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Patent Urachus with Subsequent Joint Infection in a Free-Living Grevy's Zebra Foal

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ABSTRACT: A free-living, female Grevy's zebra (*Equus grevyi*) foal was found lethargic, lame, with swollen joints, pyrexia, and urine dripping from the umbilicus. It died 2 days later despite intensive care. Gross examination revealed patent urachus and suppurative arthritis. Swabs were taken from the joints, the patent urachus, and urine for bacteriology. The dominant isolate was *Escherichia coli.* The joint infection was probably secondary to septicemia, resulting from the patent urachus. To our knowledge, this is the first report of neonatal patent urachus in a wild equid.

Key words: Case report, *Equus grevyi, Escherichia coli,* Grevy's zebra, patent urachus, septic arthritis.

The most common abnormality of the umbilicus in the domestic equine foal is patent urachus (Koterba, 1990). Patent urachus is the persistence following birth of the tubular connection between the urinary bladder and umbilicus (David and Mark, 1999). Patent urachus may also be acquired, with spontaneous reopening a few days after birth, following umbilical infection, illness, or debilitation (Koterba, 1990). Urine may be present in the hair around the umbilicus, or it may pass through the umbilicus in a resting or micturating foal. This defect may serve as a source for hematogenous infection; therefore patent urachus should be treated quickly.

A female Grevy's zebra (*Equus grevyi*) estimated to be 1 mo old was found recumbent at Ol Jogi Ltd., Laikipia District in Kenya (0°20′N, 36°57′E). The foal was in the company of a mixed-sex herd of 10 free-living Grevy's zebras. The foal was caught by hand and transported to the veterinary clinic at Ol Jogi Game Reserve.

The foal's body temperature was 39.6 C, pulse was 132 beats per min, and respiration was 54 per min. Respiration effort was both thoracic and abdominal and the lungs sounded harsh on auscultation. The foal was depressed, had a rough hair coat, and was in poor body condition. Hocks and carpal joints were distended and fluctuant. The hair around the umbilicus was wet, with urine dripping through the umbilicus while micturating. The skin of the face had old healing wounds. Packed cell volume was 34%, total protein was 11g/dl (Schuco Clinical Reflactometer, Japan), blood glucose was 400mg/dl (Glucostix Test-strips, Bayer Corporation, Tarrytown, New York, USA), and blood urea nitrogen was 20 mg/dl (Azostix Reagent Strips, Bayer Corporation).

Treatment included 500 ml of 5% glucose intravenously (IV; Glucose Intravenous Infusion BP 5% w/v, Wockhardt Ltd., Mumbai, India), 600 mg trimethoprim and sulphadiazine IV because of its broad spectrum of activity (Norodine, Norbrook Laboratories Ltd., Newry, Ireland) every 8 hr, and 40 mg flunixin meglumine IV (Finadyne, Norbrook Laboratories Ltd.). The foal was bottle-fed with 1.5 l of milk replacer (Foal-Lac®Powder, Pet-Ag. Inc., Hampshire, Illinois, USA) every 6 hr. Chemical cauterization of the patent urachus was attempted using sterile cotton swabs soaked in 2.5% iodine solution applied about 2 cm into the urachus. Treatment was continued the following day, however during the night the foal died.

On postmortem examination the foal was in poor body condition. Each carpal, elbow, hock, pelvic, stifles, and tarsal joints contained viscous, suppurative exudates. Liver and lungs were congested, and the urinary bladder communicated with the umbilicus through the patent urachus. Formalin-fixed samples were sent to the

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University of Nairobi (Kenya) for microscopic examination. The patent urachus had suppurative inflammation and areas of necrosis in the underlying connective tissue. These changes were most severe towards the umbilicus.

Swabs of the left elbow, stifles, hocks, patent urachus, and urine were collected for bacterial culture and sensitivity test (Cottage Hospital, Nanyuki and Analabs Ltd., Nairobi, Kenya). The swabs were planted on Mac-Conkey and blood agar. Some bacteria were isolated directly from the plates but most were re-isolated and then characterized. Morphologic and biochemical tests included colony characteristics (color, size, shape), Gram staining, catalase, coagulase, esculine, TSI (slope, Butt, H2S, Gas), citrate, indole, and oxidase tests.

The isolate was oxidase negative, indole positive, citrate negative, lactose fermenting, Gram negative rod. On TSI, a yellow color and gas were produced on both slope and butt. These tests were positive for *Escherichia coli* from six of the seven sites tested. In addition, coagulase negative *Staphylococcus* spp. and one *St. aureas* were isolated. *Streptococcus faecalis* was isolated from four sites. The bacteria sensitivity results indicated that sulphadiazine and trimethoprim combination did not inhibit growth of *Escherichia coli*; hence treatment initiate prior to results of sensitivity testing may have had no effect on the septic joints.

Lameness and reluctance to move was due to septic arthritis affecting multiple joints. *Escherichia coli* is usually associated with pyelonephritis, navel infection, joint infection, cervicitis, cystitis, mastitis, and metritis (Merchant and Packer, 1983). In this case report the bacteremia and septic arthritis were most likely secondary to the umbilical infection. It is remarkable that the foal did not fall prey to predators while free-living. The cohesive behavior of its herd may have protected it, so when the zebra became severely debilitated, we were the first predators that appeared.

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