

THIAMINE DEFICIENCY IN A COLLECTION OF PACIFIC HARBOR SEALS (*Phoca vitulina*)

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ABSTRACT

From April to May 2010 eight Pacific harbor seals presented with acute neurologic signs; two additional animals were unexpectedly found dead. Keepers reported no abnormal behavior prior to presentation. Affected animals ranged from four to eight years of age. Nine out of ten animals were female; five of these had recently delivered pups. Seals were housed in a large feeder pool with California sea lions. Animals were fed a mixture of herring, capelin, and lake smelt and supplemented with Mazuri pinniped vitamins with lutein.

Clinical signs included depression, ataxia, blindness, muscle fasciculations, vertical nystagmus, diminished reflexes, and in some cases grand mal seizures. Bloodwork was unremarkable except for mild hyperglycemia. Supportive therapy included intravenous fluids, steroids and diazepam. Anti-convulsive therapy seemed to exacerbate symptoms and in several cases preceded respiratory arrest. Three seals were successfully treated with high dose infusions of intravenous thiamine and Vitamin B complex.

In total, seven seals died. Gross necropsies were unremarkable. Histopathology revealed varying degrees of neuronal necrosis. Extensive diagnostics ruled out infectious agents and toxins. Liver and serum thiamine concentrations were not diagnostic. Thiamine deficiency was confirmed by measuring liver and brain thiamine-dependent enzymes (transketolase, pyruvate dehydrogenase and alpha-ketoglutarate dehydrogenase) with and without the addition *in vitro* of thiamine pyrophosphate.

The situation likely resulted from a confluence of multiple factors. Vitamin administration requirements and a large male sea lion in the exhibit resulted in challenges for vitamin dosing. Thiaminase activity of smelt was higher (5-fold) than expected compared to previously published values; however, variability in our food is unknown. Chronic low dosing associated with increased physiologic need due to pregnancy and lactation led to the cluster of thiamine deficiency cases. We have currently modified vitamin supplementation to include additional oral thiamine. Administration will be increased prior to parturition and continued until weaning.