MENINGEAL THICKNESS IN A FRENCH BULLDOG

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* Presenter

SIGNALMENT:

Lola, 10 years old, female neutered French Bulldog.

HISTORY

LOLA was presented to the Small Animal Veterinary Teaching Hospital *(Hospital Clinic Veterinari)* of the *Universitat Autònoma de Barcelona* (UAB), Spain, on April 9th 2019 for a sudden onset of clusters seizures. The owners described that seizure duration was less than one minute characterized by tonic-clonic movements of all limbs with total impairment of consciousness. Autonomic signs such as sialorrhea and behavioral changes were noted before the episode.

CLINICAL FINDINGS

On physical examination, Lola was panting, had congestive mucous membranes and a body temperature of 39ºC. The neurologic examination revealed circling to the left, delayed postural reactions in all limbs and absent menace response bilaterally. The neurological examination was consistent with a prosencephalic lesion. Main differential diagnoses included neoplasia, vascular and inflammatory/infectious diseases.

DIAGNOSTIC TESTS

A complete blood cell count with a blood smear and biochemistry profile were performed and the results are listed in tables 1 and 2, respectively. The biochemistry results were within normal limits.

Thoracic radiographs, abdominal ultrasound and magnetic resonance imaging of the brain were performed. Thoracic radiographs did not show any significant pulmonary changes and abdominal ultrasound was unremarkable.

Magnetic resonance of the brain revealed diffuse thickening of the meninges of the left hemisphere, with extension to the *falx cerebri*. The lesion was hypointense on T2w (Figure 1) and FLAIR, isointense on T1w, and showed marked diffuse and homogeneous contrast enhancement (Figure 2). Severe mass effect causing midline shift to the right and distortion of the left lateral ventricle were also observed.
There was also an intramedullary lesion over C2 that was poorly marginated and located in the central area of the spinal cord occupying 40% of its width. This lesion was hyperintense on T2w and hypointense on T1w, and did not enhance after contrast administration.

A neoplasm or idiopathic hypertrophic pachymeningitis were the main differentials for the lesion observed in the brain MR images. The presence of an intramedullary lesion over C2 was consistent with syringohydromyelia probably secondary to the brain lesion.

Cerebrospinal Fluid (CSF) analysis showed albumin-cytological dissociation (Table 3). A craniotomy plus durectomy were performed to biopsy the lesion and to relieve mass effect. The brain meninges appeared thickened and had a highly irregular surface. A piece of the affected meninges was biopsied and submitted for histopathologic examination. Before immersing the sample in formalin, multiple cytological imprints were performed and analyzed.

Table 1. Hematological results

Parameters (units)	Result	Reference interval
RBCs ($x10^6/\mu L$)	6.46	5.5-8-5
Hematocrit (%)	43	37-55
Hemoglobin (g/dL)	16	12-18
MCV (fl)	72.3	62-77
MCHC(g/dL)	36.1	33-37
Reticulocytes ($x10^3cells/\mu L$)	34.238	0-60.000
WBC ($x10^3cells/\mu L$)	8.190	6.000-17.000
Neutrophils (cells/μL)	5.897	3.000-11.500
Band cells (cells/μL)	0	0-300
Lymphocytes (cells/μL)	1.638	1.000-4.800
Monocytes (cells/μL)	328	150-1.350
Eosinophils (cells/μL)	328	100-1.500
Basophils (cells/μL)	0	0-200
Platelets ($x10^3cells/\mu L$)	80	200-500

RBC: red blood cells, **MCV**: median corpuscular volume, **MCHC**: Mean Corpuscular hemoglobin concentration and **WBC**: white blood cells.

∗ **Advia 120.**

Table 2. Biochemistry results

Parameters (units)	Result	Reference interval
Creatinine (mg/dL)	1.02	0.5-1.5
Urea (mg/dL)	34.6	21.4-59.9
Total cholesterol (mg/dL)	244.3	135-270
Glucose (mg/dL)	93.7	65-118
Total protein (g/dL)	6.61	5.6-7.5
ALKP (UI/L)	23.64	20-156
ALT (GPT) (UI/L)	32.5	21-102
Calcium (mg/dL)	10	9-11.3
Potassium (mmol/L)	4.16	4.37-5.35
Phosphorus (mg/dL)	3.96	2.6-6.2

ALKP: Alkaline Phosphatase and **ALT**: Alanine Aminotransferase.
∗Beckman Coulter AU480

Table 3. Cerebrospinal fluid results

Parameters (units)	Result	Reference interval
Cellularity	2/µL	<5 /µL
WBC∗	2/µL	<5/µL
RBC∗	1/µL	0/µL
Protein concentration	49.5 mg/dL	<25-30 mg/dL

WBC: White blood cell; **RBC:** Red blood cell
∗ Sysmex XN 1500

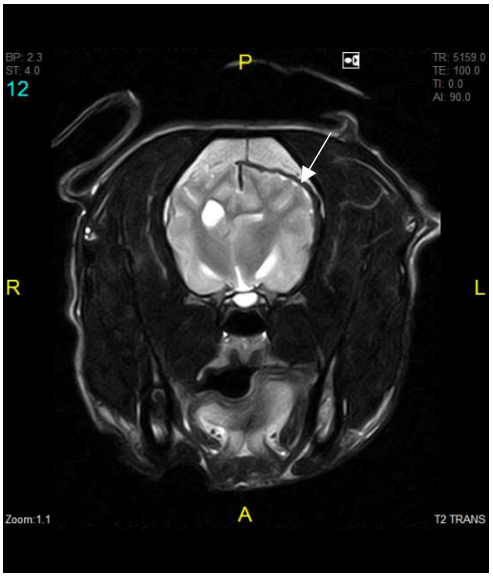

Figure 1. Transverse T2-W. Diffuse extra-axial lesion in the left cerebral hemisphere. Note the hypointense signal of the lesion and the moderate mass effect (arrow).

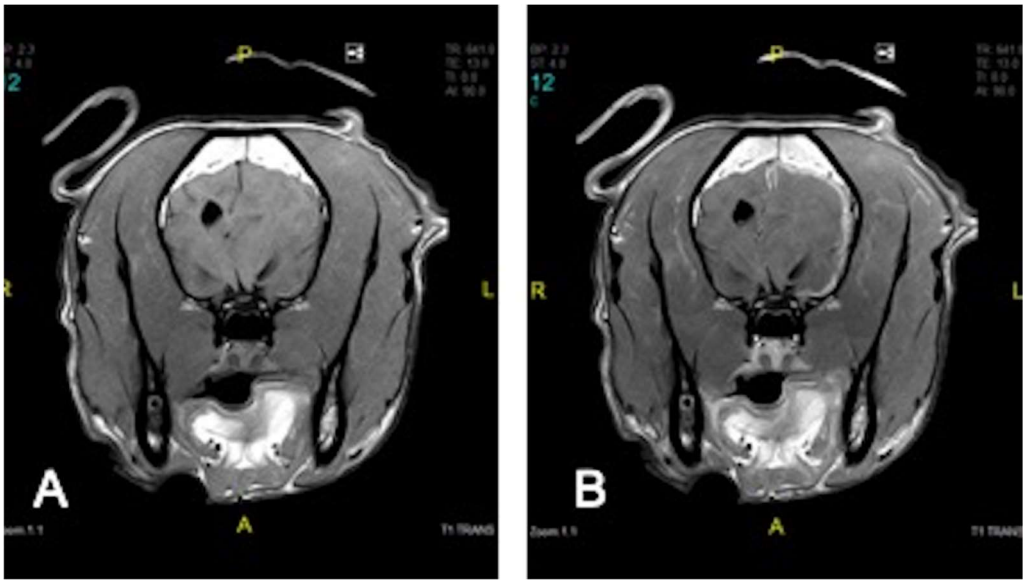

Figure 2. (A) Transverse T1-w and (B) T1-w after contrast administration images. The lesion is isointense to the brain parenchyma and shows marked and homogeneous contrast enhancement.

CYTOLOGICAL IMAGES OF THE LESION

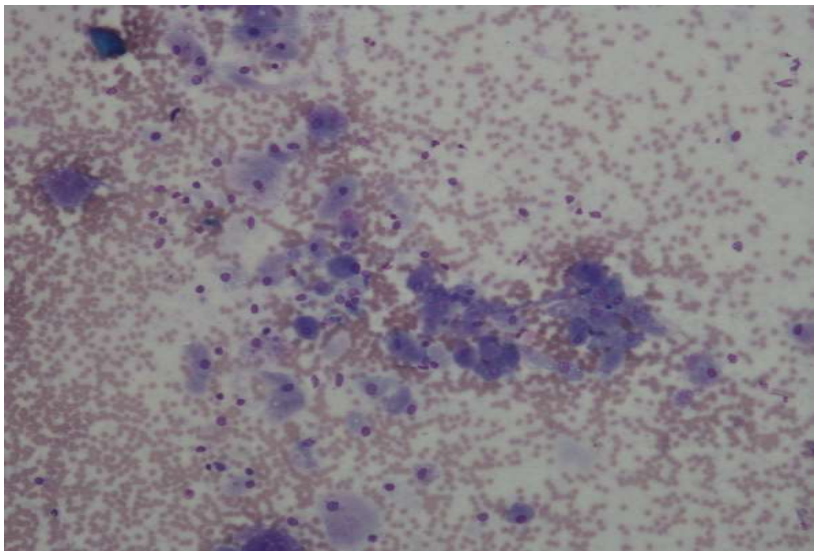

Figure 3. Imprints from the meningeal lesion, 100x (May-Grünwald-Giemsa stain).

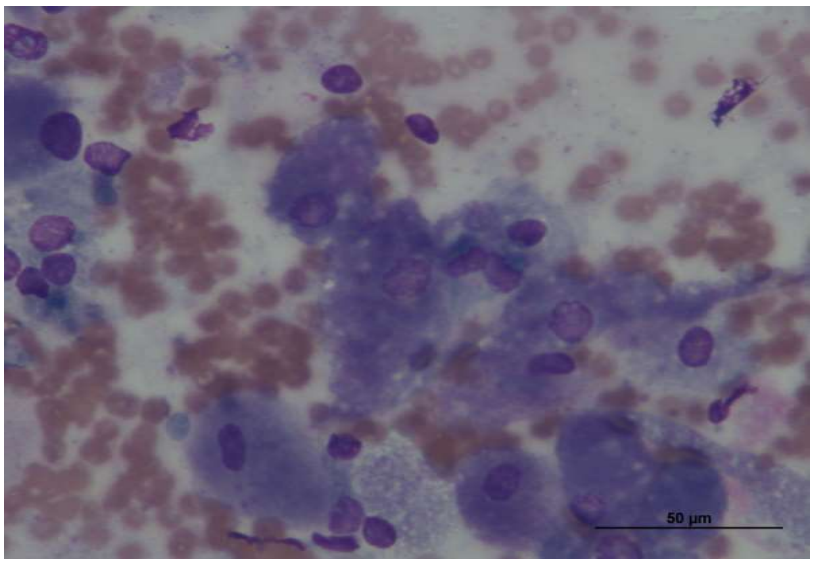

Figure 4. Imprints from the meningeal lesion 400x (May-Grünwald-Giemsa Stain).

QUESTIONS

1- What is your cytological description and interpretation of the cytological findings?
2- What additional special stains or immunohistochemistry stains could be performed to further investigate the case?