

**REPORT OF LABORATORY EXAMINATION**

Client:		Owner:	
White Shepherd Genetics Project (295483)		Dzis, Diana	
Project PO Box 2068 Howell, MI 48844-2068		14800 Fairlane Street	
USA		Livonia MI 48154	
Rcvd Date:	04/23/2007 12:45:00 PM	Animal:	POLO
Admitted By:	Sell, Dr.	Species:	Canine
Ordered By:	N/A	Age:	9 years
Encounter:	00359721	Tag/Reg ID:	
CR#:	AP 711312462	Other ID:	
		MRN:	
		Breed:	German Shepherd
		Gender:	Male

Necropsy	Preliminary	Report
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Accession Number:	Received Date/Time:	Verified Date/Time:	Pathologist:
NC-07-0000643	04/23/2007 12:48:00 PM	04/24/2007 10:48:54 PM	McKnight, Christy

**History**

This 9 year 10 month old white German Shepherd was euthanized after a 7-8 week period of decline following a diagnosis of tonsillar squamous cell carcinoma. The dog previously had a history of hip replacement with a titanium implant and suspected nerve damage to the tail as well as damage to the left knee. This dog was enrolled in the White Shepherd Genetics project at MSU. Relatives of the dog had a history of lumbar stenosis. Additional history is on file at the Diagnostic Center for Population and Animal Health.

**Gross Description**

This 29.45 kg intact male white German Shepherd appeared thin with muscle wasting of the hindlimb musculature and mild to moderate dehydration with sunken eyes and tacky mucous membranes. Externally, there was a 100 ug transdermal Fentanyl patch adhered to the epidermis within a 14 cm x 6 cm area of clipped hair on the right caudal dorsum. The right forelimb had a 1 cm x 1 cm area of alopecia and crusting over the dorsolateral carpus. Focal areas of alopecia with thickening of the epidermis (calluses) were present over the right hock and on the elbows. Within the oral cavity, the right 4th mandibular premolar was missing. The tonsillar fossae were not prominent or dilated. Within the right tonsillar fossa, there was a focally extensive, firm nodularity and irregularity of soft tissue. A discrete mass within the tonsils was not evident. Within the subcutaneous tissue and musculature of the right neck, there was a firm, infiltrative mass measuring approximately 5.5 cm x 6 cm. This mass extended from the right ramus of the mandible distally to the medial thoracic inlet. It appeared to involve a lymph node and the tissue was white to yellow, firm, and moderately lobular on cut section. Within the thorax, there were multifocal, randomly distributed pinpoint to 2 mm diameter, firm nodules throughout all lung lobes that ranged from dark brown and hemorrhagic to white to yellow. There were flat areas of black pigmentation on the visceral surface of the pericardium and mediastinum resembling melanosis. There was moderate thickening and nodularity of the mitral valve, consistent with endocardiosis. The urinary bladder was moderately to markedly distended and contained approximately 250 ml of yellow, clear urine. The prostate was bilaterally and symmetrically enlarged, measuring 6 cm x 6 cm x 3 cm. The prostate was moderately

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## Necropsy

## Preliminary

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firm, lobulated, and exuded a moderate amount of white, slightly opaque fluid (prostatic fluid) on cut section. The gall bladder was enlarged and distended, measuring approximately 9 cm x 5 cm x 5 cm and containing approximately 125 ml of dark red to black bile.

The right femoral head and acetabulum were replaced by a titanium implant. This implant appeared intact and the joint was freely movable. There was a moderate amount of fibrosis surrounding the acetabulum. The left femorotibial joint had focal roughening and erosion of the medial trochlear ridge with mild associated fibrosis and hyperemia. The corresponding gliding surface of the left patella had mild hyperemia and was slightly flattened. The cruciate ligaments were intact in both femorotibial joints. Within the spinal canal, there was an osteophyte originating from the ventral aspect of the third lumbar vertebrae that was partially bridging over the second and third thoracic disk space. There was also a small non-bridging osteophyte on the ventral second lumbar vertebra. Gross evidence of intervertebral disk disease or lumbar stenosis were not noted.

The remaining organs were grossly within normal limits.

### Gross Diagnosis(es)

**Cervical soft tissue: Cervical mass with pulmonary metastasis (most suggestive of squamous cell carcinoma with local lymph node and pulmonary metastasis)**

**Prostate: suspected benign prostatic hyperplasia**

**Urinary Bladder : Moderate, chronic distension (suggestive of atony)**

**Right hip: Right hip replacement with titanium implant**

**Left medial femoral trochlear ridge: Mild degenerative osteoarthritis with suspected patellar luxation**

**Vertebrae: Mild spondylosis affecting the third thoracic vertebra and fourth lumbar vertebra**

### Comments:

The most significant gross finding in this dog was the suspected pulmonary and submandibular lymph node or local soft tissue metastatic neoplasia, likely originating from the previously diagnosed tonsillary squamous cell carcinoma.

Additional gross findings included bladder distension and symmetric enlargement of the prostate. Benign prostatic hyperplasia is a common finding in older intact male dogs that predispose them to prostatitis (not evident grossly in this case). It could not be determined grossly whether the bladder distension was due to prostatic enlargement, neurological impairment, or other cause.

The degree of spondylosis observed grossly was mild and the clinical significance is uncertain.

Histopathology is in progress.

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Ingrid L. Bergin, VMD, MS, DACLAM

Christy McKnight, DVM

(Electronically signed by) CM

Verified: 04.24.2007 22:48

CM /ILB

Necropsy	Final	Report
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### Microscopic Description

Sections of brain, spinal cord, eye, lung, heart, liver, spleen, kidney, adrenal, lymph node, pancreas, stomach, intestine, skeletal muscle, prostate, urinary bladder, testes, tonsil, and cervical mass were examined.

The cervical mass consisted of nests and branching islands of neoplastic squamous epithelium situated within a dense collagenous stroma. The mass was surrounded by dense fibrous tissue with adjacent adipose tissue and large veins and arteries. The epithelial cells were polygonal with a moderate amount of eosinophilic cytoplasm and moderate anisocytosis. The nuclei were round to ovoid and had vesiculate chromatin with 1-2 prominent nucleoli. Mitoses are present at 2-3/400x field. Individual cells contained hypereosinophilic foci suggestive of keratinization and there were rare, small keratin pearls. Numerous large necrotic foci were present, accompanied by hemorrhage and moderate numbers of degenerate neutrophils. The neoplastic cells infiltrated into the adjacent dense fibrous tissue and normal lymph node architecture was not observed.

Sections of tonsillary fossa contained multiple small neoplastic emboli within lymphatics surrounded by dense fibrocollagenous tissue. Normal tonsillary lymphoid tissue was not present. The cells appeared similar to those described above, although keratin pearls were not observed and there were occasional megalokaryocytes.

Sections of lung contained multiple metastatic foci of neoplastic squamous epithelium that locally effaced the pulmonary parenchyma. Cellular morphology is similar to that described in the cervical mass, although keratin pearls are rare and the mitotic index was high (7-9/400x field).

A section of bronchial lymph node contained infiltrative neoplastic cells with a similar appearance to those described above within the subcapsular sinuses and multifocally within the cortex.

Sections of prostate appeared markedly hyperplastic, with numerous, well-differentiated glandular epithelial cells lining tubules and glands within expanded prostatic lobules. The urethra was lined by mildly hyperplastic transitional cell epithelium. Bladder epithelium had sloughed from the majority of the tissue, impeding evaluation. Neural plexi within the bladder wall appeared within normal limits.

Within the kidney, there was multifocal thickening of Bowman's capsule which appeared pale and homogeneously eosinophilic. There were occasional shrunken and sclerotic glomeruli and mild, multifocal mineralization of shrunken glomeruli and within few tubules. Mild, multifocal, interstitial lymphoplasmacytic inflammation was also present. The liver contained diffuse, moderate to severe, predominantly centrilobular congestion and moderate amounts of intrahepatocytic

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yellow pigment resembling lipofuscin. The heart contained mild, multifocal adipocyte infiltration within the myocardium. The spleen appeared contracted and contained moderate numbers of hemosiderin-laden macrophages. Mesenteric lymph nodes also contained moderate hemosiderin-laden macrophages within medullary cords.

Sections of small intestine contained mildly increased lymphoplasmacytic inflammation in the lamina propria. In sections of stomach there was severe, multifocal glandular atrophy, with irregularity of mucosa, loss of parietal cells, and diffuse fibrosis within the lamina propria. Many remaining glands were dilated with attenuated epithelium and contained moderate amounts of proteinaceous, eosinophilic material within the gland lumen. Moderate numbers of neutrophils admixed with lymphocytes and plasma cells were present in the lamina propria and there were few mucosal lymphocytic aggregates. Mucus cells were present in large numbers.

In sections of spinal cord, the dura mater in the region of the cauda equina contained multifocal aggregates of mineralized bone surrounding foci of myeloid (marrow) elements within adipose tissue. Within segments of the lumbar spinal cord, there was mild myelin and axonal degeneration within the ventral tracts and, to a lesser degree, within dorsomedial tracts. Small numbers of large, dilated myelin sheaths which sometimes contain macrophages (Gitter cells) are present, as are small numbers of axonal spheroids.

### Morphologic Diagnosis(es)

Tonsillary fossa, cervical subcutis, lung, and bronchial lymph node: Squamous cell carcinoma, likely of tonsillary origin, with intralymphatic neoplastic emboli, bronchial lymph node infiltration, and pulmonary metastasis

Prostate: Benign prostatic hyperplasia  
Bladder: Bladder atony and distension (gross finding)

Kidney: Mild to moderate, multifocal, chronic glomerulosclerosis  
Liver: Moderate to severe, multifocal centrilobular congestion  
Stomach: Severe, multifocal, chronic atrophic gastritis with parietal cell loss, mucus metaplasia, and fibrosis

Cauda equina: Severe, focally extensive, chronic dural osseous metaplasia  
Vertebrae: Mild spondylosis affecting the third thoracic vertebra and fourth lumbar vertebra (gross finding)  
Lumbar spinal cord, white matter, ventral and dorsomedial tracts: Mild, multifocal, chronic axonal and myelin degeneration  
Right hip: Right hip arthroplasty with titanium implant (gross finding)  
Left medial femoral condylar ridge: Mild degenerative osteoarthritis with suspected patellar luxation (gross finding)

### Final Diagnosis(es)

**Metastatic squamous cell carcinoma**  
**Benign prostatic hyperplasia with bladder atony**  
**Chronic atrophic gastritis**  
**Dural osseous metaplasia**  
**Mild lumbar stenosis (suggestive of)**  
**Mild thoracic spondylosis**  
**Hip arthroplasty (right)**  
**Mild distal femoral osteoarthritis (left)**

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The most significant finding in this case was the metastatic squamous cell carcinoma. In addition, there was benign prostatic hyperplasia which, in the absence of detectable changes in the neural plexi, likely contributed to the bladder distension observed grossly. Osseous metaplasia in the dura mater and spondylosis are relatively common changes in older dogs and have been reported as incidental findings or, in some cases, in association with decreased flexibility of the spine. The mild degenerative changes in the lumbar vertebrae are suggestive of mild lumbar stenosis, although this was not observable grossly.

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