

BRONCHOPNEUMONIA CAUSED BY *Streptococcus equi* IN A NORTH ATLANTIC PILOT WHALE (*Globicephala melaena*)

Authors: HIGGINS, ROBERT, CLAVEAU, ROBERT, and ROY, RENE

Source: Journal of Wildlife Diseases, 16(3) : 319-321

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-16.3.319>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

BRONCHOPNEUMONIA CAUSED BY *Streptococcus equi* IN A NORTH ATLANTIC PILOT WHALE (*Globicephala melaena*)

ROBERT HIGGINS, Department of Microbiology and Pathology, School of Veterinary Medicine, University of Montreal, St. Hyacinthe (Quebec) Canada J2S 7C6

ROBERT CLAVEAU and RENE ROY, Laboratory of Animal Pathology, Ministry of Agriculture of Quebec, 337 Moreault St., Rimouski (Quebec) Canada G5L 1P4

Abstract: Bronchopneumonia was observed at the necropsy of a North Atlantic pilot whale (*Globicephala melaena*). The areas of necrosis were well circumscribed clusters, disseminated throughout the left lung. *Streptococcus equi* was isolated in pure culture from the lung parenchyma, pharynx and pericardial fluid.

INTRODUCTION

Bacterial respiratory diseases frequently have been reported in cetaceans and pinnipeds. Pulmonary infections have been reported associated with *Diplococcus pneumoniae*, *Escherichia coli*, *Proteus* spp., staphylococci (coagulase positive), alpha and beta-hemolytic streptococci, *Pseudomonas* spp. or *Nocardia*.^{2,3,5,6,7,8,9,10} A beta-hemolytic *Streptococcus* spp. biochemically similar to *Streptococcus canis* recently has been isolated from the respiratory tract of an adult harbor seal.⁹ However, in the majority of the reports, beta-hemolytic streptococci are not identified biochemically nor serogrouped. A case of bronchopneumonia caused by *Streptococcus equi* in a North Atlantic pilot whale (*Globicephala melaena*) is reported.

CASE HISTORY

A 3.35 m female, immature North Atlantic pilot whale (*Globicephala melaena*) was found stranded on Metis Beach in the estuary of the Saint-Laurent River in the Province of Quebec, Canada, on November 1978. The moribund animal was immediately transported to the Laboratory of Animal Pathology of Rimouski for euthanasia and necropsy.

GROSS NECROPSY FINDINGS

Corneal ulcers were the only significant external gross lesions. Numerous foci of necrosis of 1 to 2 cm in diameter were present in the blubber layer. Blood tinged, serous exudate was present in the thoracic cavity. Bronchopneumonia was most severe in the left lung. The lesions were well circumscribed, but irregularly distributed and clustered. The heart appeared normal, but the pericardial sac was filled with approximately 100 ml of yellow exudate. Significant gross lesions were not observed in the organs contained in the abdominal cavity. Nematodes were present in the stomach and some small cestodes in the intestines. Final identification of those parasites was not achieved.

HISTOPATHOLOGY

Histopathologic examination revealed the presence of an acidophilic and fibrinous material in the alveolar lumen. The leucocytes were chiefly neutrophils and macrophages, and were found with desquamated epithelial cells in alveoli, bronchi and bronchioles. Some areas of the alveolar parenchyma were completely transformed in a mass of necrotic tissue. In other tissues or organs, significant histopathologic lesions were not observed.

TABLE 1. Comparative biochemical characteristics of the whale isolate and the *Streptococcus equi*.

	Whale isolate	<i>Streptococcus equi</i> ^a
Hemolysis	beta	beta
Presence of a capsule	+	+
Growth at 45 C	-	-
Growth initiation at pH 9.6	-	-
Heat tolerance (60 C for 30 min.)	-	-
Growth in 6.5% NaCl broth	-	-
Growth with bile (40%)	-	-
Litmus milk	-	-
Hydrolysis of arginine	+	+
Hydrolysis of esculin	-	-
Hydrolysis of starch	+	ND ^b
Hydrolysis of hippurate	-	-
Melibiose	-	ND
Arabinose	-	-
Glucose	+	+
Glycerol	-	-
Inulin	-	-
Lactose	-	-
Maltose	+	+
Mannitol	-	-
Raffinose	-	-
Salicin	+	+
Sorbitol	-	-
Sucrose	+	+
Trehalose	-	-
Xylose	-	ND

^aAs described in Bergey's Manual¹^bNo data or insufficient data

MICROBIOLOGY

Swabs from pharynx, pericardial fluid, lung tissue from normal and affected areas, bronchial lymph node, liver and kidney were cultured on blood and MacConkey agar at 37 C for 24 h. Muroid beta-hemolytic colonies were grown in pure culture from lung tissue, pericardial fluid and from pharyngeal specimens. Bronchial lymph node, liver and kidney were negative for bacterial growth.

The bacteria was identified as an encapsulated form of beta-hemolytic *Streptococcus* spp. The biochemical reactions were characteristic of a

*Streptococcus equi*¹ (Table 1). The organism was serogrouped by coagglutination with Phadebact reagents² as a Group C beta-hemolytic *Streptococcus*. The serogrouping was confirmed by the method of Lancefield¹¹ using Wellcome Streptococcal grouping sera.¹²

DISCUSSION

The isolation of *Streptococcus equi* has not been reported in cetaceans. *S. equi* is an equine pathogen and rarely has been isolated from other animal species.¹

The bronchopneumonia in the whales is similar to the condition as it appears in

¹ Pharmacia Diagnostics, Montreal (Quebec) Canada.

² General Diagnostics, Scarborough (Ontario) Canada.

domestic animals, the differences being related more to morphologic aspects of the whale lung than to inflammatory response.⁵ In horses, the disease (strangles) begins with a respiratory infection, followed by swelling and abscess formation in the lymph glands of the head and neck. Sometimes, the infection spreads through the lymphatics to the forelegs and trunk causing multiple abscesses. In fatal cases abscesses are often observed in bronchial lymph nodes.⁴ In the present case, the localisation of necrosis in tissues could be

associated with the thickness of the lobular septa.³

A survey of 23 necropsies of captive cetaceans demonstrated that bronchopneumonia is often the only gross lesion.⁵ Bacterial infection of the lungs is the most frequent systemic disease of small cetaceans and is the most common cause of death.¹⁰ All stages of the infection are seen, from peracute hemorrhagic bronchopneumonia to chronic abscessation. In most acute cases, severe depression, fetid breath and pulmonary rales develop.¹⁰

Acknowledgements

We thank Mr. Louis Michaud for excellent technical assistance in bacterial isolation.

LITERATURE CITED

1. *Bergey's Manual of Determinative Bacteriology*. 1974. Eighth Edition. The Williams and Wilkins Company, Baltimore, Maryland.
2. BROWN, D.H., R.W. McINTYRE, C.A. DELLI QUADRI and J. SCHROEDER. 1960. Health problems of captive dolphins and seals. *J. Am. vet. med. Ass.* 137: 534-538.
3. COWAN, D.F. 1966. Pathology of the pilot whale *Globicephala melaena*. A comparative study. *Arch. Path.* 82: 179-189.
4. *Hagan's Infectious Diseases of Domestic Animals*. 1973. Sixth Edition. Cornell University Press, Ithaca, New York.
5. MEDWAY, W. and H.F. SCHRYVER. 1973. Respiratory problems in captive small cetaceans. *J. Am. vet. med. Ass.* 163: 571-573.
6. MIGAKI, G., J.C. WOODARD and R.T. GOLDSTON. 1978. Renal adenoma in an atlantic bottle-nosed dolphin (*Tursiops truncatus*). *Am. J. vet. Res.* 39: 1920-1921.
7. RIDGWAY, S.H. 1965. Medical care of marine mammals. *J. Am. vet. med. Ass.* 147: 1077-1085.
8. ———. 1979. Reported causes of death of captive killer whales. *J. Wildl. Dis.* 15: 99-104.
9. STROUD, R.K. and T.J. ROFFE. 1979. Causes of death in marine mammals stranded along the Oregon coast. *J. Wildl. Dis.* 15: 91-97.
10. SWEENEY, J.C. and S.H. RIDGWAY. 1975. Common diseases of small cetaceans. *J. Am. vet. med. Ass.* 167: 533-540.
11. SWIFT, H.F., A.T. WILSON and R.C. LANCEFIELD. 1943. Typing group A hemolytic streptococci by M-precipitin reactions in capillary pipettes. *J. Exp. Med.* 78: 127-133.

Received for publication 5 November 1979