

**GA 740**

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GA 740, a 255 cm long 159 kg male *Tursiops*, was recovered dead, Code 2, from the Gulf-side beach 9.4 miles past San Luis Pass bridge (Surfside) on January 28 1996.

He was extremely wasted, with prominence of the neck, ribs and lateral spinous processes. The blubber was thin and appeared depleted.

A striking external feature was two areas of purplish discoloration and slight roughening of the epidermis on the ventral surface of the thorax, immediately over the palpable humeroscapular joints. These looked like pending pressure sores.

Our routine is to examine the animal left side up. No abnormality was found in the left chest; however, the lymph nodes associated with the left lung were large, the one associated with the edge of the lung on the left was 35 x 32 x 11 mm, suggesting inflammation. The left lung showed no particular abnormality, except for large numbers of thread-like nematode lung worms in the small airways. The lower dorsal mediastinum (the membranes separating the chest into left and right sides) bulged upwards, from right to left, under the aorta. At this point, the mediastinum is merely two apposed sheets of the pleural membranes, and is very thin. The bulge was caused by a massive amount of fluid (pleural effusion) in the right side of the chest. This was associated with shaggy, often polypoid masses of clotted blood protein in the space. The fluid measured over 4 liters in volume. The right lung was very compressed. The left bronchus was filled with yellowish foam, suggesting heart failure.

There were a few small fissure/ulcers in the esophagus, and one *Braunina* in the third stomach. All the other organs were normal, except for the liver, which was soft and very congested.

We were able to isolate *Vibrio damsela* from the blood, but no bacteria were cultured from the pleural fluid.

Our interpretation of this case is that something, probably a parasite, provoked the massive pleural effusion, which had several effects. First, as the fluid accumulated, it gradually compressed the right lung, until it was completely collapsed and non-functional. Fluid continued to accumulate until the mediastinum (and the heart) were pushed to the left, compressing the left lung as well. Pressure inside the chest impaired the venous return of blood to the heart, which severely congested the abdominal organs, especially the liver, which is normally very vascular. These changes in blood flow and compression inside the chest resulted in congestive heart failure. The *Vibrio* probably came from the intestine, and was able to enter the blood because of poor nutrition of the intestine resulting from heart failure. These changes would have been gradual, resulting in progressive impairment of the animal's ability to fend for itself, and finally even to swim. I think the purple spots mentioned earlier result from the animal's resting on the bottom before it died of debility and heart failure.

Comment: We were not able to identify the cause of the effusion, but we speculate that it due to a parasite, as we had an earlier case with very similar pleural effusion, and after extensive search, were able to identify worm parts in the fluid. There was no other cause, such as bacterial infection or injury in this case. Any time there is an injury to the tissues, blood vessels become leaky, and fluid and protein leak out. If the injury is in solid tissue, the fluid causes swelling, and the pressure causes pain. Eventually the pressure in the tissue reaches a

level that inhibits further oozing from the vessels by compressing them. The protein clots, and if on the skin surface, forms a scab. In a body cavity fluid oozing from the vessels accumulates. Since the lung is elastic and has a natural tendency to collapse, pressure does not build up for a while; fluid simply accumulates as the lung collapses. After a while the space is filled, but the protein can continue to draw fluid in via osmotic forces. Eventually pressure rises and vessels are compressed. Unfortunately, the vessels being compressed are the veins returning blood to the heart. Also, if the animal cannot add fluid to the body by eating, fluid in the chest accumulates at the expense of the blood volume. In effect, the blood volume is going into the chest, as if it were bleeding. Respiration is impaired by collapse of a lung and by poor circulation. The total effect of this profound physiologic disturbance is progressive weakness and limitation of mobility, inability to catch prey, debility and eventually death. Sometimes mother nature is not kind to her children!