



What Is Your Neurologic Diagnosis?

A 10-year-old 7.6-kg (16.7-lb) spayed female Pekingese was referred for evaluation because of progressive clinical signs including dull mentation, circling to the right, a right-sided head turn, head pressing, and, more recently, coughing, vomiting, anorexia, and melena. Empirical treatment with

dexamethasone sodium phosphate, an antimicrobial, and a gastroprotectant was unsuccessful in resolving the clinical signs. Results of serum biochemical analysis and a CBC prior to referral revealed mildly high alkaline phosphatase activity and a stress leukogram.

Neurologic examination

Observation

Mental	Alert	Depressed	X	Disoriented		Stupor		Coma	
Posture	Normal	Head tilt		Tremor		Falling		Head Turn	X
Gait	Normal	Ataxia		Pelvic limbs		All 4		Circling	X
Paresis	Pelvic limbs	Tetra	X	Hemi		Mono			
Other	Severe right-sided head turn and reluctance to ambulate.								

Postural reactions

Key: 4 = Exaggerated, clonus; 3 = Exaggerated; 2 = Normal; 1 = Diminished; 0 = None; NE = Not evaluated.

	Left forelimb	Right forelimb	Left hind limb	Right hind limb
Wheelbarrow	I	0		
Hopping	I	0	I	0
Ext postural thrust			I	0
Proprioceptive pos	I	0	I	0
Hemistand/walk	I	0	I	0
Placing-tactile	I	0		
Placing-visual	NE	NE		

Spinal reflexes

	Left forelimb	Right forelimb	Left hind limb	Right hind limb
Quadriceps			2	2
Extensor carpi	2	2		
Flexion	2	2	2	2
Crossed extensor	0	0	0	0
Perineal			2	2

Cranial nerves

	L	R		L	R	Comments
II, VII—Vision menace	0	0	VIII—Nystagmus, resting	0	0	Menace response was absent in both eyes. Spontaneous rotary to vertical nystagmus was inducible in lateral and dorsal recumbency. In the right eye, there was lateral strabismus at rest.
II, III—Pupils resting	2	2	VIII—Nystagmus, change	3	3	
Stim L	2	2	V—Sensation	2	2	
Stim R	2	2	VII—Facial mm	2	2	
II—Fundus	2	2	V, VII—Palpebral flex	2	2	
III, IV, VI—Strabismus, resting	0	3	IX, X—Gag	2	2	
III, IV, VI, VIII—Strabismus, position	0	3	XII—Tongue	2	2	

Sensation (Locate and describe abnormal)

Hyperesthesia	0	
Superficial pain	2	
Cutaneous reflex	2	
Deep pain	NE	Owing to intact motor function

What is the problem? Where is the lesion? What are the most probable causes of this problem? What is your plan to establish a diagnosis? Please turn the page.

Assessment

Anatomic diagnosis

Problem	Rule out location
Absent menace responses in both eyes (with normal palpebral reflexes in both eyes)	Loss of vision (bilateral retinal problem or cranial nerve II, forebrain, or thalamus) versus menace response deficit (cerebellum or forebrain)
Right-sided head turn	Forebrain or midbrain
Lateral strabismus in right eye	Cranial nerve III or midbrain
Dull mentation	Forebrain, thalamus, or reticular activating system throughout brainstem
Bilateral postural deficits (worse on the right)	Diffuse or multifocal lesions of the forebrain, midbrain, brainstem, or cervical portion of the spinal cord
Head pressing	Forebrain
Cough	Lungs or trachea

Likely location of I lesion

Multifocal or diffuse lesion in the brain involving or affecting the cerebral cortex, thalamus, and brainstem

Etiologic diagnosis—Differential diagnoses for a chronic, progressive, multifocal CNS disorder in a geriatric dog include metastatic neoplasia (eg, carcinomas, hemangiosarcoma, or other sarcomas), primary neoplasia (eg, glioma, choroid plexus tumor, lymphoma, or meningioma), infectious disease (fungal, protozoal, or bacterial), or inflammatory conditions (ie, meningoencephalitis of unknown etiopathogenesis). Other differential diagnoses, such as metabolic abnormalities or toxicosis, were considered less likely for the dog of the present report because of its signalment, history, and unremarkable clinicopathologic findings.

The diagnostic plan included MRI of the brain with and without IV administration of contrast agent, thoracic radiography (to evaluate for primary or metastatic disease), and urinalysis (to determine renal sufficiency). Collection of a CSF sample was planned depending on the MRI findings. However, owing to a rapid decline in the dog's condition, thoracic radiography and brain MRI were delayed in lieu of an emergency CT examination of the brain with and without IV administration of contrast agent.

Diagnostic test findings—The CT^a examination of the brain performed before and after IV contrast agent administration revealed multiple round to ovoid, smoothly margined structures that ranged in maximal dimension from 5 to 10 mm in the right parietal and temporal lobes. The lesions were isodense, compared with the surrounding brain parenchyma, and were strongly rim contrast enhancing. There was a mild to moderate leftward shift of the falx cerebri and asymmetry of the lateral ventricles (the left lateral ventricle being larger than the right lateral ventricle; **Figure 1**).

The primary differential diagnosis for the CT findings was infectious disease (abscess formation or granulomatous disease [bacterial, protozoal, or fun-

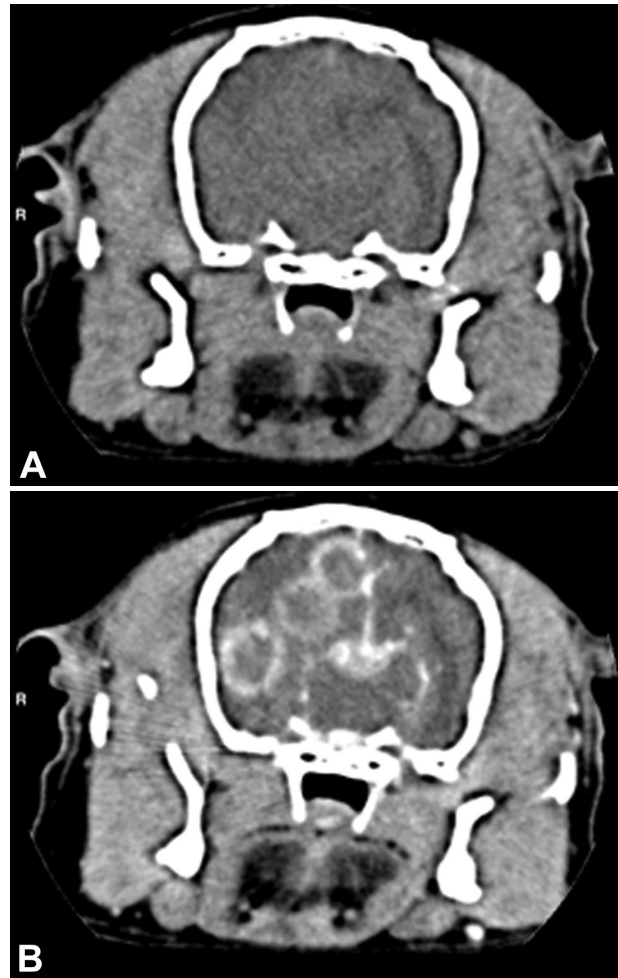


Figure 1—Transverse CT images of the head of a 10-year-old Pekingese that had progressive clinical signs including dull mentation, circling to the right, a right-sided head turn, head pressing, and, more recently, coughing, vomiting, anorexia, and melena. The images were obtained at a level just rostral to the tympanic bullae before (A) and after (B) IV administration of contrast agent. There are 3 strongly rim contrast-enhancing circular lesions in the right cerebral hemisphere with a leftward shift of the falx cerebri.

gal origin]), although multifocal or metastatic neoplasia and meningoencephalitis were also considered. Radiography of the thorax and ultrasonography of the abdomen were recommended for staging purposes. Given the severity of the dog's clinical signs and the poor prognosis associated with the extent of the central lesions, euthanasia by means of IV injection of pentobarbital sodium and phenytoin sodium was elected. A postmortem examination was performed.

Grossly, the brain was mildly swollen. Three spherical, fibrous, 10- to 15-mm-wide, well-demarcated nodules were present in the right parietal portion of the cerebrum, with compression of the left hemisphere consistent with the CT findings. The left cranial lung lobe contained a well-demarcated, bulging, firm to gritty, yellow to red, mottled mass. Centrally within this lobe, there was an irregular 2-cm-wide cavity that contained a multilobular hard white mass. A 2- to 4-cm-wide, irregular, ovoid nodule of similar consistency was present in the cranioventral region of the mediastinal fat. Additionally, there were 4 spherical, 1- to 5-mm-wide, firm, pale tan, bulging, well-demarcated nodules randomly distributed in the liver. Histologic examination of tissue sections revealed metastatic pulmonary adenosquamous carcinoma in the lungs, brain, liver, mediastinal lymph node, and adrenal glands.

Comments

Pulmonary adenosquamous carcinoma is rare in dogs and reports of dogs with this specific tumor type are limited.¹⁻³ Adenosquamous carcinoma is a mixed tumor type comprised of adenomatous and squamous cells. Primary pulmonary adenocarcinomas most commonly metastasize to the lungs or the hilar lymph nodes.⁴ Squamous cell carcinomas are typically more aggressive than adenocarcinomas, and have a metastatic rate that exceeds 50%.⁵

In humans, adenosquamous carcinoma typically has more aggressive biological behavior than that of adenocarcinoma or squamous cell carcinoma alone, and is associated with a poor prognosis.^{2,6} In 1 study of 48 people with adenosquamous carcinoma of the lungs,⁷ more than half (54.2%) of the patients developed distant metastasis, and metastasis to the brain was most common. The most effective treatment is reportedly platinum-based chemotherapy and resection of the tumor.⁷

Prognosis for dogs with primary lung tumors is dependent on multiple factors including, but not limited to, size of the tumor, clinical signs, evidence of metastasis, and the tumor's histologic subtype.⁸⁻¹⁰ When affected dogs have evidence of metastasis to the lymph nodes, mean survival time for dogs with macroscopic disease that is not resectable is typically < 1 month; for dogs with poorly differentiated carcinomas, mean survival time may be as short as

5 days.⁸ For the dog of the present report, prognosis was grave given the multiple distant metastases and the clinical signs attributable to both the primary pulmonary tumor and the metastases to the brain.

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Footnotes

- a. Toshiba Aquilon 16, Toshiba America Medical Systems, Tustin, Calif.

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