Canine Parvovirus

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

**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)
    - Ondasetron 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
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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
    - 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)