

PA 636

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PA 636 was an adult male dwarf sperm whale, *Kogia sima*, 233 cm long, weighing 401 pounds, recovered alive from Matagorda Island Gulf beach, Aransas County, 2.1 m north of Cedar Bayou, Sept 11, 2002, by Tony Amos and brought to Galveston for rehabilitation. Initially he was active and passing a lot of ink; later he calmed down. During the thrashing period, he suffered an abrasion and scratched his head on the plastic outlet pipe. Mainly he was passive, and accepted handling. He was weak and did not improve, and he died Sept 13, 8:10 AM.

External examination: There was no evidence of recent trauma, except for a small cookie cutter bite on the right side, lateral, above the anus. Notches in the fin, the flukes, and a portion of the left flipper was gone. All these wounds were well healed and pigmented normally. Several shallow scars (appear to be well healed cookie cutter bites) were present on both sides of the body; and there were intricate scarring/pigmentation patterns; swirls, etc.

Internal examination: There was minimal normal fluid in the chest and abdomen; the lungs were collapsed and airless; very fine soft texture, but gritty on cutting, as the bronchial cartilages are calcified. The trachea was rigid, and the bronchi ringed with cartilage, which was remarkably pliable compared to *Tursiops*. The striking finding was that the trachea, bronchi and distal airways were filled with yellowish to pink foam.

The heart was large and very flabby, with subtle blotching of the myocardium, but

no pits or evident scarring. The right ventricle in particular was very dilated and thin; the left ventricle was also thinned and a bit dilated. The left atrial wall was thinned, and there was a thick, dense, friable, yellow mural thrombus adherent to the atrial wall. The liver was soft and congested. The bile duct was wide, filled with transparent bile; no parasites.

The spleen was elongate, without the usual ovoid configuration, resembling a dog spleen. There were a few patchy cortical fibrous scars. The kidneys were normal. The adrenals were asymmetrical, but appeared normal. The testes were very large, indicating sexual maturity. The stomach and intestines were empty, except for many small nematodes in the stomach. The pancreas was normal. The brain was grossly normal, but quite small compared to the brain of a *Tursiops* of equivalent body size.

Diagnosis and comment: There doesn't seem to be much of a problem with finding a cause of death in this animal. The filling of the airways with pinkish foam is a clear indication of acute congestive heart failure. There is very marked congestion, with death of cells in the liver, also consistent with acute heart failure. The heart is very abnormal, which was evident grossly as pallor and flabbiness. The solid thrombus in the atrium indicates that the myocardial injury to the atrium occurred within a period of days, allowing thrombus to form as it does on any injured vessel surface. This suggests that the heart problem is what brought the animal to shore. Microscopically, there are features of severe cardiomyopathy.

“Cardiomyopathy” is a general term meaning abnormality of the heart muscle. Some cases are associated with virus infection, others with ischemia or severe reduction in blood flow, in man mainly due to coronary artery disease, and some cases associated with metals toxicity. Some degree of cardiomyopathy is universal in our stranded dolphins, no matter what the species, attributable to

none of the causes just mentioned. In viral cardiomyopathy we expect to see signs of inflammation, which are lacking; there is no major coronary artery disease, and there is no indication of metals toxicity. We are inclined to attribute it to a massive stress reaction, seeing it in live strandings, injuries, and net captures, among other causes. Our impression is that this 'stress' triggers a massive release of adrenalin from the adrenal glands, combined with reflexive spasm of blood vessels in the heart and other organs. This reduces the blood supply of the heart to intolerably low levels, while simultaneously stimulating heart action. I think that this is rooted in the diving adaptation, but similar findings can be observed in land animals dying under stress.

It is interesting to note that *Kogia* stranding on the Florida coast have all had this finding. Why should this be so? *Kogia* are highly specialized animals. They are believed to live mainly along and off the continental shelf, and so are relatively deep water animals. They are unusual, but not very rare in our shallow waters. They also have very specialized feeding habits, as one can see from the peculiar jaw and teeth, quite unlike our gregarious, adaptable bottlenose dolphins. This implies to me that their behavior is rather stereotypic; they are very 'set in their ways'. The small brain size may mean that they are not very bright and adaptable. However, we should not judge the quality of a stew by the size of the pot. I suspect the cardiomyopathy results from something that draws them away from the usual habitat into the shallows and exposes them to a set of stressors they are simply not capable of handling. This is of course an hypothesis that requires a lot of testing.