

## Clinical Articles

### OUTBREAK OF TRYPANOSOMIASIS EVANSI AMONGST TIGERS AND JAGUARS IN THE ZOOLOGICAL GARDEN, CALCUTTA

BY

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*Trypanosoma evansi* infection in cattle, buffalo, horse, camel and dog has been of common occurrence in various parts of India. Its rare incidence in wild animals like elephant, bear, deer, tapir and mongoose has been reviewed by Nair *et al.* (1965). Tigers have also been reported to harbour *T. evansi* infection occasionally (Alwar, 1953 and Nair *et al.*, *loc. cit.*). In those reports only stray cases were observed. An outbreak of trypanosomiasis due to *Trypanosoma evansi* amongst the tigers and jaguars of the Zoological Garden, Calcutta is reported in this paper.

#### Case History

*Case No. 1* : One adult female tiger, Sima by name, of Burdwan House, cage No. 4 died all on a sudden on November 11, 1967 without showing any symptom of illness. There was no other tiger in the same cage.

*Case No. 2* : One adult male tiger, Lakahan by name, of Burdwan House, cage No. 5 was found dead in the morning of November 27, 1967. The animal was last seen in the previous evening without symptom of illness. This was the only occupant of the cage.

*Case No. 3* : One adult female leopard, Rani by name, of Small Carnivore House, cage No. 9, died on November 29, 1967 without showing any symptom of illness. Of the two leopards in this cage, only one was affected during the outbreak.

*Case No. 4* : One adult male jaguar of Small Carnivore House, cage No. 1 died suddenly on December 2, 1967 without showing any symptom of illness. There were 2 jaguars in the same cage but only one was affected in the outbreak.

*Case No. 5* : One adult male tiger, Asoka by name, of Small Carnivore House, cage No. 11 was detected to be ill in the morning of

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December 16, 1967. It was dull and the food which was supplied on the previous evening was found untouched. It was, however, roaming about inside the enclosure. At about 1 a.m. the animal was found lying prostrate on the floor and appeared to be suffering from respiratory distress. The mouth was kept open with the tongue hanging out, indicating difficulty in breathing. The animal developed severe convulsions followed by death. In the same cage there was no other tiger.

*Case No. 6:* One adult male tiger, Bharat by name, kept in open air enclosure was found to be dull and off feed on the morning of December 17, 1967 with running nose and respiratory distress. The animal died in the afternoon showing symptoms of dyspnoea with convulsive fits. This was one of the pair of tigers in the open air enclosure; the other was not affected during the outbreak.

*Case No. 7:* One adult female jaguar of Burdwan House, cage No. 8 died in the early hours of December 19, 1967. The animal was found to be dull in the afternoon of December 18, 1967 and the symptoms before death constituted mainly laboured respiration and convulsion. There was no other jaguar in the cage.

#### Macroscopic Examination

The naked eye changes in the post-mortem examinations showed congestion in lung, kidney, liver, spleen and brain. In case Nos. 5, 6 and 7, spleen and liver were also enlarged and engorged with blood. The lungs were atelectatic with generalised petechiae and red hepatisation. Fine dark pigments were closely scattered in the tissue and they were also visible from the surface of the organ. Oedematous fluid was coming out from the organ on incision. Bronchi were full of dirty mucoid exudate with diphtheretic deposits on the bronchial mucosa. Haemorrhagic spots were present in the medullary region of the kidney.

#### Clinical Examination

*Blood smear:* Heart blood smears from cases No. 1-4 which died suddenly without showing any symptoms proved negative for any bacteria and protozoa on examination after staining with Leishman's as well as with Gram's stain. Heart blood smears from cases No. 5, 6 and 7, however, proved to be positive for *Trypanosoma evansi*. The degree of infection in all the 3 cases, as indicated by the number of parasites present in the smears, was very heavy.

*Urine examination:* Urine samples from cases No. 1-5 were examined but no pathogenic organisms could be detected.

*Cultural examination* : Cultural test was done in all the cases from heart blood and cerebrospinal fluid to isolate any pathogenic bacteria responsible for the death of the tigers, but from none of them pathogenic organisms could be isolated.

*Biological test* :

Guineapigs, rabbits and mice were inoculated with heart blood for pathogenic bacteria; intestinal contents for toxins and urine sediments for *Leptospira*, but the findings were negative in all the cases.

In the first few cases pooled materials of liver, spleen, lung, kidney, intestinal contents and heart blood were filtered and inoculated in guineapigs and rabbits to eliminate the virus etiology. Cerebrospinal fluid also proved to be negative on animal inoculation.

### Histopathology

*Liver* : Diffuse haemorrhage throughout the section ; hepatic cords almost without their entity and hepatic cells with extensive cloudy swelling separated from one another.

*Kidney* : Patches of haemorrhage here and there in the sections ; desquamated epithelium with hyperchromatic nuclei and very little cell membrane scattered as granular cytoplasmic masses filling up the lumen of the tubules. Most of the Bowman's capsules filled up with swollen glomerular tufts.

*Spleen* : Haemorrhage present in wide areas with marked increase in the lymphoid tissue.

*Lung* : Lung tissues with patches of haemorrhage and areas of atelectatic and emphysematous changes. Heavy infiltration of lymphocytes in general and dark green pigments scattered in masses; no exudate in alveolar spaces.

*Brain* : Congested with heavy lymphocytic infiltration all over the section.

### Diagnosis and Treatment

As the smears from heart blood of cases No. 5, 6 and 7 were found to be positive to *Trypanosoma evansi*, the cause of death was ascribed to trypanosomiasis. Unfortunately the blood from the ailing animals was not available for animal inoculation because of the difficulty in collecting blood from them.

As soon as the diagnosis of the disease was established, immediate arrangement was made for administering Antrycide prosalt, 35 gm. dissolved in 150 ml. at the dose rate of 2.6 ml. / 100 kg. body weight ; as a prophylactic measure to all the lions, tigers, jaguars,

pumas, leopards and various types of lesser cats in the Zoological garden. One ailing tiger was cured with treatment with Antrycide prosalt though the blood could not be examined to confirm the suspicion. There was no recurrence of the disease in the Zoological garden after the mass prophylactic treatment.

#### Discussion

This appears to be the first report of occurrence of *Trypanosoma evansi* in tigers, jaguars and probably leopards in the form of an outbreak. Out of the total 7 cases, there were 4 cases amongst the tigers, 2 cases amongst the jaguars and 1 case in leopard. Only 2 tigers and 1 jaguar proved to be positive for *T. evansi* infection. In the beginning 4 animals (cases No. 1, 2, 3 and 4) died suddenly one after another without showing any symptom and gave no clue about the etiology. The first 2 cases were examined 10-12 hours after their death and cases No. 3 and 4 were examined 6-8 hours after death. It is possible that the parasites in the blood disintegrated by the time post-mortem was done. It is also possible that the animals died during the negative phase of the infection when the parasites were not detectable. Cases No. 5, 6 and 7 only proved to be positive for the blood parasite and these 3 cases suffered for sometime before they died. As no trypanosomes could be detected in the heart blood of the leopard it cannot be included in the list of hosts of *T. evansi* with certainty, though the circumstantial evidences point to that direction.

Strangely enough, in this outbreak *T. evansi* infection involved only tigers and jaguars and probably leopards. They were housed in small Carnivore House, Burdwan House and open air enclosure which were separated one from the other by not less than 300 meters. The infection spread from one house to another without affecting many known susceptible species of animals housed in cages situated in between. Probably the vector in this case was very specific about their host for sucking blood; though the known vector of *T. evansi* e. g., *Tabanus*, *Naemotopota*, *Chrysops*, *Stomoxys* etc. are not known to have such specificity. Whether or not these species suck blood of tigers, jaguars and leopards is also not definitely known. The possibility of the presence of carrier hosts amongst the known susceptible animals e. g. camel, pony, deer etc. in the same Zoological garden was looked into without any success. The source of infection was probably present in the cattle brought to the cattle market situated beyond the boundary wall of the Zoological Garden.

It has been observed that surra is more common in cattle and buffalo as natural infection, than in any other susceptible species of animals in West Bengal. Usually surra in cattle occurs in latent

form and for reasons not well understood, the infection flares up in some cases and causes death of the hosts; sometimes in the form of an outbreak. Deaths in tigers, jaguars and leopards in the Zoological Garden in the form of an outbreak may probably be a similar phenomenon as found in cattle, though dog, one of the known susceptible carnivores, does not show any latent infection of *T. evansi*.

The possibility of trypanosome gaining entrance in carnivores through ingestion of beef from infected cattle cannot be ruled out if the meat is fed immediately after slaughter. The infection may gain entrance through mouth and oesophagus. The meat supplied to carnivores of the Zoological Garden is from animals slaughtered 4-6 hours before it is fed and trypanosomes do not live long in clotted blood.

It is quite interesting to note that *T. evansi* infection in the affected animals proved to be extremely fatal. Majority died before the symptoms could be detected and others shortly after the detection of illness characterised by dyspnoea and convulsion. This may probably be due to the appearance of a very virulent strain of *T. evansi* to which only tigers, jaguars and probably leopards were very susceptible. It was noted with interest that pathological changes were more marked in cases No. 5, 6 and 7 in which death was not so sudden.

The absence of further cases of *T. evansi* infection in the Zoological Garden after the mass prophylactic treatment with Antrycide prosalt confirms trypanosomal etiology of the outbreak.

#### Summary

Trypanosomiasis *evansi* occurred in the form of an outbreak for the first time in tigers, jaguars and probably leopards, in the Zoological Garden, Calcutta. The strain was very pathogenic causing death of all the affected animals, altogether 7 in number.

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