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Therapeutic Management of *Cystoisospora* Infection in a Dog

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ABSTRACT

Three young male dogs (two Labrador and one German shepherd) were presented with the complaint of weakness, fever, weight loss, dyspnoea and diarrhoea. The coccidian oocysts were observed by examining faeces using the direct smear method and the floatation techniques. The oocysts were identified as *Cystoisospora* coccidia on sporulation. The oocysts were measured 18 – 21 µm x 19 – 23µm using micrometry and confirmed as *C. ohioensis* complex. The dogs were cured using sulphamethoxazole + trimethoprim (tab septran) and fluid therapy with dextrose, normal saline, Ringer's lactate, and parenteral multivitamins. Meloxicam and paracetamol (Melonex Plus) are administered only in febrile conditions. Significant health improvement was noticed 10 days post-treatment.

Keywords: Canine *cystoisospora*, coccidia, sulphamethoxazole and trimethoprim

INTRODUCTION

A dog's health condition is severely affected by many infectious diseases. Diarrhoea-associated illness caused by protozoa constantly deteriorates the health status of domestic dogs and poses a health risk. *Cystoisospora*, a genus belonging to the phylum Apicomplexa, which includes species of protozoa commonly referred to as coccidia of dog and cat, is responsible for enteritis and diarrhoea (Frenkel, 1977; Dubey, 1977). In dogs, four species of *Cystoisospora* have been observed, *viz., C. canis, C. ohioensis, C. burrowsi* and *C. neorevolta*. Indirect parasite transmission through rodents has been reported (Dubey, 1975). Coccidiosis poses serious health issues in young puppies; therefore, it needs more attention and care (Dubey, 1978). Dogs that roam on streets have a higher chance of contracting from infected paratenic hosts than dogs that stay in the home (Buehl, 2006; Dubey *et al*., 2009).

The major biological processes (schizogony and gametogony) of *C. canis* occur in the lamina propria of the small intestine and set up the ulcerative lesions, petechiae, enteritis and diarrhoea in puppies (Lepp and Todd, 1974; Lappin, 2010). The *C. ohioensis* complex develops in enterocytes in the lamina propria of the small intestine, cecum and colon and thereby induces villous atrophy, necrosis and cryptitis. The clinical symptoms include diarrhoea, rarely haemorrhagic, vomiting, anorexia, depression, dehydration, and death may occur in severely affected dogs (Garanayak *et al*. 2017). Coccidia infection is diagnosed by laboratory findings of oocysts in the faeces by direct smear and the flotation method. In India, only one clinical case of *Cystoisospora* infection in a dog has been reported from Odisha. The present study aimed to diagnose *Cystoisospora* infection and the management of affected dogs using sulphamethoxazole and trimethoprim.

MATERIALS AND METHODS

Three male dogs (two Labrador and one German shepherd), aged 6 months, were presented to the Teaching Veterinary Clinical Complex, Durg, with the complaint of weakness, decrease in body weight and continuous bellowing with respiratory distress. Clinical assessment of all dogs

displayed dyspnoea, increased body temperature, decreased body activity and diarrhoea.

Faecal sample examination was done by both direct smear and the flotation technique. An emulsion was prepared on the slide by mixing a small quantity of faeces and a drop of water with the help of a needle. The cover slip was placed over the emulsion and examined under the microscope. The samples were also processed in the flotation method by suspending 1 g of faeces in 3 ml of saturated sugar solution (Seather's sugar solution) in a small cylinder. A clean slide is slit over the cylinder for 20 minutes and examined after placing a cover slip over it. The coccidian oocysts were sporulated by incubating faecal samples mixed with ample volume of 2.5% potassium dichromate in shallow petri dishes with good aeration at room temperature. The culture was routinely examined to determine the time required for sporulation of the oocyst. The size of the oocyst was measured in micrometres using a calibrated ocular. The length and width of the oocyst were measured and multiplied by a factor to get the actual size of an oocyst.

The affected dogs were treated with a combination of sulfamethoxazole/trimethoprim along with supportive therapy. Sulfamethoxazole + Trimethoprim (Tab. Septran) was given @ 100 mg/kg. body wt. twice daily for 10 days. The supportive treatment was given with fluid therapy, DNS, Ringer's lactate, parenteral multivitamins for 5 days and a combination of meloxicam and paracetamol (melonex plus) @ 0.05 mg/kg body wt. in febrile condition.

RESULTS AND DISCUSSION

Direct smear examination indicated the presence of coccidian oocysts. Observation of samples employing the floatation method under high-power objective revealed many spherical and oval-shaped unsporulated oocysts (Soulsby, 1986). The wall was pale to light green, and at the centre of the unsporulated oocyst, it contained a sporoblast. The sporulation of the oocyst took 14 days. The presence of two sporocysts and 4 sporozoites/sporocysts in a sporulated oocyst clearly indicated coccidia of *Cystoisospora*. The size of the oocysts was determined by micrometry, and it was found to be 18 – 21 µm x 19 – 23 µm.

Coccidia are identified to the genus level based on size, shape, colour, texture and internal structures of sporulated oocyst. Although coccidia of many genera have isosporan features found in dogs (*Neospora* and *Isospora*). The oocyst of *Neospora caninum* is small in size, ranging from 10.6-12.4 × 10.6-12.0 µm (Lindsay *et al*. 1999). The sporulation time recorded in the present study was in agreement with an earlier report (Ashford, 1979), which reported 14 days for sporulation of *Cystoisospora*. The size of *Cystoisospora* sp. measured was closely related to the size of *C. ohioensis* (19–27 x 18–23 µm), *C. burrowsi* (17–22 x 16–19 µm) and *C. neorivolta* (18–28 x 16–23 µm) compared to *C. canis* (34–40 x 28–32 µm). Based on micrometry findings, it could be confirmed *C. ohioensis* complex, which was in complete agreement with previously reported by Garanayak *et al*. (2017). Although it is difficult to conclude the species of *Cystoisospora* but the size and number of sporozoites and sporocysts are the important parameters for the identification of *Cystoisospora* organisms earlier suggested by Dubey (1978).

Systemic treatment was undertaken to cure the infected puppies and thereby limit the oocyst excretion. Sulphamethoxazole and trimethoprim are commonly used anticoccidial drugs, which limit the oocyst excretion by acting on the schizont stage of *Cystoisospora*, which was previously reported by Garanayak

et al. (2017). A combination of meloxicam and paracetamol effectively alleviates pain and reduces fever for the short term in cases. The puppies started taking food after 7 days of treatment, and a significant improvement in health and activities was noticed after 10 days of treatment. The major aim of the medication includes interrupting the life cycle of *Cystoisospora* and thereby reducing excretion of oocysts to prevent environmental contamination. The clinically recovered dogs were reconfirmed by examination of faeces by the flotation method using Seather's sugar solution.

SUMMARY

Three young dogs were brought to the institute clinic with the symptoms of weakness, fever, weight loss, dyspnoea and diarrhoea. All three dogs were diagnosed with *Cystoisospora* infection based on faecal examination. The dogs were treated and managed using a combination of sulphamethoxazole and trimethoprim along with supportive therapy. Antipyretic compound (meloxicam and paracetamol) was also given. The condition was improved, and they started taking food after 7 days of treatment. Complete recovery was noticed after 10 days of treatment.

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