

Pathologic findings and causes of death of stranded cetaceans in the Catalan coast (June 2019-February 2020)

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1. Introduction

Marine mammals are believed to be sentinel species, this is the reason why they play such an interesting role in our understanding of marine ecology, and through necropsy and sampling, we can appropriately assess the health status of our oceans and their environmental degradation (Barnett et al., 2018; Bossart, 2011).

The objective of the present study is to analyze the cause of death of the cetaceans that were found stranded in the Catalan coast and critically assess the pathologic findings and epidemiologic factors. Also, one of the present objectives is to further analyze the role of *Strobilocephalus triangularis* in cetacean pathology, reviewing the prevalence of this parasitic infection and the reported findings.

2. Cases summary

A total of seven cetaceans were investigated belonging to two species: Striped dolphin (*Stenella coeruleoalba*) and Rissos’s dolphin (*Grampus griseus*).

Table 1 Identification table & complementary tests performed					
Case code	Alive or dead, Conservation status	Age and sex	<i>Brucella</i> : RBT qPCR	CeMV: (RT-PCR)	Cause of death
N-258/19	D; 3	Adult female	-	-	Peritonitis and sepsis
N-259/19	D; 5	Fetus	-	-	Mother’s death
N-312/19	A; 2	Unweaned female	-	-	Maternal separation
N-314/19	A; 2	Subadult female	+	-	Neurobrucellosis
N-361/19	A; 2	Adult female	+	+	CeMV
N-368/19	A; 2	Subadult male	+	-	Neurobrucellosis
N-414/19	D; 3	Adult female	-	-	PUE

D, dead; A, alive; 1, very fresh; 2, fresh; 3, mildly autolytic; 4, autolytic; 5, very autolytic



Figure 1. N-414/19. Mandibular wound with open fracture.

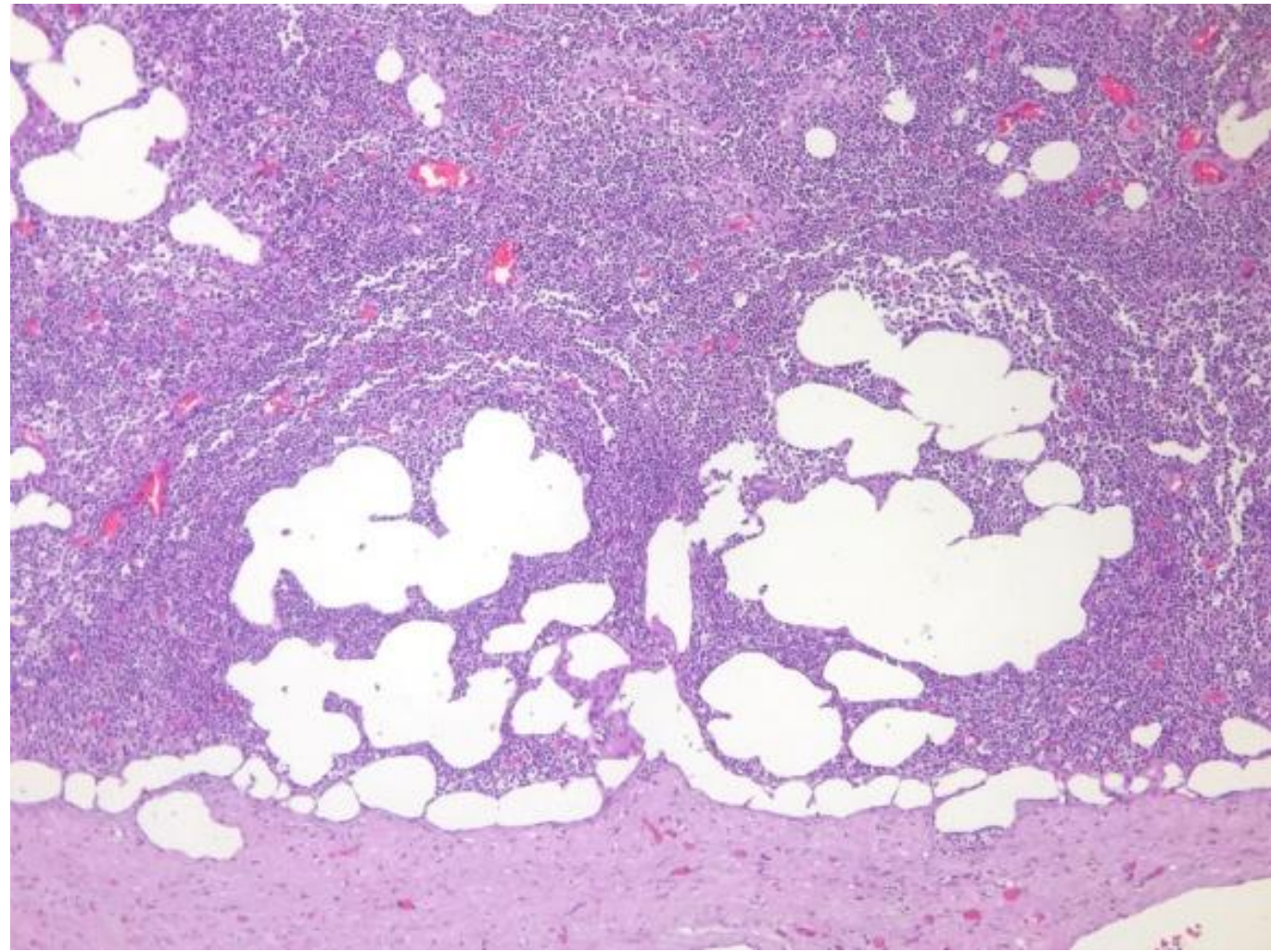


Figure 2. N-414/19. Presence of gas bubbles in the mesenteric lymph node

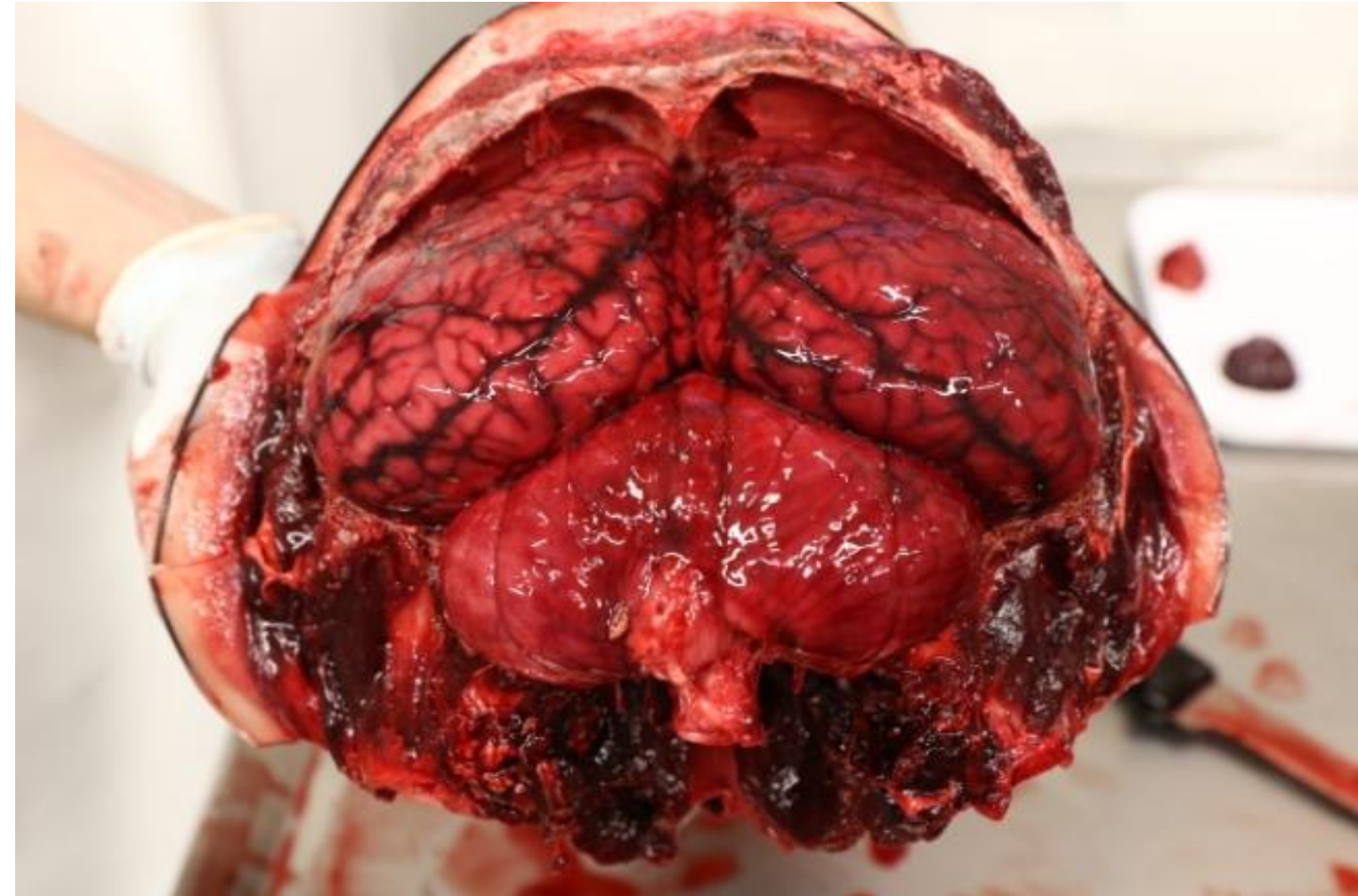


Figure 3. N-368/19. Congestive and hemorrhagic appearance of the CNS



Figure 4. Strobilocephalus triangularis present in the colon’s lumen (*S. coeruleoalba*).

3. Strobilocephalus triangularis

Case N-314/19 presented *S. triangularis*, a cestode that has been reported to affect at least 15 species of odontocetes. This parasite is easy to identify thanks to his enormous scolex that is anchored to the colon wall and grows inside a fibrotic capsule. Its pathogenicity is rather mild, varying from a slight local inflammatory reaction to necrotic ulcerations.

Table 2 *S. triangularis* prevalence in published studies

Place	Prevalence	Year	Species presenting the parasite	Source	Cetacean sample size
Costa Rica (pacific coast)	9,1%	2001-2009	<i>S. coeruleoalba</i>	(Oliveira et al., 2011)	25
Brasil	6,1%	1994-2009	<i>P. electra</i> , <i>S. clymene</i> , <i>S. longirostris</i> , <i>S. frontalis</i>	(Carvalho et al., 2010)	82
Spain (Atlantic coast)	0%	1991-1996	-	(Abollo et al., 1998)	80
Italy	ND	1985-1991	<i>S. coeruleoalba</i>	(Cerioni et al., 1996)	17
New Zealand	0%	2007-2014	-	(Lehnert et al., 2017)	17
United States	5,3% 8,3%	1973	<i>S. longirostris</i> <i>S. graffmani</i>	(Dailey et al., 1973)	19 72
United States	10%	1973-1977	<i>S. coeruleoalba</i>	(Dailey et al., 1978)	10
Spain (Mediterranean coast)	4,8%	1989-2008	<i>T. truncatus</i>	(Quiñones et al., 2013)	21
Argentina	3,2%	1992-1994	<i>C. commersonii</i>	(Berón-Vera et al., 2001)	32

4. Discussion and conclusions

Our results are obtained from a small sample of animals (n=7) and therefore drawing epidemiological conclusions or assessing the causes of death of the cetaceans on our coasts is difficult. Nonetheless, animals with an evident severe injury, which is often caused by human activity, are more frequently referred to pathologists by local authorities. The present study only reports one case of a dolphin that died from direct human interaction.

Aside from that, we had animal N-361/19 that was diagnosed as chronic encephalitis caused by CeMV. It is frequent to find chronic cases of CeMV after epizootic. In 2017 some animals presented systemic infection of CeMV. Thus active infection was affecting animals on our coast, and probably this explains the presence of chronic cases at the moment of this study (Domingo et al., 1995; Van Bressem et al., 2014).

The other causes of death had been described previously and its pathogenesis is well described. For instance, neurobrucellosis is one of the most significant manifestations of *Brucella* infection as it’s the one that is more often reported as the cause of stranded dolphins' death. Also, cetaceans can carry *B. ceti* without showing any kind of clinicopathological signs, such as case N-361/19 (Guzmán-Verri et al., 2012).

No epidemiological conclusions can be drawn to evaluate the health of the cetaceans in our coasts aside of that there isn’t evidence of any CeMV outbreak and that the causes of death are relatively usual and not novel.

Bibliography

Abollo, E., López, A., Gestal, C., Benavente, P., & Pascual, S. (1998). Macroparasites in cetaceans stranded on the northwestern Spanish Atlantic coast. *Diseases of Aquatic Organisms*, 32(3), 227–231.

Barnett, J., Bernaldo de Quirós, Y., Dagleish, M. P., Davison, N., Deaville, R., ten Doeschate, M. T. I., Rodríguez, A. J., Grilo, M., Gröne, A., Jauniaux, T., Jepson, P. D., van Neer, A., Perkins, M. W., Reckendorf, A., & Siebert, U. (2018). *Cetacean Pathology : Necropsy Technique & Tissue Sampling*. September, 1–28.

Bossart, G. D. (2011). Marine mammals as sentinel species for oceans and human health. *Veterinary Pathology*, 48(3), 676–690.

Carvalho, V. L., Bevilacqua, C. M. L., Iñiguez, A. M., Mathews-Cascon, H., Ribeiro, F. B., Pessoa, L. M. B., de Meirelles, A. C. O., Borges, J. C. G., Marigo, J., Soares, L., & de Lima Silva, F. J. (2010). Metazoan parasites of cetaceans off the northeastern coast of Brazil. *Veterinary Parasitology*, 173(1–2), 116–122.

Dailey, M., & Perrin, W. (1973). HELMINTH PARASITES OF PORPOISES OF THE GENUS STENELLA IN THE EASTERN TROPICAL PACIFIC, WITH DESCRIPTIONS OF TWO NEW SPECIES: AIASTZGONEMA STENELLAE GEN. ET SP. N. (NEMATODA: SPIRUROIDEA) AND ZALOPHOTREMA PACZCUM SP. N. (TREMATODA: DIGENEA) . *FISHERY BULLETIN*, 71(2), 455–471.

Dailey, M., & Stroud, R. (1978). PARASITES AND ASSOCIATED PATHOLOGY OBSERVED IN CETACEANS STRANDED ALONG THE OREGON COAST12. In *Journal of Wildlife Diseases* (Vol. 14).

Domingo, M., Vilafranca, M., Visa, J., Prats, N., Trudgett, A., & Visser, I. (1995). Evidence for chronic morbillivirus infection in the Mediterranean striped dolphin (*Stenella coeruleoalba*). *Veterinary Microbiology*, 44(2–4), 229–239.

Guzmán-Verri, C., González-Barrientos, R., Hernández-Mora, G., Morales, J. A., Baquero-Calvo, E., Chaves-Olarte, E., & Moreno, E. (2012). *Brucella ceti* and brucellosis in cetaceans. In *Frontiers in cellular and infection microbiology* (Vol. 2, p. 3). Frontiers Media SA.

Lehnert, K., Randhawa, H., & Poulin, R. (2017). Metazoan parasites from odontocetes off New Zealand: new records. *Parasitology Research*, 116(10), 2861–2868.

Oliveira, J. B., Morales, J. A., González-Barrientos, R. C., Hernández-Gamboa, J., & Hernández-Mora, G. (2011). Parasites of cetaceans stranded on the Pacific coast of Costa Rica. *Veterinary Parasitology*, 182(2–4), 319–328.

Quiñones, R., Giovannini, A., Raga, J. A., & Fernández, M. (2013). Intestinal Helminth Fauna of Bottlenose Dolphin Tursiops truncatus and Common Dolphin Delphinus delphis from the Western Mediterranean . *Journal of Parasitology*, 99(3), 576–579.

Van Bressem, M. F., Duignan, P. J., Banyard, A., Barbieri, M., Colegrove, K. M., de Guise, S., di Guardo, G., Dobson, A., Domingo, M., Fauquier, D., Fernandez, A., Goldstein, T., Grenfell, B., Groch, K. R., Gulland, F., Jensen, B. A., Jepson, P. D., Hall, A., Kuiken, T., ... Wellehan, J. F. X. (2014). Cetacean morbillivirus: Current knowledge and future directions. In *Viruses* (Vol. 6, Issue 12, pp. 5145–5181). MDPI AG.