

A STRESS-RELATED DISEASE OF WHITE RHINOCEROSSES CAUSED BY COMMENSAL BACTERIA

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Abstract - This presentation is a report on a disease characterised by septicaemia, septic sore throat and oesophagitis caused by the commensal bacterium *Streptococcus equisimilis* in white rhinoceroses. Four of five free-ranging, 2-3-year-old white rhinoceroses died as a consequence of infection by this bacterium. The disease was highly fatal, causing death of the infected animals after a period of about four days, despite intensive systemic antibiotic and supportive treatment. Based on limited data, it appears that infection with *S. equisimilis* in white rhinos is not uncommon, is associated with situations of stress, and also affects black rhinoceroses under similar conditions

INTRODUCTION

All animals normally carry a substantial population of bacteria, amongst other micro-organisms, on their skin, mucous membranes of the gastro-intestinal and respiratory tracts, blood stream and internal organs. These commensal bacteria are often non-pathogenic and play no significant role as a cause of disease in these animals. Under certain circumstances, however, these bacteria, some of which may be pathogenic and known causes of disease, are associated with outbreaks of disease in various domesticated species. One such bacterium, namely some of the various serovars of *Salmonella*, is known to occur in horses, where it is carried in the intestinal tract or mesenteric lymph nodes. When these animals are introduced into new surroundings, or translocated, these bacteria, due to the stress created by these altered circumstances, cause the development of full-blown disease. The ability of these bacteria to cause disease is related to the depressed body defences that occur during periods of stress, thus allowing the bacteria to multiply to the extent that they overcome the natural defence mechanisms of the body. Infected animals may overcome such infections, or it may lead to their death

One known disease that occurs under similar circumstances in rhinoceros, both black and white, is salmonellosis, which under local circumstances, particularly when these animals are maintained in bomas, cause a severe enteric and septicaemic disease often resulting in the death of affected animals⁴. In this presentation, I wish to report on the occurrence of another bacterium, with the ability to invade the tissues and blood of rhinoceros under conditions of stress, causing a highly fatal disease

FIELD OUTBREAK

During the winter of 1992, a game farm in the northern Transvaal experienced a number of deaths in their population of white rhino. All the affected animals were in the 2-3-year-old, post-weaning age group, which apparently failed to maintain themselves in the face of competition for the available forage. The outbreak occurred over a period of two to three weeks, and was preceded by a confirmed case of salmonellosis on the same property¹

Four out of a group of five rhinos died as a consequence of this infection, which was confirmed in two of the animals after necropsy at the Faculty of Veterinary Science, University of Pretoria. I

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all these instances, the affected rhinos were on their own in the field, and were noticed to be in poor condition and visibly ill for up to four days prior to dying. When examined closely, they were found to be severely depressed, and emitted a particularly foul odour from their oral cavities. They invariably went down, became comatose and died after a few hours of becoming recumbent. Once down, the prognosis appeared to be hopeless, since intensive antibiotic treatment, after identification and determination of the antibiotic sensitivity of the specific organism, as well as supportive treatment, including intravenous fluids, failed to have a curative response. All the animals that were visibly affected, died

NECROPSY

The affected animals, both male and female, were in very poor condition with depletion of the body fat reserves. Consistent and specific lesions occurred in the oral cavity and in the oesophagus, while other lesions were non-specific and related to the presence of a septicaemia (such as severe congestion, cyanosis, scattered haemorrhages, splenomegaly and degeneration of the parenchymatous organs). In the oral cavity, from which the exceedingly bad smell originated, there was a severe, acute, haemorrhagic to necrotic pharyngitis which extended, in particular, into the crypts lateral to the base of the tongue. This infection extended into the surrounding tissues causing a severe, acute inflammatory reaction. In addition, the oesophagus manifested severe lesions which were located in the distal portion adjoining the stomach in particular. Here the oesophagus was markedly increased in diameter to at least three times its original diameter, due to oedema and a severe inflammatory reaction that extended into the surrounding tissues. These changes were also accompanied by marked, linear erosion and ulceration of the lining epithelium. The extent of these two lesions were such that they, in themselves, would have cause dysphagia. In both these cases, *Streptococcus equisimilis*, one of the Group C streptococci, was isolated in pure culture from the throat, and various other specimens, including the blood

DISCUSSION

This highly fatal infection was confirmed to have caused the death of two, and probably the two other animals, out of a group of five. The lesions seen, particularly those in the oral cavity and in the oesophagus, are considered to be distinctive and diagnostic for the infection

Streptococcus equisimilis appears not too uncommonly to be associated with the death of rhinos, both black and white, sometimes associated with conditions of stress. It has been isolated from a variety of specimens obtained from rhinos from South Africa and Namibia² and Zimbabwe³

This bacterium is a known commensal with a limited pathogenetic potential, and occurs in a number of animal species in which it may be associated with septicaemia and a variety of septic conditions such as mastitis, polyarthritis and wound infections. In particular, it has been reported in horses, cattle, sheep, pigs and humans in which it normally occurs in the upper respiratory tract⁵. It is not suggested that any of these species may play a role in the transmission of the bacterium to rhinos, but that the rhinos may, as is the case in the other animals, be carriers of the bacterium as part of their normal bacterial flora

It does appear that rhinos, both free-ranging and in captivity, under conditions of stress, may be particularly susceptible to infection by this bacterium, as is reflected by the regular isolation of *S. equisimilis* from specimens submitted for bacterial isolation in these species, and that this infection should be added to the list of potential problems that may be expected to occur in these animals when stressed. When the infection does occur, it is a serious problem since it responds poorly to treatment, and appears to be invariably fatal. There is no available vaccine. Pre-empting the conditions which may lead to situations of increased susceptibility, and evading them, should be part of the management plan to restrict the occurrence of the disease.

REFERENCES

1. Botha W.S. 1992. Unpublished data. Private Pathologist, P O Box 12321, Onderstepoort, 0110, Rep. of South Africa.
2. Henton M.M. 1992. Unpublished data. Bacteriology Section, Onderstepoort Veterinary Institute, Private Bag X05, Onderstepoort, 0110, Rep. of South Africa.
3. Kock N., Kock M., Pawandiwa A. & Matambo T. 1989. Post mortem findings in translocated black rhinoceros (*Diceros bicornis*) in Zimbabwe. *Erkrankungen der Zootiere. Verhandlungsbericht des 31. Internationalen Symposiums über die Erkrankungen der Zoo- und Wildtiere*, Dortmund, pp. 275 - 279.
4. Rogers P. 1993. Care of the white rhinoceros *Ceratotherium simum* in captivity. In: McKenzie A.A. (ed.) *The Capture and Care Manual*. Pretoria: Wildlife Decision Support Services and the Veterinary Foundation. pp. 546-553.
5. Schliefer K.H. 1986. Gram-positive cocci. In: Sneath P.H.A., Mair N S., Sharpe M E. & Holt J. G. *Bergey's Manual of Systematic Bacteriology*, Vol. II. Baltimore: Williams & Wilkens.