

Eperythrozoon

These are minute prokaryotic forms seen on the surface of erythrocytes and in the plasma. They appear as minute rings or coccoid-shaped granular bodies about 0.5-3 µm in diameter. Stain reddish purple with Romanousky stains.

Spp : *E. suis*, *E. coccoides*, *E. ovis*, *E. parvum*, *E. wenyoni*.

Toxoplasma

Oocysts: two sporocysts each w 4 sporozoites

Definitive host: felids.

Merogony occurs in intermediate and definitive hosts and can cause infection in Intermediate and Definitive Hosts. schizonts and gamonts are located in the enteric cell of felids .Sporogony occurs outside the host.

Toxoplasma gondii

Enteric coccidian of the domestic cats. Intermediate Host: Little host specificity and almost every warm blooded animal including man can be infected.

LIFE CYCLE

On ingestx, sporulated oocyst rupture in the intestine and release the sporozoites. These penetrate and multiply in the cell of the intestine associated lymph node to form rapidly multiplying stages (tachyzoites) which spread to all other tissue of the body: they invade cells and continue to multiply. Eventually, tissue cyst containing slowly dividing forms (bradyzoites) are formed in brain, striated muscles & liver & they remain viable for the whole life of the host. These are infective on ingestion to all warm blooded animals .Paratenic host become infected with *Toxoplasma gondii* by ingesting sporulated oocysts from cat faeces / bradyzoites in the tissue other paratenic host. When a felid ingest the tissue cyst of *T. gondii*, bradyzoites penetrate the epithelial cell of the S.I, undergo a series of asexual cycles and finally sexual which leads to shedding of oocysts. Cats shed oocyst in faeces within 3-10 days after eating nice infected with encysted bradyzoites but not until 19-48 days after ingestion of sporulated oocysts.

Oocysts: spherical to sub-spherical 11-13µm by 9-11µm. Fully sporulated are infective on ingestion to all warm blooded animals including cats.

PPP = 5- 24days depending on infection route

CLINICAL SIGNS : Congenital infect in early pregnancy leads to abortion CNS infection in late pregnancy *E. g* cerebral calcification, hydrocephaly etc. Lymphadenopathy, malaise, fever lymphocytosis and myocarditis. Abortx due to focal placentitis in S and G.

Dx

- Difficult
- Demonstrate of organism/ Ab against it from aborted fetus or infected brain.
- Best Diagnostic method is inoculation of suspected material into mice and demonstration of the organism multiplying in the mice.
- Serology.

Rx

No completely satisfactory Rx pyrimethamine has been found to be effective. When combined with triple sulfa drugs.

CYPTOSPORIDIUM

- C. parvum man and animals
- C. baileyi, C. meleagridis
- C. wrairi (G. pigs), C. felis, C. canis
- C. andersoni Cattle (older)

Cryptosporidium. spp are tiny (Oocysts 4-8 μ m in diameter) depending on spp and stage of development.

Cryptosporidium. Are Coccidians that undergo schizogony, gametogony and sporogony in parasitophorous vacuoles usually in the microvillus borders of enteric epithelial cells but also in the gallbladder and the respiratory and renal epithelium, especially in immunocompromised host. Affects a wide range of vertebrate hosts and cross-infection among host spp occur. With C. (as with Giardia) infection is acquired from people most of the time,

LIFE CYCLE

Infective Oocysts containing 4 sporozoites are discharged in the faeces and serve to disseminate the infection. Oocysts remain viable for months unless exposed to extreme of Temperature, desiccation or impracticably concentrated disinfectants. On ingestion by a suitable host, the oocyst opens along a preexisting suture line to release the 4 sporozoites that invade the microvillous border of the gastric glands / lower half of the small intestine. In parasitophorous vacuole in the microvillus border, the cryptosporidians undergo schizogony, gametogony, fertilization and sporogony, some oocysts go through excystation internally, providing the mechanism for auto infection that accounts for the chronicity of certain cases in immune-sufficient host and the lethal hypoinfection in immune deficient hosts.

CLINICAL SIGNS.

Usually inapparent, diarrhea (may be intermittent leading to poor growth rates) anorexia vomiting and diarrhea has been reported .

Diagnosis

difficult with faecal slide because they are colorless, transparent and small. Usage of concentrated sucrose as floatation solution to demonstrate oocysts.

Oocysts may appear as tiny subspherical objects that may be dented by Osmotic extraction of water by hypertonic medium oocyst wall may have pinkish hue ,cyst wall are clear and colorless under a highly corrected objective lens.

Stains they can be used: Methylene blue ,Giemsa stain Iodine wet mount to increase optical contrast and stain confusing yeasts differentially.

RX and Cx :No effective specific treatment yet and control is difficult because the oocysts are resistant to disinfectant.

Sarcocystis .

Stage of sarcocystis are found in the Intermediate hosts, both as schizonts in the endothelium of the blood vessels and as bradyzoite cysts in the Skeletal and cardiac muscles.

Final Host: Dogs, cats, wild carnivores and man. Site: S.I

Int Host: Ruminants, pigs and horses.

Site: schizonts in endothelial cells of blood vessels, large cysts containing bradyzoites in muscles. Only sexual reproduction occur in the definitive host and sporogony is completed there. Fully sporulated oocysts and sporocysts are discharged in the host faeces, and no development occurs in the external environment. Asexual reproduction including schizogony and sarcocyst formation, occurs only in the Intermediate host. The bradyzoites in sarcocystis differ from other in that they develop into gametocytes instead of schizonts when ingested by the definitive host. Bradyzoites represent a state of arrested development. Like sporozoite in a sporulated oocysts bradyzoites in a sarcocyst must enter a definitive host to develop further. Normally, the carnivores become infected by eating infected flesh of the herbivore ,herbivore by ingesting sporocytes from the faeces of the carnivore. Schizogony and encystment occur exclusively in the herbivore while gametogony, fertilization and sporulation occur exclusively in the carnivore but schizogony in endothelium of the herbivore may be fatal.

Dx

At antemortem diagnosis is based on the clinical signs of neurological disease none of which is pathognomonic.

Demonstration of lesions in the CNS.

Treatment:

4-12 weeks course of pyrimethamine at 0.1-0.25 mg / kg p/O once daily after an initial dose of 0.5 mg/kg + trimethoprim/ sulfadiazine at 7.5-10 mg/kg p/O b.i.d for a total daily dose of 15-20 mg.

Isospora

Relative of Eimeria. Share many things together.

Impt spp:

Isospora suis *I. burrowsi*

I. canis and *I. ohioensis* – dog

I. felis and *I. rivolta* – cat

Differences between EIMERIA and ISOSPORA. spp

- Sporulated oocyst contain 2 sporocyst each w 4 sporozoites.
- Extraintestinal stage occurring in spleen, LV and lymph node of pig may reinvade the intestinal mucosa and cause clinical signs
- Rodents may, by ingest of oocysts from Dog and Cat, become infected with asexual stages and act as reservoirs.

DOG

Pp : less than 10 days.

There is no real evidence that they are of high pathogenicity but infection may be exacerbated by intercurrent viral diseases or immunosuppressants.

Life cycle is direct, in which the Dog acquire infection from the tissue of rodents infected with asexual stages

CAT

Infection may be acquired directly/possibly by ingestion of infected small rodents

Pp = 7-8d.

Pathogenicity thought to be low but severe diarrhea in young kittens has been associated w oocyst count

Clinical signs

Diarrhea and demonstration of oocyst. Self limiting Infection, Immunity is specific for each spp,

Treatment and Prevention

Clean surface – disinfectant, drying and direct sunlight, administration of anti coccidia drug (coccidiostats)

Besnoitia

Cysts containing bradyzoites are found in fibroblasts and possibly other cells cyst wall (around infected cell) and bradyzoites occur in a parasitophorous vacuole Host cell nucleus within the cyst undergoes hyperplasia and hypertrophy.

Sporulated oocysts of definitive host infect only the Intermediate Host. Cutaneous besnoitiasis is a serious skin condition of cattle and horses characterised by painful swellings, thickening of the skin, loss of hair and necrosis.

Besnoitia besnoiti

Hosts Definitive. - cat

Intermediate – cattle

Oocysts 14-16 μ m by 12-14 μ m are shed in an unsporulated state.

In Intermediate host: dermis, subcutaneous tissues and fascia and in the laryngeal, nasal and other mucosae.

- Cyst may be up to 600 μ m in diameter it is usually spherical, and when mature it is packed with crescentic trophozoites (bradyzoites) each 2-7 μ m in L.

Rx

No known Rx

Importance

- Clinical manifestation resulting in poor growth
- Severe cases result in death
- Economic loss due to condemnation of hides at slaughter
- hides and skin of affected animal are of inferior quality.

