

## Chapter 10 - Lesson 2



### *Infectious Diseases: Digestive System*

#### *Stomach and Intestines*

Gastroenteritis is the inflammation of the gastrointestinal tract (GI) which is composed of stomach and intestines. GI disease may be caused by many different types of bacteria, viruses, and parasites.

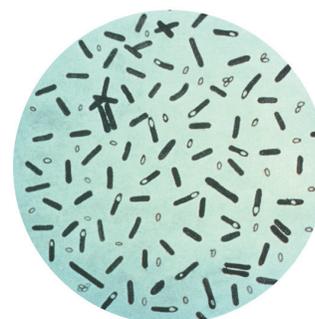
Symptoms of bacterial gastroenteritis may include excessive salivation, vomiting, diarrhea, straining, and abdominal pain. If hemorrhages occur in the lining of the lower portion of the GI tract, blood will be present in the diarrhea. Blood may be red if bleeding occurs in the lower GI, and brown or black if bleeding is from the upper portion. Salmonellosis, enterotoxemia, and colibacillosis are examples of bacterial diseases of the GI tract.

Clostridia are spore-forming bacteria that occur naturally in the soil and the intestinal tract of animals. Toxemia (toxins in the blood) is caused by intestinal clostridial species resulting from the absorption of toxins produced by the bacteria within the intestines (enterotoxemia) or by ingesting toxins in the animals's food (botulism, food poisoning). Diet change or overload may cause the transfer from inactive clostridial bacteria in the intestines to active bacteria increasing in numbers and producing toxins. Clostridial toxemia may cause sudden death.

Viral pathogens that cause disease of the GI tract are highly contagious. Symptoms of disease include vomiting and diarrhea with or without blood. Clinical signs are more severe in young animals than in adults. Dehydration and electrolyte imbalance cause the death of the animal. Types of GI tract viruses include rotavirus,



*Salmonella bacteria.*



*Clostridium botulinum bacteria.*

coronavirus, canine parvovirus, feline panleukopenia, bovine viral diarrhea (BVD), and swine transmissible gastroenteritis (TGE).

Bots are the parasitic larval stages of botflies that infest and develop in the stomach of horses. In large numbers, bots may cause stomach pain and signs of colic in horses.

GI diseases by helminth (worm) parasites are not always apparent. Both clinical and sub-clinical diseases affect the health of the animal. Clinically affected animals display obvious signs of disease such as anemia, diarrhea, and emaciation. These signs are not obvious in sub-clinical cases. Instead, the animal's reduced performance may indicate the presence of sub-clinical diseases. The life span of worms is 1 to 12 months depending on the type of worm and level of resistance in the animal. Resistance affects how long the adult worms live and how many larvae survive as they enter an animal.

Nematodes (roundworms) are worms that commonly infect the GI tract of animals. Species include trichostrongyles (hairworms) infect the stomach and intestines of ruminants; strongyles (bloodworms) infect the large intestine of horses; hookworms infect the small intestine of dogs and cats; large roundworms infect the small intestine of pigs, dogs, cats, horses, and poultry; and whipworms in the large intestine of dogs and pigs.

Animals become infected when they swallow larvae (hairworms, strongyles, hookworms) or eggs (large roundworms, whipworms), when larvae penetrate the skin (hookworms), or when larvae enter the uterus or colostrum (hookworms, large roundworms). To make a diagnosis, use a laboratory test, such as a fecal flotation, to confirm the presence of eggs in the feces.

Large numbers of roundworms in an animal's GI tract can affect the animal's health by causing a nutritional disturbance. Developing and migrating larvae and feeding adult worms can cause sufficient damage to the stomach lining and intestines. They also interfere with digestion and cause blood loss. Reduced enzyme secretion and nutrient absorption result in digestive inefficiency. Some worms suck blood and cause anemia and hemorrhages. Signs of disease are similar to the signs of malnutrition, including emaciation, rough hair coat, diarrhea, and pale mucous membranes. Migratory larvae of roundworms can cause additional damage to the arteries, liver, and lungs.

Tapeworms are another type of helminth that infect the small intestines of dogs, cats, ruminants, and horses. They do not result in clinical signs in the animal. One can detect their presence by observing the gravid segments in the feces or on the anus. Dogs and cats become infected by eating infected fleas; ruminants and horses, by eating infected soil mites.



*Canine roundworms. Photo, Joel Mills.*



*Roundworms.*



*Hookworms.*



*Tapeworm.*

Protozoa (one-celled parasites) infect the intestines of animals. Infections of small numbers of protozoa are common, and are often seen during microscopic fecal examinations in animals showing no evidence of disease.

Animals infected with parasites are considered carriers and possible sources of infection for susceptible animals. The disease is caused by exposure and infections in young animals that have not been previously exposed and have been maintained on low protein, high carbohydrate diets.

Common intestinal protozoal diseases include coccidiosis in young ruminants, dogs, cats, and poultry; trichomoniasis and giardiasis in dogs; and hexamitiasis in poultry. These diseases cause enteritis or colitis and are characterized by diarrhea, with or without blood and mucus.

Death from protozoa infection is related to dehydration and anemia. Diagnosis is based on the presence of clinical signs in the animal and protozoa cysts or motile stages in the feces. Detection is based on the presence of cysts using fecal flotation and by direct fecal smears of the motile stages.

## ***Liver***

Cattle liver flukes are worms that cause inflammation (hepatitis) and scarring (cirrhosis) of the liver. Clinical signs of digestive inefficiency are evident in young cattle with acute liver disease (hepatitis) and in older cattle with chronic liver disease (cirrhosis). The signs of disease are similar to malnutrition and gastrointestinal parasitism.

Liver flukes require aquatic snails to act as an intermediate host. Cattle that live in wet areas with alkaline soils may develop liver fluke infections. Larval stages encyst on grasses in water. Infection occurs when cattle graze the growing grass or eat the cut grass (hay). Diagnosis is made by detecting eggs in the feces using fecal sedimentation tests, or by observing flukes and liver damage during necropsy.

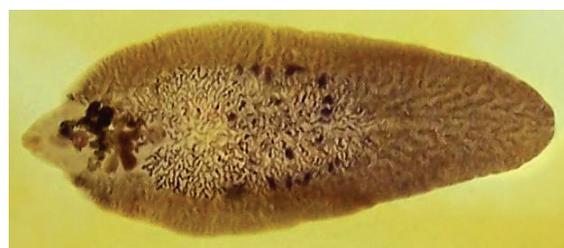
Infectious canine hepatitis (ICH) is a common viral disease that causes inflammation of the liver (hepatitis) in dogs. Due to viremia, other organs may become



*Coccidia oocysts in a fecal flotation from a cat. Photo, Joel Mills.*



*Giardia motile stage.*



*Liver fluke.*

infected, such as the liver, kidneys, spleen, and lungs. Systemic signs of illness will be present.

## ***Reference***

Kahn, C. M. (Ed.). (2010). *The Merck veterinary manual* (10<sup>th</sup> ed.). Whitehouse Station, NJ: Merck.

## *Questions*

### **Fill-in-the-Blank**

1. Vomiting and diarrhea are signs of infection of the \_\_\_\_\_ system.
2. Name some of the infections viruses can cause in the digestive system.
3. Name some of the infections bacteria can cause in the digestive system.
4. Name some of the infections parasites can cause in the digestive system.
5. Helminth infections of the digestive system of animals can be diagnosed by demonstrating the presence of \_\_\_\_\_ and \_\_\_\_\_ in the feces.
6. Protozoa infections of the intestines of animals can be diagnosed by demonstrating the presence of \_\_\_\_\_ or \_\_\_\_\_ on fecal examinations.
7. Clinical signs of helminth infections of the digestive system of animals are similar to signs of \_\_\_\_\_.
8. Discuss the difference between clinical and sub-clinical disease caused by gastrointestinal worms.

### *Activity*

1. Observe a variety of animals diagnosed with digestive infections and record the presence or absence of clinical symptoms.