

RADIOLOGY

A DOG WITH ACUTE VOMITING

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HISTORY

Lady, an eleven year-old, spayed golden retriever, was presented to the Koret School of Veterinary Medicine, Hebrew University of Jerusalem Teaching Hospital for evaluation for acute vomiting. Lady was fully vaccinated and dewormed and lived in a private house with free access to a garden. The owner reported that during the morning Lady vomited several times. They reported that the vomitus consisted of a large amount of watery yellow fluid with digested food. She also had soft stool with a normal brown color. Since then, Lady has been lethargic. For the last 2 weeks Lady has been on cortisone (Prednisone) due to pruritis.

Physical Examination

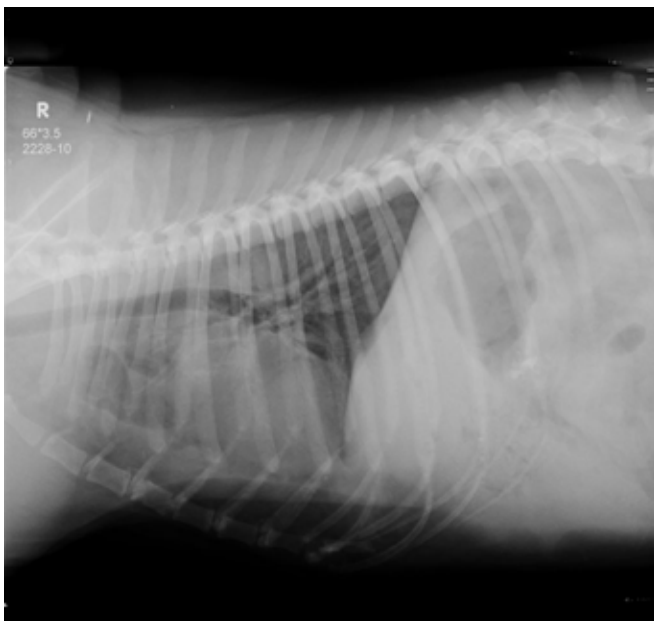
Lady weighed 33 kg (BCS=6/9). Her demeanor was bright, alert and responsive. She was adequately hydrated and her mucous membranes were hyperemic. Her body temperature was 41.4°C; pulse 180 beats per minute and on examination she was panting. Her CRT was less than 2 seconds. On palpation she exhibited a distended and painful abdomen. Abnormalities detected on the Complete Blood Count (CBC) included a leucopenia (WBC = $4.09 \times 10^3/\mu\text{L}$ (normal range $5.2\text{-}13.9 \times 10^3/\mu\text{L}$)) and thrombocytopenia (PLT = $88 \times 10^3/\mu\text{L}$ (normal range $143\text{-}400 \times 10^3/\mu\text{L}$)). Examination of the blood smear revealed a left shift and toxicity.

Blood Chemistry abnormalities were limited to increased activities of alkaline phosphatase (ALP = 309 U/L (normal range 4-140 U/L)) and alanine aminotransferase (ALT = 497 U/L (normal range 5-103 U/L)).

Thoracic radiographs were performed (Figures 1 and 2)

1. What are your radiographic findings?
2. Make a list of differential diagnoses for each abnormal finding.
3. Make a radiographic diagnosis.
4. Decide whether additional imaging studies are required.

SEE THE FOLLOWING PAGE FOR THE DIAGNOSIS AND EXPLANATION.



WHAT IS YOUR DIAGNOSIS?

RADIOGRAPHIC FINDINGS

The overall opacity of the thorax was increased. On the lateral view, there was border effacement of the cardiac silhouette (mainly at the ventral margins). Fluid opacity was observed at the ventral thorax-dorsal to the sternum and there was loss of visibility of the pulmonary parenchyma as well as the diaphragmatic outline at this area. "Skin fold artifact" was also visible at the ventral thorax.

Within the viewable abdomen, there was a decrease of peritoneal detail, and multiple poorly defined radiolucent gas shadows were visible at the area of the ventral liver parenchyma (Figure 3-black arrows). The liver margins extends beyond the costal arch.

On the dorsoventral view, numerous interlobar fissure lines were observed and the lung lobes were displaced away (retracted), from the thoracic wall. Fluid opacity was visible between the lung lobes and the thoracic wall. The cardiac and diaphragmatic silhouettes were completely obscured. Loss of peritoneal detail was again evident within the viewable abdomen.

Differential diagnoses for increased radio-opacity of the pleural cavity and lung lobe retraction

1. Pleural effusion
2. Pleural fat deposition
3. Diaphragmatic hernia

Differential diagnoses for border effacement in the thorax

1. Pleural effusion or pleural masses
2. Alveolar or severe interstitial lung pattern
3. Pulmonary or large mediastinal masses
4. Diaphragmatic hernia
5. Artifactual due to technical factors (e.g., underexposure)

Differential diagnoses for decreased peritoneal detail

1. Peritoneal effusion (e.g., ascites, peritonitis, uroabdomen)
2. Emaciation or normal puppy/kitten (due to lack of abdominal fat)
3. Artifactual due to technical factors (e.g., underexposure)

Differential diagnoses for focal irregular gas lucencies within the liver

1. Hepatic abscess (penetrating injury or hematogenous)
2. Infection with gas-producing organisms

RADIOGRAPHIC DIAGNOSIS

1. Pleural effusion
2. Abdominal effusion
3. Hepatomegaly and suspected hepatic abscessation

Since Lady's condition deteriorated quickly, abdominal ultrasound was undertaken (Figure 4).

Abdominal ultrasound-findings

- 1) Free abdominal fluid (Figure 5- arrows)
- 2) Hepatic gas pockets with ecogenic shadows (reverberation artifacts). (Figure 5-arrow heads)

These findings were consistent with abdominal effusion and liver abscessation.

Needle aspiration of the abdominal free fluid was performed. Neutrophils, and many cocci and rod bacteria were observed. One liter of pleural fluid was drained.

The assessment was that Lady suffered from septic peritonitis

due to rupture of hepatic abscess. On surgery, a large focal hepatic abscess was observed. Hepatic lobectomy was made and the abdominal cavity flushed.

IMAGING DISCUSSION

This case emphasizes the significance of a thorough and systematic radiographic evaluation. Even-though the initial aim of the radiographs were to evaluate the thoracic cavity, it is very important to also evaluate systematically the extra thoracic structures such as the peripheral soft tissues, skeletal structures (vertebrae, ribs etc.) and the viewable abdomen. The small part of the viewable cranial abdomen that was seen at the radiograph provided essential information (i.e. irregular gas lucencies, decreased peritoneal details) for further diagnostic work-up. Abdominal ultrasound findings were suggestive of hepatic abscessation and abdominal effusion. The ultrasonographic examination and the aspiration results provided a definitive diagnosis. These results, combined with the poor clinical state of the patient, brought the clinician to decide that emergency procedures were required.

REFERENCES

1. Thrall, D.E. (2007) *Veterinary Diagnostic Radiology*, fifth edition.
2. Dennis, R., Kirberger, R.M., Wrigley, R.H. and Barr, F.J. (2001) *Small Animal Radiological Differential Diagnosis*, first edition.

