

# What Is Your Diagnosis?

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Figure 1—Right lateral (A) and ventrodorsal (B) radiographic views of the abdomen of a 6-year-old neutered male mixed-breed dog with a thoracic laceration and a subcutaneous swelling near the right ilium. L = Left. R = Right.



## History

A 6-year-old neutered male mixed-breed dog was evaluated at an emergency veterinary service because of a laceration on the right ventral aspect of the thoracic wall and a firm subcutaneous swelling near its right ilium. The dog had been playing outside that morning, and the owner noticed the injuries after the dog emerged from the woods.

On initial physical examination, the dog was bright and alert and its heart rate and respiratory rate were within reference limits. The dog's abdomen was tense, a laceration with bruising was present on the right ventral aspect of the thorax, and a firm subcutaneous structure was palpable cranial to the right hemipelvis. Limited abdominal ultrasonography was performed by the emergency clinician to evaluate for the presence of fluid within the abdominal cavity; no free fluid was found. Given the physical examination findings and signs of abdominal pain, radiographs of the abdomen were obtained (Figure 1).

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

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## Radiographic Findings and Interpretation

A cylindrical radiolucent structure (33 X 2.5 cm) is present in the right aspect of the abdomen. It extends in a cranioventral to caudodorsal direction from adjacent to the pyloric antrum to the level of L7, where its tip is identified in the subcutaneous tissue. Subcutaneous emphysema is evident at the site dorsal to the wing of the right ilium (Figure 2). On a more cranially centered right lateral radiographic projection of the abdomen, gas is identified superimposed with the caudoventral aspect of the thorax, indicating a possible entry wound (Figure 3). No evidence of pneumoperitoneum is seen. On thoracic radiographs (not shown), subcutaneous emphysema is evident along the right body wall. No

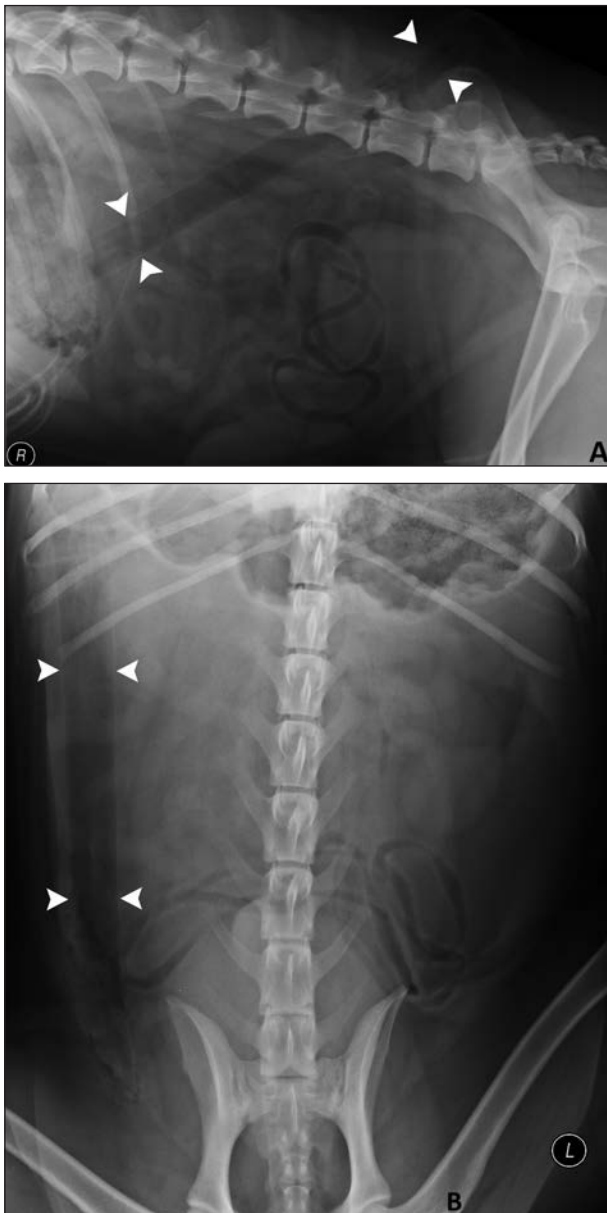


Figure 2—Same radiographic images as in Figure 1. A cylindrical radiolucent structure is evident in the right side of the abdomen extending into the subcutaneous tissues lateral to the right ilium (arrowheads). L = Left. R = Right.

evidence of pneumothorax or pleural effusion was present. On the basis of the physical examination and radiographic findings, a traumatic wooden stick foreign body with penetration of the thoracic and abdominal cavities was suspected.

## Treatment and Outcome

An abdominal surgery for foreign body removal was performed. At surgery, the wooden stick was present within the abdomen along the right body wall and was removed. Abdominal organs were unscathed by the wooden stick. Two samples of abdominal fluid in the area of the stick were submitted—1 for aerobic and 1 for anaerobic microbial culture. A hole in the diaphragm was found on the right side ventrolateral to the liver and gallbladder. A partial median sternotomy was

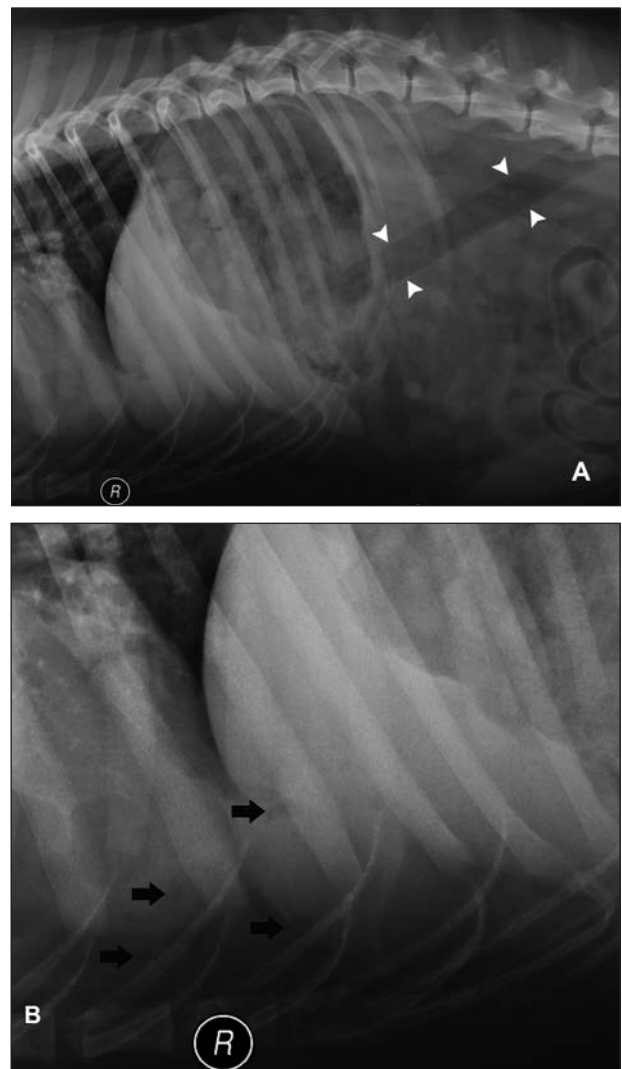


Figure 3—Radiographic views of the abdomen of the same dog as in Figure 1. A—Right lateral radiographic image centered on the cranial aspect of the abdomen. Notice the radiolucent foreign body (arrowheads). Gas is present overlying the caudoventral aspect of the thorax in line with the foreign body, indicating an entry wound. B—Right lateral radiographic image focused (coned down) on the cranialmost aspect of the abdomen. Notice the gas radiolucencies superimposed with the caudoventral aspect of the thorax (arrows). R = Right.

performed, followed by copious lavage of the thoracic cavity with sterile saline (0.9% NaCl) solution. Thoracic structures were normal in appearance. A chest tube and a closed-suction drain were placed intraoperatively. Numerous splinters of wood and pieces of bark were removed from the thoracic laceration followed by copious lavage and closure of the wound.

After surgery, the dog was treated with ampicillin (25.7 mg/kg [11 mg/lb], IV, q 8 h), enrofloxacin (10 mg/kg [4.5 mg/lb], IV, q 24 h), and metronidazole (10 mg/kg, IV, q 12 h) in addition to IV administration of fluids. Microbial culture results revealed scant growth of fungal organisms (*Rhizopus* spp), but no anaerobic organisms. The fungal organisms were thought to be either erroneous culture contaminants or to have been removed from the patient by the intraoperative lavaging process. The dog recovered well from anesthesia and surgery and was discharged from the hospital 4 days after surgery.

## Comments

Impalement injury is an uncommon type of penetrating trauma.<sup>1</sup> Of this type of injury, thoracoabdominal impalement is among the most severe.<sup>2</sup> Thoracoabdominal impalements typically compromise vital organs and negatively impact respiration and circulation.<sup>2</sup> Some of the common sequelae of thoracic trauma are pneumothorax, pulmonary contusions, and flail chest.<sup>3</sup> Abdominal complications can be serious and include intestinal perforations, splenic lacerations, and peritonitis.<sup>2</sup>

Both plain and contrast radiography can be used to identify the affected sites and to guide surgical re-

moval of a foreign body.<sup>4</sup> However, wooden objects are often difficult to appreciate on survey radiographs because they are typically of soft tissue opacity and thus radiolucent.<sup>4,5</sup> Although radiography does not always reveal the foreign object, animals with impalement injuries often have secondary evidence of thoracic or abdominal trauma such as subcutaneous emphysema, pleural or abdominal effusion, pneumothorax, or pneumoabdomen.<sup>1</sup> When radiographic findings are equivocal, other imaging modalities such as ultrasonography are useful in identifying wooden foreign bodies.<sup>5</sup> On ultrasonography, wooden sticks are identified by their linear, echogenic interface and uniform acoustic shadowing.<sup>5</sup> In the case described in the present report, diagnostic ultrasonography was not performed because the presence of gas within the dry wood made identification of the foreign body on radiographs unusually straightforward.

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