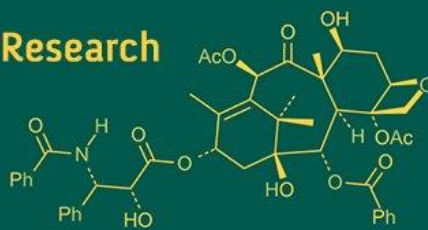


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Dr. Kanchan Walwadkar
Assistant Professor,
Department of Veterinary
Medicine, College of Veterinary
Sci. & A.H., NDVSU,
Jabalpur, Madhya Pradesh,
India

Dr. Rajesh Tomar
Veterinary Officer, Mukundpur
Zoo, Maihar, Madhya Pradesh,
India

Dr. Nitin Kumar Gupta
Veterinary Officer, Mukundpur
Zoo, Bandhavgarh, Madhya
Pradesh, India

Dr. AP Singh
Dean, College of Veterinary
Sci. & A.H., NDVSU,
Jabalpur, Madhya Pradesh,
India

Dr. Vipin Kumar Gautam
P.G. Scholars, Department of
Veterinary Medicine, College of
Veterinary Sci. & A.H.,
NDVSU, Jabalpur, Madhya
Pradesh, India

Dr. Shubhankar Medha
P.G. Scholars, Department of
Veterinary Medicine, College of
Veterinary Sci. & A.H.,
NDVSU, Jabalpur, Madhya
Pradesh, India

Dr. Naveen Telu
P.G. Scholars, Department of
Veterinary Medicine, College of
Veterinary Sci. & A.H.,
NDVSU, Jabalpur, Madhya
Pradesh, India

Dr. Saurabh Banerjee
Veterinary Assistant Surgeon
at VH Pondi (Bachra), Block-
Baikunthpur, Korea,
Chhsttisgarh, India

Corresponding Author:
Dr. Kanchan Walwadkar
Assistant Professor,
Department of Veterinary
Medicine, College of Veterinary
Sci. & A.H., NDVSU,
Jabalpur, Madhya Pradesh,
India

Successful treatment of *Trypanosoma* infection in a wild tiger: A case report

Kanchan Walwadkar, Rajesh Tomar, Nitin Kumar Gupta, AP Singh, Vipin Kumar Gautam, Shubhankar Medha, Naveen Telu and Saurabh Banerjee

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Abstract

Trypanosomiasis (surra), caused predominantly by *Trypanosoma evansi*, is an important haemoprotozoan disease affecting domestic and wild animals, including endangered tigers. The disease is associated with high morbidity and mortality and poses a significant challenge to wildlife conservation because of its rapid progression and limited information regarding its occurrence in captive wild felids. The present case report aimed to describe the clinical presentation, diagnosis, therapeutic management, and outcome of trypanosomiasis in a rescued Royal Bengal tiger (*Panthera tigris*) maintained at Maharaja Martand Singh Judeo White Tiger Safari and Zoo, Mukundpur, Madhya Pradesh. An approximately eight-year-old male tiger weighing about 180 kg was presented with anorexia, lethargy, depression, pyrexia, tachypnoea, tachycardia and reduced aggressiveness. Blood samples were collected through coccygeal venipuncture for haematological, biochemical and microscopic examinations. Giemsa-stained blood smears revealed characteristic extracellular trypomastigotes, confirming trypanosomiasis. The tiger was treated with diminazene aceturate at 3.5 mg/kg body weight intramuscularly, repeated after 48 hours, along with supportive therapy comprising meloxicam, intravenous fluids, pantoprazole, multivitamins and oxytetracycline. Clinical improvement was evident within hours of treatment, with gradual restoration of appetite and normal activity. Blood smears collected on the fourth and seventh days after therapy were negative for parasites, indicating successful elimination of the infection. Haematological evaluation showed marked improvement in anaemia, haemoglobin concentration, erythrocyte count, haematocrit and platelet count, while biochemical abnormalities including elevated blood urea nitrogen, creatinine and liver enzymes, along with hypoglycaemia, returned towards normal values by the seventh day. The findings demonstrate that early diagnosis based on blood smear examination, followed by prompt administration of diminazene aceturate with appropriate supportive therapy, can successfully manage trypanosomiasis in captive tigers. Routine health surveillance, early disease detection, vector management and preventive monitoring are essential for safeguarding endangered wild felids in zoological parks and wildlife conservation centres.

Keywords: *Trypanosoma evansi*, trypanosomiasis, Royal Bengal tiger, *Panthera tigris*

Introduction

Trypanosomiasis commonly known as surra was classified as an OIE notifiable disease in 2009. Natural infections of *Trypanosoma* have been reported from 48 countries, including 20 in Asia including India; 27 countries have confirmed its presence at least once (Aregawi *et al.*, 2019) ^[1]. Trypanosomiasis is an important blood parasitic infection of both domestic and wild animals and humans (Wiikowsky, 2022) ^[27] and is most common in tropical and subtropical countries and is endemic in the Indian subcontinent (Shekhar *et al.*, 2024) ^[22]. The genus *Trypanosoma* is an extracellular blood parasite and is pathogenic to more than 30 wild animal species (OIE 2005) ^[14]. In Asia, numerous outbreaks linked to high morbidity and mortality have been recorded in wild animals. Clinical cases and fatalities due to surra have also been observed in endangered species, including tigers i.e. *Panthera tigris* (More *et al.*, 2017) ^[11]. Recently, it has emerged in non-endemic regions, infecting novel host species and prompting concerns about its zoonotic potential, as evidenced by occasional human infections (Joshi *et al.*, 2005 and Powar *et al.*, 2006) ^[8, 17]. It is identified as disease likely to spread due to climate change but scientific data are lacking in wildlife trypanosomiasis.

Of the many species of parasites, *T. equipardum* and *T. evansi* are the two species affecting wild animals in India. *T. evansi* is the species known to cause disease in tigers, and it has been associated with tiger population declines in India in the past (Ziauddin *et al.*, 1992; Samantray *et al.*, 2003; Singh *et al.*, 1997; Parija & Bhattacharya 2001)^[28, 19, 23, 16]. Similar mortalities in zoos in Lahore (Pakistan) and Dhaka (Bangladesh) have also been reported.

Despite its wide distribution, current information on the prevalence and economic impact of feline trypanosomosis in India remains limited.

In wild animals, *Trypanosoma* may be transmitted in four ways: i) mechanical transmission by the bite of a blood-sucking insect either from a local reservoir host (pigs, cattle, sheep, goat) or from an exotic animal species in the zoo; ii) iatrogenic transmission through the infected blood-contaminated needles and surgical instruments (Parija & Bhattacharya 2001)^[16]; iii) and in carnivores by ingestion of freshly cut meat from infected dead animals (Raina *et al.*, 1985 and Mandal *et al.*, 2017)^[18, 10]. iv) vampire bats which are also reported to have a unique ability to act as vector and host of this disease (Gingrich *et al.*, 1983). The oral transmission through ingestion of meat and blood of animals infected with *Trypanosoma* has been considered as an important mode of transmission and has been well described (Baker, 1968; Raina *et al.*, 1985 and Mandal *et al.*, 2017)^[2, 18, 10]. Leeches may also transmit trypanosomes, a factor worth examining, particularly in relation to the buffalo leech (*Hirudinaria manillensis*) in Asia (Desquesnes *et al.*, 2013)^[3]. In the present case, the mode of transmission could not be traced.

The parasite is mechanically transmitted by haematophagous flies (Veer *et al.*, 2002)^[26] of the genera *Tabanus*, *Stomoxys* (Parashar *et al.*, 2006)^[15], *Haematopota*, *Liperosia* and *Chrysops* (OIE 2005)^[14]. The success of transmission depends on the parasite's ability to survive in the oral cavity of the vector. *Trypanosoma* does not survive in the proboscis of flies for more than 10-15 minutes, and must therefore be transmitted to an uninfected host during the same feeding period. This makes transmission more likely in conditions where animals are kept in close proximity, such as in crowded cages. In contrast, tigers are solitary by nature, which offers them a degree of natural protection against such vector-borne transmission. Transmission of infection to carnivorous animals is comparatively easier in comparison to other animals as it may get infected either by biting flies or by ingesting infected flesh (Raina *et al.*, 1985)^[18].

Though it is a significant parasitic disease affecting wild animals globally, literature specific to wildlife trypanosomosis remains scarce. The present communication is a case of trypanosomiasis in a tiger at Maharaja Martand Singh Judeo White Tiger Safari and Zoo, Mukundpur, Maihar (Madhya Pradesh) during October 2024.

Case history, Clinical Observation and diagnosis

The case is of a rescued male Royal Bengal tiger (*Panthera tigris*) named Raja at Maharaja Martand Singh Judeo White Tiger Safari and Zoo, Mukundpur, Maihar district, Madhya Pradesh, India. The tiger was approximately eight years and weighing about 180 kg. History revealed that the tiger was found anorectic, inactive, and lethargic was found lying dull, depressed in the open area. Immediately the animal was shifted to a squeeze cage and restrained for physical

examination. Clinical examination revealed increased rectal temperature (105.7°F), tachypnoea (68-75 breaths per min.), increased pulse rate (130 beats per minute as measured from tail vein) and dry muzzle. The animal was ailing in pain as evident from his restless behavior and loss of normal aggressive behavior.

Blood samples were collected via venipuncture of the coccygeal vein before treatment. Blood smears were prepared immediately, air dried and fixed in methanol for further staining. Remaining blood was used for hematology and serum biochemistry, the results of which are detailed in Table No. 1 and 2. The blood smears were stained with Geimsa's stain (Schalm, *et al.*, 1975)^[20] and examined under microscope which revealed the presence of unicellular, extracellular organism with typical morphology consistent with trypomastigotes, confirming diagnosis of trypanosomiasis. The species of the trypanosome could not be determined because the immunodiagnostic test was not conducted.

Treatment and Discussion

The tiger was treated with Injection deminazine acetate at the dose rate of @ 3.5 mg per kg b.wt IM. along with symptomatic and supportive therapy including injection meloxicam @ 0.3 mg per kg b.wt. IM for 2 days, injection multi-vitamin-8 ml IV for 3 days, injection pantoprazole-80 mg (total dose) IV along with 0.9% NS (3 litres) for 3 days. The temperature started receding gradually in 2 hours after the treatment. The animal was offered mutton soup that night. Next evening it was offered 3 kg buffon which the animal consumed immediately. Injection deminazine acetate was repeated after 48 hours @ 3.5 mg per kg b.wt IM. Injection Oxytetracycline @ 15 mg/Kg b.wt was also given intravenously for 3 days to give complete cover against the secondary bacterial infection.

Blood smears of 4th days and 7th day were negative for parasites. The changes in haemato-biochemical parameters values on day 1 and day 7th are detailed in Table 01 and 02. The supportive therapy with multivitamins and haematinics was continued for 10 days. *Trypanosoma evansi* is an important protozoan parasite of tigers. Major outbreaks as well as sporadic cases of trypanosomiasis have been reported in tigers in captivity in India (Singh *et al.*, 1997; Parija & Bhattacharya 2001; Samantray *et al.*, 2003 and Shalini *et al.*, 2025)^[23, 16, 19, 21]. In the present case the tiger exhibited signs of fever, anemia, tachypnea, increased pulse rate, lethargy, restlessness and depression. Several other workers also reported major clinical findings which include fever, anemia, weight loss, edema, lymphadenomegaly, uncoordinated movements (gait) and sudden death (Muhammad *et al.*, 2007; Khan *et al.*, 2015 and Shalini *et al.*, 2025)^[12, 9, 21]. Wild carnivores infected with trypanosomes may display typical signs similar to those exhibited by domestic species, or may succumb without showing any signs.

In the present case the haemato-biochemical parameter reports indicated anaemia, hypoglycaemia and increased, liver enzyme values, creatinine and BUN values which showed good improvement and returned to normal by 7th day. Decreased PCV, TEC, blood glucose and increased ALT, AST, serum creatinine, BUN were also reported by Gupta *et al.*, (2009)^[6], Zubaidah *et al.*, 2021^[29], Habila *et al.*, 2012^[7] and Garba and Mayaki, 2018^[4].

Diminazine aceturate @ 3.5 mg/kg b.wt was given IM and then repeated after 48 hrs (Khan *et al.*, 2015) ^[9] gave good result and the tiger started consuming 70-80% food offered to it by 3rd day. Khan *et al.*, 2015 ^[9], Zubaidah *et al.*, 2021 ^[29] and Muraleedharan (2015) ^[13] all reported diminazine aceturate to be effective in treating trypanosome cases in tigers.

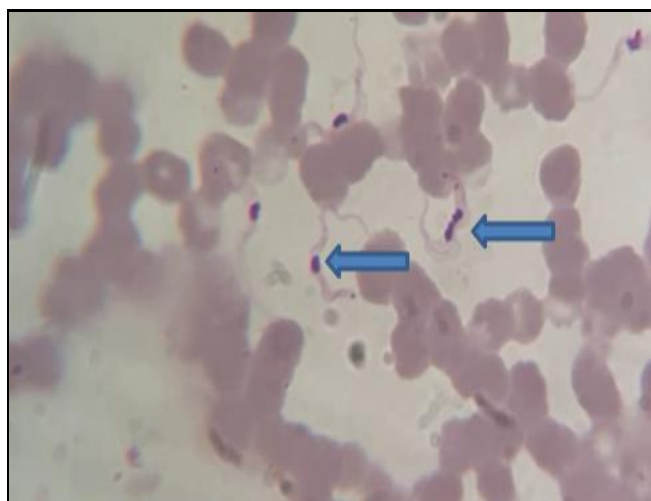


Fig 1: Blood smear examination showing trypomastigotes (marked in blue arrows) in male Tiger

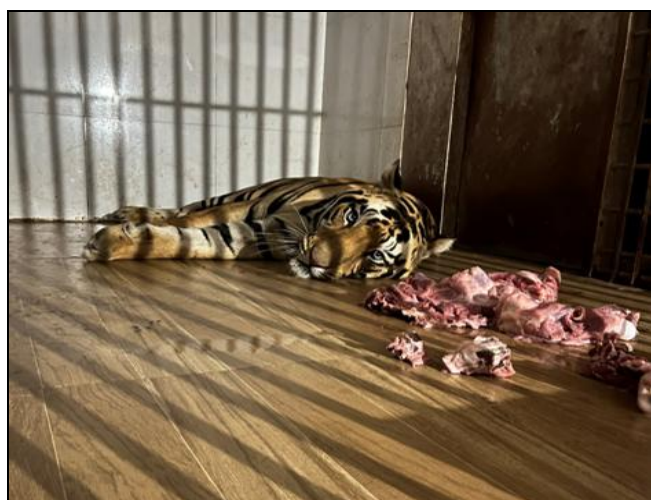


Fig 2: Tiger lying dull, depressed in the cell



Fig 3: Tiger lying lethargic in the open area

Table 1: Haematological Alterations in the Tiger Before and After Treatment

Values	Pre-Treatment Day 1	Post-Treatment Day 7	Reference Value
WBC (10 ³ /μl)	21600	6000	5.5-19.5
LYM (%)	17	31	18-35
MON (%)	6%	1	2-6
NEU (%)	76%	68	57-75
EOS (%)	1%	0	2-6
BAS (%)	0%	0	0-4
RBC (10 ⁶ /μl)	3.5	4.5	5-10
HGB (g/dl)	8.7	12.6	9.8-15.4
HCT (%)	21%	38	30-45
PLT (10 ³ /μl)	91	310	300-800

Table 2: Biochemical Alterations in the Tiger Before and After Treatment

Value	Pre-Treatment (Day 1)	Post-Treatment (Day 7)	Reference Range
BUN (mg/dL)	53.8 mg%,	21	10-30
CRE (mg/dL)	2.15 mg/dl,	0.9	0.3-2.1
ALT (U/L)	29.67 U/L	22.51	20-100
ALP (U/L)	114 U/L	97.32	10-90
AST (U/L)	32.46 U/L	17.24	12-43
GLU (mg/dL)	67 mg/dl	110	70-150
TP (g/dL)	7.86	6.51	5.4-8.2
Albumin (g/dL)	4.39 gm/dl	3.6	2.2-4.4
Globulin (g/dL)	3.47 gm/dl	2.91	1.5-5.7

Conclusions

Early diagnosis and prompt treatment are crucial for managing *Trypanosoma* infections in wild felids. Diminazine aceturate therapy on 1st day and repeated after 48 hours, combined with supportive care, proved effective in this case. Regular health monitoring of rescued carnivores is essential to prevent fatal disease progression and its spread in the protected areas like zoos and sanctuaries. Further research on disease transmission, vector control and disease prevention strategies are necessary to mitigate future outbreaks.

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