Reinhard Göltenboth, DVM, PhD,* W. Busch, J. Jenschke, Ä. Oces, U. Wittstatt
Zoologischer Garten Berlin, Berlin, Germany

Abstract

This paper represents a report of the death of a female Indian tapir far advanced in pregnancy, and a preliminary report of the death of a male black rhinoceros at the Berlin Zoo in 1995. Either case clearly indicates that a herpesvirus infection is to be made responsible for the death of the animals.

As is generally known, both the Indian tapir and the black rhinoceros are highly endangered species. For this it is of greatest importance to put all emphasis on the breeding of these species in zoological institutions. All the more regretful is the loss of a female tapir far advanced in pregnancy, and that of a breeding male black rhinoceros as has been experienced in the Berlin Zoo in 1995.

Resumen

Este documento presenta el reporte de la muerte de un tapir indio hembra en estado avanzado de gestación, y el reporte preliminar de un rinoceronte negro macho en el Zoológico de Berlín en 1995. En ambos casos claramente se observó una infección por herpesvirus que fue la causa presumible de la muerte.

Como se sabe, el tapir indio y el rinoceronte negro son especies en peligro de extinción. Por lo anterior es muy importante poner un gran énfasis en la cría de estos animales en los zoológicos. Lo más deplorable es la pérdida de un tapir indio en estado avanzado de gestación y el de la pérdida de una cría de un rinoceronte negro reproductor como se ha experimentado en el zoológico de Berlín.

Indian Tapir

After decades, finally in March 1995 a healthy male Indian tapir was born at the Berlin Zoo. In consequence of absence of estrus, of conclusive general symptoms, and on the basis of fecal hormone analysis we had even expected an additional birth from our second female in May that year.

Unfortunately, one morning several days before the expected delivery, the animal became restless, showing symptoms of pain, and forced pressing set in. Little liquid feces, yet no urine was discharged. A rectal and vaginal palpation failed to prove impaction of a fetus in the parturient canal as had been suspected, but rather showed a tightly filled urinary bladder pushing down into the pelvis. The animal was administered a spasmolysant.

Together with colleagues of the Clinic of Animal Reproduction of Berlin Free University and because no improvement was noticeable, several hours later the tapir was immobilized with Immobilon® at a dose of 0.9 ml and with xylazine/ketamine at a dose of 40 mg each.

Catheterization of the urinary bladder proved somewhat problematic since the animal kept pressing intensely. Drainage of the bladder produced 4-½ L of sanguineous urine. Parturition clearly was not an issue since the *Cervix uteri* was completely closed, yet a rectal ultrasonic examination proved the presence of a living fetus.

Tentative diagnosis was an acute retention of urine in the bladder, presumably caused by flexion of the urethra. That day the animal was administered intramuscular a long-term penicillin preparation and another penicillin preparation directly into the bladder. The next day the animal's general condition had substantially deteriorated; motivating it to get on its feet was difficult. Here, for the first time observation was made that the animal could not fully stand up, but with bent hind legs could only take a few steps.

Respiration was accelerated and labored. On rectal palpation the urinary bladder showed to be little filled. A long-term penicillin again was administered and additionally Clenbutyrol® (Ventipulin). The next day the weakened female tolerated an infusion of Sterofundin®, glucose, and calcium into the *Vena saphena* on his hind limb. A few hours later the animal was dead.

The summarized post-mortem protocol reads as follows: Primarily evident pathological changes in the lymphoid tissue are foremost found in the body and organo lymphatic nodes, which to a great extent are clearly enlarged, partially marmoreal with hemorrhagic leaks, partial necrotic disintegration of tissue is seen. The gastro-intestinal mucosa shows ulcerative processes with inflammatory depositions. Massive sub-endocardial hemorrhages in the left ventricle are found. The liver seems enlarged, the hepatic tissue friable. Focal adhesive pleuritis is seen in the lungs. The urinary bladder is empty. Detected in the uterus is a fully developed female fetus, the amniotic fluid appears ocher in color and turbid.

Histological findings in the preparations from the different lymphatic nodes are acute inflammatory processes as well as large necrotic lesions. Inclusion bodies (I.B.) are clearly identifiable in the nuclei. In the large parenchyma hemorrhages and degeneration predominate.

Escherichia coli bacteria is observed in the intestine, and *Klebsiella pneumoniae* in the lungs. Virological examination of the organo system concludes EHV-1-herpesvirus infection. To support this diagnosis an examination of the central nervous system should have been conducted but was refrained from, as it had been agreed upon to send the carcass to a museum.

Black Rhinoceros

One morning in October 1995 our proven male breeder was found dead in his shed without previously having shown any pathological symptoms. An autopsy was performed the same day with the following findings:

Altogether the animal is seriously emaciated. On the gastrointestinal, hepatic, and spleno mucus lining, hemosiderosis is seen.

The gastro glandular mucosa shows numerous ulcera that appear up to 1 cm in diameter.

The mucosa of the duodenum and jejunum shows chronic hypo-generative atrophy with loss of surface epithelium and partial fusion of the villi. Also, indication of bronchitis and myocardial degeneration is seen.

Bacteriological investigation proves the presence of *Escherichia coli* in liver, spleen, and intestine, and *Klebsiella pneumoniae* in the lungs.

Virologically a herpesvirus is identified by means of electron microscope.

Discussion

So far as is known, herpesvirus infection in tapirs has not been reported. Consequently, this is the first diagnosed case of herpesvirus-equi-1 infection in a tapir, underlining this species' close genetic relation to equids.

Herpesvirus-equi-1 infection in equids has been described previously.[1,2]

In the Berlin Zoo equine degenerative myoencephalopathy (EDM) was frequently diagnosed in Przewalski horses and zebras. In this connection the strong suspicion of the presence of EHV-1 infection was expressed.[3,5]

As a result of the virological findings we have since vaccinated all tapirs with an inactivated vaccine against EHV-1 (Resiquin F®, Hoechst).

Also, very few references exist regarding herpesvirus infection in rhinoceroses.

In the Berlin Zoo, in black rhinoceroses, concurrently three cases were observed of small cutaneous ulcera in great number as well as disturbance of the general state of health.[4]

A biopsy under the electron microscope revealed the presence of herpesvirus-like particles. However, absolute proof of the involvement of a herpesvirus could not be furnished.

In the case at question, organic material was inoculated to an aerobic cultivated hen's egg, isolating an agent which under the electron microscope was identified as herpesvirus. Whether or not and EHV-1 infection was involved could not be clarified.

Hypo-generative atrophy of the mucosa as is registered after infection with an entero-pathogenic virus, was seen in this individual as well as the other 2 who had died of hemolytic anemia at the Berlin Zoo.[6]

Consequently, necropsies in rhinoceroses should always be performed with regard to possible involvement of viruses in the pathological processes.

LITERATURE CITED

1. Lin, S.-K., E.D. Dolensek, C.P. Adams, and I.P. Tappe. 1983. Myoencephalopathy and vitamin E deficiency in six Mongolian wild horses. J. Am. Vet. Med. Assoc., 183: 1966.
2. Montali, R.J., G.P. Allen, I.T. Bryans, L.G. Phillips, and M. Bush. 1985. Equine herpesvirus type 1, abortion in an Onager and suspected herpesvirus myelitis in a zebra. J. Am. Vet. Med. Assoc., 187: 1248-1249.
3. Göltenboth, R. und H.-G. Klos. 1989. Zur Problematik der Nachhandataxien bei Przewalskipferden und Zebras im Zoologischen Garten Berlin. Proc. Int. Symp. on Diseases of Zoo-animals, Dortmund, 31: 217-224.
4. Göltenboth, R. 1995. Nashorner. In: Goltenboth, R. und H.-G. Klos (eds.). Krankheiten der Zoo- und Wildtiere. Blackwell Wissenschafts-Verlag, Berlin.
5. Kahrmann, B. 1992. Todesursachen der Equiden des Zoologischen Gartens Berlin in den Jahren 1970-1990 unter besonderer Berucksichtigung der Atiologie von Bewegungsstorungen bei Myopathien und Infektionen mit Equinem Herpesvirus Typ 1 (EHV-1). Med. Vet. Dissertation, Berlin.
6. Taugner, F., R. Göltenboth, und J. Henschke. 1995. Beitrag zur Hamolyse bei Spitzmaulnashornern. Verh.ber.Erkrg. Zootiere, 37: 71-77.