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CYTAUXZOONOSIS IN A GIRAFFE [*GIRAFFA CAMELOPARDALIS* (LINNAEUS, 1758)] IN ZULULAND

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ABSTRACT

R. M. McCULLY, M. E. KEEP & P. A. BASSON. Cytauxzoonosis in a giraffe [*Giraffa camelopardalis* (Linnaeus, 1758)] in Zululand. *Onderstepoort J. vet. Res.* 37 (1), 7–10 (1970).

Cytauxzoonosis is reported for the first time in a giraffe [*Giraffa camelopardalis* (Linnaeus, 1758)] that died naturally of the disease. Both histiotropic and erythrocytic parasites were found. The animal was very anaemic and had marked haemoglobinuria. The most significant lesions were disseminated foci of haemorrhage and necrosis, especially in the liver, spleen and abomasum. Multiple haemorrhages also occurred on both pleura and peritoneum, within and on the entire gastro-intestinal tract, on the surface of the kidneys, subepicardially and in the urinary bladder. Very enlarged and even multinuclear cells heavily parasitized by schizonts were encountered in the lesions.

INTRODUCTION

Neitz & Thomas (1948), who created the genus *Cytauxzoon,* initially described *C. sylvicaprae* Neitz & Thomas, 1948 in the common duiker [*Sylvicapra grimmia* (Linnaeus, 1758)]. The parasite was defined as one that multiplies by schizogony in the histiocytes and by division into four in the erythrocytes. Subsequently *C. strepsicerosi* Neitz & De Lange, 1956 was recorded by Neitz (1957) in the kudu [*Tragelaphus strepsiceros* (Pallas, 1766)] and *C. taurotragi* Martin & Brocklesby, 1960 by Brocklesby (1962) in the eland (*Taurotragus oryx pattersonianus* Lydekker, 1906). In the latter, Brocklesby procuced evidence that schizonts can also occur in the liver parenchyme cells. Brocklesby & Vidler (1965) reported the presence of a parasite of doubtful identity in the renal corpuscles of a reticulated giraffe (*Giraffa reticularis* De Winton, 1899). This parasite bore some resemblance to *Cytauxzoon* and was listed among others as a doubtful record of this specific organism.

HISTORY

One male and two female year-old giraffes were imported from South West Africa and kept in the Ubizane game ranch in Zululand. About 4 months after arrival, late one afternoon the male was found *in extremis* although it had appeared to be normal the previous day. The animal died naturally and the autopsy was commenced an hour after death. Photographs of macroscopic lesions were not taken as the examination had to be carried out during the night, under poor artificial light. Blood smears were prepared and specimens from the liver, lung, spleen, abomasum and small intestines were collected and preserved in 10 per cent formalin. After fixation tissue blocks from the latter were embedded in paraffin wax and sectioned for light microscopy. The sections were stained with haematoxylin and eosin (HE).

The other two giraffes remained unaffected and are still on the ranch.

MACROSCOPIC FINDINGS

The animal was very anaemic, but still in good condition. Large numbers of unidentified ticks were found on the skin. Both pleural and peritoneal surfaces had many fairly large haemorrhages. The pericardial sac contained a large volume of reddish fluid. Multiple petechial haemorrhages occurred subepicardially, subendocardially in both ventricles, subpleurally, in the lungs and in the subserosa and mucosa of the entire gastro-intestinal tract. Similar haemorrhages were also noticed below the kidney capsule and in the mucosa of the urinary bladder. Marked haemoglobinuria was present. The liver was swollen but the spleen was apparently normal. The lymph nodes were slightly oedematous and had several petechial haemorrhages. Some blood-stained faeces were passed at death.

MICROSCOPIC FINDINGS

The blood smears revealed anaemic changes and many red blood cells contained one or more small piroplasms, some being arranged in adjacent pairs or maltese crosses. The following lesions were observed in the sections:-

Liver [Plate 1 (1, 2, 4 and 5)]

Small disseminated haemorrhagic and necrotic foci, which were frequently infiltrated by mononuclear cells, were present either midzonally or peripherally. Most of these lesions contained hypertrophied cells which were heavily parasitized by schizonts. These schizonts varied in size and numbers and contained either small or large chromatin granules and merozoites. The host cell cytoplasm was frequently entirely occupied and very distended by the parasites. In many of these cells, some of which measured up to 35 × 29 microns, the cell membranes appeared very prominent. Multiple nuclei were present in some of them. One syncytium was formed by contiguous parasitized cells. Pyknosis was recognizable in a large number of host cell nuclei.

Most of the enlarged parasitized cells were evidently Kupffer cells in distended sinusoids, but some also appeared to be hepatocytes. Although most frequently associated with the above lesions, they were occasionally encountered without any accompanying lesions. Numerous erythrocytes were parasitized by one or more small piroplasms. Even maltese crosses were recognized in some of the red blood cells. A few extracellular schizonts were seen in the sinusoids. The liver parenchyme in general revealed vacuolar degeneration. Some of the sinusoids were very distended and filled with blood.

Spleen [Plate 1 (3 and 6)]

Small disseminated haemorrhagic and necrotic foci were found in the red pulp and occasionally in the

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marginal zone of some of the splenic corpuscles. Enlarged parasitized reticulo-endothelial cells harbouring schizonts were sometimes encountered, especially at the periphery of some of the larger necrotic areas. These cells corresponded in size with those of the liver. The number of schizonts in each cell also varied. Numerous parasitized erythrocytes were present.

Lung

Haemorrhages and fibrinous material occurred subpleurally, in the septa and within some of the alveoli. Within the lung tissue proper, these lesions were focal and disseminated, frequently revealing evidence of mild pneumonitis. A few cells with schizonts were found in one area which was infiltrated with a fair number of

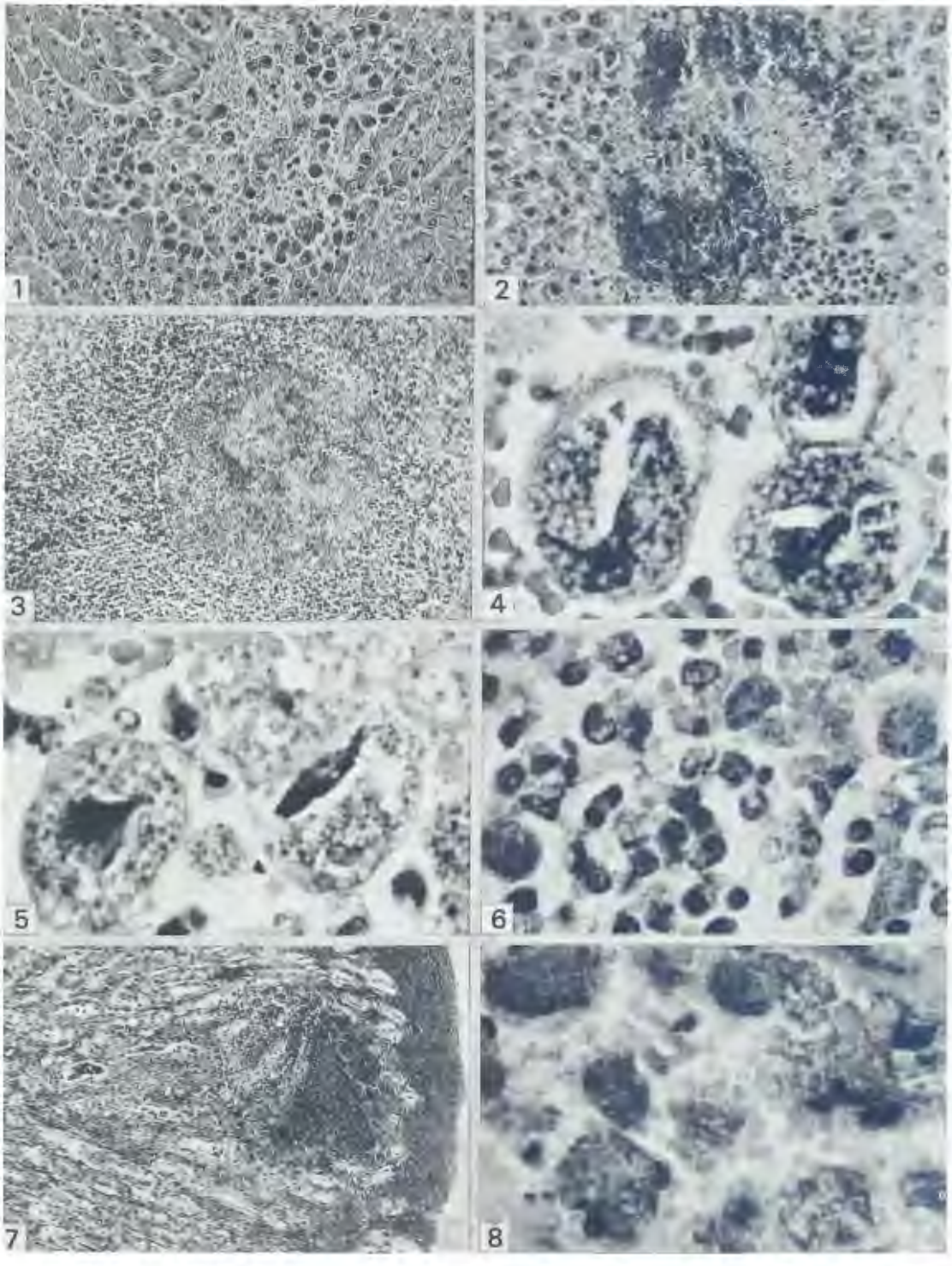

PLATE 1 1. Liver: Haemorrhagic lesion with many cells containing schizonts. HE. × 150. 2. Liver: Another lesion with necrosis, haemorrhages, some leukocytic infiltration and enlarged parasitized cells. HE. × 200. 3. Spleen: Haemorrhagic and necrotic lesion. HE. × 75. 4. Liver: Parasitized cells with schizonts. HE. × 1200. 5. Liver: Both intra- and extracellular schizonts. HE. × 1200. 6. Spleen: Parasitized cells in the red pulp containing multiple schizonts. HE. × 750. 7. Abomasum: Haemorrhages and necrosis. HE. × 75. 8. Abomasum: Cells containing schizonts. HE. × 750.

leukocytes. Small piroplasms were noticeable in many of the erythrocytes.

Abomasum [Plate 1 (7 and 8)]

Small and medium-sized haemorrhagic and necrotic foci occurred in the mucosa. They were frequently associated with the presence of hypertrophic cells which contained schizonts. These cells were similar to those found in the liver and spleen, but could not be identified specifically. Many of the erythrocytes were parasitized. Haemorrhages were also present in the submucosa.

Small intestines

The lamina propria of some of the villi was necrotic and contained variable numbers of neutrophils. Mucosal haemorrhages were present and small piroplasms were noticeable in the erythrocytes.

Discussion

A diagnosis of cytauxzoonosis was made. This was based on the presence of schizogony in the Kupffer cells and hepatocytes and the enlargement of these parasitized cells with their tendency to become multinuclear and form syncytia, as well as on the presence of small erythrocytic piroplasms which revealed some evidence of division into four. Admittedly only one syncytium was found, but they were also either rare in smears or absent in the sections of the case of strepsicerosine cytauxzoonosis described by Neitz (1957). The anaemia and haemoglobinuria as well as the most significant lesions, such as the haemorrhagic foci of necrosis in association with parasitized hypertrophic cells in the liver, abomasum and spleen, corresponded with those changes that have been reported previously. The possibility exists that the animal, which was imported from South West Africa, came from an area free of the disease and consequently lacked immunity.

The study in this case was based mainly on the pathology. For this reason, and because it appears to be impossible to distinguish morphologically between the various species of this parasite, no attempt will be made to classify it specifically. Furthermore, before this is attempted, experimental transmission to other established hosts such as the duiker, kudu and eland should be undertaken.

Summary

A natural case of cytauxzoonosis in a giraffe is reported. Both histiotropic and erythrocytic parasites were found. The animal was very anaemic and had marked haemoglobinuria. The most significant lesions were disseminated foci of haemorrhages and necrosis, especially in the liver, spleen and abomasum. Very enlarged cells heavily parasitized by schizonts were encountered in these lesions. Some of these cells were multinuclear and once a syncytium was found.

Acknowledgements

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