

**Mystic Aquarium
55 Coogan Boulevard
Mystic, Connecticut 06355**

**Mystic Aquarium Permit #22629
Incident Report- Beluga whale, ID 'Havok'**

Summary

A male beluga whale ID 'Havok' under research permit #22629 was moved from Marineland in Canada to Mystic Aquarium. In the months following the move, the animal experienced a reversion and worsening of the pre-existing gastric condition identified medically at his former facility. Despite 24-hour care and intensive medical, behavioral, and nutritional support provided by a team of veterinarians who are board certified by the American College of Zoological Medicine, the whale died.

Complete Description of Events

A male beluga whale ID 'Havok' was transported successfully to Mystic Aquarium on May 15, 2021, from Marineland in Canada. The Marineland medical history for this animal included a history of gastric ulcers and associated bleeding, anemia, and inappetence. Once these were identified by the ML veterinarian, Dr. June Mergl, the 3 veterinarians at Mystic Aquarium who are boarded as specialists by the American College of Zoological Medicine, guided the care and treatment of this whale at Marineland and the ulcers healed and the animal resumed normal appetite. The transport was postponed on several occasions to ensure that the gastric ulcers had healed, and that the animal was doing well prior to transport. Preshipment diagnostics and transport planning conducted by Marineland veterinarian, Dr. June Mergl, and overseen by the Canadian Food Inspection Agency, a Canadian science-based regulator with a mandate encompassing food safety, and animal and plant healthy, included bloodwork indicative of stable condition, negative for all infectious diseases tested, and gastric sample and respiratory sample testing that were normal. Despite normal gastric samples prior to transport, the animal was given gastric medications prior to the transport as additional protection.

The transport occurred without incident or complication. Beginning at arrival on May 15, 2021, the animal was administered gastrointestinal medications as well as supportive antibiotics and antifungal medications as a precaution. Following arrival at Mystic Aquarium, the animal did well initially, eating soon after transport, though demonstrated inconsistent appetite for the first couple of weeks, which then improved into June 2021, and then declined towards the end of June 2021. This decline in his appetite was identified as being gastric in origin, with gastric samples consistent with the return of the gastric ulcers that had been identified in his medical history at his prior facility. Medications were adjusted with animal condition in real time. The gastric samples improved with treatment, recurred, and then again improved. Supplemental feeding provided during this period included additional fish, salmon oil, and milk matrix formula, to deliver a high level of digestible nutrition. Food was delivered in small volumes over a 16-hour period each day to allow for maximum digestibility. Hydration was provided orally and parenterally periodically as well. The animal's appetite became strong in mid-July and endoscopy showed that ulcerations appeared to be resolving shortly thereafter. Despite the supplemental feedings and high caloric intake, the animal developed a rapid and progressive loss of condition beginning in mid-July 2021. Bloodwork at this time showed inflammation and an elevation in liver enzymes, both of which improved over time, and a mild anemia. Endoscopy and gastric sample analysis confirmed the ulcerations in the

esophagus and forestomach were healing as previously documented; however, fasted gastric samples were thick and contained debris. The combination of gastric sample appearance and rapid weight loss despite high calorie nutritional delivery supports that the whale was not processing his food normally.

In the beginning of August 2021, the animal developed muscle spasms in his back, which resulted in the development of an acute spinal curvature. The animal could mostly straighten out during swimming, but the curvature persisted when not moving. Despite 24-hour care and intensive medical and nutritional management, the whale died on August 6, 2021, and was transported to the University of Connecticut Pathobiology Laboratory for necropsy. A gross necropsy report is attached to this incident report. Cause of death is pending histopathologic review.

This death was the result of a health issue and is unrelated to any research being performed.

Attending Veterinarians

Jennifer Flower, DVM, MS, Diplomate American College of Zoological Medicine; supervised by Allison D. Tuttle, DVM, Diplomate American College of Zoological Medicine

Research Samples Collected

A summary of research samples collected on this animal at Mystic Aquarium follows:

- The animal provided behavioral saliva samples on May 21, May 27, June 17, June 18, and June 25 and July 16, 2021.
- Microbiome samples (oral and skin) were collected under behavioral control on June 15 and June 24.
- Opportunistic fecal samples were collected from the pool on four occasions (May 23, June 1, June 29, July 16, 2021) without contacting the animal.
- Blood was provided to research only opportunistically from clinical health testing and occurred on the May 15 arrival, Jun 1, June 7, June 30, July 1, July 14, July 16, July 19, July 22, July 27, and July 30, 2021.
- Microbiome samples were collected opportunistically during clinical procedures on July 22, July 27, and July 30, 2021. Samples included blowhole swabs in addition to skin and oral for the 22-30 and a fecal swab on the 30th.
- A piece of skin was collected opportunistically on July 30th.

As this was an isolated health event and in no way related to the research being conducted, we respectfully ask for permission to resume research sampling on the other animals listed on the permit to accomplish our important research goals.

Identification of Steps to Reduce Risk of Additional Events

This case was an unpredictable health issue in an animal that had been cleared by qualified veterinarians in Canada to transport. We have, and will continue to, ensure that medical conditions in one whale do not pose risk to the others. This case has no impact on the health of our other animals. Accredited by the Association of Zoos and Aquariums (AZA), the Alliance of Marine Mammal Parks and Aquariums (AMMPA), the International Marine Animal Trainers Association (IMATA), and certified by American Humane (AH), Mystic Aquarium consistently provides the highest quality medical and husbandry care to our animals. Our veterinary program is led by veterinarians who are board-certified specialists in zoological medicine

and our facility has over 4 decades of experience in providing the highest quality husbandry care for belugas. With a strong focus on preventative medicine, our animals are well-monitored during periods of health and receive prompt attention to all medical or behavioral concerns. A fully functioning clinical lab and veterinary hospital equipped with portable ultrasound, endoscopy, and radiography are on site for immediate diagnostic results when any condition arises. When necessary, Mystic Aquarium provides 24-hour care to our animal collection. This exceptionally high platform of animal care ensures the maximal welfare for all our animals. We will continue to provide our consistently exceptional animal husbandry and veterinary care as we move forward.



Connecticut Veterinary Medical Diagnostic Laboratory

Department of Pathobiology and Veterinary Science • College of Agriculture and Natural Resources
61 North Eagleville Road Unit 3089 • Storrs, CT 06269-3089
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Accession No: 21 - 3399
FINAL REPORT

MYSTIC AQUARIUM
55 COOGAN BLVD
MYSTIC CT 06355

Date Collected: 8/6/2021
Date Submitted: 8/6/2021
Date Reported: 10/13/2021

PH: 860-572-5955 FAX: 860 - 572-5972

Animal ID:	Species:	Breed:	Sex:	Age:	Wt:
Havok	Marine	Beluga	M	6Y	300 kg

FINAL DIAGNOSIS:

EMACIATION

LYMPHOPLASMACYTIC ENTERITIS, MODERATE TO MARKED
CUTANEOUS ULCERS, FLUKE & ROSTRUM, SEVERE
GRANULOMATOUS PANNICULITIS, THORACIC WALL, MARKED, WITH INSOLUBLE LIPID RESIDUES
ESOPHAGEAL ULCERS, MULTIPLE, MARKED TO SEVERE
GASTRIC ULCERS, SECOND COMPARTMENT, MARKED
ENDOCARDIAL FIBROSIS, MODERATE TO MARKED
EPICARDIAL FIBROSIS, SEVERE, WITH PROMINENT BLOOD VESSELS
LUMBOCAUDAL SCOLIOSIS, SEVERE
HEMORRHAGE AND EDEMA, EPAXIAL MUSCLES, MARKED
LYMPHOID DEPLETION, GASTRIC, MESENTERIC, AND TRACHEOBRONCHIAL LYMPH NODES, MODERATE TO MARKED
KERATITIS, LEFT EYE, MODERATE

MORPHOLOGIC DIAGNOSIS:

SKIN AND BLUBBER, FLUKE: [1] severe, focal, epidermal ulcer, with necrotizing, suppurative, dermatitis and panniculitis, thrombosis, hemorrhage, edema, and gram-negative bacteria; [2] moderate, multifocal, superficial epidermal, hydropic and spongiotic change, with lightly proteinaceous edema
SKIN AND BLUBBER, ROSTRUM: severe, focal, epidermal ulcer, with superficial collagen lysis thrombosis, edema, congestion, and spotty hemorrhage
SKIN AND BLUBBER, RIGHT DORSAL THORACIC WALL: [1] moderate, multifocal, superficial epidermal, hydropic and spongiotic change, with lightly proteinaceous edema; [2] moderate, multifocal, granulomatous panniculitis, with mild congestion, hemorrhage, and intrahistiocytic pigmented lipid residues
SKIN AND BLUBBER, PEDUNCLE: [1] mild, multifocal, chronic, papillary, lymphohistiocytic dermatitis; [2] mild, multifocal, superficial epidermal, hydropic and spongiotic change, with lightly proteinaceous edema; [3] moderate, multifocal, hemorrhage in the panniculus
SKELETAL MUSCLE AND FASCIA, RIGHT & LEFT EPAXIAL: marked, diffuse, edema, with hemorrhage
ESOPHAGUS: [1] severe, focal, ulcer, with granulation tissue, thrombosis, mild, lymphocytic, histiocytic, inflammation; [2] marked, focal, ulcer, with granulation tissue and minimal superficial suppurative inflammation; [3] marked, multifocal, ulcers, with collagen lysis, suppurative inflammation, and thrombosis; [4] marked, diffuse, epithelial hydropic change, mucosa
ESOPHAGUS, PERI-LARYNGEAL including GLANDS & MUCOSA ASSOCIATED LYMPHOID TISSUE: marked, multifocal, ulcers, with thrombosis, suppurative inflammation, edema, congestion, and granulation tissue
STOMACH, FIRST COMPARTMENT: marked, diffuse, hydropic change of mucosal epithelium
STOMACH, SECOND COMPARTMENT: [1] marked, multifocal, ulcers with necrosis and suppurative inflammation, thrombosis, hemorrhage, and superficial pigment; [2] marked, multifocal, lamina propria congestion
INTESTINE: [1] moderate to marked, segmental, lymphoplasmacytic enteritis with lymphofollicular arrangements; [2] mild, multifocal, crypt ectasia, with luminal necrotic debris

GASTRIC LYMPH NODE: [1] marked, diffuse, follicular, lymphoid depletion; [2] marked, diffuse, sinus histiocytosis, with sinus hemorrhage and erythrophagocytosis
MESENTERIC LYMPH NODE: [1] moderate, diffuse, follicular, lymphoid depletion; [2] marked, diffuse, sinus histiocytosis, with sinus hemorrhage
TRACHEOBRONCHIAL LYMPH NODE: [1] marked, diffuse, lymphoid depletion; [2] marked, diffuse, sinus histiocytosis, with mild neutrophilia
KIDNEY: [1] mild, multifocal, acute, tubular epithelial necrosis; [2] minimal, focal, medullar, tubular mineral deposition
LIVER: moderate, multifocal, biliary epithelial hyperplasia and fibrosis, with minimal to mild, lymphocytic, histiocytic portal infiltrates
HEART: [1] severe, locally extensive, perivascular, epicardial fibrosis; [2] moderate to marked, focal, endocardial fibrosis
LEFT EYE: marked, focal, chronic, lymphohistiocytic keratitis, with marked neovascularization
BRAIN: minimal, multifocal, perivascular, lymphohistiocytic meningoencephalitis
WHOLE BODY: emaciation (GROSS DIAGNOSIS)
TRACHEA AND LUNG: marked, diffuse, tracheobronchial edema (GROSS DIAGNOSIS)
VERTEBRAL COLUMN: severe, lumbocaudal scoliosis (GROSS DIAGNOSIS)

COMMENTS:

Along with and corroborating grossly apparent lesions identified in this beluga whale, there were several noteworthy histopathologic findings which could help explain the clinical signs and death. There is evidence of lymphoplasmacytic enteritis, gastric ulcers, and esophageal ulcers, which together could have contributed to the lack of appetite, weight loss, and emaciation reported by the submitting veterinarians. In comparison with intestinal sections from other beluga whales from this institution, multiple segments of intestine from this beluga whale demonstrated marked infiltration of the submucosa by high numbers of lymphocytes, sometimes forming follicular arrangements, and accompanied by scattered aggregates of low numbers of macrophages. Relatively high numbers of plasma cells expanded the overlying lamina propria. Microscopic examination confirmed mucosal ulceration of the second compartment of the stomach. In the esophagus, there were multiple ulcers, some of which had granulation tissue along their deep margins as well as varying degrees of inflammation, which was suppurative in some instances. Histologic sections of several of the multiple skin ulcers seen grossly revealed a range of inflammatory reactions. In the skin ulcer on the fluke, which was complicated by superficial bacteria, there was necrotizing and suppurative dermatitis and panniculitis. Conversely, the skin ulcer at the rostrum was lacking significant inflammation, with little or no evidence of wound healing. Consideration was given to the delayed or lack of wound healing possibly being related to emaciation and prolonged negative energy and protein balance. Within one section of blubber, there was a granulomatous panniculitis associated with intrahistiocytic pigmented lipid residues, which could be the result of incomplete lipid peroxidation associated with oxidative stress and/or antioxidant imbalance. Subjectively in sections of skeletal muscle, myofibers were slender with reduced sarcoplasm, and consideration was given to an interpretation of myofiber atrophy. The areas of grey endocardium were revealed to be areas of marked endocardial fibrosis. The arrangement of prominent blood vessels along the epicardium beneath the heart base noted on gross examination were resolved in histologic sections to be blood vessels surrounded by abundant vascularized fibrous connective tissue. The fibrosis is severe in the absence of epicardial adipose tissue, and it is unclear whether this fibrous connective tissue replaced the typical epicardial adipose tissue or whether this is an anomalous arrangement of fibrous connective tissue and blood vessels along this region of epicardium. There was chronic keratitis. Nodal lymphoid depletion could be interpreted as evidence of immunologic and/or physiologic stress. Other findings, e.g. minimal renal mineral deposition and minimal chronic inflammation in the meninges and brain, could be interpreted as incidental given the other findings in this case.

PATHOLOGIC FINDINGS

HISTORY:

History of reduced appetite and weight loss (est. 2 month duration). Transferred to medical pool for ongoing medical management and advanced diagnostics. Blood work suggestive of inflammation, mild anemia, elevated muscle and liver enzymes. History of gastritis/gastric ulceration, responsive to medical management. Recently developed spinal curvature that has progressed over last 3 days. Current medications include: antibiotics, antifungals, muscle relaxers, GI medications, misoprostol, probiotics, liver support, fluid therapy, nutritional support.

GROSS FINDINGS:

A 6-year-old, approximately 300kg, male, Beluga Whale (*Delphinapterus leucas*, Mystic Aquarium ID: Havok) was presented for postmortem examination. The whale was in thin body condition with prominent dorsal and transverse spinous processes. An S-shaped lateral curvature of the spine (scoliosis) was evident involving the mid-lumbar spine to the peduncle. Spanning the segment of the body involved in the scoliosis, there was severe bilateral subcutaneous and intramuscular edema of the epaxial muscles. Multiple abrasions of the skin were present on the head, dorsum, lateral body wall, peduncle, and fluke with the more severe including an ulcer of the rostrum and a large, oval ulcer on the fluke with raised margins. The peduncular subcutis and underlying connective tissue was hemorrhagic. Trachea and bronchi contained abundant foam. The mediastinum was emphysematous. The right atrial surface was irregular with pale pitted regions and reddened raised regions. Minimal fluid was present in the pericardial sac. Along the heart base and the coronary sulcus, and extending onto the epicardium, there were enlarged and tortuous blood vessels. There were streaks and plaques of smooth, grey, endocardium along the surfaces of the left and right ventricles. Minimal fluid was in the abdomen. The liver had rounded edges with irregular, depressed areas along its surface. Along the hepatic surface, there were multiple, 1-2mm diameter, white foci. Located along the esophageal mucosa immediately caudal to the larynx and extending to the thoracic esophagus, there were multiple and discrete, linear and elliptical ulcers, which had raised, curled margins. In the second compartment of the stomach, there were multiple and discrete, black ulcers. The first compartment contained fish. The intestine contained bright to dark green, semi-fluidic to semi-solid digesta and fecal material.

Measurements:

Snout to melon: 6cm
Snout to angle of mouth: 23.5cm
Snout to blowhole: 50cm
Snout to center of eye: 37.25cm
Snout to anterior insertion of the dorsal ridge: 145cm
Snout to tip of dorsal ridge: 176cm
Snout to fluke notch: 312cm
Snout to anterior insertion of flipper: 78cm
Snout to caudal end of ventral groove: 54cm
Snout to center of genital aperture: 183cm
Snout to center of anus: 223cm
Flipper length: 41.5cm
Flipper width (maximum): 26cm
Fluke width: 77.5cm
Dorsal fin height: not measured
Girth, axillary: 134cm
Girth, maximum (17cm caudal to axilla): 151cm
Girth at level of anus: 80cm
Blubber thickness (dorsal): 3cm
Blubber thickness (lateral at mid-length): 3.5cm
Blubber thickness (ventral at mid-length): 3cm

HISTOPATHOLOGY:

Histologic sections of the following tissues were evaluated on slides A-AZ: SKIN and BLUBBER of the FLUKE, ROSTRUM, PEDUNCLE, AND RIGHT DORSAL THORACIC WALL, SKELETAL MUSCLE of the RIGHT AND LEFT EPAXIAL MUSCLES, DIAPHRAGM, ESOPHAGUS, STOMACH (FIRST, SECOND, AND THIRD COMPARTMENTS), SMALL INTESTINE, LARGE INTESTINE, LIVER, ADRENAL GLAND, SPLEEN, LUNG, HEART, AORTA, PANCREAS, BRAIN, and EYES including LENSES.

SKIN AND BLUBBER, FLUKE (SLIDE A): [1] epidermal ulcer, focal, severe, with necrotizing, suppurative, dermatitis and panniculitis, thrombosis, hemorrhage, edema, and bacteria; [2] hydropic and spongiotic change, superficial epidermis, multifocal, moderate, with lightly proteinaceous edema

SKIN AND BLUBBER, ROSTRUM (SLIDE B): epidermal ulcer, focal, severe, with superficial collagen lysis, thrombosis, edema, congestion, and spotty hemorrhage

SKIN AND BLUBBER, RIGHT DORSAL THORACIC WALL (SLIDE C): [1] hydropic and spongiotic change, superficial epidermis, multifocal, moderate, with lightly proteinaceous edema; [2] panniculitis, granulomatous, multifocal, moderate, with mild congestion, hemorrhage, and intrahistiocytic pigmented lipid residues

SKIN AND BLUBBER, PEDUNCLE (SLIDE D): [1] dermatitis, lymphocytic, histiocytic, papillary, chronic, multifocal, mild; [2] hydropic and spongiotic change, superficial epidermis, multifocal, mild, with lightly proteinaceous edema; [3] hemorrhage, panniculus, multifocal, moderate

SKELETAL MUSCLE AND FASCIA, RIGHT EPAXIAL (SLIDES E & F): edema, diffuse, marked, with hemorrhage
SKELETAL MUSCLE AND FASCIA, LEFT EPAXIAL (SLIDES G & H): edema, diffuse, marked, with hemorrhage
ESOPHAGUS (SLIDE K): [1] ulcers, focal, severe, with granulation tissue, thrombosis, mild, lymphocytic, histiocytic, inflammation; [2] hydropic change, mucosal epithelium, diffuse, marked
ESOPHAGUS (SLIDE L): [1] ulcers, focal, marked, with granulation tissue and minimal superficial suppurative inflammation; [2] hydropic change, mucosal epithelium, diffuse, marked
ESOPHAGUS (SLIDE M): ulcers, multifocal, marked, with collagen lysis, suppurative inflammation, and thrombosis
ESOPHAGUS, PERI-LARYNGEAL including GLANDS & MUCOSA ASSOCIATED LYMPHOID TISSUE (SLIDE N): ulcers, multifocal, marked, with thrombosis, suppurative inflammation, edema, congestion, and granulation tissue
STOMACH, FIRST COMPARTMENT (SLIDE O): hydropic change, mucosal epithelium, diffuse, marked
STOMACH, SECOND COMPARTMENT (SLIDES P & Q): [1] ulcers, multifocal, marked, with necrosis and suppurative inflammation, thrombosis, hemorrhage, and superficial pigment; [2] congestion, lamina propria, multifocal, marked
INTESTINE (SLIDES Q, R, & S): [1] enteritis, lymphocytic, plasmacytic, segmental, moderate to marked, with lymphofollicular arrangements; [2] crypt ectasia, multifocal, mild, with luminal necrotic debris
GASTRIC LYMPH NODE (SLIDE U): [1] lymphoid depletion, follicular, diffuse, marked; [2] sinus histiocytosis, diffuse, marked, with sinus hemorrhage and erythrophagocytosis
MESENTERIC LYMPH NODE (SLIDE V): [1] lymphoid depletion, follicular, diffuse, moderate; [2] sinus histiocytosis, diffuse, marked, with foci of sinus hemorrhage
TRACHEOBRONCHIAL LYMPH NODE (SLIDE W): [1] lymphoid depletion, diffuse, marked; [2] sinus histiocytosis, diffuse, marked, with mild neutrophilia
KIDNEY (SLIDES X & Y): [1] tubular epithelial necrosis, acute, multifocal, mild; [2] mineral deposition, tubular, medulla, focal, minimal
LIVER (SLIDES Z, AA, AB, & AJ): biliary epithelial hyperplasia and fibrosis, multifocal, moderate, with minimal to mild, lymphocytic, histiocytic portal infiltrates
HEART (SLIDES AI, AJ, AZ): [1] epicardial fibrosis, perivascular, locally extensive, severe; [2] fibrosis, endocardial, focal, moderate to marked (SLIDE AI)
LEFT EYE (SLIDE AP): keratitis, lymphocytic, histiocytic, chronic, focal, mild, with marked neovascularization
BRAIN (SLIDES AR, AU-AY): meningoencephalitis, lymphocytic, histiocytic, perivascular, multifocal, minimal

SPECIAL STAINS:

TWORT'S TISSUE GRAM STAIN. SLIDE A. SKIN, FLUKE: The surface of the ulcer has mats of densely arranged, faintly gram-negative, rod-shaped bacteria.
SLIDE B. SKIN, BEAK: No bacteria are identified in representative sections.
SLIDE Q. INTESTINE: Low numbers of gram-negative rods are present within luminal debris on the surface of villi.

WARTHIN-STARRY SILVER STAIN. SLIDES O-Q. STOMACH (FIRST & SECOND COMPARTMENTS) & INTESTINE: No definitive bacteria are identified within representative sections.

PRUSSIAN BLUE HISTOCHEMICAL REACTION FOR IRON. SLIDE AB. LIVER: Hepatocytes throughout the section have brown granules within their cytoplasm, which are not reactive.

VERHOEFF-VAN GIESON'S STAIN FOR COLLAGEN AND ELASTIN. SLIDES AI-AK, AZ. HEART: The grey endocardium seen grossly is moderately to markedly expanded up to three times its typical width by abundant but varying amounts of collagen which separate and disrupt elastin. Along the epicardial surface, there are prominent medium-diameter blood vessels with abundant elastin within their walls. Between these blood vessels are densely arranged bundles of collagen which are interrupted by low numbers of small diameter blood vessels, occasional nerves, and elastin.

ZIEHL-NEELSEN ACID-FAST STAIN. SLIDE C. SKIN, RIGHT DORSAL THORACIC WALL: No acid-fast bacteria are identified within representative sections.

SLIDE Q. INTESTINE: No acid-fast organisms are identified within representative sections.

GROCOTT'S METHENAMINE SILVER STAIN. SLIDE C. SKIN, RIGHT DORSAL THORACIC WALL: No fungal hyphae or yeasts are identified in representative sections.

PERIODIC ACID-SCHIFF STAIN. SLIDE Q. INTESTINE: Macrophages forming aggregates within submucosal lymphoid tissue, interpreted as tingible-body macrophages, occasionally contain PAS-reactive material within their cytoplasm.

WOLBACH GIEMSA STAIN. SLIDE Q. INTESTINE: The material within the cytoplasm of macrophages aggregated within submucosal lymphoid tissue does not stain as a bacterium, fungus, or protist.

N. Tocco, DVM; Veterinary Pathology Resident
E. Reinhardt, BVM&S, MS, DACVP; Veterinary Pathologist
S. Frasca, Jr., VMD, PhD, DACVP; Veterinary Pathologist

Preliminary Report: 8/9/2021

Final Report: 10/13/2021

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Accession No: 21-3399
PRELIMINARY REPORT

MYSTIC AQUARIUM
55 COOGAN BLVD
MYSTIC CT 06355

Date Collected: 8/6/2021
Date Submitted: 8/6/2021
Date Reported: 8/9/2021

PH: 860-572-5955 FAX: 860 - 572-5972

Animal ID:	Species:	Breed:	Sex:	Age:	Wt:
Havok	Marine	Beluga	M	6Y	

FINAL DIAGNOSIS:
PENDING

MORPHOLOGIC DIAGNOSIS:

Whole Body: emaciation
Skin: epidermal erosions and ulcers, multifocal, moderate to severe
Heart: epicardial vascular proliferation, locally extensive, marked
Trachea and Lung: edema, tracheobronchial, diffuse, marked
Esophagus: ulcers, multiple, marked
Stomach, Second Compartment: ulcers, multiple, marked
Epaxial Muscles: edema, regional, severe
Vertebral column: scoliosis, lumbocaudal, severe

COMMENTS:

Multiple grossly apparent lesions were identified in this beluga whale. The esophageal and gastric ulcers appear chronic in some instances and will be evaluated further by microscopic evaluation of histologic sections. Allowing for speculation, these ulcers could have contributed to the emaciation of this whale. The scoliosis and muscular edema could be associated with chronic muscle wasting and exertion of wasted muscles. Tissues were submitted for histologic processing and microscopic evaluation, which is pending.

PATHOLOGIC FINDINGS

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and reddened raised regions. Minimal fluid was present in the pericardial sac. Along the heart base and the coronary sulcus, there was marked proliferation of enlarged and tortuous epicardial blood vessels. There were several areas of smooth, grey, endocardium at the base of the chordae tendinae along the endocardial surface of the left and right ventricles. Minimal fluid was in the abdomen. The liver had rounded edges with irregular depressed areas along its surface. Along the hepatic surface, there were multiple 1-2mm white foci. Located along the esophageal mucosa just caudal to the larynx and extending to the thoracic esophagus, there were multiple and discrete, linear and elliptical ulcers, which had raised, curled margins. In the second compartment of the stomach, there were multiple and discrete, black ulcers. The first compartment contained fish. The intestine contained bright to dark green, semi-fluidic to semi-solid digesta and fecal material.

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HISTOPATHOLOGY:
PENDING

N. Tocco, DVM; Veterinary Pathology Resident
E. Reinhardt, BVM&S; Veterinary Pathology Academic Assistant
S. Frasca, Jr., VMD, PhD, DACVP; Veterinary Pathologist

Preliminary Report: 8/9/2021

-----**END OF REPORT**-----

