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Research Article

Application of Diagnostic Veterinary Parasitology in the Management of Canine Helminthiasis: A Case Study from Depot Nigerian Army Veterinary Clinic, Zaria, Nigeria

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ABSTRACT

Gastrointestinal helminthic infections remain a major health concern in companion animals, with significant implications for animal welfare and zoonotic transmission. Accurate diagnosis through veterinary parasitology plays a critical role in the effective management and control of these infections. This report presents a case of mixed gastrointestinal helminthiasis in a dog, emphasizing diagnostic approaches, therapeutic management, and public health relevance. A two-year-old male Alsatian dog was presented to the Depot Nigeria Army Veterinary Clinic, Zaria, Nigeria, with diarrhoea, weight loss, and lethargy. Clinical examination revealed poor body condition and mild dehydration. Parasitological diagnosis using the faecal flotation technique revealed a mixed infection with *Toxocara canis* and *Ancylostoma caninum*. The dog was treated with fenbendazole (50 mg/kg orally for three consecutive days) alongside supportive rehydration therapy. Clinical recovery was observed within one week, with restoration of appetite and stool consistency. The successful management of this case reinforces the significance of accurate parasitological diagnosis, evidence-based anthelmintic therapy, and preventive strategies in controlling canine helminthic infections. Hence, there is a need to strengthen diagnostic capacity in veterinary clinics and promote One Health collaboration so as to contribute to improving animal health and reducing zoonotic risk in Nigeria.

Keywords: *Ancylostoma caninum*; Diagnostic parasitology; Dog; *Toxocara canis*; Zoonosis

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INTRODUCTION

Gastrointestinal parasitism in dogs is a persistent global concern that poses significant veterinary and zoonotic challenges (Kamani *et al*., 2021; Pal *et al*., 2023). Dogs are susceptible to a wide range of helminthic and protozoan parasites that inhabit the gastrointestinal tract and cause various degrees of morbidity. Among these, nematodes such as *Toxocara canis* and *Ancylostoma caninum* are most frequently encountered and are recognised for their capacity to inflict gastrointestinal disturbances, anaemia, and malnutrition in affected animals (Bayou *et al*., 2025). The infections are particularly prevalent in developing countries where climatic conditions favour parasites transmission and where routine deworming and public health surveillance are often inadequate (Dubie *et al*., 2023; Yirsa *et al*., 2024).

Helminthic infections in dogs are transmitted mainly through the faecal-oral route, transplacentally, transmammarily, or percutaneously, depending on the species involved (Siyadatpanah *et al*., 2020). Eggs shed in faeces of infected animals contaminate the environment and pose a high risk of infection to other dogs and humans (Shamsaddini *et al*., 2024). *Toxocara canis* larvae can migrate through human tissues, leading to visceral or ocular larva migrans, whereas *Ancylostoma* species are capable of causing cutaneous larva migrans. (Morsy, 2020). These zoonotic implications emphasise the necessity of regular veterinary surveillance and the integration of One Health approaches to limit environmental contamination and human exposure (Gado *et al*., 2023). In Nigeria and other parts of sub-Saharan Africa, canine helminthic infections remain widespread despite the availability of effective anthelmintics. Studies have reported varying prevalence rates, often exceeding 60% in some regions, depending on factors such as dog ownership patterns, hygiene practices, and climatic conditions (Omonijo *et al*., 2020; Kamani *et al*., 2021; Adenubi *et al*., 2022). Zaria, located in Kaduna State, provides a suitable ecological environment for the transmission of helminthic parasites due to its warm climate and presence of numerous stray and semi-owned dogs that contribute to environmental faecal contamination (Esonu *et al*., 2019). The recording and publication of individual clinical cases in this region would contribute valuable information for the understanding of disease trends and their management in companion animals.

This case report presents a clinical case of mixed gastrointestinal parasitism caused by *Toxocara canis* and *Ancylostoma caninum* in a two-year-old male Alsatian dog treated at the Depot Nigerian Army Veterinary Clinic, Zaria. The report elaborates on the clinical presentation, diagnostic findings, therapeutic management, and public health significance, highlighting the importance of maintaining accurate clinical records and implementing preventive strategies for the control of zoonotic parasitic infections.

CASE PRESENTATION

A two-year-old male Alsatian dog was presented at the Depot Nigerian Army Veterinary Clinic, Zaria, with a three-week history of intermittent diarrhoea, progressive weight loss, and generalised body weakness. The owner reported poor appetite and dullness. The dog had not been dewormed in the past six months, and its vaccination status was incomplete. Physical examination revealed poor body condition, mild dehydration characterised by skin tenting and tacky mucous membranes, and mild abdominal discomfort upon palpation. However, the rectal temperature, heart rate, and respiratory rate were within normal limits.

DIAGNOSTIC WORK-UP

A fresh faecal sample was collected and examined using the standard flotation technique as described by Segura *et al*. (2023). Microscopic examination revealed numerous oval, thin-shelled hookworm eggs consistent with *Ancylostoma caninum* and thick-shelled, round *Toxocara canis* eggs, which were identified using colour atlas of companion animal parasites by McGarry *et al*. (2024). The infection was classified as a mixed gastrointestinal helminthiasis. No other parasites were observed. Quantitative egg counts and haematological tests were not conducted due to resource limitations.

TREATMENT AND FOLLOW-UP

The dog was treated with fenbendazole at 50 mg/kg orally once daily for three consecutive days. Supportive care, including fluid rehydration therapy and nutritional supplementation, was provided. The owner was instructed on environmental hygiene, regular deworming at every three months, and the importance of avoiding canine faecal contamination in human living areas. The patient showed marked clinical improvement within five days, regaining appetite and normal stool consistency. Follow-up after two weeks indicated complete recovery, and a routine deworming schedule was established.

DISCUSSION

The diagnosis and management of gastrointestinal parasitism in dogs require a sound understanding of principles of diagnostic veterinary parasitology (Inácio *et al*., 2020). Parasitological diagnosis depends on accurate identification of eggs, larvae, or adult worms using well-established laboratory methods (Rojas *et al*., 2024). In this case, faecal flotation technique served as a reliable and rapid screening tool to detect helminthic eggs. The detection of eggs of both *Toxocara canis* and *Ancylostoma caninum* provided a clear indication of a mixed infection, and this is consistent with a previous study (Sivakumar *et al*., 2017). Also, this observation is not uncommon in regions with high environmental faecal contamination (Mulugeta *et al*., 2019). However, diagnostic confirmation could have been strengthened by quantitative egg counting (e.g., McMaster technique), which will provide a measure of infection intensity and be helpful in assessing the effectiveness of post-treatment interventions (Aleem *et al*., 2024).

A deeper diagnostic approach in veterinary parasitology also considers larval culture and molecular tools (Zendejas-Heredia *et al*., 2023). Larval culture techniques such as the Baermann method can be used to differentiate hookworm species, which is important in epidemiological studies (Nieves *et al*., 2024). Molecular diagnostics, including polymerase chain reaction (PCR), are powerful tools for species differentiation, particularly when morphological identification is challenging (Tsokana *et al*., 2023). The integration of these advanced diagnostic techniques in Nigerian veterinary clinics would enhance surveillance of canine parasites and aid in identifying zoonotic species with greater precision.

Haematological and biochemical evaluations are important adjuncts in the diagnosis of parasitic infections, as they help determine the systemic impact of parasitism (Ofori *et al*., 2025). For instance, *Ancylostoma caninum* infections are typically associated with microcytic hypochromic anaemia due to chronic blood loss (Dos Santos *et al.,* 2024), while *Toxocara canis* may result in eosinophilia and mild hypoalbuminemia (Kowalik *et al*., 2022). The absence of these parameters in the current case limits the clinical insight into the physiological impact of the infection. Future case documentation should include these investigations to enable comprehensive clinical interpretation.

Another critical aspect of diagnostic parasitology is the differentiation between patent and prepatent infections. Young dogs or recently infected animals may harbour immature worms that are not yet producing eggs, leading to false-negative results when using faecal flotation technique (Mehra *et al*., 2024). This emphasises the importance of combining clinical observation with laboratory testing, as well as repeating faecal examinations after an interval to increase diagnostic accuracy.

Environmental monitoring and epidemiological mapping play key roles in veterinary parasitology. The assessment of soil samples, kennel environments, and communal dog parks for helminthic eggs can be used to identify sources of reinfection. Such data are essential for designing of community-based control programmes (Ristić *et al*., 2020). Also, integration of Geographic Information Systems (GIS) and climate data could further predict seasonal patterns of parasite transmission, through guiding targeted deworming campaigns and public health interventions (Kwarteng *et al*., 2025). This is applicable in Zaria and similar urban settings.

Furthermore, the discussion of diagnostic veterinary parasitology would be incomplete without emphasising the One Health approach. There is need for collaborative efforts among veterinarians, public health practitioners, and environmental scientists to reduce the burden of zoonotic parasites. Hence, regular deworming, proper disposal of faeces, health education, and responsible pet ownership are practical strategies that can significantly reduce parasite prevalence and zoonotic risk.

CONCLUSION

This report demonstrates that effective diagnosis and management of gastrointestinal parasitism in dogs depend on accurate parasitological techniques, comprehensive clinical evaluation, and pet owner's cooperation. The successful treatment with fenbendazole highlights its efficacy and reliability in managing mixed nematodal infections. Based on these, there is need to strengthen awareness among pet owners, promote One Health collaboration, and maintain comprehensive clinical records so as to improve the management and reporting of parasitic diseases in dogs.

REFERENCES

Adenubi, O. T., Adebowale, O. O., Adekoya, O. A., Akande, F. A., Adeleye, A. I., Makinde, F., Ola-Davies, O. E. &Olukunle, J. O. (2022). Prevalence of Canine Helminthosis and Anthelminthic Usage Pattern at a Veterinary Teaching Hospital in Nigeria. *Egyptian Journal of Veterinary Sciences*, 53(2), 175-184.

Aleem, M. T., Munir, F. & Shakoor, A. (2024).Parasitic diseases of dogs and cats.In Introduction to Diseases, Diagnosis, and Management of Dogs and Cats (pp. 479-488). Academic Press.

Bayou, K., Terefe, G. & Kumsa, B. (2025). Epidemiology of gastrointestinal parasites of dogs in four districts of central Ethiopia: Prevalence and risk factors. *PloS One*, 20(1), e0316539.

Dos Santos, B., da Silva, N. M. M., Mora, S. E. V., Justo, A. A., dos Santos Schmidt, E. M. &Takahira, R. K. (2024). Clinical and laboratory findings of hookworms (Ancylostoma spp.) in naturally infected adult dogs. *Brazilian Journal of Veterinary Medicine*, 46, e007724.

Dubie, T., Sire, S., Fentahun, G. & Bizuayehu, F. (2023). Prevalence of Gastrointestinal Helminths of Dogs and Associated Factors in Hawassa City of Sidama Region, Ethiopia. *Journal of Parasitology Research*, 23, 6155741.

Esonu, D. O., Ibrahim, M. D., Otolorin, G. R., Per, M. F. & Esonu, M. C. (2019). Prevalence of gastrointestinal helminthes eggs of public health importance in house-hold dogs presented to the Veterinary Teaching Hospital Ahmadu Bello University, Zaria, Kaduna State. *Nigerian Veterinary Journal*, 40(3), 211-217.

Gado, D. A., Ehizibolo, D. O., Meseko, C. A., Anderson, N. E. & Lurz, P. W. W. (2023). Review of Emerging and Re-Emerging Zoonotic Pathogens of Dogs in Nigeria: Missing Link in One Health Approach. *Zoonotic Diseases*, 3(2), 134-161.

Inácio, S. V., Ferreira Gomes, J., Xavier Falcão, A., Nagase Suzuki, C. T., Bertequini Nagata, W., Nery Loiola, S. H., Martins dos Santos, B., Soares, F. A., Rosa, S. L., Baptista, C. B., Borges Alves, G. &Saraiva Bresciani, K. D. (2020). Automated Diagnosis of Canine Gastrointestinal Parasites Using Image Analysis. *Pathogens*, 9(2), 139.

Kamani, J., Massetti, L., Olubade, T., Balami, J. A., Samdi, K. M., Traub, R. J., Colella, V. & González-Miguel, J. (2021). Canine gastrointestinal parasites as a potential source of zoonotic infections in Nigeria: A nationwide survey. *Preventive Veterinary Medicine*, 192, 105385.

Kowalik, M., Gołos, A. &Góra-Tybor, J. (2022). Eosinophilia caused by Toxocaracanis infection. *Hematology in Clinical Practice*, 13(2), 62-68.

Kwarteng, E. V. S., Asiedu, E., Amewu, E. K. A., Abakah, A., Andam-Akorful, S. A., Duker, A. A. & Kwarteng, A. (2025). Integrating geospatial tools is crucial for enhancing control strategies against human lymphatic filarial infections in Ghana: A comprehensive review. *Parasite Epidemiology and Control*, 30, e00444.

McGarry, J. W., Elsheikha, H. M. & Taylor, S. (2024). *A Colour Atlas of Companion Animal Parasites: Life Cycles and Morphological Identification*. GB: CABI, 246pp.

Mehra, M., Choudhary, G., & Desai, J. (2024). Diagnostic Perspectives of Parasitic Diseases in Dogs and Cats. *In* Rana, T. (ed). *Principles and Practices of Canine and Feline Clinical Parasitic Diseases*, Wiley-Blackwell, Pp.173-187.

Morsy, T. A. (2020).Toxocariasis: Visceral and ocular larva migrans. *Journal of the Egyptian Society of Parasitology*, 50(1), 41-48.

Mulugeta, Y., Yohannes, M., Wolde, D., Aklilu, M., Ashenefe, B. & Gebree, D. (2019).Intestinal parasites in dogs and humans, environmental egg contamination and risk of human infection with zoonotic helminth parasites from dog in Hosanna town. *International Journal of Biomedical Materials Research*, 7(1), 24-36.

Nieves, E., Fleitas, P., Juárez, M., Almazán, C., Flores, G., Alani, J., Diaz, R., Martos, J., Cajal, P., Cimino, R. &Krolewiecki, A. (2024). Comparison of parasitological methods for the identification of soil-transmitted helminths, including *Strongyloides stercoralis*, in a regional reference laboratory in northwestern Argentina: An observational study. *Parasite Epidemiology and Control*, 26, e00370.

Ofori, S. A., Amissah-Reynolds, P. K., Addo, A. K., Kyeremeh, O., Dwomoh, J. & Gyasi, D. T. (2025). Hematological, biochemical, and histopathological changes in laboratory rats naturally infected with gastrointestinal parasites. *Discover Animals*, 2(1), 19.

Omonijo, A. O., Kalinda, C. & Mukaratirwa, S. (2020). A systematic review and meta-analysis of canine, feline and human Toxocara infections in sub-Saharan Africa. *Journal of Helminthology*, 94, e96.

Pal, M., Tolawak, D. & Garedaghi, Y. (2023). A comprehensive review on major zoonotic parasites from dogs and cats.International *Journal of Medical Parasitology and Epidemiology Sciences*, 4(1), 4.

Ristić, M., Miladinović-Tasić, N., Dimitrijević, S., Nenadović, K., Bogunović, D., Stepanović, P. &Ilić, T. (2020). Soil and Sand Contamination with Canine Intestinal Parasite Eggs as a Risk Factor for Human Health in Public Parks in Niš (Serbia). *Helminthologia*, 57(2), 109–119.

Rojas, A., Germitsch, N., Oren, S., Sazmand, A. & Deak, G. (2024). Wildlife parasitology: sample collection and processing, diagnostic constraints, and methodological challenges in terrestrial carnivores. *Parasites & Vectors*, 17(1), 127.

Segura, J., Alcala-Canto, Y., Figueroa, A., Del Rio, V. & SalgadoMaldonado, G. (2023). A Simple Fecal Flotation Method for Diagnosing Zoonotic Nematodes Under Field and Laboratory Conditions. *Journal of Visualized Experiments*, 202, e66110.

Shamsaddini, S., Schneider, C., Dumendiak, S., Aghassi, H., Kamyabi, H., Akhlaghi, E., Wassermann, M., Fasihi Harandi, M., Deplazes, P. & Romig, T. (2024). Environmental contamination with feces of free-roaming dogs and the risk of transmission of Echinococcus and Taenia species in urban regions of southeastern Iran. *Parasites & Vectors*, 17(1), 359.

Sivakumar, M., Yogeshpriya, S., Saravanan, M., Arulkumar, T., Krishnakumar, S., Jayalakshmi, K., Veeraselvan, M. & Selvaraj, P. (2017). Concurrent infection of Toxocariasis and Ancylostomiasis in a puppy and its Therapeutic management: A case report. *Journal of Entomology and Zoology Studies*, 5(4), 1289-1292.

Siyadatpanah, A., Pagheh, A. S., Daryani, A., Sarvi, S., Hosseini, S. A., Norouzi, R., Boundenga, L., Tabatabaie, F., Pereira, M. L., Gholami, S. & Nissapatorn, V. (2020). Parasitic helminth infections of dogs, wolves, foxes, and golden jackals in Mazandaran Province, North of Iran. *Veterinary World*, 13(12), 2643–2648.

Tsokana, C. N., Symeonidou, I., Sioutas, G., Gelasakis, A. I. & Papadopoulos, E. (2023). Current applications of digital PCR in veterinary parasitology: an overview. *Parasitologia*, 3(3), 269-283.

Yirsa, T., Bihone, A., Teshager, G., Muktar, Y., & Berihun, A. (2024). Prevalence of gastrointestinal nematode parasites of dogs and associated risk factors in Gondar town, Northwest Ethiopia. *Heliyon*, 11(2), e41174.

Zendejas-Heredia, P. A., Colella, V., Huggins, L. G., Schaper, R., Schunack, B. &Traub, R. J. (2023). An integrated coproscopic and molecular method provides insights into the epidemiology of zoonotic intestinal helminths of dogs across Cambodia. *Transboundary and Emerging Diseases*, 2023(1), 2001871.