



Uncommon Manifestation and the Treatment Outcome of Ancylostomosis in a 4-Month Old Caucasian Dog: A Case Report

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Abstract

A 4-month old Caucasian dog was presented recumbent, with a stiff neck and inability to control his head at the University of Nigeria, Veterinary Teaching Hospital, Nsukka. No wound was found on the body. There was hyperesthesia and paddling of the limbs. The mucous membrane was slightly pale. Laboratory examinations indicated no hemoparasite but fecal sample revealed a very high hookworm egg count. The dog was first treated with a combination of Albendazole suspension at 10 mg/kg BWT and Pyrantel pamoate @ 9 mg/Kg BWT once. Subsequently, following the persistence of high FEC (264 EPG, 700 EPG), Albendazole was again given at the manufacturer's highest recommended dose of 25 mg/Kg on day 4 (3 days after the initial treatment). The faecal hookworm egg count was monitored every other day during the course of the treatment. Thereafter, on day 13 as the high FEC persisted (13,400 EPG), Ivomec super[®] (Ivermectin and Colorosum) at 1 ml/50 kg was given to the dog. Fecal examination revealed no worm egg on day 17 (4 days after the administration of Ivomec super[®]). The treatment outcome observed in this case showed that a single dose of ivermectin produced 100% cure rate against acute Ancylostomosis in the dog, unlike Albendazole and Pyrantel pamoate.

Keywords: *Ancylostoma caninum*; Pyrantel pamoate; Albendazole; Dog

Introduction

Ancylostoma caninum is the principal cause of canine hookworm disease in most tropical and subtropical areas of the world [1]. Anemia presents as the main pathological effect of hookworms in dogs through blood sucking and letting activities of both the adult and young worms in the small intestine wherein they attach to the intestinal villi by their large buccal capsule to suck blood [2]. Infected dogs especially puppies may present with pale mucous membranes, ill thrift, and failure to gain weight, poor hair coat, dehydration, and dark tarry feces. Heavily parasitized puppies develop an acute normocytic, normochromic anemia followed by hypochromic, microcytic anemia due to iron deficiency. Adult dogs are often asymptotically infected, although poor hair coat, polyphagia and anemia can also occur [3].

Control of the infection in dog has relied mainly and almost exclusively on anthelmintic treatment. However, the development of nematode resistance to various groups of anthelmintic has always being a major concern to the use of anthelmintics in both livestock and pet animals. Nevertheless, anthelmintic resistance is most times an inevitable consequence of anthelmintic usage [4]. This case is being reported because of the peculiar manifestation of ancylostomiasis in the dog and inefficacy of the two commonly used anthelmintics; Albendazole and Pyrantel pamoate at the manufacturers recommended doses (Albendazole: 5 mg/kg to 25 mg/kg Bwt and Pyrantel pamoate: 5 mg/kg Bwt) to get rid of the infection.

Case History

A 4-month old Caucasian dog weighing 13.5 kg belonging to a client in Nsukka, Enugu state Nigeria, sub-Saharan Africa was presented at the University of Nigeria Veterinary Teaching

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Received Date: 14 Aug 2020

Accepted Date: 28 Aug 2020

Published Date: 02 Sep 2020

Citation:

Umeakuana PU, Idika IK, Kolade OA, Uchendu GO, Chukwudi IC, Kanu EC, et al. Uncommon Manifestation and the Treatment Outcome of Ancylostomosis in a 4-Month Old Caucasian Dog: A Case Report. *Ann Short Reports*. 2020; 3: 1056.

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Table 1: Percentage reduction of faecal egg counts in a dog infected with *Ancylostoma caninum* and treated with Albendazole, Pyrantel pamoate and Ivermectin at different times.

| Days | Fecal egg count (egg) | Drug(s) used | % Reduction |
|------|----------------------------|---|-------------|
| 1 | 264,700 eggs/gram of feces | Combination of Pyrantel pamoate 9 mg/kg Bwt and Albendazole 10 mg/kg Bwt once | |
| 3 | 10,550 egg/gram of feces | | 4 |
| 4 | | Albendazole 25 mg/kg Bwt once | |
| 5 | 41,450 eggs/gram of feces | | 0 |
| 12 | 13,400 eggs/gram of feces | | 32.4 |
| 13 | | Ivomec super (Ivermectin and Clorusun) | |
| 17 | 0 eggs/gram of faeces | | 100 |

Hospital (UNVTH), Nsukka on the 9th of September 2013 with a primary complaint of extreme weakness which led to his falling from its cage situated upstairs and got hanged by its chain and vomiting of blood. The client could not ascertain the duration the dog had been on this condition. However, before presenting the dog to the hospital, the client had given calcium borogluconate, multivitamin and normal saline (per os and subcutaneously).

On clinical examination, the dog was unable to stand or walk. The eyes were not steady. There was no sign of dehydration. The dog had no control of its head. No wound was found on the neck and body of the dog. Neurological signs like, paddling of the limbs; stiff neck and hyperesthesia were present. The mucous membrane of the dog was pale.

Diagnosis and Treatment

Radiographic examination of the neck region revealed no abnormalities or lesion on the region. Blood was collected from cephalic vein for parasite evaluation because of pale mucous membrane but no parasite was found in the blood. While working on the case, infusion of 5% dextrose saline, injection of chlorpromazine at 0.5 mg/kg Bwt, procaine penicillin @ 10,000 iu/kg Bwt, Streptomycin sulphate at 10 mg/kg Bwt, Atropine sulphate at 0.2 mg/kg Bwt, Multivitamin, B complex, Iron dextran and doloneurobion were also instituted.

On the 13th of September, 2013 the dog began to pass out dark tarry feces and on fecal examination, high burden of *Ancylostoma caninum* ova was observed. The dog was then treated with three different anthelmintic regimens and was monitored till the dog was free from the worm burden during a period of sixteen days. The percentage faecal egg count reduction was determined using the formula, %FE_{CR} = 100 × (1 - T₂/T₁) as described by [5], where T₁ and T₂, respectively represent mean pre and post-treatment FEC of a treated group. The drugs used and the faecal egg counts are represented in Table 1.

Discussion

Hookworm disease is commonly seen in dogs of all ages and breeds in Nigeria, but usually severe in very young dogs and exotic breeds. The disease may be acute and rapidly fatal in very susceptible animals, while some dogs may develop a marked degree of resistance to the effects of infection, which may however, be broken down by a concurrent disease or adverse conditions. The pathogenesis of ancylostomosis is essentially that of an acute or chronic hemorrhagic anemia [6]. In this case report, anemia was evident as observed by pale mucous membrane but the dog showed no sign of dehydrated. These signs along with extreme weakness and the neurological signs suggest

acute blood loss sequel to the pathology of the worm. Neurological signs as observed in the present case are uncommonly associated with hookworm disease in dogs in the study area. Clinical presentation of most canine hookworm disease in the study area include transient diarrhea, dark tarry feces and pale mucous membrane with occasional constipation [7].

The clinical observations made in this case showed that the infection was very severe and had acute course. It is presumed that the dog may have acquired the infection by ingesting a whole lot of the infective larvae within a very short time. A study on the response of Nigerian local breed of dogs, observed that ancylostomosis is usually severe in dogs if the infection was acquired by a single pulse challenge of numerous infective larvae, while small multiple (escalated or non-escalated) doses of the infection are likely to produced milder form of the disease [8].

The treatment outcome observed in this case suggests the inefficacy of Albendazole and Pyrantel pamoate at the recommended therapeutic doses against hookworm when given as a single dose alone or in combination. This corroborated with the report of a study that observed similar outcome in the study with Nigerian local breed of dogs, infected with *Ancylostoma caninum* and treated with Albendazole at the manufacturer's recommended dose [8]. It should be noted that Albendazole used in this case was given at 25 mg/Kg which is the highest dose recommended by the manufacturer in dogs. Similarly, Pyrantel pamoate was given at 9 mg/Kg which is higher than the usual recommended dose of 5 mg/Kg [1]. However, Idika et al. [8] did show that increasing the frequency of treatment with Albendazole to 3 consecutive days produced a much-improved efficacy against *Ancylostoma caninum* in Nigerian local breed of dogs. Similarly Sandhu [9] recommended 5 mg/Kg Pyrantel base po start repeat after 3 weeks, 14.4 mg/kg Pyrantel pamoate po once and Albendazole, 25 mg/kg to 50 mg/kg po two times daily for five days which should be repeated in 21 days.

Conclusion

In conclusion, the clinical observation and treatment outcome in the case have emphasized the importance of hookworm infection in dogs in the study area as well as monitoring the efficacy of treatment by conducting fecal egg count few days after treatment. Drugs with different modes of actions should be used interchangeably when handling cases of treatment failure in dogs and cats to enhance efficacy and prevent possible development of resistance.

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