Laboratory evaluation of cavitary fluids in the dog, cat and horse.

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INTRODUCTION

The presence of a little amount of liquid in the body cavitaries is physiological and it keeps, in normal situation, in a constant balance between production and reabsorbation.

This study is a literature review where we have joined the different analysis methods applied in the evaluation of these fluids and the special features in the interpretation of the results, on each species.

LABORATORY PROCESS

Basic analysis that all samples should be made (Figure 1):

-Gross evaluation (macroscopic)
-Total nucleated cell count (TNCC)
-Cytologic stydy
-Biochemical analysis

Gross evaluation:

It is necessary to record de total volume collected and its characteristics like de color, turbidity or clearness and odor (DeHeer *et al.*, 2002).
Viscosity should be evaluated in synovial fluid.

TNCC

Can be determined by hematology analyzers o by manual methods (hemocytometer).

Cytology

Necessary to determinate de cellular pattern in the sample.

Biochemical analysis

The biochemical analysis includes a determination of the total protein concentration, the density and other determinations as need.

Figure 1. Diagnostic tests applicable according to the storage tube used (Dempsey 2011).

Storage tube	Diagnostic tests
Diamintetraacetic acid (EDTA) (lavender top)	TNCC PCV TPD Cytology
Serum (red top)	Biochemical tests (albumine, bilirubin, creatinine, potassium, triglycerides, glucose, lactate, lipase) Microbiology
Sterile tube or culture medium	Polymerase chain reaction (PCR) Microbiology

INTERPRETATION

Laboratory evaluation results permit classify pleural and peritoneal effusion in transudates or exudates. **Figure 2** is a summary of the principal characteristics of each one.
The synovial fluid is classified, principally, in neoplastic process or non neoplastic. The non neoplastic processes are divided in inflammatories or non inflamatories (**Figure 3).**

Figure 3. Classification of synovial fluid processes (Núñez, 2013).

Non-neoplastic	Non-inflammatory		Hemarthrosis
	Inflammatory	Septic	Neutrophils (D), Possible bacteria observation
		Non septic/immunemediated (IMD)	Neutrophils (ND), no bacteria, other IMD processes (nefritis, meningitis)
Neoplastic			

(ND) non degenerate,(D) degenerate

Figure 2. Classification of pleural and peritoneal effusions (Center, 2012).

	Transudate		Exudate				
	Pure transudate	**Trasudate rich in protein**	**Hemorragic effusion**	**Exudate (non-septic)**	**Exudate (septic)**	**Bilious effusion**	**Chylous effusion**
Color	Clear, colorless	Serosanguinous, reddish, orange	Sanguinous, red	Serosanguinous, reddish, orange	Purulent, creamy, serosanguinous	Brown/green, cervine	Milky/white/rose, opalescent
Turbidity	Clear	Clear to cloudy	Opaque	Cloudy	Cloudy/flocculent	Opaque	Opaque
TPD (g/L)	<25	25-50	>30	>30	>30	>30	>25
Density	<1.017	1.017-1.025	>1.025	>1.025	>1.025	>1.025	>1.018
TNCC (cells/L)	$<1.000x10^6$ $<5.000x10^6$ (h.)	$(500\text{-}10.000)x10^6$	$>1.000x10^6$ $>5.000x10^6$(c,)	$>5.000x10^6$ $>10.000x10^6$ (h.)	$>5.000x10^6$ $>10.000x10^6$ (h.)	$>5.000x10^6$ $>10.000x10^6$ (h.)	Variable
Cytologic differential	Mononuclear cells(mesothelial cells, lymphocytes, macrophages).	mesothelial cells, macrophages, neutrophils (ND), erythrocytes (few), lymphocytes.	Similar to blood, neutrophils (var., ND), lymphocytes (few), macrophages (erythrophagocytosis).	Neutrophils (ND), macrophages (phagocytosed detritus), erythrocytes (var.), mesothelial cells(increased in chronicity), ± neoplastic cells	Neutrophils (D, phagocytosed bacteria), Mesothelial cells (var.), erythrocytes (var.).	Neutrophils (in acute), macrophages (external and internal bilirubin crystals: brown granular material), lymphocytes(few).	Lymphocytes (predominant in early analysis), neutrophils (increased in chronicity), mesothelial cells (var.).
Bacteria	No	No	No	No	Possible	±	Rare
Lipids	No	No	No	No	No	No	High triglyceride (effusion > serum), Cholesterol (effusion < serum), Positive Sudan III or oil red-O stain

(var.) variable, (ND) non degenerate,(D) degenerate, (h.) horse values (Meyer y Harvey, 2004).

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