

## **Acute Intestinal Intussusception in a Puppy Dog Caused by *Dipylidium caninum* - A Case Study from Nepal**

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### **Abstract**

**Background:** Intussusception is a mechanical intestinal obstruction characterized by the telescoping/invagination of one segment of the gastrointestinal tract into the lumen of the adjoining segment.

**Case Presentation:** Herein, a case of an acute intestinal intussusception in a puppy infected with the common tapeworm, *Dipylidium caninum*, was described. The puppy was male, aged four months and mixed breed. The dog was admitted to the Veterinary Teaching Hospital, Institute of Agriculture and Animal Science (IAAS), Paklihawa Campus suffering from a severe pruritus. Symptomatic treatment was done. On the 9<sup>th</sup> day of observation, the dog depressed and died within a few hours. Postmortem examination revealed peritonitis and a 7 cm long intussusception at the ileocolic region as well as an abundance of the common dog tapeworm, *Dipylidium caninum*.

**Conclusion:** This unexpected case provided an evidence of the canine intestinal intussusception due to *D. caninum*.

**Keywords:** Intussusception; *Dipylidium caninum*; Dog; Bhairahawa; Nepal

### **Abbreviations**

IAAS: Institute of Agriculture and Animal Science, VTH: Veterinary Teaching Hospital, *D. caninum*: *Dipylidium caninum*

### **Background**

Intussusception is one of the most common causes of mechanical obstruction of the intestine in dogs [1]. It is an invagination of one segment of the gastrointestinal tract into the lumen of an adjoining segment caused by certain intestinal diseases, massive intestinal parasitism and others [2]. Among types of the intussusception, ileocolic intussusception is more prevalent [3].

Similarly, tapeworms, *Dipylidium caninum*, are the most common helminths occurring in the small intestine of canids and occasionally humans, particularly children [4]. It is a flea-transmitted helminth parasite assuming cucumber seed-shaped proglottids and two sets of genitalia [5].

There are various causes of intussusception, one of them being the parasitism, particularly helminthiasis. This report described a unique case of transient acute ileocolic intussusception in a puppy due to massive infection with the tapeworms, *Dipylidium caninum*.

## Case Presentation

An approximately 4 months-aged male local mix-breed puppy, captured from Meudihawa periphery Bhairahawa Rupandehi was presented to the Veterinary Teaching Hospital (VTH), Institute of Agriculture and Animal Science (IAAS), Paklihawa Campus under the program “Rescue of the street dog” organized by Vets for Animal Welfare, IAAS, Paklihawa.

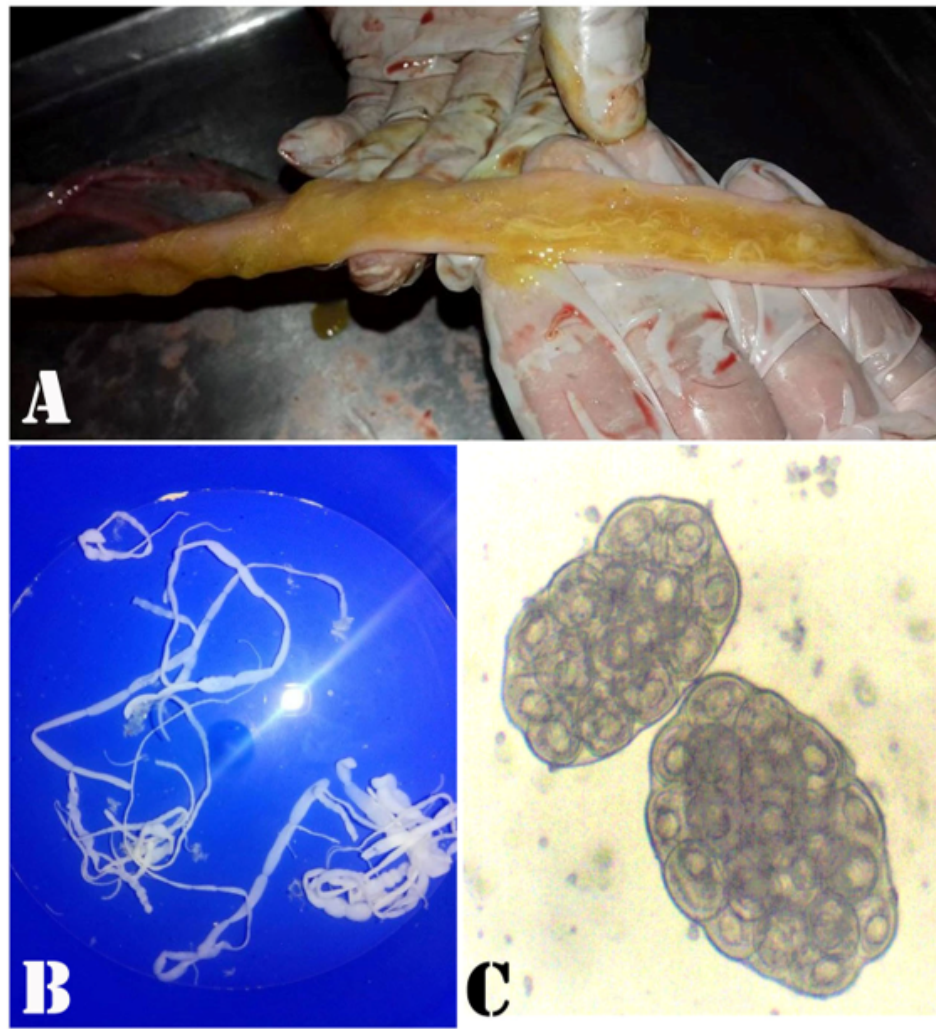
The puppy suffered from skin affections, particularly severe pruritus in the ear, neck, and legs with the occurrence of nodular masses all over the skin.

Clinically, the body temperature, heart rate, and respiratory rate were 100°F, 120 beats/minute and 30/minute, respectively. A skin scraping was performed by taking a sample from the neck region revealing the dog mite, *Demodex canis* and the puppy was treated by using ivermectin injection (0.2 mg per kg body weight, subcutaneous route, per week for 3 - 4 weeks) and antihistaminic injection. One week later, improvement, manifested by decreased damaged skin areas and declined pruritus, was observed and all the vitals are normal.

Unexpectedly, on the 9<sup>th</sup> day of observation of skin treatment, the dog was seen more depressed and anorexic, the temperature was 101.5°F. At night, the puppy was found dead with no apparent clinical signs. Upon necropsy, there was peritonitis and an ileocolic intussusception (Figure 1) by folding 7 cm of iliac portions towards the colic one. There were massive masses of adult worms of the common dog cestodes, *Dipylidium caninum*, (Figure 2A and 2B). Coprological examination revealed the occurrence of the characteristic *D. caninum* egg capsules having oval shaped containing spherical egg pocket inside shell (Figure 2C). Redness and slight swelling along the entire small intestine were detected. No pathological lesions could be detected in other organs.



**Figure 1:** A characteristic intussusceptions along the intestinal tract of puppy.



**Figure 2:** The occurrence of the common dog tapeworms, *Dipylidium caninum*. A. A massive infection or intussusception along the intestinal tract. B. Adult worms. C. Characteristic egg capsules of *Dipylidium caninum*.

## Discussion

Intussusceptions are the invaginations of one segment of the intestinal portions into others. They are classified according to their location in the alimentary tract into gastroesophageal, pylori gastric, enteroenteric, enterocolitic, and colocolic [2]. The real cause is of intussusceptions is still unknown [1], but among causes, intestinal parasitism, linear foreign bodies, viral-induced enteritis, intestinal masses, and prior abdominal surgery might be incriminated [3].

Currently, fleas' infestation and skin lesions were detected. The presence of fleas strongly suggested the occurrence of the common dog tapeworms, *Dipylidium caninum*, with fleas being the intermediate host of the helminths [4]. Massive infection with such helminth

parasites in young dogs might cause non-specific abdominal signs [5]. On maturation, adult *D. caninum* could migrate from the small to the large intestine with subsequent small intestinal irritation [4]. Accordingly, gravid segments/egg capsules could be seen in dog feces. Due to the higher peristaltic movement of the small intestine, helminth parasites might pass through the lumen of the large intestine causing the intestinal obstruction. The movement of the gravid segments as well as the massive helminth infections greatly facilitates the occurrence of the abnormal peristaltic movement of the intestine causing the invagination of the intestine into the immediate adjacent intestinal portion (intussusceptions). The exact biomechanical and morphologic events involved in the development of intussusceptions are unknown, despite; they might mainly due to either the inhomogeneity in a bowel segment or a mechanical linkage of nonadjacent bowel segments. The local inhomogeneity might represent a bowel segment that is either soft loose gastrointestinal tract or a region in which the gastrointestinal tract undergoes a sudden anatomic change in diameter and the mechanical linkage of nonadjacent bowel segment due to massive parasitism, foreign bodies or intraluminal tumor [2]. In the present case, the mechanical linkage initiated with a massive helminthic infection of *D. caninum* leading to a bowel inhomogeneity and the subsequent intussusception.

The most common clinical signs of intussusceptions include vomiting, depression, diarrhea, and anorexia [4]. Herein, the dog had a depression which might be due to peritonitis but with no other signs could be observed indicating an acute infection. The revealed peritonitis due to parasitism and intussusception might be the suggested cause of death.

The current case demonstrated the role of fleas control in management of tapeworm infections in dogs. While *D. caninum* infections are often well tolerated, there is a potential for severe pathology to occur. Parasitism and subsequent intussusception should be considered in puppies presenting with signs of acute obstruction, particularly if inadequate parasitic control measures are not followed.

### Conclusion

This is a unique evidence case of an intestinal intussusception due to the helminth parasite, *Dipylidium caninum* in a stray puppy aged 4 months with approximately 7 cm long intussusception on the ileocolic region of the small intestine. Massive adult gravid *D. caninum* parasites were noted blocking the lumen of the small intestine and caused peritonitis.

### Ethics Approval and Consent to Participate

Ethical clearance and publication approval were given by ethical review committee of Tribhuvan University and Nepal Veterinary Council.

### Consent for Publication

The Authors warrant that this contribution is original.

### Availability of Data and Materials

This case study manuscript does not contain any data.

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