X more likely** to develop parvoviral enteritis
- Nonenveloped, single-stranded DNA virus
 - CPV-2b and CPV-2c are most common in North America
- Pathophysiology
 - **Predilection for rapidly dividing cells**
 - **Crypt cells** of villous **epithelium of the small intestine**
 - **Lymphocytes**
 - **Neutrophils**
 - **Fecal-oral** route of infection
 - **Fecal shedding begins 4-5 days** after exposure, **BEFORE** onset of clinical signs.
 - Shedding lasts for 7-10 days (usually ends by day 14 post-infection)
- In humans, parvovirus B19 causes fifth disease.
 - Parvovirus B19 only infects humans, a person cannot catch the virus from a dog or cat.
 - A dog or cat cannot catch parvovirus B19 from an infected person.
 - Called 5th dz because it was 5th in a list of lookalike rashes (ie: measles, rubella, scarlet fever)



Typical vaccine label.
Image courtesy Dr. Shirley Scott

Refs: Clinical Veterinary Advisor, Cote, 2nd ed. p 839-841; Merck Manual, 10th ed (online): Canine Parvovirus, Fifth disease, US Centers for Disease Control and Prevention.