

TETANUS IN A FREE-LIVING HIPPOPOTAMUS *HIPPOPOTAMUS AMPHIBIUS CAPENSIS* FROM THE KRUGER NATIONAL PARK

V. DE VOS and B. D. DE KLERK

*Department of Research and Information
National Parks Board of Trustees
Private Bag X402
Skukuza
1350*

Abstract – Tetanus in a free-living hippopotamus (*Hippopotamus amphibius*) from the Kruger National Park is described. The animal exhibited the classical tetanus symptomatology, the most salient clinical features being trauma (skin wounds) associated with exaggerated response of voluntary muscles to trivial stimuli, muscular spasms, general muscular rigidity, trismus, prolapsed third eye-lid and the preservation of consciousness. It is conjectured that the hippo's semi-aquatic way of life with its close proximity to dung-polluted water and an innate intra-specific aggression amongst males which often leads to fighting and trauma, should provide ample opportunity for infection with *Clostridium tetani*.

History

In early 1979 a young (\pm 9 months) hippopotamus male was found lying in an unusual position on a sandbank along the Crocodile River near the Malelane Rest Camp in the Kruger National Park. On closer investigation it was found that the animal was lying in an upright sternal position, but with both the front and hind legs rigidly extended backwards and the chin resting on the sand. The animal was alive and conscious but unable to alter his position. The tracks clearly showed that the animal left the river with some difficulty at a point about 20 metres distant and moved with increasing difficulty, dragging his feet, until he collapsed on the sand in the position in which he was found. Signs also indicated that the animal, whilst recumbent, unsuccessfully tried to propel himself forward with kicking or thrusting motions of the hind legs.

Clinical manifestations

When turned over on to his side the hippo presented a rigid extension of all legs, pointing slightly backwards as depicted by Figure 1a. Bending of the joints was practically impossible. The head was also stretched forwards and upwards and the neck rigidly extended. The jaws were clamped down solidly and resisted separation by hand (trismus). The abdominal muscles were retracted and in spite of the hippo's bulkiness, a tucked-up appearance of the abdomen was obvious. The same applies to opisthotonus which was partially camouflaged by the animal's bulk and only discernible under close scrutiny. The tail was rigid and held slightly backward in an arc away from the perineum. The ears were stiff. The eyes had a staring appearance and were partly covered by the membrana nictitans, the prolapse varying from a $\frac{1}{3}$ to $\frac{2}{3}$ (Fig. 1b).

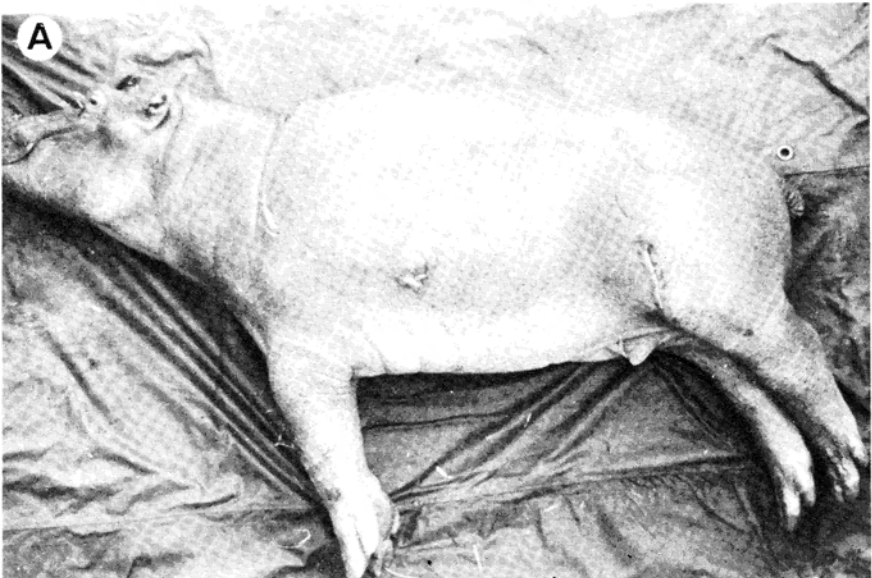


Fig. 1. a. Hippopotamus showing general muscular rigidity associated with tetanus. Note the skin wounds.

The hippo further exhibited a continuous trembling of the muscles of the body, which could be aggravated to a point of clonic spasm by sudden movement, handling, or noise. This also caused an exaggeration of the posture stiffness and prolapse of the membrana nictitans. On the other hand, when left alone, the trembling subsided to a mere tremor with an accompanying slight reduction of muscular stiffness. During the entire handling phase consciousness remained unimpaired.

As depicted by Figure 1a, three skin wounds were found on the right lateral side. These wounds had the appearance of deep scratches, partly filled with a yellow-white fibrinous-pussy sticky exudate. Films made from the wound exudate and stained by Gram's method showed the presence of



Fig. 1. b. Partial prolapse of the membrana nictitans in the same hippopotamus.

a few drumstick-like bacilli. An attempt to isolate *Clostridium tetani* organisms, however, proved futile in the presence and persistence of swarming *Proteus* spp.

Slight temporary improvement of the reflex irritability was, however, brought about by the muscle relaxant and tranquilising properties of xylazine hydrochloride (Rompun)* and propionylphenothiazine (Combelen)*.

The prognosis was considered hopeless and the animal euthanized. In a subsequent necropsy no gross or microscopical pathology other than the skin wounds could be found.

Discussion

Classical clinical features of tetanus as described by Henning (1956), Roberts (1959), Blood & Henderson (1960) and Cruickshank, Duguid, Marmion & Swain (1975), were exhibited in this case, viz. trauma associated with exaggerated response of voluntary muscles to trivial stimuli, muscular spasms, general muscular rigidity, trismus, prolapsed third eyelid and the preservation of consciousness. The presence of "drumstick"-like bacilli in the wounds further corroborated the diagnosis of tetanus. This can, however, not be taken as pathognomonic of the presence of *Clostridium tetani* as other organisms with terminal spores, which are morphologically indistinguishable from *Cl. tetani*, may also be present (Cruickshank *et al.* 1973).

*Bayer Leverkusen, Germany

The clinical and microscopic evidence were, however, so conclusive that a diagnosis of tetanus was made with confidence in spite of an inability to isolate *Cl. tetani* from the wound exudate in the presence of swarming *Proteus* spp.

The clinical findings as described in the hippo differed in only one respect from the classical picture in domestic herbivores. In the latter opisthotonus is marked, the hind limbs are stuck out stiffly behind and the forelegs forward (Blood & Henderson 1960). In the case of the hippo the front legs had a definite inclination backwards, which was exaggerated during the spasm phases (Fig. 1). This can be explained by the fact that as an adaptation to swimming in a semi-aquatic environment, the hippo's shoulder flexor muscles are probably stronger than their antagonists. This also explains the awkward position in which the animal was found initially.

Faeces of animals and faecal contaminated surroundings are commonly incriminated as the main source of *Cl. tetani* organisms, and the portal of entry is usually through puncture wounds (Blood & Henderson 1960; Roberts 1959). It is therefore expected that the hippo's mode of life would provide ample opportunity for infection to take place. The hippo lives in a light to heavily dung polluted aquatic environment for a considerable part of his life and an innate intraspecific aggression amongst males often leads to fighting and trauma. These epidemiological circumstances actually accompanied this case.

In spite of a search of the literature no other record of tetanus in the hippo could be found. Fowler (1978) and Klös & Lang (1976), however, recorded cases of tetanus in elephant, kangaroos, primates and seals under captive zoo conditions. These animals showed the typical tetanus clinical features. The clinical pattern of tetanus in wildlife therefore seems to parallel the typical features in domestic species.

This is the first record for tetanus in a wild animal from the Kruger National Park.

Acknowledgements

Thanks are due to Mr J van Graan, Game Ranger, who found and brought the case to our attention. The National Parks Board of Trustees are thanked for the opportunity and permission to record this case.

REFERENCES

- BLOOD, D. C. and J.A. HENDERSON 1960. *Veterinary Medicine*. London: Bailliere, Tindall and Cox.
- CRUICKSHANK, R., J.P. DUGUID, B.P. MARMION and R.H.A. SWAIN. 1975. *Medical Microbiology*. Volume 2. London: Churchill Livingstone.

- FOWLER, M. E. 1978. *Zoo and Wild Animal Medicine*. London: W.B. Saunders Company.
- HENNING, M. W. 1956. *Animal Diseases in South Africa*. South Africa: Central News Agency.
- KLÖS, H. G and E.M. LANG. 1976. *Zootier Krankheiten*. Hamburg: Verlag Paul Parey.
- ROBERTS, R. S. 1959. Clostridial diseases. In STABLEFORTH, A. W. and I.A. GALLOWAY (eds). *Infectious Diseases of Animals. Diseases due to Bacteria*. Volume 1. London: Butterworths Scientific Publications.