DIETARY TAURINE SUPPLEMENTATION AND CARDIAC FUNCTION IN THE GIANT ANTEATER (*Myrmecophaga tridactyla*): PRELIMINARY FINDINGS

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Abstract

Taurine is not considered an essential amino acid in most mammals as it can be synthesized from cysteine. Cats are an exception, lacking an enzyme necessary for this conversion and a lack of dietary taurine has been linked to central retinal degeneration and dilated cardiomyopathy. This form of feline cardiomyopathy is reversible with a dietary taurine supplement. More recently, a taurine-responsive, dilated cardiomyopathy has been described in dogs, leading to speculation that some species able to convert cysteine to taurine may still have a dietary requirement for taurine.

The giant anteater (*Myrmecophaga tridactyla*) has a lower metabolic rate and lower average body temperature (34.0 °C/93.2 °F) than most other placental mammals. On radiographs of the thorax, the size of the cardiac shadow is quite large, which has led to speculation within the literature and within the zoo medical community about the potential for cardiomyopathy in this species. The natural diet of termites, ants and other insects is difficult for most zoos to provide in captivity and many diets for captive animals are based on ground dog chow, a food item that can be relatively low in taurine. The natural extension of this speculation has been concern that captive diets were leading to enlarged hearts in the giant anteater and that inadequate dietary taurine may play a role. This study is a first attempt to evaluate cardiac parameters in the giant anteater, to provide baseline reference values for taurine blood levels and to evaluate the effect of long-term taurine supplementation.

In 2004, seven giant anteaters all received ultrasound cardiac evaluations and blood samples were collected for baseline taurine measurements. One animal was almost immediately sent to another zoo and was lost to further follow-up. Three of the remaining 6 anteaters were placed on a daily taurine supplement of 500 mg. Eight months after the initial evaluations, 2 animals (1 supplemented and 1 not supplemented) received cardiac evaluations and taurine levels were determined prior to these animals being sent to other institutions. The remaining 4 animals were evaluated at varying intervals over the next 4 years. One supplemented animal was diagnosed with right atrial enlargement and mild tricuspid regurgitation in November 2008 and currently is being treated with daily pimobendan (Vetmedin®, Boehringer Ingelheim, Vetmedica Inc., St. Joseph, MO 64506 USA; 0.143 mg/kg p.o. s.i.d.). Findings, excluding the final cardiac parameter values for the animal with cardiac disease, are summarized in Table 1-4.

The number of animals in this study is too small for rigorous statistical analysis, but there is a suggestion of a slight increase in cardiac function with taurine supplementation. While very

preliminary, these results are intriguing and are worthy of further investigation with a larger number of animals.

Table 1: Taurine Levels in Whole Blood (nmol/ml)

	Median	Mean	St. Dev.	Range
No taurine supplement	192	195.4	50.1	95-296
With dietary supplement	182.5	177.9	50.6	96-237

Table 2: Taurine Levels in Plasma (nmol/ml)

	Median	Mean	St. Dev.	Range
No taurine supplement	69	72.1	21.9	40-103
With dietary supplement	76	83.5	23.2	60-127

Table 3: Cardiac Ejection Fraction (%)

	Median	Mean	St. Dev.	Range
No taurine supplement	57.5	57.4	15.8	36-81
With dietary supplement	65.0	62.5	9.6	46-74

Table 4: Cardiac Fractional Shortening (%)

	Median	Mean	St. Dev.	Range
No taurine supplement	30	31.1	11.0	18-50
With dietary supplement	35.5	34.0	6.7	23-42