

# Body Cavity Effusions

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Proper classification of body cavity effusions is based on conclusions drawn from color and clarity of fluid, total protein concentration, cell quantity, and microscopic evaluation.

## Case Studies

These cases demonstrate how additional information can be gleaned through cytologic analysis and classification of body cavity effusion (See **Steps to Classifying Body Cavity Effusions**, page 87).



### Case 1: Labored Breathing

A 3-year-old castrated collie was presented for labored breathing, shortness of breath, and collapse. Physical examination revealed muffled heart and lung sounds with synchronous peripheral pulses. Thoracic radiographs revealed moderate pleural effusion.

#### Analysis of Fluid

Color/clarity	Pink/opaque (Figure 1)
Total protein by refractometer	5 g/dL
Total nucleated cell count	1690/ $\mu$ L
RBC count	30,000/ $\mu$ L
Triglyceride concentration	478 mg/dL
200 cell count differential	61% lymphocytes, 19% macrophages, 21% neutrophils (Figure 2)

#### Ask Yourself



1. Based on the fluid parameters given, what is the classification of this fluid?
2. What are some differentials for this particular fluid type in the thoracic cavity?



### Case 2: Lethargy & Inappetence

A 4-year-old intact female beagle was presented for lethargy and inappetence of 5 days' duration. She was febrile (103.1°F) and painful on palpation of her midabdomen. CBC revealed a normal leukocyte count with regenerative left shift and 2+ toxicity in some neutrophils. Abdominal ultrasonography demonstrated moderate free abdominal fluid.

#### Analysis of Fluid

Color/clarity	Red/cloudy
Total protein	4.6 g/dL
Total nucleated cell count	184,600/ $\mu$ L
RBC count	110,000/ $\mu$ L

#### Ask Yourself

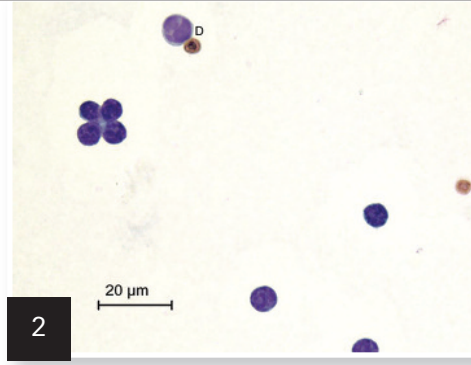


1. What is the predominant cell type (Figure 3)?
2. What is the estimated total nucleated cell count if this image represents an average field at 100 $\times$  (Figure 3)?
3. Any abnormalities noted with the predominant cell type (Figure 4)?



1

Gross image of pleural fluid. The fluid is pink and opaque.



2

Small, well-differentiated lymphocytes in a proteinaceous background; thoracic fluid from a dog. One of the lymphocytes is larger with smudged chromatin, a sign of partial degradation (D). (Wright-Giemsa, 50×)

## Cytology Interpretation

The fluid was pink, opaque, and comprised predominantly of small, well-differentiated lymphocytes, which raised concern for a chylous effusion. The fluid's triglyceride concentration was >100 mg/dL, making diagnosis of chylous effusion possible without concurrent serum triglyceride measurement.<sup>1</sup> If the fluid triglyceride concentration is <100 mg/dL, a fluid triglyceride concentration >2× the serum triglyceride concentration is also considered diagnostic. Total protein by refractometer was likely falsely increased by the lipid content of the fluid sample. Given the presence of a chylous effusion, differentials included lymphangiectasia, cardiac disease, heartworm disease, idiopathic chylothorax, fungal granuloma, lung lobe torsion, diaphragmatic hernia, neoplasia, and venous thrombi; less likely, congenital abnormality; rarely, thoracic duct rupture.

Chest radiographs were repeated after thoracentesis; no cardiac abnormalities, masses, or lung lobe torsion were observed. Additional tests, including echocardiogram and SNAP 4Dx (idexx.com), were within normal limits. The chylous effusion was deemed idiopathic, and the patient has been successfully treated for 2 years with rutin and therapeutic thoracentesis as needed.

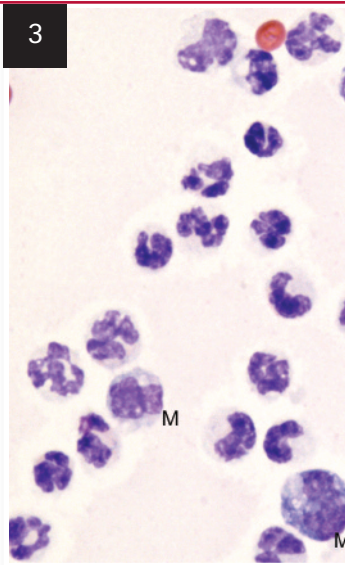
### Did You Answer



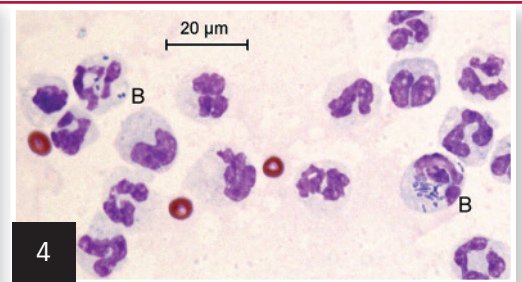
1. Chylous effusion
2. Lymphangiectasia, cardiac disease, heartworm disease, idiopathic chylothorax, fungal granuloma, lung lobe torsion, diaphragmatic hernia, neoplasia, venous thrombi; less likely, congenital abnormality; or rarely, thoracic duct rupture

## Cytology Interpretation

The abdominal fluid is best classified as an exudate based on its total protein concentration, nucleated cell count, and predominant nucleated cell type. Further examination revealed degenerative changes in many neutrophils, including karyolysis and karyorrhexis. The neutrophils contained intracellular bacteria, which allowed further classification as a septic exudate. Aerobic culture of the fluid yielded scant to moderate growth of *Escherichia coli* and *Enterococcus* spp. During exploratory laparotomy, a 15-inch cloth was found in an area of devitalized jejunum with a small perforation. Resection and anastomosis were performed to remove the affected intestinal segment and the animal was placed on IV broad-spectrum antibiotics. The patient recovered uneventfully. ■ **cb**



Mature, mildly karyolytic neutrophils and 2 mononuclear phagocytes (M); abdominal fluid from a dog. (Wright-Giemsa, 100×)



4

Mature neutrophils with fewer bands exhibiting karyolysis and containing intracellular coccobacilli and bacilli (B); abdominal fluid from a dog. (Wright-Giemsa, 100×)

### Did You Answer



1. Mature neutrophils
2.  $19 \text{ complete cells/field} \times (100 \text{ objective})^2 = 190,000/\mu\text{L}$ ; machine count was  $184,600/\mu\text{L}$
3. Mature neutrophils with fewer bands exhibiting karyolysis and containing intracellular coccobacilli and bacilli, indicative of bacterial infection

See **Aids & Resources**, back page, for references & suggested reading.