

Coccidiosis in other animals

Rabbit

- Twelve species of the family Eimeria have been reported to affect rabbits, however, only a few actually create disease.
- There are two types of rabbit coccidiosis – intestinal and hepatic. *Eimeria perforans*, *E. magna*, *E. media*, and *E. irresidua* are the four main species that cause intestinal coccidiosis in rabbits.
- *E. steidae* causes **hepatic coccidiosis** in the liver. Coccidiosis is mainly seen in intensively managed animals, especially young rabbits, although it can occur in small rabbitries and pet rabbits.

Intestinal Coccidiosis

- Intestinal coccidiosis mainly affects young weaned rabbits six weeks to five months of age. This is attributed to stress, noise, transportation or immunosuppression.
- Symptoms appear within four to six days post infection and include a rough coat, dullness, decreased appetite, dehydration and weight loss.
- Rabbits may also develop intussusception, a blockage of the intestine caused by a telescoping of the bowel on itself.
- When weight loss is greater than 20%, convulsions or paralysis is seen, followed by death within 24 hours.
- The majority of deaths are a result of dehydration and secondary bacterial infections.

Hepatic Coccidiosis

- Rabbits infected with *E. steidae*, the protozoan responsible for hepatic (liver) coccidiosis, may have mild to severe infections.
- Mild infections show no symptoms while moderately infected rabbits will have growth retardation.
- Severe infections result in loss of appetite, weakness, diarrhea and possibly constipation in the later stages of the disease.
- *E. steidae* inhabits cells of the bile ducts and liver, causing blockage and severe liver damage.

- X-rays show enlarged livers and fluid in the abdomen, which contribute to the water or pot belly symptom. This disease will either linger for several weeks or cause death within 10 days, preceded by a coma. Necropsy reveals white spots or nodules on the surface of the liver.

Symptoms

- Many rabbits that have this disease do not show any symptoms or clinical signs.
- They simply carry the organism in their intestinal tracts and pass it to other rabbits in their infected stool. But if they do show signs, they may have watery, mucousy, or possibly blood-tinged diarrhea that may be infrequent or intermittent (stopping and starting again).
- lethargy (lack of energy)
- weakness
- not eating/lack of appetite
- weight loss, dehydration/not drinking

Pig

Eight species of *Eimeria* and one of *Isospora* infect pigs in North America. Piglets 5–15 days old are characteristically infected with only *I suis*, which produces enteritis and diarrhea. These agents must be differentiated from viruses, bacteria, and helminths that also cause scours in neonatal pigs.

Isospora suis Eimeria deblickei Eimeria scabra Eimeria spinosa, Eimeria polita Eimeria porci Eimeria neodeblickei Eimeria perminuta Eimeria suis

- *Isospora suis Eimeria deblickei* and *Eimeria scabra* are most pathogenic species

Horse

Eimeria leuckart (Biggest & heaviest among all coccidian species and used sedimentation technique), *Eimeria solipedum* and *Eimeria uniungulat*

- *E. leuckarti* considered pathogenic, causing diarrhea and enteritis

GENUS-ISOSPORA

- Oocyst contains two sporocysts each containing four sporozoites
- Most coccidia of carnivores come under this genus. Oocysts are comparatively much larger in size and they are not very pathogenic.
- In cat, tiger and other felidae large size $43 \times 33 \mu$ and no micropyle is seen.
- Sporulation time is 72 hrs
- Affects small intestine- fairly benign
- Rarely pathogenic in large number
- Catarrhal enteritis in mild cases
- Haemorrhagic enteritis is common in heavy infection

ISOSPOROSIS

Isosporosis is a disease of developed and developing countries, caused by an apicomplexan protozoan parasite belonging to the genus *Isospora*.

Species

- *Isospora canis*, *I. ohioensis*, *I. burrowsi* and *I. neorivolta* in **dogs**
- *I. orlovi* and *I. cameli* in camels
- *I. rivolta* and *I. felis* in cats
- *I. suis* in pigs
- *I. belli* in **man**.

Transmission and epidemiology

- Infection can occur either by ingestion of infective (sporulated) oocysts from a contaminated environment or occasionally from ingestion of infective cyst containing tissues of paratenic or transport host. Although the direct form of transmission is most common but many mammals can serve as paratenic host including rodents, other prey and uncooked meat from herbivores. Over crowded, unsanitary, high stress conditions in setting such pet shops, kennels, pounds, catteries and laboratory colonies, concurrent disease, malnutrition and immunosuppression are predisposing factors. Thus, these coccidia are opportunists.

- Infection with a particular species of *Isospora* confers a strong and lasting immunity only to that species. Therefore, pups observed to suffer repeated bouts of isosporosis are probably experiencing infection with a series of different species.

Isosporosis

- Porcine neonatal isosporosis has a high morbidity and usually a low but variable mortality. It causes yellow watery diarrhoea, dehydration, loss of condition and death, or stunted growth. Illness usually begins at 7-10 days of age. Piglets continue to nurse but may vomit clotted milk.
- Isosporosis in dog and cat is a largely a clinical entity and usually non -fatal. Young animals are usually affected and having the history of diarrhoea of several days duration and the animal is dehydrated. Isosporosis has occasionally been associated with chronic malabsorption.
- Isosporosis in man is more severely and frequently seen in immunocompromised patients particularly with AIDS. It causes fever malaise, cholecystitis, persistent diarrhoea, weight loss, steatorrhoea and even death.

Diagnosis

- The diagnosis can be made by identification of isosporoid oocysts in fresh faeces. Identification of oocysts in a healthy animal with normal faeces indicates a self- limiting commensal infection and seldom if ever warrants treatment, although treatment might help to reduce environmental contamination with oocysts.

Treatment and control

- If clinical signs are attributed with diarrhoea, effective coccidiostats should be used for treatment, such as sulfadiazine (50-60mg/kg per day, orally for 10 days), trimethoprim-sulfa (30mg/kg per day, orally for 10 days), quinacrine (10mg/kg per day orally for 5 days). Amprolium is not approved for use in dogs.
- However, it is given orally as 20% powder in gelatin capsules at a total dose of 100 mg once daily for small breed pups or 200 mg daily for larger breed pups for 7 to 12 days. Proper sanitation and elimination of overcrowding help to prevent the spread of infection in kennels and catteries