IRON STORAGE DISEASE IN BLACK RHINO (*Diceros bicornis*) - MONITORING AND TREATMENT PROGRAM

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Abstract

Iron storage disease (ISD) is a pathological complication that is seen in some captive animal species.[3] ISD has been identified in browsing rhinoceros species (black rhino, *Diceros bicornis*, Sumatran rhino, *Dicerorhinus sumatrensis*), whereas grazing rhino species (white rhino, *Ceratothenum simun*, greater one-horned rhino, *Rhinocerus unicornis*) appear less susceptible. [1,6,7] Long term ISD damages various organs, in particular liver and bone marrow.[7] and can cause fertility problems via damage to the testis in male rhinos, and irregular oestrous cycle in female rhinos [pers. communication Marcus Clauss]

ISD is characterized by accumulation of iron in the body tissues, and can be diagnosed in humans by assessing the serum ferritin levels. This is a species-specific protein, and there is no validated assay for rhinos at this time. ISD in rhinos is potentially currently suspected and monitored by measuring serum iron and total serum iron binding capacity, and calculating transferrin saturation (%TS) from these values. Feeding susceptible species a low-iron diet is a commonly adapted approach in captivity. Additionally, because the iron is not excreted once in the body except via bleeding[4] or production of young, treatment of, and preventative measures against, ISD consist of regular phlebotomy and, in females, regular breeding.[5]

A management and treatment protocol was made based on experience at Rotterdam Zoo, which included monitoring of %TS, hematology and chemistry with special attention to GGT, and controlling iron uptake by analyzing the different food items and excluding items containing high iron levels, with a maximum daily total iron intake under 3000mg, lower than the recommended maximum intake of 6000mg.[2] At high %TS, large volume phlebotomies were performed. However, evidence that using %TS for ISD monitoring still needs to be provided. Iron concentration in the food (n = 3 animals) did not correlate to %TS. Regular phlebotomies in 1 animal reduced %TS from 99% to below 80%, over 5 months and below 60% within one year with a subsequent increase to 80% over a 1 year time period when phlebotomies were ceased.

Key words: Black rhinoceros, case report, *Diceros bicornis*, transferrin saturation, iron storage disease, phlebotomy

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