Secondary Nutritional Hypoparathyroidism (SNHP) in Reptiles:
by
Paul Stewart, DVM

Species:
Lizards, turtles and tortoises, especially diurnal basking species. Uncommon in snakes.

Cause:
Dietary calcium deficiency, improper dietary Ca:P ratio and/or insufficient ultraviolet light (B-range)/Vitamin D3.

Significance:
SNHP can lead to osteopenia (rickets), fibrous osteodystrophy, pathologic bone fractures, decreased musculo-skeletal function (paresis/paralysis/‘carpal walking’), muscle fasciculation, dystocia, ileus, dysphagia, starvation and death. SNHP is a painful disease.

Diagnosis:
Physical, history, radiographs, blood profile. Rule out hyperphosphatemia from renal disease since weakness and neuromuscular symptoms are similar in both syndromes.

Treatment:
In unstable dehydrated patients, rehydrate first with 1:1 D5W and Normasol R or lactated ringers solution by appropriate route (IV, IO, SQ, ICe) before injectable calcium is given. Fluids can be given at 20-40 mls/kg per day until rehydrated, then LRS or normasol can be use and decreased to 15-20 mls/kg/day until patient is capable of maintain hydration independently.

After rehydrating the patient, calcium gluconate (100 mg/kg IM Q6hrs prn) can be administered until animal is alert and capable of movement and swallowing.
Vitamin D-3 can be given as an adjunct therapy by injection (100 IU/kg Q7d) until radiographic and musculoskeletal improvement is seen (or if hypercalcemia occurs). Calcitonin (50 IU/kg IM Q2wks for two treatments) can be dosed but only after serum calcium levels have normalized.

If calcium is given to a significantly hyperphosphatemic patient, malignant calcification can occur in the organs. In renal patients who are hypocalcemic, phosphorus levels must be lowered prior to injectable calcium. Calcitonin is not given to these patients. These are usually older patients and the cause is likely renal secondary hyperparathyroidism.

In hypothermic dehydrated patients, provide adequate thermal support, but do this gradually as the animal is becoming rehydrated to avoid sudden blood pressure. Also, some patients with severe SNHP are unable to move away from the heat and are at risk of thermal injury if heat source is unsafe. NSAIDS can be given for pain (if rehydrated).

Nutritional support is given after the patient is stable. Tube feeding an appropriate feeding formula such as Oxbow Critical Care for herbivores can be done carefully. A soft tube may be necessary to avoid jaw fracture. Once symptoms resolve and the GI tract is working normally, oral calcium gluconate can be dosed until appropriate radiographic changes occur. In the healthy pet, pharmaceutical grade calcium carbonate can be purchased at a pharmacy, crushed up and added to the diet if deficient. Ultimately, dietary shortcomings need amending. Monitoring blood parameters and radiographs are important as follow-up. Recheck intervals are case by case. Bathing in shallow tepid water baths to encourage drinking for 15 minutes BID is beneficial.

Provide direct full spectrum lighting with UVB (wavelength 290-320) making sure bulbs are changed every 6 months to ensure output. With fluorescent tubes, placement should be within 18 inches of the animal’s basking site in a safe fixture. Mercury vapor bulbs generate heat and UVB making them potentially better for basking animals. They may be placed as much as 3 feet away, being careful not to exceed safe basking temperatures.

In stable patients with good appetites, adequate response to husbandry/dietary optimization and temporary oral calcium supplements may be seen. This decision should be based on a sound workup.
Eliminate cage furniture that may predispose to injury. Handle gently.
Fracture management will be discussed in lecture.

Prevention:
Appropriate direct full spectrum lighting with UVB must be provided to species at risk. Outdoor enclosures are very beneficial but must be predator- and pest-proof, prevent escape and provide proper habitat and safe thermoregulation for the species housed.
Adequate dietary calcium. 1.5:1 Ca:P ratio or greater).
For herbivores (many tortoises, green iguanas, uromastyx): high calcium vegetables (kale, collards, turnip greens, alfalfa), supplemental calcium carbonate powder.
For omnivores: (box turtles, aquatic turtles, blue-tongued skinks): high calcium vegetables, supplemental calcium carbonate powder over food.
For carnivores (monitors, water dragons, snakes) and insectivores (leopard geckos, chameleons, bearded dragons, anoles): lean nutritious whole prey items that have been gut loaded with a high calcium diet of dusted with a good quality calcium carbonate powder.