




CASE REPORT

Case Report: A case of dipylidiasis in a first-trimester pregnant woman attending a routine antenatal clinic at Elmina health centre, Ghana [version 1; peer review: awaiting peer review]

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Abstract

Dipylidiasis is a zoonotic parasitosis caused by a canine and feline tapeworm, *Dipylidium caninum* which rarely infects humans, usually infants and young children. The accidental ingestion of cysticeroid infected flea *Ctenocephalides felis* is the cause of this cestode infection in humans. Here we report the first and a rare case of adult dipylidiasis in a first-trimester pregnant woman in Ghana. She reported at the health facility for a routine antenatal check-up with apparently no symptoms or signs of the infection at the time of the visit. Her routine stool examination revealed a single egg packet of *Dipylidium caninum* and was treated with a single dose of praziquantel. It is important for pathologists and laboratory technicians to be aware of the emergence of human dipylidiasis in Ghana. A conscious effort should be aimed at the creation of awareness among pet owners and the general population of the public health importance of zoonotic parasites that infect pets and domestic animals.

Keywords

Human dipylidiasis, canine & feline tapeworm, pregnancy, egg packets, praziquantel, Elmina, Ghana

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Abbreviations

HB: Haemoglobin concentration; MCH: Mean corpuscular haemoglobin; MCHC: Mean corpuscular haemoglobin concentration; MCV: Mean corpuscular volume; WBC: White blood cell count.

Introduction

Human dipylidiasis is a rare zoonotic parasitosis caused by cosmopolitan dog tapeworm *Dipylidium caninum* (flea tapeworm or double-pore tapeworm)¹. Previous reports of this accidental cestode infection had been from Asia, South American, Europe and North American countries^{2,3}. At present, only 349 human cases of dipylidiasis have been reported worldwide after its first identification and description in 1758⁴. Accidental infection of cysticercoid of *Dipylidium caninum* from ingestion of infected dog or cat fleas is the cause of this infection⁵. Most of the cases of this infection has been reported in children below five years likely kissed or licked by infected pets^{6,7}. Rarely has an adult infection of dipylidiasis been reported in literature^{8,9}.

The adult *Dipylidium caninum* of the order Cyclophyllidea and subclass Eucestoda produces gravid proglottids in the small intestine of dogs and cats which are the definitive hosts¹⁰. The proglottids rupture and expel packets of eggs after it has detached and migrated to the perianal region or is passed with faeces¹¹. The larval stage of the intermediate host; *Ctenocephalides felis*, *Ctenocephalides canis*, *Pulex irritans* and *Trichodectes canis* ingest the hexacanth embryonic eggs of *Dipylidium caninum* which then develops into infective cysticercoid in the adult stage of the flea¹². Cats and dogs which are definitive hosts or humans the accidental host become infected by ingesting a flea with cysticercoid^{13,14}.

Human dipylidiasis is usually asymptomatic with occasional non-specific symptoms such as diarrhoea, nocturnal pruritus, anorexia, pruritus ani, urticaria, weight loss, epigastric pain, constipation and loss of appetite^{2,15}. Heavily infected cats which are definitive host sometimes exhibit severe symptoms such as intestinal obstruction, epileptiform seizures and convulsion^{16,17}. However, such severe forms of dipylidiasis have not been reported in human cases.

A typical clinical diagnosis of *Dipylidium caninum* is by the identification of characteristic proglottids or egg packets and the cucumber seed-like body segments of the adult worm in stool^{18,19}. However, egg packets rapidly disintegrated in the stools and can occasionally be found in fresh samples^{11,19}. However, the uncommon nature, poor description by an immediate observer and little or no experience by laboratory professionals with *Dipylidium caninum* may render it undiagnosed²⁰.

Although human dipylidiasis has occasionally been reported in young children it has rarely been reported in adults, with exception of a 26-year-old kidney transplanted patient and a 57-year old woman^{8,9,21}. Until now, there has not been any case of dipylidiasis associated with pregnancy reported in literature. In this article, we present the first case of dipylidiasis in a 27-year-old woman in her first trimester of pregnancy attending a routine antenatal care at Elmina healthcare centre, Ghana.

Case presentation

A 27-year-old first-trimester pregnant woman, a petty trader and an Akan from Komenda in Komenda-Edina-Eguafo-Abrem district in Central region of Ghana who visited the antenatal clinic in April 2013 for a routine antenatal check-up at Elimina healthcare centre in the Central Region of Ghana with no symptoms or signs of infection or abnormalities. She had experienced intermittent vomiting, slight headache and bloated stomach in the previous three weeks before visiting the antenatal clinic. Physical examination revealed she had a normal pregnancy with no clinical manifestation or any signs of threat to her health. A routine laboratory examination of full blood count (FBC), stool, urine, blood film for malaria parasites together with a serological test for syphilis and HIV were requested. She had no history of close contact with cats and dogs.

Laboratory results

Her laboratory test results were as follows (normal ranges are indicated in parentheses): HB, 10.2g/dL (10–14 g/dL); WBC, $5.3 \times 10^9/L$ ($2.2\text{--}8 \times 10^9/L$); MCV, 80.1fL (78–90 fL); MCH, 24.0pg (21–32 pg); MCHC, 31.7g/dL (30–34 g/dL); PLT, $247 \times 10^9/L$ ($150\text{--}450 \times 10^9/L$); neutrophils, 58.9% (40–60%); lymphocytes, 26.7% (20–40%); monocytes, 1.2% (2–8%); basophils, 0.8% (0.5–1%) and eosinophils of 12.4% (1–4%). Her urine, blood film analysis and the serological tests were all normal. Microscopic examination of direct stool samples revealed a single egg with packets of *Dipylidium caninum* which measured about $45 \times 90 \mu\text{m}$ without any white blood cells in the stool sample. She was diagnosed with dipylidiasis and treated with a single dose of praziquantel orally (600 mg). The patient was followed until successful delivery without any complications.

Discussion

There are sporadic reports of human dipylidiasis in recent times, although humans are not the natural host^{22,23}. The majority of these reports have been in infants and young children making them a high-risk group for *Dipylidium caninum* infection^{24–28}. In this report, we present the first and rare case of dipylidiasis in a pregnant woman in her first trimester with no clinical symptoms at the time of antenatal examination in Elmina, Ghana. Despite the fact that the patient does not own a cat or dog as a pet, and had no history of contact with these animals which are the sources of accidental infection, she however stays in an area where dogs and cats stray freely without being confined by their owners.

Dipylidium caninum is a worldwide neglected helminth infection of dogs and cats, its natural hosts^{23,29}. A study conducted in the Greater Accra region of Ghana reported a high prevalence of *Dipylidium caninum* as one of three zoonotic helminths of dogs that are kept for hunting and security purposes without confinement³⁰. The free-range breeding of dogs and cats in Ghana without any control creates room for the contamination of the vicinity with their stool. These animals are usually not subjected to veterinary check-up and treatment; coupled with the fact that they feed in unhygienic places results in them posing a great environmental challenge further facilitating the transmission of infective fleas³¹. This rare case of dipylidiasis in pregnancy is a typical case of environmental transmission of *Dipylidium*

caninum and unconscious ingestion of an infected flea. Despite the public health risk posed by *Dipylidium caninum*, many pet owners are ignorant to this parasitic infection^{30,32}. Accurate diagnosis of dipylidiasis in humans is challenged by several factors which include the experience of the pathologist or laboratory technologist with *Dipylidium caninum* and the asymptomatic nature of the infection leading to many undiagnosed carriers. Further challenges arise due to the similar presentation of *Dipylidium caninum* with *Enterobius vermicularis*, and the lack of clear differential symptoms for *Dipylidium caninum*^{32,33}. Clinical diagnosis is based on detection of proglottids or occasionally egg packets which usually rapidly disintegrate in stool^{34,35}. Therefore, multiple stool examinations are sometimes required to detect proglottids or eggs in stool specimen^{35,36}. Characteristically, *Dipylidium caninum* egg packets contain double genital pores which can be seen in unstained samples under a light microscope³⁷. The adult worm possesses an ovigerous capsulated uterus with simple genitalia, armed rostellum with unarmed suckers and two-pore gravid proglottids^{6,37}. These characteristics are important for differentiating *Dipylidium caninum* from other Cestodes such as *Taenia solium*, *T. saginata* and *Hymenolepis nana*³⁸.

Current anti-helminthic drugs such as praziquantel or niclosamide are highly efficient in the complete elimination of *Dipylidium caninum* in humans, dogs or cats^{37,38}. Other treatment options for *Dipylidium caninum* include albendazole, mebendazole, thiabendazole, paromomycin, pyrantel pamoate and paromomycin^{19,39}.

A conscious effort should be aimed at the creation of awareness among pet owners and the general population of the

public health importance of zoonotic parasites that infect pets and domestic animals.

Conclusion

We report the first and a rare human dipylidiasis in pregnancy from Ghana. To our understanding, this is the first case of human and adult infection of *Dipylidium caninum* from Ghana which makes it a case of public health concern. Therefore, the high prevalence of *Dipylidium caninum* infection among unconfined pets in communities inhabited by quite a number of young children in Ghana should be a public health concern.

Consent

A written consent was obtained from the patient for publication of this case report and its accompanying images.

Data availability

Underlying data

All data underlying the results are available as part of the article and no additional source data are required.

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