

Neurology

Case Log number: 58

Date of first treatment by applicant: 12/22/22

Patient ID number: 328460

Signalment

Canine, 328460, 8.58-year-old, male neutered, Bulldog

History

The patient was presented for evaluation of intermittent mentation change and abnormal behaviors occurring over a 1mo period. It was reported that the patient was no longer responding to basic obedience commands, no longer wanted to go on walks, was urinating and defecating in the house, was sleeping more than normal, and had become food aggressive. The patient was otherwise healthy and had no significant medical history, was up to date on vaccines, and received monthly flea, tick, and heartworm preventatives.

On 12/4/22, the patient had a CBC, serum chemistry profile, UA, total T4, ELISA serology panel (testing for heartworm antigen, *Ehrlichia canis/ewingii*, *Borrelia burgdorferi*, and *Anaplasma phagocytophyllum/ platys*), and a fecal performed by the rDVM. The CBC was within normal limits (WNL) except for a Hct of 56.7% (reference range [ref] 38.3 – 56.5%), suggesting mild hemoconcentration, potentially related to dehydration or activation of chronic stress from breed-associated hypoxemia (Mitze et al., 2022). The serum chemistry profile was WNL except for an elevated total CO₂ (TCO₂) of 28 mmol/L (ref 13-27 mmol/L) and a hypercholesterolemia 350 mg/dL (ref 131-345 mg/dL). The elevated TCO₂ was attributed to breed associated ventilatory impairment and the hypercholesterolemia related to lack of fasting and/or activation of a chronic stress response from hypoxemia (Mitze et al., 2022). The UA revealed urine that was dark yellow with a specific gravity of 1.047 (ref 1.001-1.075), indicating adequate concentrating ability (Yadav et al., 2020). The urine pH was 8.5 (average range 5 to 7.5) with possible causes for the alkalosis including a recent meal, urinary tract infection or respiratory alkalosis as the patient's functional renal values were WNL (Yadav et al., 2020). The

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patient was proteinuric at 3+, with trace to 1+ protein being considered normal in concentrated urine (Bassett & Thomas, 2014), however additional testing including a repeat UA, urine culture, and urine protein creatinine ratio were not performed to better determine the cause of the proteinuria (Yadav et al., 2020). The fecal was negative and ELISA serology panel noted the patient to be positive for *Anaplasma phagocytophyllum/ platys*. It is unknown if the patient had previously been documented to be *Anaplasma* positive, and a PCR panel was not submitted for further investigation.

Patient status on presentation

On presentation, day 1, the applicant found the patient had a normal physical examination apart from stertorous breathing (consistent with breed). The patient was bright, alert, and responsive, weighed 29.8 kg, and had a rectal temperature of 101.8 F, pulse rate of 120 bpm. Cardiac auscultation revealed no murmurs or arrhythmias, femoral pulses were bilaterally strong and synchronous, the patient was panting but eupneic, and stertorous breathing was noted. The neurological exam was normal. The applicant made a neuroanatomic localization of prosencephalon based off the reported mentation and behavior changes. At the time of presentation and based on the diagnostics performed with the rDVM, the patient's problem list included an abnormal mentation, behavior changes, stertorous breathing, elevated HCT, hypercholesterolemia, elevated TCO₂, proteinuria, and seropositive *Anaplasma* status.

Veterinarian's differential diagnosis

Given the progressive history and signalment, the attending DACVIM (Neurology) prioritized a brain neoplasm, specifically an oligodendroglioma due to the predilection in brachycephalic dogs (Jose-Lopez, et al., 2021), as the cause of the patient's behavior and mentation changes. Immune-mediated inflammatory and infectious processes could not be ruled

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out without pursuit of additional diagnostics, including an MRI and CSF analysis. Although abnormalities were noted on the minimum database collected by the rDVM the attending DACVIM (Neurology) determined the findings did not prevent the pursuit of an MRI under general anesthesia (GA).

Veterinarian's initial assessment of prognosis

The prognosis for a patient with a brain neoplasm is poor, with the reported median survival time (MST) for diagnosed gliomas generally being 1-6mo with palliative care alone (Dewey & da Costa, 2016) surgical intervention and/or radiation treatment may prolong survival time. The prognosis for an immune-mediated inflammatory process (such as meningoencephalitis of unknown origin) is variable with 25-33% of patients dying within 1wk of diagnosis, while the remaining percentage of patients have a reported variable MST of 28-1834d (Cornelis et al., 2019). The MST for an infectious process (such as fungal infections, toxoplasmosis, or neosporosis) is variable and dependent upon the specific condition as determined by imaging, CSF analysis, minimum database, and infectious disease testing results.

Interventions

The patient was hospitalized for overnight monitoring, awaiting an MRI of the brain the following day. The patient was monitored q1hr for any abnormal behaviors, mentation change, or seizure-like activity with orders to administer midazolam- a benzodiazepine used to treat seizures at 15 mg (0.5 mg/kg) IN should seizure activity be noted. The patient was fed at 7pm and noted to have a normal appetite without showing signs of aggression; after 10pm the patient was NPO. The following morning the attending DACVIM (Neurology) and the applicant reviewed the overnight record and noted that there had not been any change in behavior or mentation nor was there any notation of seizure-like activity.

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Case management

On day 2 the applicant calculated and administered the following medications as part of the pre-anesthetic plan ordered by the attending DACVIM (Neurology): butorphanol- an opiate partial agonist used for sedation and analgesia at 6 mg (0.2 mg/kg) IM and dexmedetomidine - an alpha-2 adrenergic agonist used for sedation at 150 mcg (5.03 mcg/kg) IM. The patient was then placed in a cage and the applicant waited approximately 10 minutes while monitoring the patient for signs of adequate sedation so that the intravenous catheter (IVC) could be placed with minimal stress. Prior to placing the IVC the patient was pre-oxygenated with supplemental flow by oxygen at 4 L/min delivered via face mask. The applicant then clipped and aseptically prepared the right lateral saphenous with chlorhexidine and isopropyl alcohol and placed an 18-gauge IVC. The applicant administered maropitant - an antiemetic at 30 mg (1.01 mg/kg) IV and metoclopramide- a gastrointestinal prokinetic agent used as an antiemetic at 30 mg (1.01 mg/kg) IV. Induction of anesthesia included ketamine- a dissociative general anesthetic at 60 mg (2.01 mg/kg) IV and propofol - an injectable anesthetic at 60 mg (2.01 mg/kg) IV. The patient was intubated with a size 9 endotracheal (ET) tube without difficulty. Placement of the ET tube into the trachea was confirmed via capnography, and depth of the ET tube placement was confirmed via prior measurement and palpation. Once placed, the ET tube cuff was inflated, and inhalant sevoflurane started at 2% with 2 L/min of O₂. A balanced crystalloid solution was started IV at a rate of 5 mL/kg/H (149 mL/H) which was continued throughout the anesthetic procedure.

The applicant clipped and aseptically prepared the dorsum of the left pelvic limb with applications of chlorhexidine and isopropyl alcohol in preparation of placing an arterial line. The applicant placed a 22-gauge catheter into the left dorsal pedal artery to monitor direct blood

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pressure. The arterial catheter was flushed with a dilute heparinized saline (1 unit/mL) flush to prevent coagulation and ensure adequate waveforms while direct BPs were collected.

The attending DACVIM (Neurology) ordered thoracic radiographs (CXR) to evaluate for the presence of any pulmonary pathology prior to the MRI. The CXR were noted to have a mild to moderate interstitial pattern in the left cranial lung lobe with differential diagnoses including atelectasis or aspiration pneumonia. Atelectasis was prioritized as the patient had been laying in left lateral recumbency during induction and placement of the arterial line prior to the CXR being obtained under GA. Once the CXR had been evaluated by the attending DACVIM (Neurology) and metastatic disease had been ruled out, the patient was transferred to the MRI.

The applicant placed the patient in sternal recumbency, headfirst, towards the bore of the MRI. The patient was monitored via end tidal CO₂, heart rate (HR), pulse oximetry, direct and indirect BP, respiratory rate, inspiratory gas percentage, and end tidal gas percentage. The applicant set up and monitored the mechanical ventilator for the patient while under general anesthesia. The ventilator ensured that the end tidal CO₂ stayed between 35-45 mmHg, the patient maintained an appropriate and constant plane of anesthesia, and the applicant monitored the positive pressure to ensure that it did not exceed 20 mmHg. Upon evaluation of the anesthetic parameters the applicant noted that the patient was bradycardic, at 38 bpm. Although the dexmedetomidine administered as a premedication can cause bradycardia, the inhalant can also cause bradycardia, so the applicant decreased the sevoflurane from 2% to 1.6% in response to the observed bradycardia. The applicant noted that the patient's direct BP reading at that time was WNL, measured as a systolic of 100 mmHg and diastolic 68 mmHg, and the mean arterial pressure (MAP) was 75 mmHg. The MRI was started and over the next 25 min the patient's direct BP slowly increased to a MAP of 82 mmHg while the HR remained bradycardic but

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stable. During that time the applicant decreased the sevoflurane further from 1.6% to 1.2%, with no change to HR or BP noted as a result. The applicant alerted the attending DACVIM (Neurology) as the applicant was concerned that the patient may be exhibiting a mild Cushing's reflex from brain herniation given that a neoplasm was the top differential. The attending DACVIM (Neurology) reviewed the standard 3 plane sequences that had been obtained and noted a large mass in the right frontal lobe, however there was no evidence on the MRI of herniation. However, due to the large amount of peritumoral edema noted on the images, the attending DACVIM (Neurology) ordered the applicant to calculate and administer 25% mannitol - a hyperosmotic agent at 15 g (0.5 g/kg) IV slowly over 10min using the appropriate 5-micron filter. Following administration of mannitol, the patient's HR increased to 60 bpm and continued to slowly increase to 68 bpm while the MAP decreased from 82 mmHg to 75 mmHg throughout collection of the remaining MRI sequences. The patient remained stable by way of anesthetic monitoring parameters for the remainder of the MRI.

In the completed MRI study, the following standard 3 plane sequences were obtained: T2-weighted (T2W), T1-weighted (T1W), T2 fluid-attenuated inversion recovery (T2 FLAIR), susceptibility weighted images (SWI), T1 fluid-attenuated inversion recovery (T1 FLAIR), diffusion weighted imaging (DWI), apparent diffuse coefficient (ADC), T1 FLAIR post contrast, and a volumetric interpolated breath-hold examination (VIBE). Once the T2W and T1W pre-contrast images had been obtained the applicant calculated and administered the prescribed dose of contrast medium, gadodiamide 1722 mg (57.79 mg/kg) IV.

As the MRI sequences revealed a suspected intracranial neoplasm, the attending DACVIM (Neurology) elected to not pursue a CSF tap given the nonspecific changes typically found in the CSF of patients with brain neoplasia (Dewey & da Costa, 2016). The patient's

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anesthetic recovery was prolonged, and the applicant administered atipamezole - a synthetic alpha-2 adrenergic receptor antagonist and dexmedetomidine's reversal agent at 1.5 mg (0.05 mg/kg) IM. The patient received continuous supplemental oxygen and after 1H was successfully extubated and transported to the recovery unit for additional monitoring.

Following GA, the attending DACVIM (Neurology) updated the patient's treatment plan to include monitoring for changes to the patient's respiratory function. The applicant assessed the patient's saturation of peripheral oxygen (SpO₂) via a patient side pulse oximeter. The patient was able to oxygenate well and the SpO₂ level remained at or above 97% (ref greater than 97% is normal) (Bassett & Thomas, 2014) without the need for continued supplemental oxygen. At 4pm the patient was recovered from GA and was offered food and noted to have an appetite without aggression. The attending DACVIM (Neurology) ordered the applicant to calculate and administered prednisone - a corticosteroid at an anti-inflammatory dose of 30 mg (1.01 mg/kg) PO q24h prior to discharge.

Following recovery, the applicant reviewed the T2W images and noted an ill-defined, heterogenous, intra-axial, hyperintensity in the frontal lobe of the right cerebral hemisphere, which remained hyperintense on T2 FLAIR with several areas of focal hypointensity centrally. Per review with the attending DACVIM (Neurology) the SWI was difficult to interpret due to an artifact from the frontal sinus, but no obvious hemorrhage was noted in the lesion of interest. The DWI and ADC both revealed hyperintensity in the right cerebral hemisphere on all sequences, which was not consistent with the presence of a vascular event. On T1 FLAIR post contrast images there was no significant contrast uptake noted, making an immune-mediated inflammatory or infectious process less likely. The applicant and the attending DACVIM

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(Neurology) discussed the changes found on the MRI and noted they were most consistent with a primary intracranial neoplasm.

Final outcome

The attending DACVIM (Neurology) reviewed the MRI findings with the owner and advised the owner that the patient had a suspected brain neoplasm – most likely an oligodendroglioma. It was discussed that the reported MST for patients with this neoplasm with palliative care alone is 1-6mo (Dewey & da Costa, 2016). The attending DACVIM (Neurology) explained that surgical intervention was not an option due to the location of this tumor however, radiation therapy (RT) could be considered and generally yields a MST of 84d (Jose-Lopez, et al., 2021) to 512d (Magalhães et al., 2021). The applicant discussed the process of RT and explained that the patient would undergo GA for a skull CT so that RT could be planned. Once the planning was complete, the patient would receive 20 radiation treatments (Monday- Friday daily for 4wk). The applicant discussed the patient's quality of life with the owner, with the aid of a worksheet, and in general what to expect moving forward. Ultimately, after discussing options, the owner elected to take the patient home with palliative care.

The applicant discussed the prescribed tapering corticosteroid medication therapy with the owner: prednisone 30 mg (1.01 mg/kg) PO q24hr for 2wk, then 20 mg (0.67 mg/kg) PO q24hr for 2wk, then 10 mg (0.34 mg/kg) PO q24hr for 2wk, finally 10 mg (0.34 mg/kg) PO q48hr for until otherwise directed. The applicant discussed the importance of monitoring the patient for further mentation/ behavior changes and head pressing. The applicant discussed the location of the suspected glioma and noted that given the neoplasm's location, the patient was at risk for developing symptomatic epilepsy (Dewey & da Costa, 2016).

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Three days following discharge, 12/26/22, the patient was reported to have had a generalized tonic- clonic seizure. The owner contacted their rDVM and elected to euthanize the patient. No necropsy was performed.

Discussion

Glial tumors are most commonly found in brachycephalic breeds with a median age of onset of 9 years old (Magalhães et al., 2021). Definitive diagnosis of a glioma cannot be made without histopathology; however, certain MRI findings can lead to a presumptive diagnosis. Gliomas are generally found in the cerebral hemisphere as intra-axial lesions with poorly defined margins and with varying degrees of contrast enhancement (Magalhães et al., 2021). This patient's mass exhibited these characteristics and also revealed hyperintensity in the right cerebral hemisphere on DWI imaging consistent with a cell-dense tumor base - further supporting the diagnosis of a glioma over a hemorrhagic or ischemic event (Mai, 2018).

Given that gliomas are intra-axial, have poorly defined margins, and infiltrate normal brain tissue, surgical intervention can be challenging and is not considered curative (Magalhães et al., 2021). Glial tumors are, however, responsive to RT with the goal being to decrease tumor size and/or slow growth. Options for RT were discussed with the radiation oncologist, and a course of 20 fractionated daily doses were recommended based on this patient's suspected tumor characteristics. Although there are case reports using oral chemotherapy, such as lomustine, the attending DACVIM (Neurology) did not offer this therapy as the MST reported seems to be no different than for those who are treated with palliative care alone (60-93d) (Van Meervenne et al., 2012).

Palliative care in this case was defined as the administration of an oral corticosteroid to reduce peritumoral edema. With the reduction of peritumoral edema, the goal was for the patient

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to revert back to more normal behaviors but would not be a curative therapy. Given the location of the suspected glioma, the applicant recognized that the patient may develop symptomatic epilepsy (Dewey & da Costa, 2016) and should the owner observe seizure activity, the owner was instructed to contact the attending DACVIM (Neurology) so that an antiepileptic drug could be prescribed.

The CBC, serum chemistry, UA, CXR, and MRI findings were all consistent with the top differential of neoplasia. Although the preanesthetic bloodwork performed ruled out other systemic conditions, the applicant did not expect to find any changes to the patient's bloodwork or UA that would lead to the diagnosis of a neoplasm. The CXR did not reveal any metastatic disease, however, that, too, was to be expected as only 23% of patients with a primary brain neoplasm have concurrent metastatic disease (Dewey & da Costa, 2016). The MRI strongly supported the top differential of a brain neoplasm and provided additional details to lend to the presumptive diagnosis of a glioma.

The applicant's advanced skills were utilized throughout the case as the applicant monitored the patient for mention changes, seizure-like events, as well as vitals under and during recovery from GA. The applicant was able to recognize the potential for a Cushing's Reflex and notify the attending DACVIM (Neurology) to ensure that the patient was not showing signs of herniation on the MRI. The applicant's advanced knowledge provided the owner with information about treatment options and at home care. The owner asked about the prognosis with palliative care alone or a combination of palliative care with RT and the applicant was able to answer those questions. The applicant also provided support to the client in assuring them that they could reach out with any future questions or concerns.

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References

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PET OWNER:	[REDACTED]	LAB ID:	[REDACTED]
SPECIES:	Canine	ORDER ID:	190028622
BREED:	Bulldog	COLLECTION DATE:	12/3/22
GENDER:	Male	DATE OF RECEIPT:	12/4/22
AGE:	7 Years	DATE OF RESULT:	12/4/22
PATIENT ID:	[REDACTED]		

IDEXX Services: Reflex Urine Protein: Creatinine Ratio, Senior Profile with Fecal Dx® Profile, Giardia, Lab 4Dx® Plus Test and Reflex UPC

Hematology



12/4/22 (Order Received)
12/4/22 11:06 AM (Last Updated)

TEST	RESULT	REFERENCE VALUE	
RBC	7.99	5.39 - 8.70 M/ μ L	
Hematocrit	56.7	38.3 - 56.5 %	H
Hemoglobin	20.2	13.4 - 20.7 g/dL	
MCV	71	59 - 76 fL	
MCH	25.3	21.9 - 26.1 pg	
MCHC	35.6	32.6 - 39.2 g/dL	
% Reticulocyte	0.2	%	
Reticulocytes	16	10 - 110 K/ μ L	
Reticulocyte Hemoglobin	27.2	24.5 - 31.8 pg	
WBC	5.8	4.9 - 17.6 K/ μ L	
% Neutrophils	69.1	%	
% Lymphocytes	21.2	%	
% Monocytes	3.3	%	
% Eosinophils	6.4	%	
% Basophils	0.0	%	
Neutrophils	4.008	2.94 - 12.67 K/ μ L	
Lymphocytes	1.23	1.06 - 4.95 K/ μ L	
Monocytes	0.191	0.13 - 1.15 K/ μ L	
Eosinophils	0.371	0.07 - 1.49 K/ μ L	
Basophils	^a 0	0 - 0.1 K/ μ L	
Platelets	312	143 - 448 K/ μ L	

^a AUTOMATED CBC



Chemistry



12/4/22 (Order Received)
12/4/22 11:06 AM (Last Updated)

TEST	RESULT	REFERENCE VALUE	
Glucose	92	63 - 114 mg/dL	
IDEXX SDMA	^a 11	0 - 14 µg/dL	
Creatinine	1.4	0.5 - 1.5 mg/dL	
BUN	16	9 - 31 mg/dL	
BUN: Creatinine Ratio	11.4		
Phosphorus	4.7	2.5 - 6.1 mg/dL	
Calcium	10.2	8.4 - 11.8 mg/dL	
Sodium	151	142 - 152 mmol/L	
Potassium	5.2	4.0 - 5.4 mmol/L	
Na: K Ratio	29	28 - 37	
Chloride	112	108 - 119 mmol/L	
TCO2 (Bicarbonate)	28	13 - 27 mmol/L	H
Anion Gap	16	11 - 26 mmol/L	
Total Protein	6.7	5.5 - 7.5 g/dL	
Albumin	3.4	2.7 - 3.9 g/dL	
Globulin	3.3	2.4 - 4.0 g/dL	
Albumin: Globulin Ratio	1.0	0.7 - 1.5	
ALT	21	18 - 121 U/L	
AST	23	16 - 55 U/L	
ALP	21	5 - 160 U/L	
GGT	2	0 - 13 U/L	
Bilirubin - Total	0.2	0.0 - 0.3 mg/dL	
Bilirubin - Unconjugated	0.1	0.0 - 0.2 mg/dL	
Bilirubin - Conjugated	0.1	0.0 - 0.1 mg/dL	
Cholesterol	350	131 - 345 mg/dL	H
Amylase	602	337 - 1,469 U/L	
Lipase	^b 186	0 - 250 U/L	
Creatine Kinase	128	10 - 200 U/L	



Chemistry (continued)

TEST	RESULT	REFERENCE VALUE
Hemolysis Index	^c 1+	
Lipemia Index	^d N	
Urine Protein: Creatinine Ratio If Indicated	A urine protein: creatinine ratio (UPC) has been ordered as indicated by a positive urine protein with an inactive urine sediment.	
Urine Creatinine	277.0	mg/dL
Urine Protein	30.1	mg/dL
Urine Protein: Creatinine Ratio	0.1	
Color	^e Dark Yellow	

^a SDMA and creatinine are within the reference interval: impairment of GFR is unlikely. Recommended next step: evaluate complete urinalysis.

^b Please note: the canine and feline reference intervals for lipase have been updated effective May 26, 2020 to reflect current IDEXX testing.

^c Index of N, 1+, 2+ exhibits no significant effect on chemistry values.

^d Index of N, 1+, 2+ exhibits no significant effect on chemistry values.

^e Renal proteinuria:
 UPC <0.2 non-proteinuric
 UPC 0.2-0.5 borderline proteinuric
 UPC >0.5 proteinuric
 The urine protein:creatinine ratio (UPC) should be interpreted along with a concurrent urinalysis. Pre-renal and post-renal proteinuria need to be ruled-out prior to evaluating renal proteinuria. Renal proteinuria requires proof of persistence by repeating UPC on at least three urine samples collected over a period of at least 2 weeks.

Additional interpretive guidelines and management recommendations are available in our online directory on www.vetconnectplus.com or www.iris-kidney.com.

Urinalysis



12/4/22 (Order Received)
 12/4/22 11:06 AM (Last Updated)

TEST	RESULT	REFERENCE VALUE
Collection	FREECATCH	
Color	Dark Yellow	
Clarity	CLEAR	



PET OWNER: [REDACTED]

PET OWNER: [REDACTED]

DATE OF RESULT: 12/4/22

LAB ID: [REDACTED]

Urinalysis (continued)

TEST	RESULT	REFERENCE VALUE
Specific Gravity	1.047	
pH	8.5	
Urine Protein	3+	
Glucose	NEGATIVE	
Ketones	NEGATIVE	
Blood / Hemoglobin	^a NEGATIVE	
Bilirubin	1+	
Urobilinogen	NORMAL	
White Blood Cells	0-2	0 - 5 HPF
Red Blood Cells	2-5	HPF
Bacteria	NONE SEEN	
Epithelial Cells	3+ (6-10)/HPF	
Mucus	NONE SEEN	
Casts	NONE SEEN	
Crystals	OCCASIONAL AMMONIUM MG PHOSPHATE (0-1)/HPF	

^a Low numbers of intact RBCs may not be sufficient to cause a positive reaction on the test pad due to the sensitivity of the dipstick. Results reported by repeat analysis.

Endocrinology



12/4/22 (Order Received)
12/4/22 11:06 AM (Last Updated)

TEST	RESULT	REFERENCE VALUE
Total T4	^a 2.7	1.0 - 4.0 µg/dL

^a Dogs with no clinical signs of hypothyroidism and results within the reference interval are likely euthyroid. For dogs on thyroid supplement, recommended therapeutic levels are 2.1-5.4 ug/dL.



Serology



12/4/22 (Order Received)
12/4/22 11:06 AM (Last Updated)

TEST	RESULT
Heartworm Antigen	a Negative
Ehrlichia canis / ewingii	b Negative
Lyme (Borrelia burgdorferi)	Negative
Anaplasma phagocytophilum / platys	c Positive

- a Starting on December 13, 2022 IDEXX will be removing the 4Dx specific comments seen below. View your results in VetConnect PLUS for patient-specific interpretations that incorporate clinical signs. If you do not have a VetConnect PLUS account, please call Reference Laboratory Customer Support at 1-888-433-9987. Further information on the diagnosis and management of tick/vector-borne diseases can be found at idexx.com/4DxGuide.
- b If tick-borne disease is still suspected based on clinical signs, a Comprehensive Tick/Vector Comprehensive RealPCR Panel (Add-on test code 28701) may be useful for detection of early infection prior to seroconversion.
- c A positive result indicates the presence of Anaplasma antibodies, which may be due to a prior or current infection. A CBC with blood film evaluation (IDEXX CBC-Select, test code 300) on a fresh whole blood sample is recommended to evaluate for evidence of clinical tick-borne disease.

Parasitology



12/4/22 (Order Received)
12/4/22 11:06 AM (Last Updated)

TEST	RESULT
Ova & Parasites - Zinc Sulfate Centrifugation	No ova or parasites seen. Cyniclomyces guttulatus also known as Saccharomyces guttulatus (NON-PATHOGENIC YEAST) present
Giardia Antigen	NEGATIVE
Hookworm Antigen	NEGATIVE
Whipworm Antigen	NEGATIVE

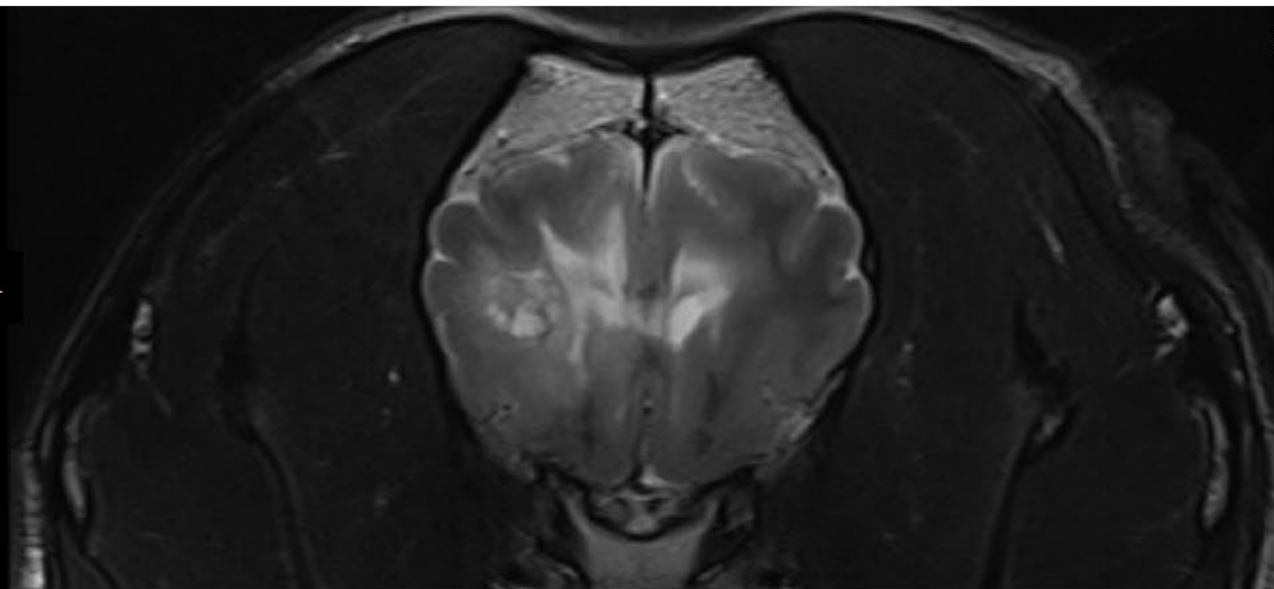
**Parasitology (continued)**

TEST	RESULT
Roundworm Antigen	^a NEGATIVE

^a The IDEXX Fecal Dx antigen tests detect worm antigen and a positive indicates infection. Antigen-positive and egg-negative specimens can be seen during the pre-patent period, with single sex infections and due to intermittent egg shedding. Identification of eggs microscopically in antigen-negative specimens may be due to ingestion of infected feces (coprophagy) or because the amount of antigen is below the level of detection. Treatment should be considered for patients positive by either antigen or egg-detection. In cases of acute or chronic diarrhea also consider testing for viral, bacterial and protozoal infectious agents using RealPCR (canine diarrhea panel: test code 2625; feline diarrhea panel: test code 2627).

MRN: 328460
DOB: 19-May-2015
Age: 007Y
Sex: O

R



22/35
IM # 22
SE # 4

ACC # 1755529
Study Date: 23-Dec-2022
IM Time: 08:59:11
Zoom Factor: 2.68
Flip, Rotate 180°

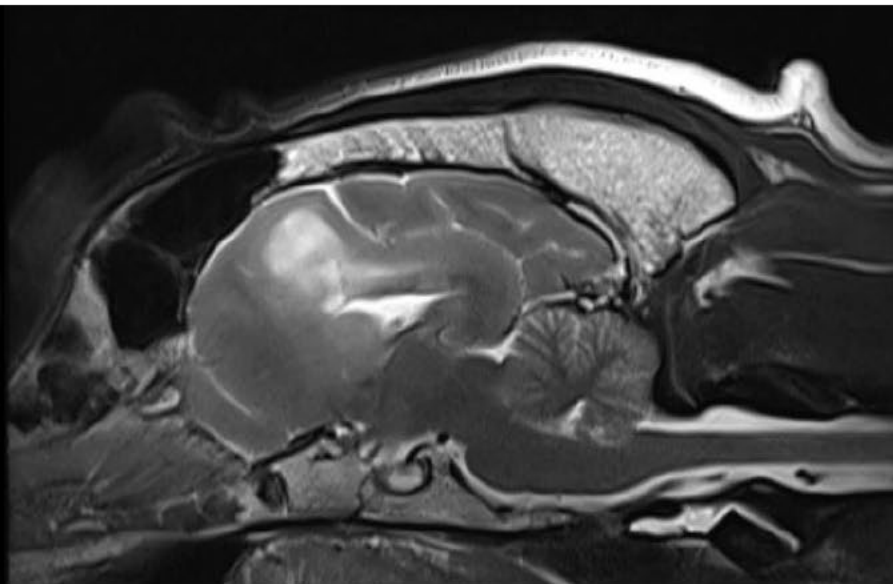
L

TE: 96
TR: 4560
Matrix: 384/250
Thickness: 3.00
Series: T2_TRV_

MRN: 328460
DOB: 19-May-2015
Age: 007Y
Sex: O

Rostral

H
R
P



A
L
F

Caudal

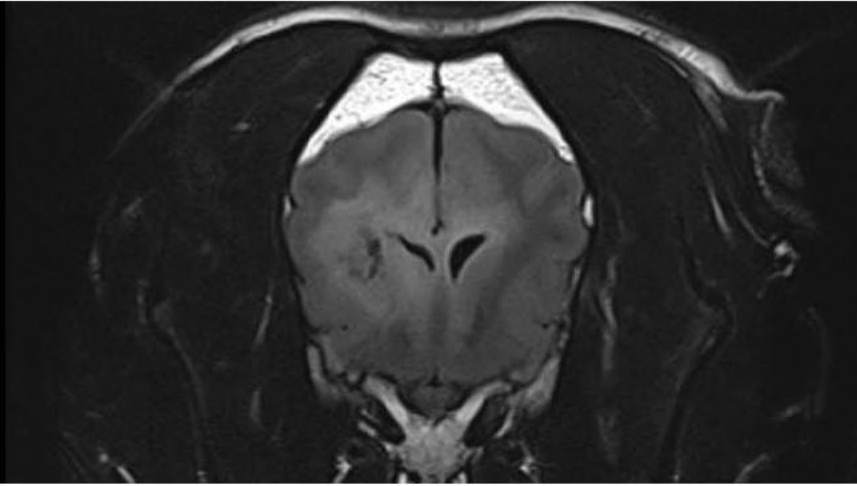
12/25
IM # 12
SE # 3

ACC # 1755529
Study Date: 23-Dec-2022
IM Time: 08:54:50
Zoom Factor: 1.88
Rotate -90°

TE: 87
TR: 2930
Matrix: 384/230
Thickness: 2.50
Series: T2_SAG_

MRN: 328460
DOB: 19-May-2015
Age: 007Y
Sex: O

R



L

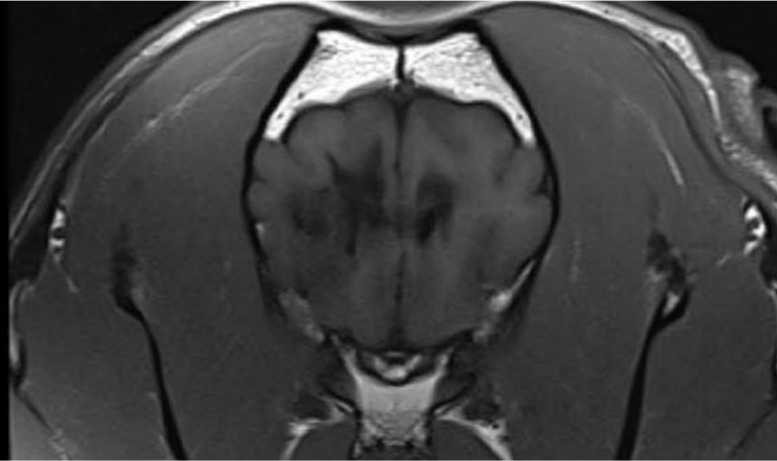
ACC #: 1755529
Study Date: 23-Dec-2022
IM Time: 09:05:53
Zoom Factor: 1.80
Flip, Rotate 180°

21/35
IM #: 21
SE #: 5

TE: 100
TR: 8000
Matrix: 384/250
Thickness: 3.00
Series: T2_FLAIR_TRV

MRN: 328460
DOB: 19-May-2015
Age: 007Y
Sex: O

R



L

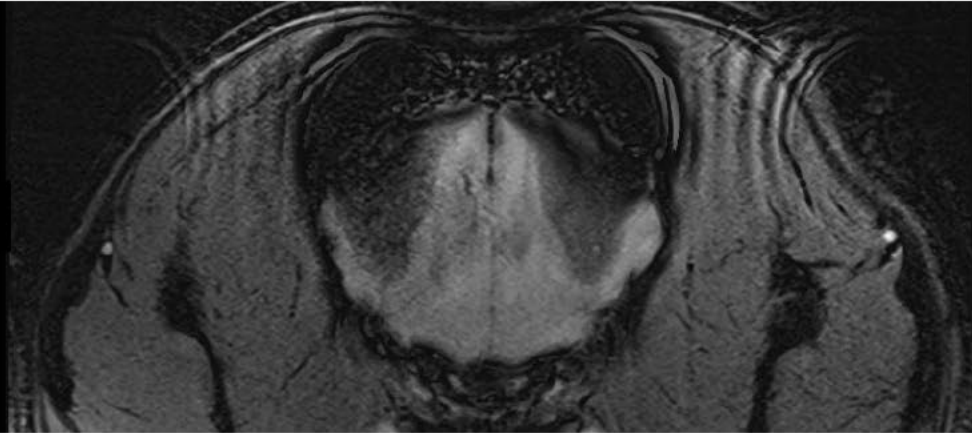
ACC #: 1755529
Study Date: 23-Dec-2022
IM Time: 09:14:28
Zoom Factor: 1.80
Flip, Rotate 180°

22/35
IM #: 22
SE #: 10

TE: 8.9
TR: 2100
Matrix: 384/226
Thickness: 3.00
Series: T1_FLAIR_TRV_

MRN: 328460
DOB: 19-May-2015
Age: 007Y
Sex: O

R



L

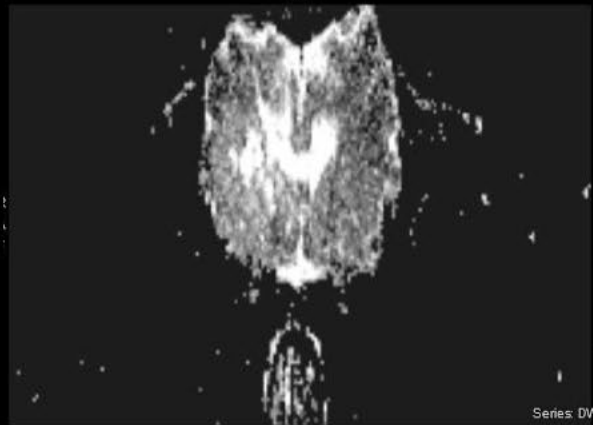
ACC #: 1755529
Study Date: 23-Dec-2022
IM Time: 09:09:42
Zoom Factor: 1.00
Flip, Rotate 180°

23/36
IM #: 23
SE #: 8

TE: 20
TR: 28
Matrix: 384/307
Thickness: 3.00
Series: SWI_Images

MRN: 328460
DOB: 19-May-2015
Age: 007Y
Sex: O

R



L

ACC #: 1755529 MRN: 328460
Study Date: 23-Dec-2022 DOB: 19-May-2015
IM Time: 09:10:39 Age: 007Y
Zoom Factor: 2.35 Sex: O
Flip, Rotate 180°

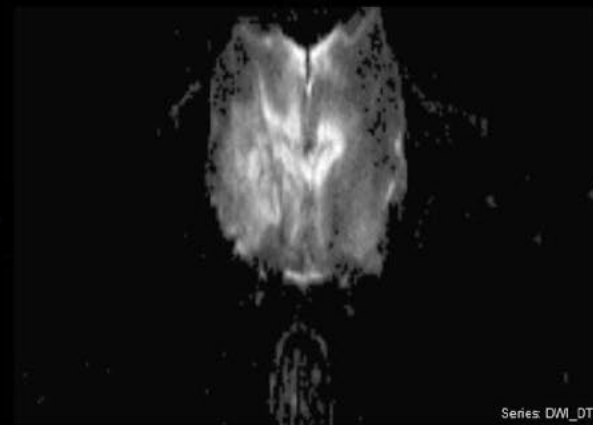
TE: 167
TR: 7200

Matrix: 190/180 16/50
Thickness: 3.00 IM #: 16

Series: DWI_DTI_TRV_Pre_ADC SE #: 13

16/25
IM #: 16
SE #: 12

R



L

ACC #: 1755529
Study Date: 23-Dec-2022
IM Time: 09:10:40
Zoom Factor: 2.35
Flip, Rotate 180°

TE: 167
TR: 7200

Matrix: 190/180
Thickness: 3.00

Series: DWI_DTI_TRV_Pre_TRACEW



Large Animal FAX [Redacted]

Pet Health Center FAX [Redacted]

Client: 378925 - [Redacted]
[Redacted]
[Redacted]
[Redacted]

Patient: 328460 - [Redacted]
Canine
Olde English Bulldog
Male Neutered 29.8 kg
May 19, 2015

DVM: [Redacted]
[Redacted]
[Redacted]
[Redacted]

Admission Date/Time: 12/22/22, 11:39 AM

Reason for Visit: Acute Aggression + Disoriented

Request: 175529



MR-SA BRAIN

Questions:

Signalment (Age,Sex,Breed,Weight): 8yo MN English Bulldog
Reason for Exam/Pertinent Clinical History (summary): acute behavior changes 3-4 weeks ago
Site Of Study Requested: Brain
Site Of Anatomic Study:: Brain
Additional Site(S)::
Specific Localizing History: brain
Top Clinical Rule-Outs: neoplasia vs other
Patient Status: Inpatient
Anesthesia Required Except With Prior Approval: Acknowledged
Patient Prep: Fasted
Desired Examination Boundaries (Pending Approval): brain
Pre And Post Contrast: Yes
Have You Read The Mri Instructions: Yes
House Officer's Name (Attending Clinician): [Redacted]

Report:

Report

MRI HEAD number 20/3/2022: 1553 images are provided using multiplanar T1, T2, FLAIR, gradient echo, diffusion-weighted, diffusion tensor, and postcontrast techniques.

FINDINGS:

With respect to size and shape, asymmetry is associated with the cerebral hemispheres specifically the right frontal lobe. In this region a mass is present. This mass is characterized by nonhomogenous signal intensity with small fluid pockets and regions of fluid suppression (1.9 x 1.6 x 1.3 cm with a larger region of perilesional edema). No susceptibility is clearly seen. This lesion is to the right of the right lateral ventricle noted on transverse images 20-24. Please note the differentiation between the fluid signal and fluid suppression of the lateral ventricles on transverse image 20 versus the more rostral fluid pocket with surrounding edema on transverse image 24. No definitive enhancement is seen with this lesion. No additional similar lesions are noted throughout the cerebral hemispheres. This causes mild compression of the right lateral ventricle. The remainder of the ventricular system is normal. There is no subfalcine, transtentorial, or cerebellar herniation. The rostral folia of the cerebellum on sagittal image 13 appears reduced in volume. There is reduced fractional anisotropy throughout the mass on series 14 images 14-18 with shear artifact at the rostral aspect

Status: COMPLETE Requesting DVM: [Redacted]

(common). No restricted diffusion is noted. Facilitated diffusion is evident. The visible portions of the eyes and retrobulbar spaces appear symmetric. The optic nerves are unremarkable. The optic chiasm on transverse image 21 is normal and symmetric. The pituitary is normal size but appears to contain a cyst on series 17 image 19. The thalamus is symmetric. The brainstem is also unremarkable. The region of the trigeminal nerves is subjectively normal and symmetric. The muscles of mastication are unremarkable. The zygomatic arches and temporomandibular joints are symmetric although the contour of the temporomandibular joints is irregular on series 17 image 15. At the level of the internal acoustic meatus, no abnormalities are noted. However within the left tympanic bulla, fluid and soft tissue is present nicely delineated on series 17 image 22. This does not extend into the eustachian tube. The visible teeth and adjacent bone are unremarkable. The dens is normally positioned.

CONCLUSION:

1. There is a cystic intracranial intra-axial mass lesion associated with the right frontal lobe to the lateral aspect of the right lateral ventricle. Regional edema is present. The intra-axial location, cystic components, and lack of enhancement in an older patient of this species raises concern for a high-grade glial origin neoplasm. A single/solitary parasitic lesion would be unusual.
2. There is questionable atrophy of the rostral aspect of the cerebellar vermis. It is possible this is a normal variation for this patient. The importance of this finding is uncertain.
3. Left otitis media
4. Possible pituitary cyst (small).

Sarah Pownder, DVM,DACVR (IDEXX Radiologist)

Radiologist

Result Date

December 23, 2022

Status: COMPLETE

Requesting DVM: [REDACTED]

Companion Animal Quality of Life Work Sheet

The Quality of Life of your companion animal includes the physical, emotional, mental, and social aspects of their lives and describes the level of comfort and happiness they experience. When our animals become ill, we continue to hope for them to have good quality of life. This worksheet is designed to help clarify what "good quality of life" means to your companion animal and you.

Circle the most appropriate answer based on your companion animal's current condition.

- | | |
|---|------------|
| ❖ They do not appear to be painful. | True/False |
| ❖ They can enjoy their food. | True/False |
| ❖ They are still drinking well. | True/False |
| ❖ There has not been a change in their urination/defecation habits. | True/False |
| ❖ They can get around enough to enjoy life. | True/False |
| ❖ Their personality has not changed. | True/False |
| ❖ They have not become aggressive or violent. | True/False |
| ❖ They still want to cuddle, visit, or play. | True/False |
| ❖ They still seem to enjoy life. | True/False |
| ❖ They are having more good days than bad. | True/False |

The three most important things I want my companion to continue to be able to do are ...

- 1.) _____
- 2.) _____
- 3.) _____

Overall, what I wish for _____ is ...
(companion animal's name)

What questions do I have for my Veterinarian about my companion animal's current quality of life and, if treatments are needed, what is expected after treatments? _____

