COMPARISON OF PARATHYROID HORMONE, CALCIUM, PHOSPHORUS, AND MAGNESIUM IN SERUM AND URINE OF NYALA (*TRAGELAPHUS ANGASSI)* ON CONCENTRATES OR A FORAGE ONLY DIET

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Abstract

The nyala (*Tragelaphus angasii*) herd at Busch Gardens Tampa has historically had one of the highest incidences of Johne's disease (*Mycobacterium avium paratuberculosis,* Mptb) within the collection. A 10-yr epidemiologic review at Busch Gardens Tampa Bay revealed 27/83 (32.5%) Mptb culture positive individuals. At the time of this trial, 20/21 positive animals were also noted to be hypocalcemia. It was decided that the remainder of this herd, nine females, be euthanatized as a control measure. The herd had been maintained on ad libitum alfalfa hay and commercial zoo herbivore pellets (Mazuri® ADF #16 Herbivore, St. Louis, Missouri 63166 USA) fed at the manufactures recommended rate of 10 g/kg body weight. Water was available free choice. The herd was processed through a drop chute for baseline collection of blood and urine. Serum, EDTA, Na citrate, and heparin blood samples were collected from the jugular vein. Complete blood counts (CBC), serum biochemical profiles, ionized calcium (iCa), parathyroid hormone (PTH), and 25-hydroxycholecalciferol (25-OH CC vit D were performed. The herd was then restricted to ad libitum access to alfalfa hay and browse for 5 wk. At the end of the 5 wk, the herd was again processed through the drop chute over 3 days and the same samples collected. Student T-test was utilized to compare the mean values of serum and urine electrolytes, serum PTH, and serum vitamin D between the two diets.

Results from the first sampling revealed various states of hypocalcemia in all animals, based on both total (range 6.2-8.1 mg/dl, reference range 8.7-11.1 mg/dl, n = 70 ISIS) and iCa (range 0.75-0.98 mmol/L). Based on an endocrinologist's evaluation of the iCa and PTH, 8/9 of the animals were thought to have nutritional secondary hyperthyroidism. Results from the terminal collection demonstrated that all animals had some improvement in calcium status. All animals had iCa improvement (0.98-1.17 mmol/L). Changes in mean total calcium and iCa were all higher ($P < 0.05$) between the collections. Serum phosphorus increased ($P < 0.05$) in the group from a mean of 4.2 to 6.2 mg/dl and serum magnesium also increased ($P < 0.05$) from 0.95 to 1.74 mEq/L. Mean parathyroid hormone was less ($P < 0.05$) if the one outlying animal, Number 4, was excluded. Vitamin D (25 OH CC) did not change significantly.

Low serum calcium concentrations have been noted in domestic sheep with Johne's disease. Captive ruminants may be hypocalcemic from various causes; concentrates are known to alter calcium and phosphorus handling in ruminants and high phosphorus soils may lead to an

increase in dietary phosphorus intake, leading to hypocalcemia. We believe that hypocalcemia does not result from Johne's disease and may in fact be a predisposing factor. We also suspect that the hypocalcemia seen in numerous species of zoo browsers/concentrate selectors may be a result of an imbalance of concentrate to forage ratio fed and can potentially be corrected.