Welcome to the latest edition of the BVNS Neurotransmitter.

BUSH VETERINARY NEUROLOGY SERVICE

neurotransmitter

Lufa

Dr. Fiona Inglis, Neurology Intern

Lufa, an 8 year old Pomapoo (Pomeranian/Miniature Poodle mix) was referred by Veterinary Referral Center NoVA for seizures and impaired mentation. Lufa had a history of seizures, was treated with levetiracetam (25 mg/kg) and he had not had a seizure for approximately two years. Two days before presentation, he had missed a dose of levetiracetam, and had two seizures. Since the seizures, Lufa's behavior was abnormal. He wandered around the house, was more willing to be petted, and he walked into the owner's mirror. On exam at the referring veterinarian's office, Lufa had a very stiff gait. He had no menace response, but a normal pupillary light reflex. Shortly after his exam, Lufa had a generalized clonic-tonic seizure and was given a dose of 30 mg/kg levetiracetam intravenously. While hospitalized, Lufa was seen to chew at the air in the corner of his cage.

PRESENTING COMPLAINT

Seizures, mental dullness, pacing.

EXAM FINDINGS

Lufa was obtunded. He was ambulatory with normal postural and reflexes. He had no menace response bilaterally, and had anisocoria (right pupil smaller than left). He was comfortable with palpation of his spine and skull.

Q/A

Based on Lufa's history and clinical signs, where would you localize?

Localization:

Lufa's clinical signs localize to the forebrain. His anisocoria may indicate pathology within the left cerebral hemisphere.

What is the cause of Lufa's ongoing seizures and dullness?

Differential Diagnoses:

(i) Lufa was previously diagnosed with idiopathic epilepsy. His current mental dullness and pacing could be post-ictal behavior, or ongoing seizure activity, such as non-convulsive status epilepticus.

(ii) Lufa's current clinical picture is also consistent with neoplasia, encephalitis (autoimmune vs infectious), or a cerebrovascular accident.

What diagnostic plan should be considered? Based on the results, what treatments should be initiated?

Diagnostic Plan:

(i) General wellness screening:

This was performed to rule out systemic disease as a cause for Lufa's clinical signs. Blood work, blood pressure and ECG were normal.

(ii) Electroencephalogram (EEG):

This was performed since our main concern was ongoing seizure activity. EEG was reviewed by Dr. Bush and Dr. Colette Williams, an expert in EEG. Lufa's EEG indicated that he did not have seizures, but the had spike activity that may indicate some form of intracranial disease.

(iii) MRI of the brain:

Lufa's MRI revealed changes consistent with inflammation within the left cerebral hemisphere.

Figure 1: Cross-sectional MRI image of Lufa's brain.

Arrow indicates T2w-hyperintense lesion within areas of the left cerebral cortex indicating fluid accumulation consistent with encephalitis.

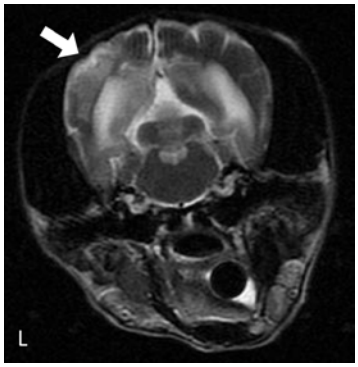

Figure 1

(iv) Cerebrospinal fluid (CSF) Analysis:
There was no evidence of infection, but we did detect abnormally high amounts of protein, consistent with encephalitis.

Summary of findings: Lufa's EEG, MRI and CSF tap are consistent with meningoencephalitis of unknown etiology (MUE).

Based on the results, what treatments should be initiated?

Treatment plan:

MUE requires prompt treatment to reduce intracranial pressure and inflammation, and to halt ongoing seizures.

OUTCOME

Lufa was hospitalized for seizure management and immunosuppressant therapy. He was treated with mannitol (0.5g/kg) to relieve elevated intracranial pressure, and his MUE was managed with immunosuppressant drugs (steroids and cytarabine). Lufa recovered well and was discharged after 48 hours. He continues to receive immunosuppressant medications and anti-epileptic drugs to reduce his seizure frequency and severity. His neurological status has improved and his seizure frequency has decreased.

DISCUSSION

MUE (meningoencephalitis of unknown origin) signs can range from discrete focal deficits to widespread dysfunction including changes in mentation and cranial nerve deficits.

MUE can be life-ending, and requires prompt treatment. Inflammation within the brain causes increased intracranial pressure that compromises blood supply and causes swelling of brain tissue that results in herniation and death. Seizures place a high metabolic demand on the already compromised brain, and can cause further elevations in intracranial pressure. Immediate treatment includes reducing intracranial pressure, controlling seizures, and halting the ongoing immune attack on brain tissues.

Long term prognosis for patients with MUE is mixed: while some animals recover fully, relapses are common, and in some patients, progression of the disease cannot be controlled. Sadly, a percentage of patients do not survive to discharge despite therapy.

What makes Lufa's case interesting is his prior history of seizures that pointed us to idiopathic epilepsy as our top differential, although our diagnostic tests indicated otherwise. Lufa is older than the typical patient that presents with a first episode of MUE, and we suspect that Lufa's condition is in fact long-standing, with a relapsing and remitting course.

TAKE HOME POINTS

Clinical signs of MUE can vary, and can be easily overlooked, particularly when the disease has a waxing/waning course. However, awareness of the condition and early referral is critical to treatment for these patients and improves survival. Thanks to the prompt action of Veterinary Referral Center of NoVA, Lufa's encephalitis was diagnosed quickly and treated appropriately.

Thank you to Veterinary Referral Center of Northern Virginia for referring this case.

References:

Coates JR, Jeffery ND (2014) Perspectives on meningoencephalomyelitis of unknown origin. *Vet Clin North Am Small Anim Pract*. 44:1157-85.