A "SEEMINGLY" NORMAL PARTURITION AND A STILLBIRTH OF A SOUTHERN WHITE RHINOCEROS (*Ceratotherium simum simum*)

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Abstract

The Budapest Zoo and Botanical Garden has never had rhinoceros offspring in its history due to the brother–sister relationship of the 1.1 Southern white rhinoceroses (*Ceratotherium simum simum*) which were kept here since their young age. The only option for breeding between this male (Easy Boy) and this female (Lulu) was the artificial insemination. This intervention took place on 6 April, 2004 and was preceded by years of previous reproductive work with our animals, mainly carried out by the experts of the Institute for Zoo and Wildlife Research, Berlin.

The intensive monitoring of the pregnancy did not reveal any abnormalities (Sós et al., 2006). The pregnancy lasted for 16 months and 3 days, and the parturition started on 9 August, 2005. This paper describes the „seemingly" normal parturition, the stillbirth and the pathological findings of the rhino calf.

Introduction

The Budapest Zoo has been kept 1,1 Southern white rhinoceroses since 1983. The first evaluation of the reproductive organs of both of the animals took place in September, 2001. These examinations were integrated into the research project of the Institute for Zoo and Wildlife Research, Berlin (Hermes et al, in press; Hildebrandt et al., 2000). After years of proper training (including medical training) and an unsuccessful artificial insemination (AI) attempt in 2003, a successful AI took place on 6 April, 2004. This time Lulu was 22 years old. The expectations were incredibly high, as this pregnancy was not only the first ever in Hungary, but the third which was a result of AI and the first which was the result of AI and reached the status of the second trimester.

The uneventful pregnancy lasted 16 months and 3 days, and the actual calving process started early morning on 9 August, 2005.

The thorough examination of the literature revealed that dystocia is not described in this species, but maternal aggression caused a number of deaths in different institutions. Therefore, one of the main concerns was to prevent such an occasion (Sós et al., 2006).

Steps of the parturition
The birth process and the immediate follow-up steps were divided to four main phases. The next table shows the time and activity of the labouring animal in detail, recorded by 7 different digital cameras.

Preliminary signs/onset of uterine contractions
Actual birth process, labour pains
Mother/calf first interaction
Resuscitation trial

Time	Activity	Comments
19:24	Lulu is walking around at the outside paddock	8 August, 2005
23:00	standing in the corner at the outside paddock, then starts to walk	
03:46	continously walking around at the inside enclosure	9 August, 2005
03:55	blood circles at the inside enclosure, both tarsus is covered by blood (especially the left one)	
10:40	walking around at the outside paddock	
11:06	stands up- lies down, outside paddock	
11:32	the amniotic fluid drains, Lulu turns back and smells it	
12:10	the allantoic sack turns up	the estimated size of the allantoic sack is 20×40 cm
12:12	the hind legs turn up, Lulu is lying on her side, intensive labour, her tail is held like a flag, standing up, the allantoic sack is slightly ruptured	
12:13-12:15	stationary, almost standing at the same position, labour pains	
12:15	the tarsal joints of the fetus are visible	
12:16	the femoral region is born	
12:16	the thoracic region is born	
12:16	Ada is born, the caul splits	recognising that Ada is not breathing at all
12:17 (+30”)	Lulu sniffs her offspring	+ means the time in seconds
12:17 (+1’)	gentle bites on Ada’s hind leg	+ means the time in minutes
12:20 (+4’)	first attempt to remove Ada from the paddock	+ means the time in minutes
12:23	Lulu lies down beside Ada, the amniotic fluid is still pouring out	
12:24	beginning of the resuscitation trial	

Resuscitation trial
Due to the defensive behaviour of the dam it took 8 minutes until we were able to separate the calf and start the resuscitation trial. This trial followed the so-called ABC methodology (ensuring the Airway, Breathing and Circulation, in this order).

The possibility of maternal aggression
According to previous zoo experience it was advised that only the head keeper should stay beside the labouring dam during the last phase in order to reduce the chance of the maternal aggression. Despite of our preliminary concerns Lulu behaved normally and gently, even a slightest sign of aggression was missing. In contrary – as a part of the normal maternal behaviour – she was very defensive while we wanted to separate the calf.

Post mortem examinations
The following examinations were carried out immediately after the stillbirth.

CT, MRI
CT and MRI examinations were performed at the Institute of Diagnostic Imaging and Radiation Oncology of the Kaposvár University using its Siemens Magnetom Avanto type, magnetic resonance tomograph (MRI) equipment of 1.5 Tesla magnetic-field strength and a Siemens Somatom Emotion 6 multislice CT.
The animal was fixed in prone position for the diagnostic imaging.
During the CT examination, after preparing the normal topogram (slice thickness (SL): 8 mm, FoV: 380mm, mA: 20, kV: 110, scan time: 0.8s), the whole body was scanned (head and thorax: mA: 70, kV: 130, scan time: 8.5s; abdomen: mA: 70, kV: 130, scan time: 6.37s).
We found small, air-density (bubble-like) structures in the thoracal and abdominal arterial system.
During the MRI examination we used T1- (TR: 2119s, TE: 17.9s, Aq.: 2s, SL: 5mm, FoV: 240x240 mm) and T2- (TR: 3200s, TE: 100s, Aq.: 2s, SL: 5mm, FoV: 260x260 mm) weighted spin echo sequences in coronal, transversal and sagittal planes.

Gross pathology
The post mortem examination was performed at the Szent István University, Faculty of Veterinary Science, Department of Pathology and Forensic Veterinary Science, Budapest.
The female rhinoceros calf weighed 34.5 kg. The main alterations were the liquid, not-clotted blood, the confined, dot-like subepicardial and subendocardial bleeding and the subcapsular necrosis of the size of a pinhead in the liver.
There was no change in the skin, lymphnodes, spleen, stomach, small intestine, large intestine, pancreas, kidneys, adrenal glands, ovaries, thyroid gland, thymus, heart muscle and brain.
On the histopathological examination of the lungs mild interstitial oedema, gas-containing alveolars and the lack of atelectasy was seen. There was a lack of any obturative changes (signs of aspiration) in the macro- and microbronchi.
The necrotic foci of the liver raised the suspicion of Herpes-virus infection. The light- and electro-microscopical examination did not reveal any changes in the lungs, liver, and placenta typical for Herpes-virus infection. The virological examinations gave a negative result. The bacteriological examination of the liver and spleen yielded negative as well.

Conclusions
Some of the clinical signs were vague, whilst others were straightforward, but the oncoming of the birth was obvious. The dam refused to take her feed the previous evening and an increased activity (circling) was observed. We suppose that the length of the actual birth can be considered normal.
Previously, we observed small cracks on the vagina of the female which will not disturb the following parturition at all. The involution was uneventful, we milked Lulu for a while to prevent mastitis.
Ada came out in a backward position, Lulu was standing while she left the birth canal. There are still debates which is the normal position for a rhinoceros calf leaving the birth canal, some zoos had the experience of „head first" calfs, while others state the opposite (Tomasova, pers. comm). ú
The cause of the stillbirth was the disruption of the umbilical cord and subsequent suffocation.
In our opinion, this detailed description may help for zoo personnel whether to intervene such a birth process. We conclude that none of the observed clinical symptoms would have justified to act and disturb the „seemingly" normal parturition.

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