

## Case #2

SIGNALMENT: 39 year old male Pacific bottlenose dolphin

HISTORY: Captive dolphin at Sea World San Antonio presented for inappetence and lethargy. The animal showed initial clinical improvement on antibiotics, but remained inappetent and was found dead three days after initial presentation.

GROSS FINDINGS: Multifocal to coalescing, white, solid masses ranging from 1 mm to 10 cm in diameter throughout both lung lobes and on the ventral caudal visceral and parietal pleura. A copious amount of fluid (salinity of 69 ppt) was present in the lungs. Thoracic lymph nodes were greatly enlarged and black on cut surface. The liver was firm and demonstrated a diffuse nutmeg coloration pattern. An olive color discoloration was noted in the blubber along the ventral abdomen

HISTOPATHOLOGIC/CYTOLOGIC FINDINGS: Normal pulmonary architecture is effaced and replaced by numerous macrophages, degenerate and non-degenerate neutrophils and fewer lymphocytes and plasma cells admixed with fibrin and edema. Pyogranulomas are centered on 3-5 um diameter intrahistiocytic and extracellular PAS positive yeast surrounded by a 1-3 um clear halo and numerous eosinophilic radiating spicules of Splendore-Hoeppli material (asteroid bodies).

Pyogranulomatous lymphadenitis, capsulitis and pleuritis were also present in multiple thoracic lymph nodes and the diaphragmatic pleura each containing variable numbers of yeast. Focally extensive granulomatous panniculitis was noted in the ventral abdominal skin but no organisms were present.

MORPHOLOGIC/ETIOLOGIC DIAGNOSIS: 1. Lung: Pleuropneumonia, necrotizing and pyogranulomatous, chronic, multifocal, marked with intra- and extracellular yeast occasionally surrounded by Splendore-Hoeppli material

2. Lymph node, thoracic: Lymphadenitis, pyogranulomatous, diffuse, severe, with yeast consistent with *Sporothrix schenckii* and rare Splendore-Hoeppli material

3. Non-haired skin: Dermatitis, steatitis, and myositis, fibrinosuppurative, multifocal to coalescing, moderate with necrotizing myositis

DISCUSSION: Tissue sent for culture on potato flakes agar showed apical clusters of small hyaline conidia (rosettes) that developed from denticles on a long sympodial rachis. DNA sequencing of the organism showed 98.4-100% similarity to *Sporothrix schenckii*. Upon electron microscopy examination, yeasts with numerous electron dense granules and a single large central vacuole surrounded by a 1 um cell wall were found. In the lung, yeasts were occasionally surrounded by electron dense radiating material (asteroid body), consistent with the diagnosis of *S. schenckii*.

*Sporothrix* is a dimorphic fungus that is in a mycelial form at environmental temperatures and a yeast form at body temperature. It is ubiquitous in the environment and favors soil rich in decaying matter. Infection usually occurs by traumatic implantation. After it enters the tissue, it can proliferate locally and produce cutaneous nodules and fistulas at the inoculation site. Infection can spread along regional lymphatics producing lymphangitis and lymphadenitis. Visceral dissemination is rare, but can occur in immunocompromised animals. Sporothricosis is most common in horses, cats and dogs. *Sporothrix* is a pleomorphic, round, oval or cigar-shaped yeast approximately 2-6 microns in diameter and 2-10 microns in length. It has a refractile cell wall; on histopathology, shrinkage artifact may cause yeast to appear encapsulated. Organisms are numerous in lesions in cats and rare in dogs and horses. They can be found extracellularly in the lesion's purulent core or within cytoplasm of macrophages, multinucleate giant cells and neutrophils. Asteroid bodies (central yeast with radiating eosinophilic spicules (Splendore-Hoeppli material)) may be noted on histomorphology and electron microscopy.

The route of infection in this case is unknown. Inhalation may have been the primary route in this case, due to the high numbers of fungi present throughout the lungs, with subsequent spread to local lymph nodes. Alternatively, the route of entry may have been via the skin of the ventral abdomen, at the site of discoloration noted on necropsy, which showed granulomatous panniculitis on histopathology (but no organisms were found).

#### REFERENCES:

Asper ED, Font RL, Kaplan W, Migaki G. 1978. Sporotrichosis in a pacific white-sided dolphin (*Lagenorhynchus obliquidens*). *Am J Vet Res* 39(12):1916-1919.

Barros MB, Conceicao-Silva F, Conceicao M J, Do Valle AC, Gutierrez Galhardo MC, Marzochi KB, Reis RS, Schubach AO, Schubach TM, Wanke B. 2004. Cat-transmitted sporotrichosis epidemic in Rio de Janeiro, Brazil: description of a series of cases. *Clin Infect Dis*. 38(4):529-535.

Cavalcanti MC, Figueiredo AB, Gremião ID, Menezes RC, Pereira SA, Schubach TM. Feline Sporotrichosis: epidemiologic and clinical aspects. 2014. *Med Mycol*. 53(1):15-21.

Mauldin EA, Peters-Kennedy J. Integumentary System. In: Maxie MG (ed.). Jubb, Kennedy and Palmers pathology of domestic animals, Volume 1. 6th ed. Philadelphia (PA): Elsevier Saunders; 2015:655.

Greene C. Infectious Diseases of the Dog and Cat. 4th ed. New York (NY): Saunders Co; 2012:645-650.

Gross TL, Ihrke PJ, Walder EJ, Affolter VK. Skin diseases of the dog and cat. 2nd ed. Ames (IA): Blackwell Publishing Professional; 2005:298-301.

Marimon R, Cano J, Gene J, Sutton DA, Kawasaki M, Guarro J. 2007. *Sporothrix brasiliensis*, *S. globosa*, and *S. mexicana*, three new *Sporothrix* species of clinical interest. *J Clin Microbiol* 45:3198-3206.

Morris-Jones R. 2002. Sporotrichosis. *Clin Exp Dermatol*. Sep;27(6):427-31.

Romanelli AM, Sutton DA, Thompson EH, Rinaldi MG, Wickes BL. 2010. Sequence-based identification of filamentous basidiomycetous fungi from clinical specimens: a cautionary note. *J Clin Microbiol* 48:741-752.