

What's Your Diagnosis?

Allison Crow, Class of 2014

Signalment: 13 year old male castrated mixed breed dog

History: The patient presented to the rDVM for pain in the hind end, weakness and neck stretching one week prior to presentation at KSU VHC. At that time, he was prescribed Previcox. Three to four days later, the patient vomited and had a decreased appetite and returned to the rDVM. At that visit, he was prescribed prednisone.

Presenting Complaint: The patient presented to KSU VHC on emergency for vomiting.

Physical Exam: On presentation, the dog was lethargic but alert and responsive and had a painful abdomen. He had a temperature of 98.8°F, heart rate of 180 and respiratory rate of 36. He weighed 16.8 kilograms.

Blood work abnormalities:

- Severe leukopenia (1 K/uL) and neutropenia (segs = 0.4 K/uL) with a degenerative left shift (bands = 0.4 K/uL) and marked toxic changes
- Hypoglycemia (glucose = 36 mg/dL)
- Azotemia (BUN = 72 and creatinine = 3.6)
- Hypoalbuminemia (2.2 g/dL)
- Hyperphosphatemia (12.1 mg/dL)
- Hypochloridemia (97 mmol/L)
- Elevated alkaline phosphatase (271 U/L)

Abdominal Radiographs:

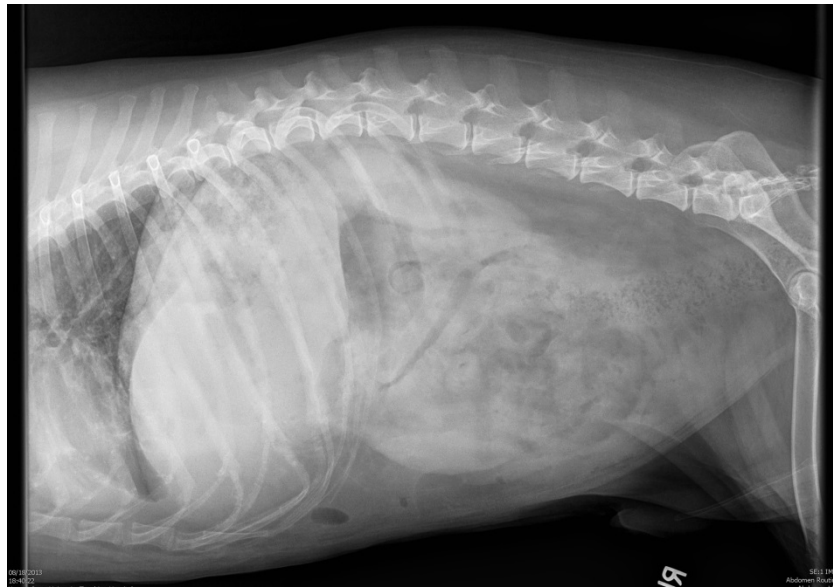


Figure 1 – Right lateral abdominal radiograph



Figure 2 – Dorsoventral abdominal radiograph

Radiographic Interpretation:

Abdominal contour is mildly pendulous. There is decreased peritoneal serosal detail. Multiple small round to oval gas opacities visible are visible ventrally, superimposed with the falciform fat, that do not appear to be associated with any bowel loops. There is a curvilinear gas opacity superimposed over small intestines in the mid-abdomen on both the lateral and ventrodorsal radiographs. The stomach contains a heterogeneous soft tissue opacity consistent with food ingesta.

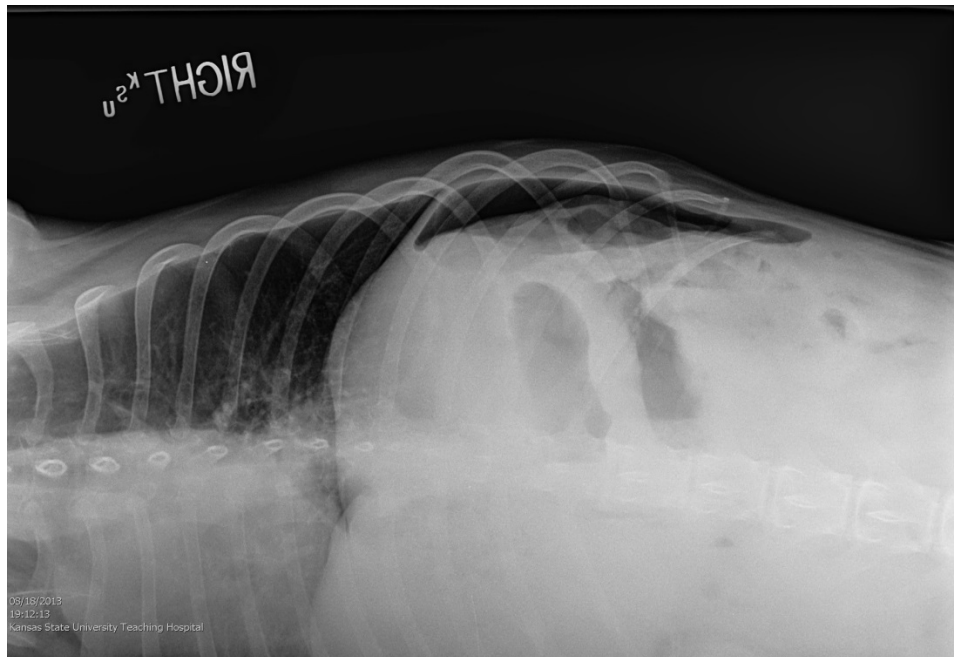
Horizontal Beam Radiograph:

Figure 3 – Left lateral recumbency dorsoventral horizontal beam radiograph

Radiograph Interpretation:

There is increased visibility of the abdominal margin of the diaphragm. Free abdominal gas is visible between the liver and body wall on the left recumbency dorsoventral horizontal beam image. The free gas in the peritoneum and the abdominal effusion are consistent with gastric perforation and pneumoperitoneum.

Thoracic Radiographs:

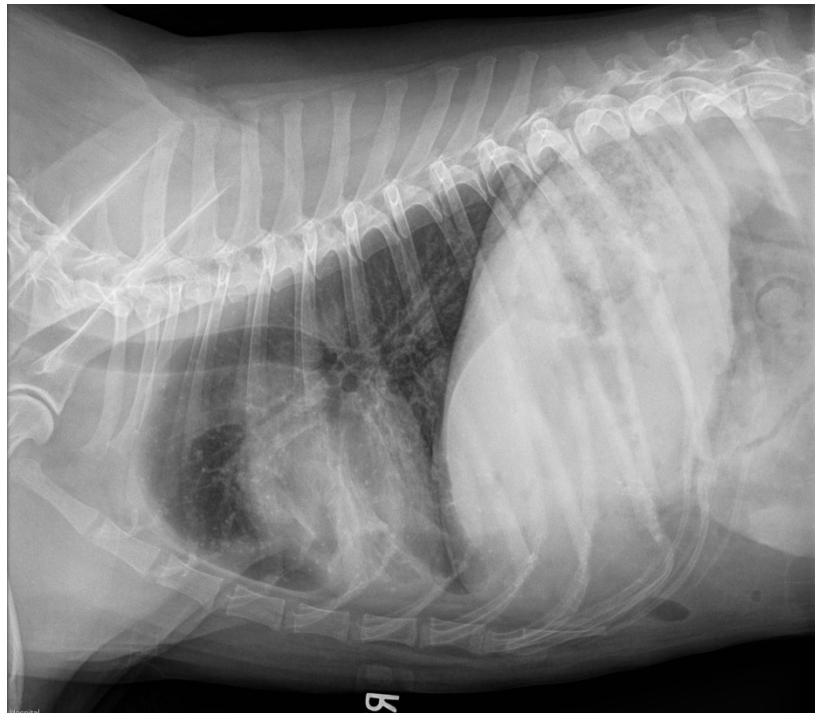


Figure 4 – Right lateral thoracic radiograph



Figure 5 – Left lateral thoracic radiograph

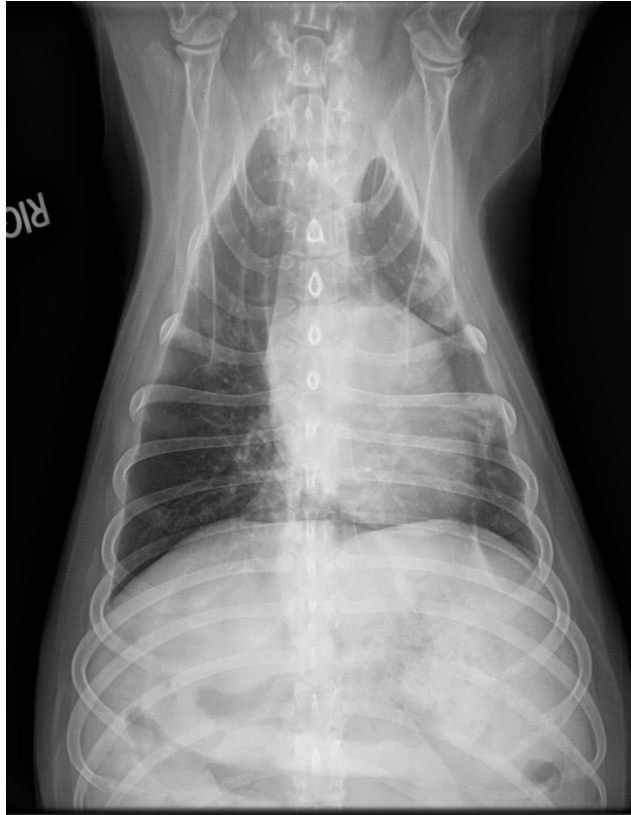


Figure 6 – Ventrodorsal thoracic radiograph

Radiographic Interpretation:

There are multiple small (less than 3mm diameter) mineral opaque structures superimposed over the heart and cranial lung lobes. The apex of the heart is shifted toward the left on the ventrodorsal projection. There is evidence of a mild alveolar pattern with air bronchograms present in the caudal and accessory lung lobes. There may be evidence of mild pneumonia in the caudal lung fields.

Final Outcome: Owners elected for euthanasia the same day.

Discussion:

The discovery of free gas in the abdomen was highly suggestive of gastrointestinal perforation. The abdominal radiographs showed irregularly-marginated gas opacities within the abdomen that did not appear to be associated with bowel, but it was difficult to free gas with certainty due to superimposition of those areas with abdominal contents. The horizontal beam view was used to isolate the air in an area of the abdomen where it was not superimposed with any other structures. The patient was placed in left lateral recumbency, and the beam was rotated so that it was horizontally projected across the right lateral aspect of the patient. The free gas was clearly visible between the liver and the right body wall, which confirmed the diagnosis of pneumoperitoneum.

Combining NSAID and corticosteroid therapy is generally not recommended due to their similar mechanism of action. All non-steroidal anti-inflammatory drugs (NSAIDs) inhibit the cyclooxygenase pathway to some extent, whether inhibiting COX-1, COX-2 or both enzymes. While this is beneficial in preventing the continuation of the inflammatory cascade, inhibition of these enzymes also disrupts protective functions of the body such as mucous and bicarbonate secretion in the stomach, as well as mechanisms necessary to maintain renal blood flow. Glucocorticoids act higher in the inflammatory cascade by inhibiting phospholipase A₂, the precursor for the COX enzymes. Glucocorticoids thus have similar effects on the body as NSAIDs in terms of interfering with gastric protective mechanisms and renal perfusion. Combining these two drug classes can result in serious side effects including gastric perforation and renal hypoperfusion and ischemia.

In the case of this dog, it is thought that the combination of NSAIDs and corticosteroids lead to the formation of a gastric ulcer severe enough to perforate the gastrointestinal tract. This allowed for the release of both gas and gastrointestinal contents into the abdominal cavity, resulting in pneumoperitoneum and septic peritonitis, respectively. This is an emergency situation requiring immediate surgical intervention. Even with surgery, septic peritonitis carries a guarded prognosis.