

Pharyngeal nodules in the Hawaiian green turtle

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As part of an educational outreach program, Hawaiian green turtles (*Chelonia mydas*) from Sea Life Park on Oahu have been captive-bred and reared for display and released into the wild each year since 1990 at the Mauna Lani Bay Resort on the island of Hawaii (Balazs et. al. 2002). Prior to the anticipated ocean release on July 4, 2000, severe throat lesions resembling necrotic plaques and ulcers were noted in 17 of 18 two to three year old turtles ranging from 19.3 to 45.0 cm in straight carapace length. These turtles were returned to Sea Life Park and quarantined. The cause of the original lesions was never determined. They were speculated to be stomatitis possibly caused by bacteria, viruses, or parasites. Blood chemistries and complete blood counts of the turtles were normal.

After 18 months in quarantine, it was observed that most of the turtles had from 1-10 small throat nodules in the dorsal pharynx. These nodules could best be described as raised areas, some with erythema and others looking like a pimple with a white center (Fig. 1). The turtles had exhibited no other signs of illness and had thrived. Blood chemistries and complete blood counts continued to be normal. Throat cultures revealed various bacterial organisms, much the same as cultured from healthy wild green turtles in Hawaii. All viral cultures had been negative. The nodules did not resemble the original lesions, which were much more severe. No diagnosis as to the cause had been determined.

In January 2001 throat biopsies were obtained from five of the quarantined turtles placed under gas anesthesia at the Makai Animal Clinic. Samples were examined by the Armed Forces Institute of Pathology of the Department of Defense. The resulting histological diagnosis was stomatitis described as mild to moderate lymphohistiocytic and plasmacytic that was nodular and multifocal with epithelial hyperplasia and edema. One area of granuloma was seen associated with a trematode egg. No viral inclusions were noted. It was speculated that the lesions could be normal lymphoid aggregates that were enlarged from antigenic stimulation of unknown cause.

In September 2001 one of the affected turtles in quarantine with multiple nodules was placed under gas anesthesia for biopsies at the Makai Animal Clinic. Photos and tissue samples were obtained with endoscopic instruments (Fig. 1). The tissues were analyzed by the Veterinary Diagnostic Laboratory at Colorado State University. A diagnosis of nodular lymphoid hyperplasia was made. The aggregates of lymphocytes were considered benign and possibly normal. No viruses were isolated or detected by Douglas Docherty of the National Wildlife Health Center in Madison, Wisconsin.

Nodules similar to those present in the quarantined turtles at Sea Life Park were observed in healthy wild green turtles off the Kona Coast on the island of Hawaii. Many of the turtles sampled (30-80%) had one to five pharyngeal nodules. These nodules were discovered by careful deep oral exams using an intense light source. Biopsy samples from one of these turtles were obtained under gas anesthesia at the Makai Animal Clinic. The histological diagnosis by Colorado State University was nodular lymphoid hyperplasia with granulomas surrounding parasitic ova. Viral cultures by the National Wildlife Health Center were negative.

CONCLUSIONS

During the 18 months in quarantine the Sea Life Park turtles appeared healthy and showed no signs of illness. Blood chemistries and complete blood counts were normal. Appetite and growth rates were normal. No viruses were isolated. Because of these findings, and the observations of similar nodules in wild turtles, it was decided that the turtles could be safely released.

The accumulation of lymphocytes in the pharynx of green turtles may be normal, much like human tonsils. Antigenic stimulation from bacteria, viruses, or parasite ova may make the nodules more pronounced. Structures termed "pharyngeal tonsils" have been reported in green turtles (Winokur 1988, cited by Hirth 1997). They were described as five to seven "pits" in the median ventral pharynx, posterior to the glottis, consisting of large clusters of cells with densely staining basophilic nuclei. The pits reported by Winokur (1988) were not observed in the Hawaiian green turtles.

Spirochid ova are common in the tissues of green turtles in Hawaii (Dailey and Morris 1995). Numerous species of bacteria inhabit the throats of normal Hawaiian green turtles (Morris unpublished data). This is the first description of pharyngeal nodules for green turtles in Hawaii. However, Douglas Mader (personal communication) has seen similar appearing nodules in some sea turtles in Florida. This study demonstrates the importance of a routine mouth exam, using a good light source, as a part of all sea turtle physical exams.

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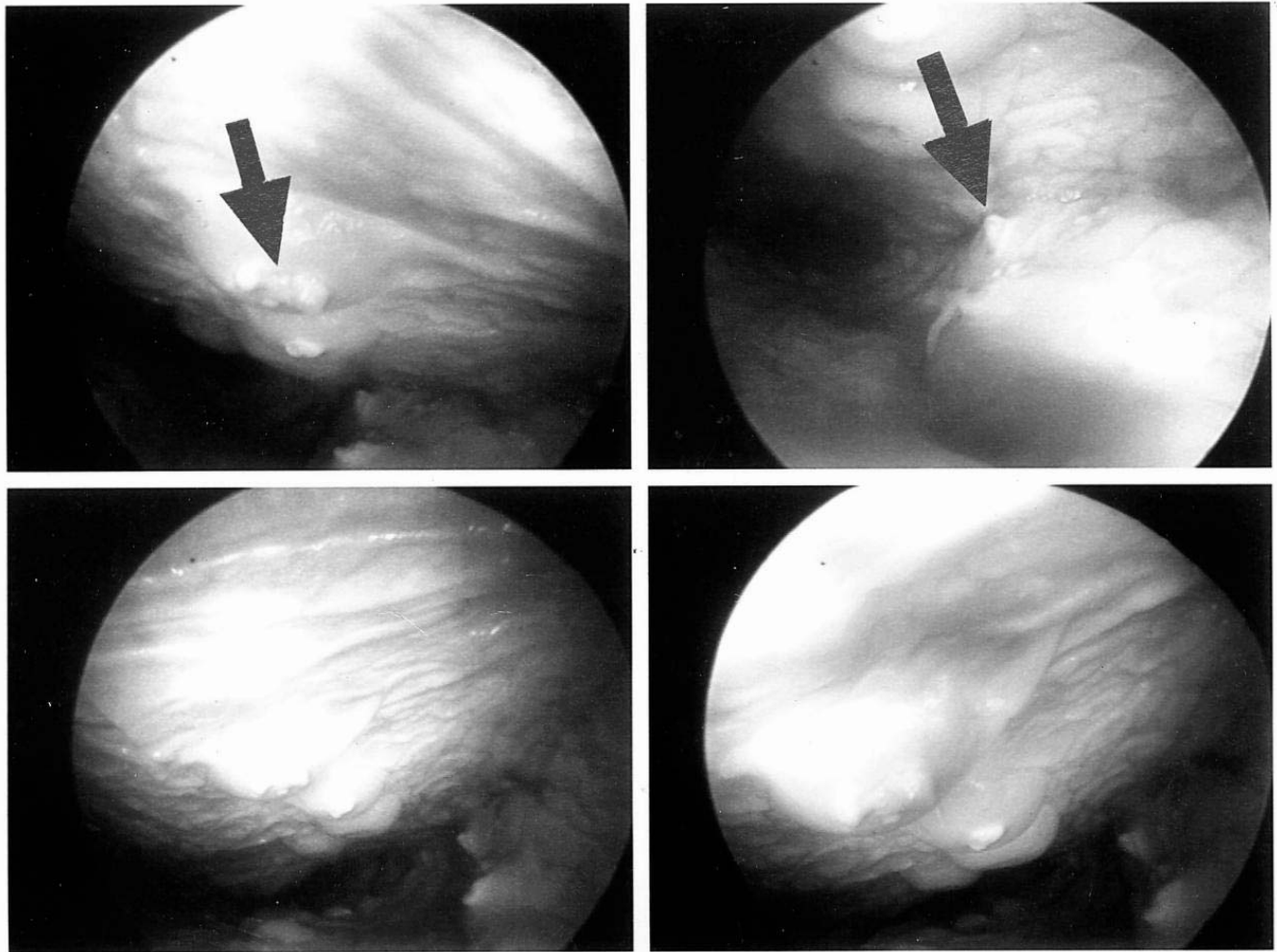


Fig. 1. Endoscopic photographs of pharyngeal nodules in the Hawaiian green turtle.

Heavy metals in marine turtles from the Adriatic Sea

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Loggerheads are endangered in the Mediterranean and one of the main threats is pollution. The Adriatic Sea is a semi-closed system and upon its shores impinge some relatively large centres of human population; levels of marine contaminants in this ecosystem are considered to be relatively high. Heavy metals are one of the potential contaminants in loggerhead turtles. To investigate the rate of this potential samples of liver, kidney, muscle, adipose tissue and bone from ten dead turtles were collected for heavy metals analysis. A range of cadmium, chromium, lead, and mercury were determined using acid digestion (except for mercury) HNO_3 67% v/v (Suprapur Merck) and H_2O_2 30% v/v (Aristar – BDH) with microwave heating followed by analysis using atomic absorption spectrophotometry in a Zeeman graphite furnace for cadmium, chromium, and lead. Total mer-

cury was analysed using automatic solid/liquid analyzer AMA-254. All analyses were conducted under an analytical quality protocol requiring the analysis of blanks and reference materials. Maximum mercury concentrations are in liver and kidney tissues, respectively 2.62 (g/g and 2.64 (g/g dry weight) and, on the contrary, low in bone (0.005 (g/g dry weight)). Lead and chromium are high in bone, respectively 10.9 (g/g and 32.9 (g/g dry weight)). Cadmium concentrations were the highest in liver tissue and present, in decreasing order, in kidney, muscle, adipose tissue and bone. Data recorded, although based on a relatively small number of turtles, provide evidence that concentrations of heavy metals in this species could be useful in environmental impact assessment.



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