



CASE REPORT

First Report of Clinical Toxoplasmosis in a Wild Royal Bengal tiger (*Panthera tigris tigris*) from South India

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Abstract

A wild Bengal tiger (*Panthera tigris tigris*) exhibiting neurological symptoms was rescued from a nearby human settlement adjoining a tiger reserve in South India. The animal was taken into observatory care for further observation. The animal was found to be sluggish, anorexic, and ataxic, with noticeable listlessness, and to exhibit insufficient responses to stimuli. Clinical and diagnostic testing via quantitative PCR revealed the presence of *Toxoplasma gondii* nucleic acid material in the whole blood. Treatment with oral clindamycin and supportive therapy was accordingly commenced. The tiger was housed under continued care in a rescue facility with minimal human intervention for the treatment duration. The animal subsequently recovered and was collared for release back into the wild with ongoing monitoring. To our knowledge, this study provides the first report of clinical toxoplasmosis in a live, wild Bengal tiger from South India. Our findings indicate the pathogenicity and sylvatic transmission of the organism among wild felids, and highlight the importance of monitoring diseases and their ecological effects in niche ecosystems to support long-term conservation efforts.

Key words: Bengal tiger, toxoplasmosis, wildlife health, conservation medicine

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BACKGROUND

Toxoplasmosis, caused by the protozoan *Toxoplasma gondii*, is a zoonotic disease affecting a wide range of mammals. This condition has been well documented among captive wild felids and domestic cats, and extensive studies have elucidated the associated morbidity, pathogenicity, and transmission of *T. gondii* among various species [1]. However, no reports on the presence of *T. gondii* in a wild Bengal tiger exhibiting clinical symptoms from South India had been published.

To our knowledge, this study provides the first report of a clinically infected wild royal Bengal tiger that was rescued,

treated, and released back into the wild, thereby contributing to the conservation of this species, and describing a disease with zoonotic and ecological importance.

CASE PRESENTATION

A 7-year-old male royal Bengal tiger (*Panthera tigris tigris*) was reported to have been lying idle in a bush on the forest border, overlooking a main road and human settlements, for 3 days. Despite efforts by local staff to drive the animal back into the forest, the tiger remained in the same area, and showed restricted movement and ataxia, thus prompting suspicion of traumatic injury or disease.

To address issues of safety to the animal and the possibility of human depredation, a decision was made to chemically immobilize and assess the animal. The tiger was immobilized with 10 mg medetomidine HCl (medetomidine compounded, 20 mg/ml, Vtech Pharma, South Africa) and 400 mg ketamine HCl (Ketamin 10%, Astron Pharmaceuticals, Sri Lanka), administered intramuscularly via a projectile dart administration system [2] (Fig 1). The animal attained a sufficient plane of sedation and lay in lateral recumbency for 8 minutes, after which it was physically examined, and blood samples were collected for further investigation. No visible injuries or septic wounds were found on the body, and all claws and canines were deemed intact, and showed wear appropriate for the animal's age.

The animal was revived after being loaded into a transport cage with intramuscular administration of 50 mg atipamezole (Mobitor, Headway AH, Australia) [2]. Additionally, supportive treatment was administered, comprising 500 ml dextrose normal saline intravenous, 40 mg dexamethasone intramuscular, 500 mg long-acting enrofloxacin subcutaneous, and 100 mg doramectin 100 mg subcutaneous. The tiger was transferred to a nearby rescue center for further observation with closed-circuit cameras and minimal human interaction (Fig 2).

After recovery from anesthesia, the animal remained lethargic, ataxic, and anorexic over the next 2 days in observational captivity. It exhibited limited, sluggish movement and arose only to consume water. Its hematology and serology findings were unremarkable and showed slightly elevated serum creatinine, neutropenia, and lymphocytosis (Table 1). Direct fecal flotation tests revealed

the presence of only large numbers of strongyle larvae and nematode eggs.

However, viral and protozoal testing of whole blood samples in EDTA tubes with quantitative real-time PCR (qPCR) revealed positivity for *T. gondii* nucleic acid.

For testing of viral diseases, genomic nucleic acids were extracted from 200 µl whole blood with 100 µl elution buffer (Invitrogen) with commercial kits [4].

The presence of genomic nucleic acids was screened with qPCR. The reactions were performed with Invitrogen (qPCR Supermix) mix according to the manufacturer's instructions [4]. The samples were found to be negative for FeLV, FIV, herpes, and distemper viruses.

For molecular testing of *T. gondii* in whole blood samples, TaqMan probes targeting the 529-bp repeat element

TABLE 1 | Hematological and serum biochemical values for the royal Bengal tiger tested [3].

Test	Normal range	Reported values
WBC	6–16	$10.98 \times 10^3/\mu\text{l}$
RBC	6–9	$5.73 \times 10^6/\mu\text{l}$
Hb	8–16	10.8 g/dl
HCT	26–44	47.3%
Platelets	127–376	$338 \times 10^3/\mu\text{l}$
Blood urea nitrogen	6.8–31	48 mg/dl
Creatinine	1.5–4.1	2.77 mg/dl
Sodium	151–159	153 mg/dl
Potassium	3–4.5	4.9 mg/dl
Chloride	113–123	123 mg/dl
AST	15–122	57 IU/L
ALT	29–126	29 IU/L
Albumin	2.9–4.3	2.53 g/dl
Globulin	2–4	6.24 mg/dl
Total protein	4.9–8.9	8.87 mg/dl



FIGURE 1 | Wild Bengal tiger with neurological symptoms, which was sedated after straying into a human-dominated landscape in southern India.



FIGURE 2 | Observation of the animal via closed-circuit cameras without human interaction.

were designed to detect *Toxoplasma* DNA [5]. An internal control targeting the RNase P gene was also included to increase sensitivity. Appropriate positive and negative control DNA samples were included in the qPCR to increase test quality. The final mix consisted of GoTaq probe qPCR master mix (Promega), *T. gondii* primer, *T. gondii* TaqMan probe, and internal controls to increase sensitivity and specificity [5]. The cutoff Ct value was 33. The test sample was positive, with a Ct value of 27.23, whereas the positive control maintained a Ct value of 22.99 (Fig 3). All internal controls also presented appropriate values, thus confirming the test's validity and sensitivity.

INTERVENTION AND THERAPY

Although clinical symptoms may be attributable to toxoplasmosis alone, and morbidity may be due to concomitant infections, renal disease, or any other cause of immunosuppression, a decision was made to treat the animal for toxoplasmosis with oral clindamycin 500 mg (Tab. Bioclan, Sava Vet, India) bid for 4 weeks, according to the prescribed protocol. The treatment was supplemented with multivitamins and supportive therapy [6].

Close monitoring of the animal via remote cameras throughout the housing period, to avoid human imprinting, indicated gradual improvements in its condition. By the end of the first week, its movements became more agile, and it responded markedly more quickly to stimuli. Its appetite increased over the course of treatment. By the end of the fourth week, treatment was discontinued after two negative fecal tests for the presence of oocysts.

Two months after capture and treatment, the tiger was sedated with 6 mg HCl (medetomidine compounded, 20 mg/ml, Vtech Pharma, South Africa) and 250 mg ketamine HCl (Ketamin 10%, Astron Pharmaceuticals, Sri Lanka), administered intramuscularly, to fit a radio collar before release. The tiger was revived with 30 mg atipamezole (Mobitor, Headway AH, Australia), administered intramuscularly, after the procedure. After the animal attained a sufficient level of consciousness, it was released back into the wild and has been continually monitored since (Fig 4).

DISCUSSION AND CONCLUSION

T. gondii is an obligate, intracellular apicomplexan parasite affecting most, if not all, warm-blooded species, including birds [7]. Felids are definite hosts contributing to the shedding of oocysts in the environment, thereby maintaining the parasite's lifecycle. Transmission occurs when sporulated oocysts are ingested by intermediate hosts from infected tissue or through exposure to feces. Although toxoplasmosis is asymptomatic in healthy felids, clinical disease can manifest in immunocompromised or stressed individuals [6]. *T. gondii* has been well documented among domestic felids and wild felids in captivity. The presence of *T. gondii* in wild tigers from Bhutan and the Russian Far East has been reported, on the basis of antigen-antibody presence according to latex agglutination and hemagglutination tests rather than clinical disease manifestations [8,9]. However, the presence of toxoplasmosis in a live, wild Bengal tiger straying into human habitation is a

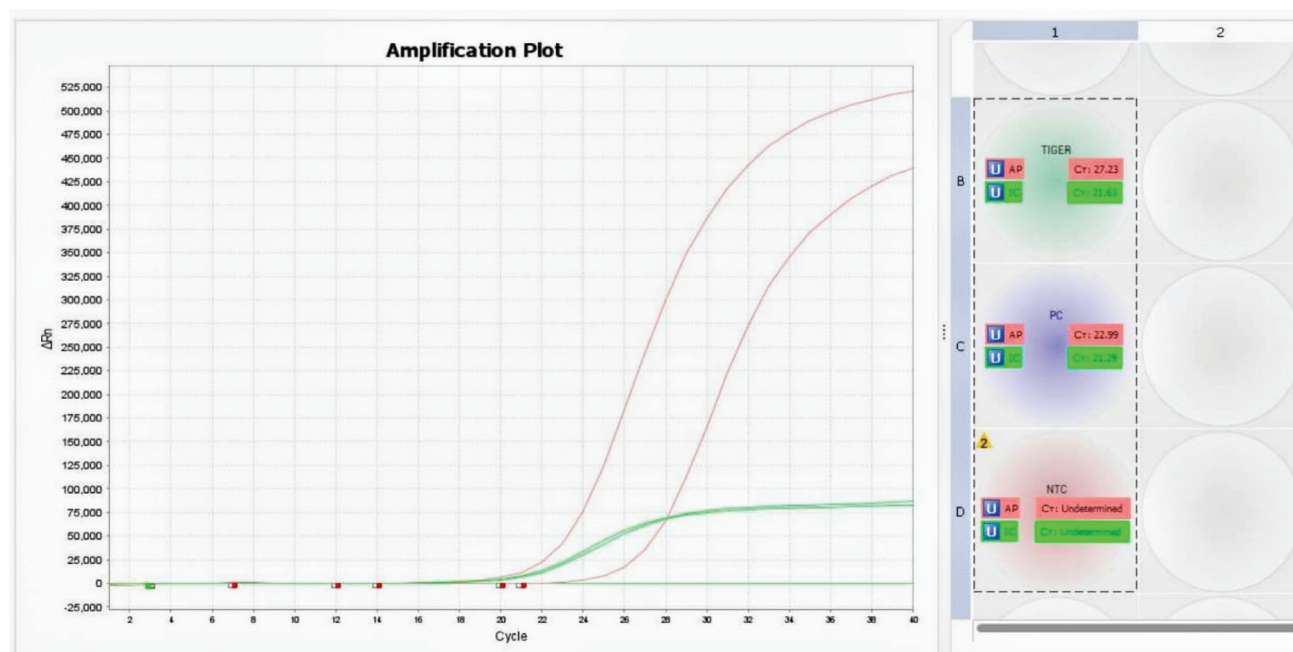


FIGURE 3 | *T. gondii* detection in a whole blood sample from the Bengal tiger. Fluorescence was achieved between 21 and 27 cycles, thereby indicating moderate to high levels of nucleic acid material in the systemic circulation. The Ct values were 22.99 for the positive control and 27.23 for the tiger sample.



FIGURE 4 | Radio collaring and release of the animal into its natural habitat after treatment and symptomatic recovery.

novel incident that warrants investigation of the prevalence, transmission, and effects of this disease among wild tiger populations worldwide, particularly in South India. The source of infection in this case could not be identified, owing to limited information regarding the prevalence of toxoplasmosis in this region. However, although felids are definitive hosts for toxoplasmosis, factors such as stress or immunosuppression might potentially have led to clinical disease in this individual [6]. A recent study has highlighted the symptoms of toxoplasmosis in a sand cat (*Felis margarita*), including ataxia of the rear legs along with seropositivity; the clinical signs were ameliorated after clindamycin treatment [10]. Additionally, the same study described reports of clinical toxoplasmosis in several species of wild felids, including lion (*Panthera leo*), bobcat (*Lynx rufus*), cheetah (*Acinonyx jubatus*), Persian leopard (*Panthera pardus saxicolor*), and Pallas cat (*Felis manul*) [10].

To our knowledge, this novel case represents a rare instance of clinical toxoplasmosis in a live, wild royal Bengal tiger exhibiting neurological symptoms of delirium, weakness, and ataxia, while also straying into a human-dominated landscape. This finding underscores the vulnerability of endangered species to infectious diseases and highlights the need for a multidisciplinary approach in the conservation of Bengal tigers, which are already critically endangered in their natural habitat.

Despite its widespread prevalence, *T. gondii* has varying infectious ability among individuals, yet is highly contagious and causes substantial morbidity and mortality among affected populations. Most studies reporting the incidence of toxoplasmosis in wildlife have been captive studies, whereas few studies have documented oocyst shedding patterns in the feces of wild felids [1].

This incident highlights the presence of this disease within critical habitats in southern India, where mammals including endangered, vulnerable populations of Bengal tigers, Indian leopards (*P. pardus fuscus*), and rusty spotted cats (*Prionailurus rubiginosus*) thrive. The discovery of this disease in a flagship species indicates the sylvatic spread of the pathogen from domestic hosts into wild populations or vice versa, and warrants further investigation of

the prevalence of many other diseases in niche ecosystems, their effects on critical wildlife, and zoonotic implications from a One Health perspective [11]. Furthermore, many questions regarding the source of occurrence of such pathogens in niche ecosystems remain to be addressed, such as the effects of habitat degradation, and the sharing of habitats such as waterholes between domestic and wildlife species, on pathogen exchange; the influence of such diseases on predator-prey relationships; the roles of intermediate hosts, such as other carnivores, in disease incubation and transmission; and the effects of novel diseases in isolated populations of Bengal tigers. Additionally, wildlife health surveillance is important and should be performed in all capture, rescue, and translocation procedures, particularly among critically endangered tigers in India. Regular non-invasive sampling methods may be used as part of regular disease monitoring in protected areas in addition to biological sampling of captured animals, to enable comprehensive studies of wildlife diseases prevalent in any populations of interest.

DATA AVAILABILITY STATEMENT

All data are available from the corresponding author and may be provided on request.

ETHICS STATEMENT

All ethical considerations were duly followed and undertaken by the state government in charge of dealing with wildlife in India.

AUTHOR CONTRIBUTIONS

Corresponding author Dr. Mirza Vaseem was responsible for capturing the tiger and drafting the manuscript. Dr. Adarsh A.M. was responsible for laboratory analyses and supportive care of the animal. Dr. Ramesha H. was responsible for sedation for radio collaring, release, and subsequent monitoring of the animal.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

CONSENT FOR PUBLICATION

All authors consent to publication.

REFERENCES

1. Bolais PF, Galal L, Cronemberger C, Pereira FA, Barbosa AS, Dib LV, et al. *Toxoplasma gondii* in the faeces of wild felids from the Atlantic forests, Brazil. Mem Inst Oswaldo Cruz. 2022;117:e210302.

2. West G, Heard D, Caulkett N. Zoo animal and wildlife immobilization and anesthesia. 1st edition. Edited by WestG, HeardDJ. Blackwell Publishing; 2007.
3. Allwin B, Kalaighan PA, Kannappan S, Vairamuthu S, Jayathangaraj MG. Hematological and serum biochemical indices of captive Royal Bengal Tigers (*Panthera tigris*), Arignar Anna Zoological Park, Vandaloor, Chennai. Indian J Anim Res. 2019;53(12):1613-1618.
4. Gallina L, Facile V, Roda N, Sabetti MC, Terrussi A, Urbani L, et al. Molecular investigation and genetic characterization of feline leukemia virus (FeLV) in cats referred to a veterinary teaching hospital in Northern Italy. Vet Res Commun. 2024;48:2683-2689.
5. Liyanage KLDTD, Lynch M, Omotainse OS, Su C, Hufschmid J, Jabbar A. Molecular detection and characterization of *Toxoplasma gondii* in eastern barred bandicoots (*Peromyscus gunni*) in Victoria, Australia. Int J Parasitol Parasites Wildl. 2025;27:101071.
6. Hartmann K, Belak S, Boucraut-Baralon C, Egberink H, Frymus T, Gruffydd-Jones T, et al. *Toxoplasma gondii* infection in Cats: ABCD guidelines on prevention and management. J Feline Med Surg. 2013;15(7):631-637.
7. Ammar S, Wood L, Su C, Spriggs M, Brown J, Why KV, et al. *Toxoplasma gondii* prevalence in carnivorous wild birds in the eastern United States. Int J Parasitol Parasites Wildl. 2021;15:153-157.
8. Phuentshok Y, Choden K, Rojas CA, Deplazes P, Wangdi S, Gyeltshen K, et al. Cerebral cysticercosis in a wild Bengal tiger (*Panthera tigris tigris*) in Bhutan: a first report in non-domestic felids. Int J Parasitol Parasites Wildl. 2021;14:150-156.
9. Goodrich JM, Quigley KS, Lewis JCM, Astafiev AA, Slabi EV, Miquella DG, et al. Serosurvey of free-ranging Amur tigers in the Russian Far-East. J Wildl Dis. 2012;48(1):186-189.
10. Dubey JP. Clinical toxoplasmosis in zoo animals and its management. Emerg Anim Species. 2022;2:100002.
11. Bokaba RP, Dermauw V, Morar-Leather D, Dorny P, Neves L. *Toxoplasma gondii* in African Wildlife: a systematic review. Pathogens. 2022;11(8):868.