Successful therapeutic management of canine Isosporosis in puppies

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Abstract Four labrador male puppies were confirmed for the Isospora spp infection by direct smear and flotation method following complains of anorexia, haematemesis and haematochezia. The puppies were treated with trimethoprim and sulphamethoxazole @ 40 mg/kg body weight in combination with metronidazole @ 10 mg/kg body weight twice daily for 5 days which was supported with fluid therapy, aniemetics and plasma expanders. All the animals showed completed clinical recovery along with clearing of faecal oocyst.

Keywords Puppies · Isospora · Diarrhoea · Flotation method · Oocyst · Sulphamethoxazole and trimethoprim

Introduction

Diarrhoea among the puppies is a major health hazard encountered which can affect the normal development of the animal along with immunologically compromising it for various diseases and vaccination failure (Daugschies et al. 2000). Bacterial and viral diseases are the major culprits for diarrhoea among the puppies along with some parasitic origin. Attending proper protection by scheduled vaccination and deworming, the diarrhoea incidences of infectious origin can be reduced. Among the parasitic entities responsible for puppy diarrhoea coccidial organism Isospora spp. plays a vital role. Isospora associated diarrhoea has been reported prior (Baek et al. 1993) but the clinical manifestations may be due to secondary bacterial and viral infections of the compromised gut environment (Lindsay et al. 1997; Lappin 2010; Altreuther et al. 2011).

The protozoan organism Isospora belongs to the kingdom—Protista, phylum—Apicomplexa, class—Sporozoea, Subclass—Coccidia, family—Eimeriidae and genus—Isospora (Levine 1977).

A large number of species diversity among the genus Isospora can be found along with a wide range of host organisms which includes human, primates, pig, canines and felines etc. (Levine 1988; Lindsay et al. 1997).

I. canis and I. ohioensis complex which includes 2 additional spp. I. burrowsi, I. neorivolta are the major miscreants for canine coccidiosis. Identification of the Isospora organisms is based on the dimensions and number of sporozoites and sporocysts present in the excreted oocyst from the host animal (Dubey 1978; Lindsay et al. 1997).

Young canines mostly get infected by ingestion of sporulated oocyst (Lindsay et al. 1997; Daugschies et al. 2000; Buehl et al. 2006; Dubey et al. 2009). Immune compromised puppies and stressed animals are under the enhanced risk of infection (Lappin 2010). I. canis establishes itself in the lamina propria of the posterior small intestine (Lepp and Todd 1974) resulting enteritis and mucosal damage due to schizogony and gamogony (Mitchell et al. 2007; Lappin 2010). The I. ohioensis complex infects the enterocytes in the lamina propria of small intestine, cecum, and colon of dogs resulting in villous atrophy, necrosis of apical enterocytes, and cryptitis (Dubey 1978; Dubey and Mahrt 1978; Trayser and Todd 1978).

The clinical implications include watery to haemorrhagic diarrhoea along with vomition, tenesmus and inappetance. Death due to excessive dehydration has been advocated by Daugschies et al. (2000) and Lappin (2010).
Diagnosis of oocyst in the faecal matter by direct smear, Sheather sugar flotation method and sedimentation method with increasing order of sensitivity has been reported (Faust et al. 1961; Current 1990).

The present study deals with *Isospora* associated diarrhoea in four puppies and its successful management with sulphamethoxazole and trimethoprim combinations.

Materials and methods

Four labrador male puppies of 2–3 month age were presented to the Teaching Veterinary clinical complex (TVCC) of College of Veterinary Science and AH, Bhubaneswar with history of anorexia, haematemesis, haematochezia for last 3 days with an average body temperature ranging from 101.8 to 102.2 °F. The puppies were vaccinated against distemper, hepatitis, parvo, parainfluenza, leptospira and corona virus following deworming with pyrantel pamoate @ 11 mg/kg body weight. Prior treatment regime of the puppies was done with Amikacin @ 10 mg/kg body weight without any clinical recovery. Faecal sample examination through direct smear method for presence of sporulated and non-sporulated oocyst of *Isospora* spp. was carried out which was later confirmed by flotation method (Soulsby 1986). Haematological findings of the infected animals showed haemoglobin (Hb) level as 8.6 ± 0.8 g/dl and the differential count was within the normal range.

The puppies were administered with trimethoprim and sulphamethoxazole @ 40 mg/kg body weight in combination with metronidazole @ 10 mg/kg body weight twice daily for 5 days. As supportive therapy plasma expander @ 5 ml/kg body weight for 3 days along with Ringer’s Lactate @ 30 ml/kg body weight twice daily for 5 days were given. Dextrose was administered to the puppies to provide the energy @ 0.5 mg/kg body wt. Antiemetic metoclopramide @ 0.4 mg/kg body weight and haemocoagulase etamsylate @ 250 mg twice daily was given for 2 days.

Result

The direct faecal smear examination showed presence of *Isospora* oocyst which was confirmed by flotation method (Fig. 1) but Identification of the *Isospora* spp. was not confirmed. Basing on the internal anatomy of the oocyst it was concluded that both *I. Canis* and *I. Ohioensis* complex were present. History also confirmed the presence of mouse (*Mus musculus*) in the kennel premises which can act as the paratenic host of the infection as reported by Frenkel and Dubey (1972), Dubey (1977, 1978).

Discussion

*Isospora* infection in puppies is the serious health concern due to its ability to spread through litter materials of kennel (Daugschies et al. 2000; Buehl et al. 2006). The infectivity of sporulated *Isospora* spp. oocysts can remain up to months along with the ability to resist the basic hygienic measures (Barutzki et al. 1981; Buehl et al. 2006). The infection leads to malabsorption in puppies rendering reduced vigour (Brandborg et al. 1970; Henry et al. 1974; Seah et al. 1975).

Identification of the *Isospora* spp. by structural morphology through flotation method and its superiority over the direct smear method has already been advocated for Isosporosis determination (Faust et al. 1961; Current 1990). However identification of the organism is not confirmatory based on oocyst structure which leads to the nomenclature of *I. ohioensis-like* or *I. ohioensis* complex (Dubey et al. 1978).

The recovery of the puppies by administration of trimethoprim and sulphamethoxazole along with supportive therapies and metronidazole resulted in complete clinical recovery with elimination of faecal oocyst.
Similarly use of Sulfadimethoxine alone and in combination with ormetoprim has been proved effective in canines and felines (Wilkinson 1977; Dunbar and Foreyt 1985; Lindsay and Blagburn 1995). Administrations of emodepside plus toltrazuril suspension in combination with oral Amprolium have proven effectiveness against canine infection (Altreuther et al. 2011). Anti-giardial drugs like metronidazole, tinidazole, quinacrine, and furazolidone have very limited effect but metronidazole has been reported successful in some cases (Trier et al. 1974; Syrks et al. 1975; Butler and deBoer 1981; Hallak et al. 1982; Forthal and Guest 1984; Weiss et al. 1988). The major aim of the treatment includes reduction of clinical signs along with reduction in faecal oocysts for interrupting the life cycle (Daugschies et al. 2000; Buehl et al. 2006). Supportive therapies like fluid administration are depending on the severity of clinical signs which can enhance the recovery of the animals (Altreuther et al. 2011).

It was concluded that the canine Isosporosis can be clinically managed by use of trimethoprim and sulfamethoxazole along with supportive therapies and metronidazole. The major concern of the treatment should include elimination of faecal oocyst for interrupting life cycle of the disease.

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