



What Is Your Diagnosis?

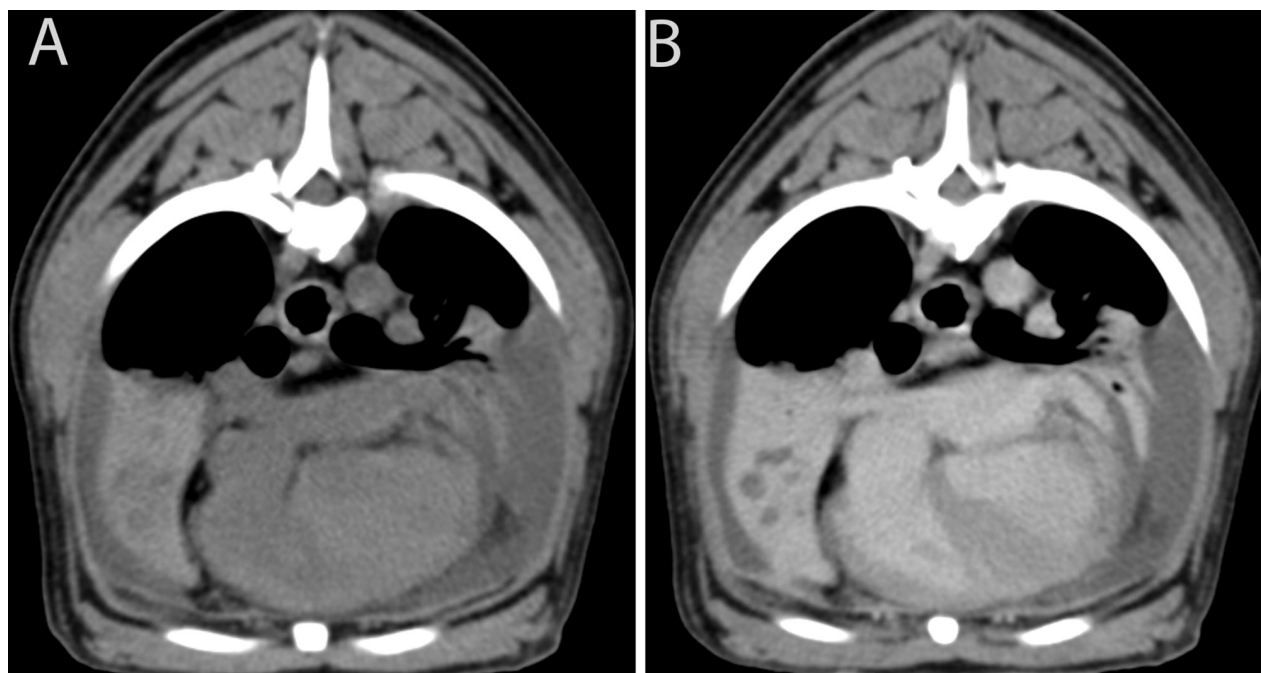


Figure 1—Transverse thoracic CT images at the level of the right middle lung lobe obtained before (A) and after (B) administration of contrast medium to a 4-year-old 10-kg (22-lb) spayed female French Bulldog referred because of pleural effusion and aspiration pneumonia following treatment (induction of emesis and oral administration of activated charcoal) of an accidental overdose of trazodone that occurred 19 days earlier. The patient was positioned in sternal recumbency, and the images are displayed in a soft tissue window (window width, 350 HU; window level, 40 HU).

History

A 4-year-old 10-kg (22-lb) spayed female French Bulldog was referred because of pleural effusion and aspiration pneumonia following treatment (induction of emesis and oral administration of activated charcoal) of an accidental overdose of trazodone that occurred 19 days earlier. Thoracic radiography performed by the referring veterinarian revealed a severe alveolar pattern in the right middle lung lobe and an interstitial to alveolar pattern in the cranial lung lobes. Thoracocentesis performed by the referring veterinarian yielded dark red to black fluid that by cytologic examination was determined to have been aseptic.

On examination, the dog was tachypneic (42 breaths/min; reference range, 12 to 36 breaths/min) but did not have crackles or wheezes on auscultation. Findings for the rest of the physical examination were unremarkable. Oxygen supplementation was initiated, and thoracic CT was performed (**Figure 1**).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

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Diagnostic Imaging Findings and Interpretation

Fluid in the dependent aspect of the pleural space and retraction of lung lobes were evident. In addition, all lung lobes were reduced in size and had consolidation ventrally combined with ground glass attenuation dorsally, consistent with atelectasis. In the ventral aspect of the right middle lung lobe, there were multiple fluid-filled areas (22 HU) that did not have contrast enhancement (**Figure 2**). The right middle lung lobe was focally enlarged at this location, and the adjacent parietal pleura was thickened with linear, contrast-enhancing, soft tissue attenuation that extended into the pleural space, consistent with granulation tissue. The sternal lymph nodes were heterogeneously contrast-enhancing and 10.0 mm in diameter (reference range, 3.0 to 10.0 mm in diameter). The primary differential diagnosis was a ruptured right middle lung lobe abscess and secondary pyothorax. The other differential diagnosis considered was a necrotic pulmonary mass (eg, carcinoma) with neoplastic or hemorrhagic effusion.

Treatment and Outcome

A right lateral thoracotomy was performed to evaluate the right lung lobes and the thoracic cavity. A mass-like structure, suspected to have been an abscess in the right middle lung lobe, appeared to have ruptured, and the right middle lung lobe was adhered to the adjacent region of the thoracic wall. Lobectomies of the right middle and right caudal lung lobes were performed because of the presence of parenchymal damage in each secondary to adhesions formed in the thoracic cavity. In addition,

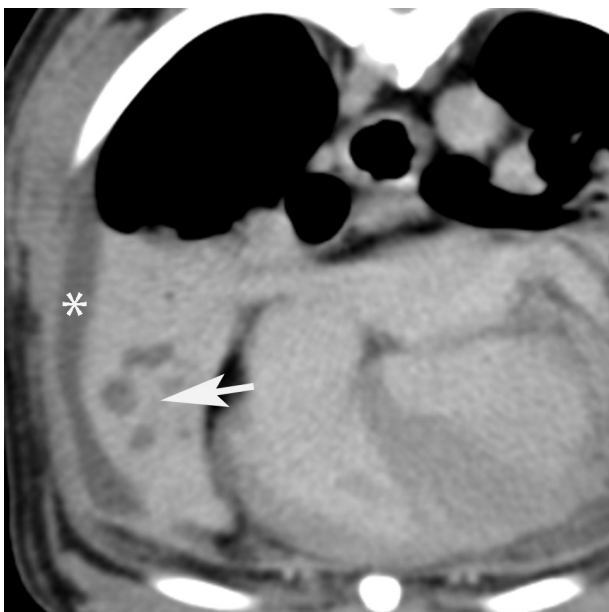


Figure 2—Enlargement of the CT image in Figure 1 obtained after administration of contrast medium. Fluid is evident in the pleural space (asterisk), and multiple small, noncontrast-enhancing, fluid-attenuating areas appear in the ventral aspect of the adjacent right middle lung lobe (arrow).

material consistent with activated charcoal was present throughout the thoracic cavity, and debridement of the foreign material-covered tissues was performed. Results of histologic evaluation of samples from the resected right middle lung lobe suggested marked aspiration pneumonia with diffuse black foreign debris (consistent with activated charcoal).

The dog recovered from anesthesia and surgery without complications and was discharged from the hospital 8 days after surgery, with continued medical treatment consisting of amoxicillin-clavulanic acid (25.0 mg/kg [11.4 mg/lb], PO, q 12 h) and enrofloxacin (13.0 mg/kg [5.9 mg/lb], PO, q 24 h) for 14 days. On recheck examination 14 days after surgery, the dog was doing well.

Comments

In humans with aspiration pneumonia following gastric lavage with activated charcoal, autopsies reveal charcoal in the alveoli, in alveolar macrophages, and even in sinusoidal histiocytes of regional lymph nodes.¹ Activated charcoal administered into the trachea increases lung microvascular permeability, compromising the lung barrier.² Pulmonary compromise and abscess formation in those affected can be directly related to intratracheal instillation of activated charcoal. In the dog of the present report, it was unknown whether the activated charcoal was aspirated, or whether it was directly administered into the trachea rather than the esophagus.

Computed tomography is an essential tool in differentiating lung abnormalities, including revealing characteristics that help distinguish between focal necrotizing pneumonia and lung abscesses,³ providing the ability to diagnose specific abnormalities and formulate the most effective treatment plans. Results of diagnostic imaging were vital for making the decision that the dog of the present report required surgery and in determining the appropriate surgical approach to use. On the basis of radiographic results, the initial concerns were for aspiration pneumonia and pleural effusion, which would not have warranted surgical intervention. With CT, however, we were able to identify in the consolidated right middle lung lobe focal, fluid-filled areas that were not contrast-enhancing, consistent with an abscess. This finding, combined with results of cytologic evaluation of the fluid obtained with thoracocentesis, helped in determining that surgical management was indicated. In addition, images obtained with CT also helped guide surgical planning and selection of a lateral thoracotomy given the focal nature of the specific abnormalities rather than a median sternotomy. Thus, CT was a fundamental component in treating the dog of the present report.

References

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3. Seo H, Cha SI, Shin KM, et al. Focal necrotizing pneumonia is a distinct entity from lung abscess. *Respirology* 2013;18:1095-1100.