

DIETARY AND VETERINARY MANAGEMENT OF A LINGUAL ABSCESS IN A GERIATRIC CAPTIVE BLACK RHINO (*Diceros bicornis*) WITH IRON STORAGE DISEASE

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Poster Abstract

The present case reports extensive investigations regarding the gastrointestinal tract in a captive female black rhinoceros (*Diceros bicornis*) showing symptoms of chronic quidding, described as reluctance to eat fibrous foods, hypersalivation and ejection of lumps of fibrous food material on which the animal had been chewing. At the age of approximately 15 years the animal started showing symptoms of intermittent quidding and from the age of 30 years on the quidding was constantly noticed. Several one-week periods of complete intake and faecal output documentation and recording allowed to estimate intake and digestibility coefficients in the following two years. The amount of saliva lost due to the ejection of lumps was quantified in three different weeks and varied between 2.2 and 5.7 kg of saliva. It was observed that the animal lost weight initially, which was seen by increasing prominence of bone structures such as the pelvis or spinous processes on the back. At this stage, on its regular diet (diet A) of Lucerne hay, grass hay, produce and concentrates, the animal had a dry matter intake (DMI) of 1.2 % of its estimated body weight (BW), with an according digestible energy (DE) intake of 0.76 MJ/kg^{0.75}. Dry matter (DM) digestibility was 69 %, but crude fibre (CF) digestibility was only 38 %. In an attempt to increase fibre utilization and reduce the vain attempts to ingest whole roughage, green meal pellets were additionally introduced to the animal (diet B). In two according feeding periods, DMI averaged 1.2 % BW, DE intake was 0.73 MJ/kg^{0.75}. DM and CF digestibility were 67 and 48 %, respectively. Therefore, it seemed that, with energy supply not being compromised, fibre utilization was increased. At the same time, the particle fraction in the faeces retained on a 4 mm sieve decreased from 57 to 36 %, whereas fine particles retained on a 0.125 mm sieve increased from 11 to 20 %. Increasing bad breath odor lead to a first intervention under general anaesthesia to examine the oral cavity in February 2001. Anaesthesia was induced with 10 mg of detomidine, 6 mg butorphanol and 1.2 mg etorphine by blow dart followed by 100 mg ketamine i.v.. For anaesthesia antagonisation 60 mg naltrexone und 200 mg atipamezole i.v. were used. Large amounts of dental plaque and calculus were noted and removed. In the upper mandible between PM 1 and 2, an abscess was diagnosed, which was treated locally by flushing. Bacteriology revealed no specific bacteria. The treatment resolved in an improvement which lasted approximately six months.

From October 2000 until December 2002 a total of 17 blood samples were taken from the unsedated animal. Compared to reference data for female black rhinoceros aged >5 years (International Species Inventory System. ISIS Physiologic Data Reference Values. International Species Inventory System. 1999) no consistent abnormalities were noted. However,

serum iron was high compared to values of free-ranging animals, mean transferrin saturation was 90 % (Reference value 28% (1)), and mean serum ferritin was 6046 ng/ml (Reference value 133 ng/ml (1)), indicating excessive iron absorption and excessive iron stores .

When iron contents of diet A and diet B were compared, it was realized that the addition of green meal pellets had increased the iron concentration of the whole ration from app. 270 to app. 590 mg/kg DM. Additionally, the faecal consistency had deteriorated on diet B. Therefore, it was decided to replace the green meal pellets with a combination of grass and Lucerne chaff (diet C), which was well consumed; in contrast to whole hays, quidding and ejection of lumps of half-chewed hay was not observed. DMI was 1.2 % BW on this diet, DE intake was 0.67 MJ /kg^{0.75}. DM digestibility was 66 %, but CF digestibility dropped again to 37 48 %.

As foetor ex ore was again noted, a second examination of the oral cavity was performed in February 2002 with a flexible endoscope. The anaesthetic regimen was identical to the first procedure and no new findings could be disclosed.

Ten months later, in January 2003 the animal died suddenly, at the age of 32 years. Hours prior to death the animal showed minor bleeding from the mouth. Post-mortem examination revealed an abscess which opened laterally on the tongue and extended approximately 15 cm towards the base of the tongue. The main finding however was a severe hemochromatosis with consequent severe hepatocellular degeneration and fibrosis. Hemochromatosis was further diagnosed in lungs, spleen and small intestines. Anatomical preparation of the skull revealed minor osteolysis were during the first anaesthesia an abscess was found.

It is reasonable to assume that the black rhinoceros in this case suffered from chronic iron storage disease (ISD). The intensive diagnostic measures and monitoring which were initiated in this case did not provide any clinical evidence for a disease process, confirming the fact that the clinical consequences of ISD are unclear in live animals (1). The difficulty of intra vitam diagnosis of ISD is well known. In human medicine the most efficient approach to the diagnosis of ISD is to measure the serum transferrin saturation and ferritin levels (2). Increased transferrin saturation is an important hallmark of ISD but phlebotomy will not give any information on the location of iron deposits, quantification of iron deposits and presence of cirrhosis. The latter being an important factor for the estimation of prognosis. Liver biopsies would allow such information to be gained (see Hatt *et al.* in this proceedings). However, liver biopsy sampling is not current practice in rhinoceros.

Furthermore no explanation could be found for the chronic quidding in the present case. A possible explanation may be the abscess on the base of the tongue. Hanson *et al.* (1993) reported quidding in a horse suffering of a rhabdomyosarcoma of the dorsal aspect of the tongue (3). Following surgical removal of the neoplasia quidding resolved. Although two thorough oral examination were performed in the rhinoceros, the abscess in the tongue was not diagnosed. The oral anatomy in black rhinoceros make oral examination very challenging. Nevertheless in future case, quidding in rhinoceros should be linked to possible pathologies in the tongue and further diagnostic investigations, such as radiography attempted.

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References

1. Paglia D and Dennis P. Role of chronic iron overload in multiple disorders of captive black rhinoceroses. In: Proc Am Assoc Zoo Vet; 1999; Columbus; 1999. p. 163-170.
2. Beutler E, Hoffbrand AV and Cook JD. Iron deficiency and overload. Hematology 2003; 40-61.
3. Hanson PD, Frisbie DD, Dubielzig RR, et al. Rhabdomyosarcoma of the tongue in a horse. J Am Vet Med Assoc 1993; 202: 1281-1284.