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Article Summary

This paper summarizes “Malignant Seminoma with Metastasis, Sertoli Cell Tumor, and Pheochromocytoma, in a Spotted Dolphin (*Stenella frontalis*) and Malignant Seminoma with Metastasis in a Bottlenose Dolphin (*Tursiops truncatus*)”. This article was about the tumors found around the testicles of a male spotted dolphin and male bottlenose dolphin and the severity of the tumors. Images of the testicles of both dolphins along with microscopic images of the cells of the testicles and tumors were provided in this article. In examining these images, it is clear that it would have had to be pretty painful for the dolphins.

The formation of tumors in cetaceans, called neoplasia, has rarely been documented. In a couple of reviews on neoplasia in cetaceans, it was found that there were only eighty documented neoplasms in cetaceans. Of the eighty documented cases, fifteen were thought to be malignant. Also of these eighty cases, twenty-eight, or thirty-five percent, were documented from beluga whales (*Delphinapterus leucas*) from the St. Lawrence estuary. The spotted dolphin that this report discusses had malignant seminomas with metastasis, Sertoli cell tumors, and pheochromocytomas. In plain English, this spotted dolphin basically had testicular cancer which was spreading as well as tumorous Sertoli cells which provide support and nourishment for the developing sperm. The Atlantic bottlenose dolphin in this report had malignant seminoma with

metastasis. In plain English, this Atlantic bottlenose dolphin also had testicular cancer and it was spreading¹.

This article started with the male spotted dolphin that was examined. The dolphin was found stranded alive along the southeastern shore of Choctawhatchee Bay, Florida on July 1993. When the dolphin was found, he showed signs of dyspnea (difficulty in breathing), back arching, and excessive diarrhea. He was rescued and sent to an oceanarium for rehabilitation, but died shortly after arrival. Within an hour after his death, a necropsy (basically an autopsy) was performed. Upon examination, it was found that he measured 210 cm in length and had worn teeth. Based on these findings, it was determined that he was a mature adult at the time of his death. During the necropsy, it was found that the dolphin had an enlarged left testicle which was measured at 58 cm in length and weighed 8.4 kg. This testicle was found to be displacing the intestines. This testicle also had multiple firm nodules on its surface that were gray-white in coloration, measured up to 8 cm, and had areas of hemorrhaging. The right testis was smaller than the left testicle measuring 34.5 cm in length and weighing 1 kg. The surface of the right testicle was a smooth gray in coloration and had a uniform tan parenchyma. The gray-white nodular masses found on the left testis were also found on the right testis in the retroperitoneal area and extended toward the adjacent muscle. The dolphin's adrenal glands were also found to be enlarged. Specimens of most of the dolphin's organs including his brain, heart, lung, stomach, liver, and spleen were preserved in formalin. These specimens were then embedded in paraffin, sectioned at 5µm, and then stained with hematoxylin and eosin¹.

¹ Estep, pg. 357-359

A histology examination was also conducted on the dolphin which revealed that the left testicle was largely replaced by two discrete neoplasms. The first of the two neoplasms was found to be unencapsulated and composed of polygonal cells that were arranged in sheets or ill-defined packets. The cells in this neoplasm had cell borders, some foamy eosinophilic cytoplasm, a round nucleus with finely stippled chromatin, and some cells had a small nucleolus that was magenta in coloration. The mitotic figures of the cells averaged one per high-power field and had a range of up to three per high power field. The microscopic characteristics of the neoplasm's cells were characteristic of seminoma. The cells that were similar to the seminoma had effaced the majority of a retroperitoneal lymph node¹.

The other neoplasm was also unencapsulated and was made up of packets of elongated to spindle-shaped cells which had sometimes palisaded along a fine fibrovascular stroma. These cells had wispy eosinophilic cytoplasm that ranged from small to moderate in terms of amount. The nuclei of the cells were round to oval-shaped and had finely stippled chromatin as well as small nucleoli that were also magenta in color. Mitosis in these cells averaged one per two high-power fields. This neoplasm was characteristic of a Sertoli cell tumor. Hemorrhaging and necrosis were found in both tumors multifocally.

One of the spotted dolphin's adrenal glands was also examined. It was found that the medulla of this gland was expanded due to an unencapsulated neoplasm that was made up of packets and cords of polygonal cells. These cells had distinct cell borders and had plenty of cytoplasm that was gray in coloration and granular in nature. The nuclei of these cells were irregularly round and vesicular and had indistinct nucleoli. The

mitotic figures of these cells were rare. The cytoplasmic granules were looked at multifocally and it was found that these granules were argyrophilic by the Churuckian-Schenk method. The findings from this examination were characteristic of pheochromocytoma¹.

The Atlantic bottlenose dolphin in this article was found dead from stranding on a beach in Topsail Island, North Carolina in November 1997. This dolphin, identified as DAP 027, was measured at 283 cm in length and had worn and chipped teeth. These characteristics indicated that this dolphin was a mature adult. When this dolphin was found, he was extremely emaciated having protruding ribs and scapulae. A necropsy was performed on this dolphin and it was found that he had a large neoplasm that had expanded from the right testicle and fused with the organs of the caudal and peritoneal cavity. These organs include the spleen, liver, intestine, mesenteric lymph node, kidney, and pancreas. There were also masses that were attached to the mesentery and abdominal cavity filled with a red-brown fluid¹.

A histological examination was also conducted on this dolphin and it was found that the neoplasm in the testicle and mesentery made up of variably sized nests and packets of cells that were round in shape. These cells were separated and supported by bands of connective tissue. The cells also had borders and eosinophilic cytoplasm that was granular in nature. The examination also found moderate anisokaryosis. The nuclei of these cells were vesiculate and had clumped chromatin as well as 1 – 4 variably sized and shaped nucleoli that were magenta in coloration. The mitotic figures of these cells had an average of one per high-power field and had a range of up to three per high-power

field. The findings of the examination were found to be characteristic of testicular seminoma with metastasis to the mesentery¹.

This article reported that there have not been many reports of testicular neoplasia in dolphins or any other kind of marine mammal. There has been a case of a common dolphin (*Delphinus delphis*) having a Leydig cell tumor. A Leydig cell is a hormone secreting cell in the testicles which secretes testosterone along with other male-associated sex hormones. There has also been an earlier case of a bottlenose dolphin having an unspecified testicular tumor. There has even been a documented case of a sea otter (*Enhydra lutris*) having malignant seminoma with metastasis¹.

It was reported that reports of adrenal neoplasms in cetaceans are very rare. There has been a case of a beluga whale that had pheochromocytoma. There has also been a case of adrenal adenomas in two Atlantic white-sided dolphins (*Lagenorhynchus acutus*). Another bottlenose dolphin was reported having an unspecified adrenal cortical tumor¹.

For the spotted dolphin, there had only been one previously reported neoplasm. That neoplasm was immunoblastic malignant lymphoma. There have been several previously reported neoplasms for the bottlenose dolphin. These neoplasms included pulmonary squamous cell carcinoma, uterine adenocarcinoma, immunoblastic malignant lymphoma, splenic lymphoma, hepatic adenoma, pancreatic carcinoma, lung and liver reticuloendotheliosis, renal adenoma, thyroid adenoma, and sublingual squamous cell carcinoma¹.

The spotted dolphin's case of seminoma, Sertoli cell tumor, and pheochromocytoma in this report was actually the first documented case in a cetacean. It

was also the first time that all three were documented in a single dolphin. Both cases are also now among the small number of previously documented cases of metastatic neoplasia in cetaceans. The findings of this report appear to imply that there is a potential for metastasis of seminomas in dolphins¹.

This was a very interesting article to read. Some of the terminology may need to be more properly explained for a novice in the field, but it made its point on the severity of the tumors and how rare it is to find them in cetaceans. This article did not say whether the tumors contributed to the strandings, but it does seem very unlikely. A stranding by itself is enough to kill any cetacean. The findings of this article will help broaden the understanding of cetacean diseases.

Work Cited

Estep, J.S.; Baumgartner, R.E.; Townsend, F.; Pabst, D.A.; Mclellan, W.A.; Friedlaender, A.; Dunn, D.G.; Lipscomb, T.P. “Malignant Seminoma with Metastasis, Sertoli Cell Tumor, and Pheochromocytoma in a Spotted Dolphin (*Stenella frontalis*) and Malignant Seminoma with Metastasis in a Bottlenose Dolphin (*Tursiops truncatus*)”. *Veterinary Pathology* Vol. 42, pg. 357-359 (2005). Retrieved from <<http://www.vetpathology.org/cgi/abstract/42/3/357>> 11/14/07.