MICHIGAN STATE UNIVERSITY

DCPAH
Diagnostic Center for Population & Animal Health

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REPORT OF LABORATORY EXAMINATION

Client:
White Shepherd Genetics- (295483)
Project - Attn: Judy Huston
PO Box 404
Howell, MI 48844

Owner:
Fuellgraf, Melanie
316 North Trail

Butler PA 16002

Rcvd Date:	2/10/2012 10:56:00 AM	Animal:	NIKITA	MRN:	
Admitted By:	Not, Provided	Species:	Canine	Breed:	German Shepherd
Ordered By:	N/A	Age:	9 years	Gender:	Female
Encounter:	01310483	Tag/Reg ID:			
CR#:	AP	Other ID:			

Necropsy Preliminary Report

Accession Number:	Received Date/Time:	Verified Date/Time:	Pathologist:
NC-12-0000170	2/10/2012 10:58:00 AM	2/13/2012 8:26:35 AM	Patterson, Jon S.

History

A 9-year-old, spayed female white German shepherd died on 2/8/12 after a 2-month illness which included a diagnosis of splenic hemangiosarcoma and hemoabdomen in early December 2011. Initial clinical signs included lethargy, a distended abdomen, polydipsia, and pale oral mucous membranes. Physical exam by a veterinarian and abdominal radiographs suggested hemoabdomen, and a ruptured spleen was suspected. The dog had emergency surgery on December 6 to remove its spleen. At that time, approximately 3 liters of blood also were removed from the abdomen. Biopsy diagnosis of the spleen was hemangiosarcoma. A liver biopsy also was collected at surgery, because the organ was deemed to be slightly discolored by the surgeon, but the only reported histopathologic finding was cholestasis.

The dog had been given a blood transfusion prior to surgery because of a low hematocrit, and was treated with Hetastarch and human albumin post-surgery because of low serum albumin concentration. On 12/28, the dog had a swollen front leg and some facial swelling. It was thought that this was an allergic reaction to the human albumin, and the animal responded well to prednisolone treatment.

Toward the end of January 2012, the dog's abdomen seemed to enlarge and then subside in size over the course of a day, and over several days. After January 30, the abdomen remained distended, and the animal was treated with Tramadol to relieve discomfort. On February 5, the dog was lethargic with a decreased appetite. On February 7, some "bloody" fluid was removed from the abdomen by a veterinarian. However, during the night of February 7, the dog was extremely uncomfortable and dyspneic, with open-mouth breathing. Oral mucous membranes were again very pale. The animal died between 11 a.m. and 12:30 p.m. on February 8.

Previous history included a diagnosis of "moderate" hip dysplasia according to OFA radiographs taken at age 2. There was "mild to moderate" radiographic evidence of degenerative joint disease in the left hip at that time, but no radiographic evidence of DJD in the right hip. The dog had good activity level throughout its life, and showed no signs of lameness or joint disease until August 2011, when she seemed to be "slowing down." The animal also seemed to gain weight, beginning in November 2011, and came to favor its left hind limb in January 2012.

Also described in the OFA radiology report was a "transitional vertebra." The location of this abnormal vertebra was not specified.

Additional history is on file at the DCPAH. Also, Dr. Patterson obtained extensive history from the owner via e-mail on February 11 and 12.

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Gross Description

A 58-kg dog in fair to poor nutritional condition (BCS = 7/9) and fair post mortem condition was presented dead for necropsy. There was excessive subcutaneous, perirenal, and mesenteric adipose tissue, especially in the lumbar epaxial region and the flanks bilaterally. Oral mucous membranes were pale pink to white. There was an oval, 4x3-cm, dry, gray red brown, thick callus on the point and lateral aspect of the left elbow. A similar, though less thick, 3x2.5-cm callus was present on the lateral aspect of the right elbow. Just to the right of dorsal midline, and approximately 10 cm caudal to the scapula, there was a round, 1.5-cm diameter, raised (1 cm), dark brown to black, dry scab; when the surface of the scab was removed, a small volume of creamy, tan pink exudate was noted. This exudate extended into the dermis to a depth of approximately 3 mm, where it was surrounded by a 3-mm wide gray, fibrous wall (abscess).

There was 29-cm long, healed, surgical skin incision along the ventral abdominal midline, extending from the xiphoid caudally. Just cranial and to the right of the umbilicus, there was an oval, gray red, 5x3-cm cutaneous discoloration (bruise). The subcutaneous adipose tissue of the right flank and medial right thigh contained an oval, 4x3-cm, light red, gelatinous area of edema. The vulva was somewhat fatty (“hooded”), with numerous pinpoint black nodules on the cutaneous surface.

The head of the left femur was markedly thickened and somewhat flattened on its articular surface. The medial aspect of the articular surface was red brown because of cartilage thinning, and the entire margin of the articular surface of the femoral head was rough and sharp. The neck of the left femur was markedly thickened and irregular because of bony proliferation. The left acetabulum was somewhat shallow, and its border was thickened by gray white fibrous tissue in a 6-mm wide, circumferential band. This left coxofemoral joint also contained two smooth, white, ovoid, hard, free-floating masses ("joint mice", or fragments of cartilage and bone); one mass was 5x4x4 mm, and one was 10x8x7 mm.

The right coxofemoral joint was normal except for mild bony thickening along a 7-mm width of the medial border of the articular surface with the acetabulum.

The medial and lateral trochlear ridges, and the cranial aspects of the medial and lateral condyles of both femurs were slightly thickened and irregular, with splotchy, thin, red streaks on the articular surfaces. Otherwise, the stifles were normal, as were other examined joints.

The entire vertebral column was split parasagitally and examined. Intervertebral discs at T13-L1, L1-L2, L2-L3, L3-L4, and L4-L5 had opaque white or yellow white centers, and were slightly dry and flaky, compared to normal intervertebral discs at other sites. There was mild bony bridging spondylosis on the ventral aspects of vertebral bodies L2 and L3. Bridging spondylosis was moderate at L3-L4, as the bony proliferation was 1.5 cm long, 1 cm wide (left to right), and 1 cm tall (dorsoventral). Bridging spondylosis was severe at L7-S, as the bony proliferation was 2.2 cm long, 1.7 cm wide, and 1.5 cm tall. At this site, the intervertebral disc also protruded slightly into the vertebral canal. The sacrum was, overall, 4.5 cm long, but there was an intervertebral disc space (with an intervening disc) 2 cm from the joint with L7. It was suspected that this portion of the sacrum may have represented the transitional vertebra (an "extra" lumbar vertebra?) described in the OFA radiology report. Caudal to this intervertebral disc space, the sacrum was 2.5 cm long.

The entire spinal cord, including the cauda equina, was removed and examined, and was found to be grossly normal.

The free edge of the mitral valve was mildly thickened and nodular (valvular endocardiosis). The myocardium of the right atrium was dark red centrally, in an irregularly shaped 2x2-cm area, but there was no obvious 3-dimensional mass.

The peripheral aspects of lung lobes were somewhat yellow brown on pleural surfaces, but the lungs were otherwise grossly normal.

Two ovoid to spherical, 1-cm diameter, dark red, smooth, structures were identified in the mediastinum; one was in the cranial mediastinum and one was near the base of the heart.

The abdominal cavity contained approximately 9 liters of dark red, unclotted blood. The retroperitoneal space and caudal abdomen contained an additional 50 mL of clotted blood.

The liver was diffusely yellow brown with a prominent lobular pattern. Approximately 15-20 spherical, dark red, soft masses were scattered throughout the liver. The masses ranged in diameter from 1-2 cm, and some were raised above

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the capsular surface. There was one irregularly shaped, 13x9x10-cm, dark red, soft, multilobular mass in the quadrate lobe of the liver. The medial aspect of this mass was rough in a 3x3-cm area, which appeared to be a rupture site. Approximately 10 similar dark red nodular masses were present on the abdominal surface of the diaphragm, and approximately 15 masses were attached to the parietal peritoneum. The mesentery contained 75-100 similar masses. These masses ranged in diameter from 3 mm to 3 cm, except for one mesenteric mass toward the root of the mesentery and near the stomach, which was multinodular and measured 10x5x6.5 cm.
The spleen was not identified.
The greater curvature of the stomach was attached to the parietal peritoneum of the ventral abdomen over a 4-cm, linear length (gastropexy site, presumptive). The gastric fundus contained gray brown, moist digesta, several 2- to 3-cm segments of hot dogs, and 4 irregularly shaped, 1- to 3-cm long bone fragments. The gastric pylorus was somewhat impacted with drier yellow brown, fibrous digesta, mixed with 1-cm long, soft, white flecks of feed.
All other tissues and organs were grossly normal.

Gross Diagnosis(es)

Severe hemoabdomen
Disseminated abdominal neoplasia (liver, diaphragm, mesentery, parietal peritoneum; hemangiosarcoma, presumptive)
Severe unilateral chronic degenerative arthropathy, left coxofemoral joint
Moderate to severe bridging spondylosis, intervertebral joints L3-L4 and L7-sacrum
Possible "extra" lumbar vertebra
Moderate chronic degenerative intervertebral disc disease (T13-L1, L1-L2, L2-L3, L3-L4, L4-L5)
Moderate hepatic lipidosis (presumptive)
Mediastinal lymphadenopathy (metastatic hemangiosarcoma, presumptive)
Mild valvular endocardiosis (mitral valve)
Mild pulmonary hemosiderosis (presumptive)
Focal cutaneous chronic abscess

Comment:
The most significant findings with respect to the dog's cause of death were hemoabdomen and disseminated abdominal neoplasia. The neoplastic masses are believed to be hemangiosarcomas, and the largest mass in the liver appeared to have ruptured; this would have led to hemoabdomen. The dog undoubtedly died of severe blood loss and hypovolemic shock.
Severe degenerative joint disease in the left hip joint would explain the animal's stiffness and soreness on that limb during the last months of her life. Histopathologic examination of all tissues and organs is in progress, and results will be sent in a final report.

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Jon S. Patterson, DVM, PhD, Dipl ACVP
Anatomic Pathologist

Jon S. Patterson, DVM, PhD, DACVP

(Electronically signed by) JSP

Verified: 02.13.2012 08:26

JSP /JSP

Necropsy Final Report

Accession Number:	Received Date/Time:	Verified Date/Time:	Pathologist:
NC-12-0000170	2/10/2012 10:58:00 AM	3/1/2012 11:06:14 AM	Patterson, Jon S.

History
NA

Gross Description
NA

Gross Diagnosis(es)
NA

Laboratory Findings
NA

Microscopic Description
Sections of spinal cord (from cervical through cauda equina), brain, heart, kidney, diaphragm, mesenteric mass, and stomach were examined. On the peritoneal surface of the diaphragm, there was a discrete, raised mass composed primarily of pleomorphic spindle-shaped cells lining small irregular clefts and tortuous channels. Some of the channels contained blood cells, and others were empty. The clefts and channels were supported in multiple areas by dense, short bands of collagen. The neoplastic cells had elongate to oval, small to large, hyperchromatic to hypochromatic nuclei, and a scant to moderate amount of pale eosinophilic cytoplasm. Some nuclei contained prominent nucleoli. There were 0-6 mitotic figures per high-power field. Between the densely cellular base of the mass and the peripheral surface, there was a zone of primarily blood cells and fibrin. The peripheral surface was defined by a thin band of neoplastic cells and non-neoplastic fibrovascular tissue.

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Sections of 2 of the largest mesenteric masses were examined. These were composed primarily of blood cells and fibrin, surrounded by a thin fibrovascular capsule. Neoplastic cells were difficult to identify in these masses because of post mortem autolysis.
Three sections of right auricle were examined, because of the suspicion of neoplastic involvement noted grossly. In these sections, there were multiple small foci of neoplastic cells, similar to those described in the diaphragmatic mass, in the myocardium. In many other areas, bands of blood cells were present between cardiac myofibers (hemorrhages), and there was multifocal epicardial hemorrhage. In some areas, myocardial capillaries were distended with blood cells, but the lining endothelial cells did not appear neoplastic.
The brain and spinal cord were essentially normal, except for scattered neurons containing lipofuscin. In sections of brain, and in occasional sections of spinal cord, a few blood vessels in the neuropil and leptomeninges contained numerous round cells with hypochromatic nuclei and scant or unstained cytoplasm; the origin or nature of these cells was unknown, but they were not similar to the neoplastic cells described in the diaphragmatic mass.
Occasional aggregates of lymphocytes, plasma cells, and macrophages were present in the interstitium at the corticomedullary junction in a section of kidney. Sections of stomach were histologically normal, except for post mortem autolysis.

Morphologic Diagnosis(es)

diaphragm, mesentery, right auricle: hemangiosarcoma

Final Diagnosis(es)

Severe hemoabdomen
Disseminated hemangiosarcoma (liver, diaphragm, mesentery, parietal peritoneum, right auricle)
Severe unilateral chronic degenerative arthropathy, left coxofemoral joint
Moderate to severe bridging spondylosis, intervertebral joints L3-L4 and L7-sacrum
Transitional lumbar vertebra
Moderate chronic degenerative intervertebral disc disease (T13-L1, L1-L2, L2-L3, L3-L4, L4-L5)

Comment:
There was no evidence of spinal cord disease in this dog, despite moderate degenerative disc diseases at several intervertebral joints and bridging spondylosis in the lumbosacral spine. The transitional vertebra at the lumbosacral joint was confirmed by consultation with veterinary radiologists (who examined the provided radiographs) at the MSU Veterinary Teaching Hospital.
As reported in the preliminary report, blood loss into the abdomen secondary to rupture of a hemangiosarcoma mass in the liver was the cause of death in this case. Histopathologic examination revealed that neoplastic cells were present in the right side of the heart (auricle) as well as the abdominal sites described in the gross necropsy report.

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Jon S. Patterson, DVM, PhD, Dipl ACVP
Anatomic Pathologist

Jon S. Patterson, DVM, PhD, DACVP

(Electronically signed by) JSP

Verified: 03.01.2012 11:06

JSP /JSP

Special Requests

Collected Date/Time (If Provided)	02/10/2012 11:01:00
Procedure	
Notification *	"See Below"

2/10/2012 11:01:00 AM Notification:
This report informs you of laboratory results associated with an Anatomic Pathology case. Laboratory results should be interpreted in conjunction with pathologic findings. In some instances, laboratory results may be received prior to the pathology report. In all instances, a cumulative report will be issued.