

An anecdote on combating Babesiosis in Tata Steel Zoological Park, Jamshedpur in the year 2018

Babesia is transmitted through vectors like ticks. The protozoa multiply in and destroy the red blood cells (RBC). Death occurs due to acute anaemia and jaundice. The chances of recovery of the infected wild animals are less.

Preamble

The Tata Steel Zoological Park is situated in the city of Jamshedpur of Jharkhand State. The Zoo is of a medium category facility recognised by the Central Zoo Authority and is spread over an area of 25ha. The Zoo is annually visited by 4.5 lakh visitors. Among the large carnivores, the zoo has the Bengal Tiger, Leopard and the African Lion in its collection.

Three tiger cubs were born in this Zoo on the 23 August 2017. All the cubs were healthy at the time of birth, vaccinated against feline distemper, rabies, and herpes, which are commonly



Tiger cubs in healthy prior to onset of disease. © Manik Palit.

occurring diseases in cats. They were also dewormed. They were achieving all milestones normal in their growth until one of the cubs, TC1 was found dull on 21 February 2018 having high fever and went off feed. Symptomatic treatment with antibiotics was initiated and TC1 started responding to the treatment from 24 February 2018 when it consumed its food to the full.

However, on 25 February 2018, its eyes (cornea) turned opaque blue resulting in partial blindness with

deep yellow lining and dull appearance.

Appearance of Babesia

Blood samples were collected by manually restraining TC1 on 26 February 2018 and sent for diagnosis to the local veterinary laboratory. It was confirmed positive of having infected with Babesia blood protozoa. It was accordingly treated with Berenil (Diminazine acetate -70mg/ml MSD pharma) and it recovered fully in a week's time including getting its vision back.



TC1 - Discoloration of cornea & visual impairment. © Manik Palit.

On 8 March 2018, TC1 was again restrained manually using nets for collection of blood and repeat testing. A repeat dose of *Bereni* was also injected. This time the blood report was found negative for Babesiosis. Normal sight/vision was also restored. On 15 March 2018, one more cub TC2 was found by animal keepers to have a similar problem and symptomatic treatment was provided. Blood was collected and sent for examination. Test report showed the presence of Babesia.

Treatment continued with Berenil, but this time the

recovery rate was slow. Only by 25 March 2018, TC2 started showing normal behaviour including its food intake.

As Babesia was found in TC1 & TC2, symptomatically TC3 was injected with Berenil 1.5ml (4mg.per Kg. Body wt. considering body weight to be 25–30kg) as prophylaxis from Babesia. The rest of the adult tigers were also injected with Berenil (5–7 ml).

On 16 March 2018, cub TC3 was found showing the symptoms as observed in other cubs. Treatment was provided as in the past; however, on 18 March 2018, the cub's condition was found critical manifested with signs of neurological disorder, unable to stand on four legs with posterior paralysis and convulsion. Saline therapy was immediately provided as support but the cub died 12.30h. Postmortem was carried out by the zoo and government veterinarians. On conducting postmortem, it was found that the animal had highly congested lungs and liver.

The report was inconclusive of any disease and cause of death was attributed to acute respiratory failure followed by cardiac arrest. Tissue samples from liver, lungs, kidney, and intestine were sent to the Ranchi Veterinary College and the Indian Veterinary Research Institute, Bareilly, U.P for histopathological analysis.

A female Bengal Tiger by name Ahana of age 3 years and 7 months died in our zoo on the night of 25 March 2018. She was under treatment along with saline therapy for suspected haemo- protozoan infection (Babesiosis/Anaplasmosis as confirmed through the blood tests) along with supportive treatment since 21 March 2018, the day she went off feed.

All reports regarding the medication given and mortality were shared with the Central Zoo Authority, New Delhi; the Chief Wildlife Warden, Jharkhand and with the District Animal Husbandry Officer, east Singhbhum, Jamshedpur, Jharkhand. Tissue samples collected during postmortem

were sent to the Indian Veterinary Research Institute, Bareilly, Uttar Pradesh for histopathological examination.

In search of Babesia

On the recommendation of the Central Zoo Authority, New Delhi, an official request was made to the Institute of Animal Health and Veterinary Biologicals (IAHVB), Kolkata and the Centre for Wildlife Health, College of Veterinary Science and Animal Husbandry, Bhubaneswar to help in detailed investigation of the disease and suggest ways to containing the same.

A two-member scientist team comprising of Dr. Mritunjay Mandal and Pralay Mandal arrived from IAHVB on 29 March 2018. The team members collected blood samples from the infected tigers as well as healthy Tigers, Lions, and Leopards for analysis of blood protozoa.

Blood samples collected from the infected but recovered tigers and those unaffected were sent for analysis to the College of Veterinary Science and

Animal Husbandry, OUAT, Bhubaneswar, Odisha.

Fact-finding team

The Zoo Veterinary Health Advisory Committee (ZVHAC) arrived at the Zoological park on 08 April 2018 to help the Zoo team in containing the disease.

The fact-finding team comprising of members of ZVHAC along with Dr. D.N. Dwivedi, District Animal Husbandry Officer, Tatanagar carried out a joint investigation on the death of Tigers. Relevant health records with respect to treatment, laboratory analysis and postmortem findings were examined

by the members in detail. Concerned enclosures were inspected where apparently healthy Tigers were housed and clinical examination were recorded by the team.

Observation of fact-finding team

The Tata Steel Zoological Park had a total of six (03 female cubs, 01 male adult, and 02 female adults) wildcats of which one female cub and another female adult died on 18 and 25 March 2018, respectively.

All the three 7-month-old female cubs (TC1; TC2 & TC3) of one litter housed along with their mother Dona in one enclosure became



Restraint of TC2 and collection of blood sample. © Manik Palit.

ill; one on 21st February 2018 and the other two on 15/ 16 March 2018. Clinical signs recorded were onset of acute dullness, inappetence, fever, corneal opacity with impaired vision, posterior weakness and nervous signs. Blood smear examination in a local private veterinary laboratory revealed presence of Babesia sps. in all three cases. Two cubs (TC1 & TC2) recovered following treatment with Diminazine aceturate (Berenil) alone. Cub TC3 which was administered Berenil on 16 March 2018 succumbed on 18 March 2018.

Imidocarb was used on subadult tiger Ahana and white tiger Kailash on 21 March 2018. Ahana who was administered Berenil on 16 March 2018 and repeated with a dose of Imidocarb on 21 March 2018, failed to respond to therapy and succumbed after a brief illness of three days on 25 March 2018. Considering the gravity of the situation, prophylactic treatment was initiated with

Berenil and Imidocarb to apparently healthy adult animals on 16 & 17 March 2018, of which, Ahana died after a subacute suffering of nine days.

Biosamples from the dead animals were not available for examination. Blood samples collected from four live healthy animals (03 tiger and 01 leopard) were analyzed at three different laboratories i.e., Institute of Animal Health and Veterinary Biology, Kolkata, Centre for Wildlife Health, College of Veterinary Science and Animal Husbandry, Bhubaneswar and Indian Veterinary Research Institute, Bareilly, U.P. Reports indicated absence of hemoparasites. However, a serum analysis report of all the four samples at the Institute of Animal Health and Veterinary Biology, Kolkata revealed the presence of antibodies against Canine Distemper Virus (CDV). Samples sent to the Indian Veterinary Research Institute also corroborated the presence of CDV.



ZVAHC members at work. © Manik Palit.

Biochemical parameters were within the reference range.

On clinical examination, four animals i.e., male white tiger 'Kailash', tigress 'Dona' and tiger cub TC1 & TC2 were observed to be normal. Blood samples were again collected for laboratory investigation at the Centre for Wildlife Health, Bhubaneswar. Short term minor palliative treatment was suggested.

Interpretation of the fact-finding team
Keeping the above-stated information in backdrop especially with respect to the onset of acute illness, clinical signs, laboratory investigation including direct blood smear examination and response to anti-protozoan therapy there was enough reason to believe that there was an outbreak of Babesiosis. However, further investigation is warranted to substantiate such finding and to explore the co-existence of Canine Distemper Virus.

On the spot suggestions made by the fact-finding team

- (i) Implementation of prophylactic measure as per Central Zoo Authority guidelines in big cats.
- (ii) Repair/replacement of the tiger enclosures particularly the floor and iron grills.
- (iii) Regular monitoring of susceptible population under risk to record their feed intake, characteristic of faeces and urine and any other deviation from normal behaviour.
- (iv) Avoid feeding pork with a thick layer of lard as the same was leading to obesity in

animals. Advised to discontinue pork and feed buffalo or goat meat.

Containment of Disease-action taken by Zoo

- (i) Regular fumigation of all feeding cells and outdoor enclosures of big cats & other zoo animals was initiated on war footing and continuing.
- (ii) Old flycatchers were removed and replaced with new ones in feeding /resting cubicle verandahs of all big cats.
- (iii) Regular monitoring of vector load in the zoo campus through the civic body JUSCO initiated and ongoing.
- (iv) Mechanism for day to day consultation with national expert veterinarians put in place on future management of the big cats in the zoo.

Further to the above, a request was made by the Zoo authorities to Indian Council of Medical Research (ICMR), New Delhi to help in proper investigation of Canine distemper virus in zoo large cats. This request was made by the zoo on the background that ICMR had recently concluded tests on Asian Lions in Gir, Gujarat and confirmed presence of Canine distemper virus in the Lions.

A team of scientists comprising of Dr. Dilip R. Patil (Veterinarian), Scientist and Mr. H.L. Chakankar, Sr. Technician-3 from ICMR-National Institute of Virology, Pune, Maharashtra was deputed by ICMR to our zoo on 21 November 2018.

Blood samples and swabs (rectal, nasal, & ocular) were collected from all existing zoo leopards, lions and tigers and transported under cold chain to the Pune laboratory on 25 November 2018. Analysis of the samples was initiated on 26 November 2018 and results shared with the Zoological park which confirmed that none of the existing zoo large cats was having any blood protozoa infection or traces of the same. Secondly, presence of Canine Distemper Virus was also over ruled by the laboratory.

Learnings

- (i) Tiger and in general all large cat enclosures, hygiene always must be maintained within resting / feeding cubicles and the area should be free of insects.
- (ii) The Zoo Veterinary Health Advisory Committee members should be regularly involved in the health management of animals through quarterly meetings and visits.
- (iii) The Zoo Veterinary Team should be in constant touch with their peers in other zoos for keeping themselves updated on diseases affecting animals and preventive care.
- (iv) Periodic tests of blood and tissues of large cats to be done through eminent institutions like IVRI, Bareilly; ICMR NIV, Pune; Institute of Animal Health & Veterinary Biologicals, Kolkata; and the Regional Wildlife Veterinary Health Centres identified by the Central Zoo Authority for keeping check on the level of infections etc. in large cats.

Acknowledgement

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Thanks are also due to the entire Management & Team, Tata Steel Zoological Park who stood up to the challenge in containing the spread of Babesiosis amongst large cats.

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