What Is Your Diagnosis?

History

A 6-year-old spayed female mixed-breed dog weighing 27 kg (59 lb) was evaluated because of a 5-month history of right forelimb lameness and soft tissue swelling over the right shoulder region. The lameness and swelling were first noticed 4 days following exploratory laparotomy and gastrotomy for removal of a wooden gastric foreign body. Several antimicrobials and NSAIDs had been administered, with no clinical improvement seen.

Physical examination revealed a rectal temperature of 39.4°C (103°F). The patient was intermittently non–weight bearing on the right forelimb. Two firm subcutaneous masses that did not cause signs of pain were found over the right scapula and the right side of the thorax. No abnormalities were detected on a CBC, serum biochemical analysis, and urinalysis. Fine-needle aspiration and cytologic evaluation of the masses and the right superficial cervical lymph node revealed suppurative inflammation in all locations. Radiographs of the thorax were obtained (Figure 1).

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

On the ventrodorsal view, a large, broad-based, peripherally rounded soft tissue opaque extrathoracic mass is evident along the right craniolateral aspect of the thoracic wall, measuring approximately 14 cm in length. The midportions of the right fourth and fifth ribs have evidence of mild to moderate irregular periosteal new bone formation. At the level of the rib changes described, there is a mild extrapleural sign characterized by slight retraction of the adjacent peripheral lung margins from the thoracic wall. In addition, a prominent soft tissue opaque pleural fissure line is seen at the same level and may represent a small volume of right-sided pleural fluid or focal pleural thickening. On the left lateral projection, a pulmonary soft tissue opacity that is roughly rectangular in shape is seen extending diagonally across the cardiac silhouette and terminates at the cranioventral aspect of the diaphragmatic margin. This opacity measures up to approximately 1.6 cm in width. Ventral to this soft tissue opacity, a second smaller triangular soft tissue opacity is seen, also superimposed with the cardiac silhouette. On the ventrodorsal view, these same opacities are seen within the right middle and right caudal lung fields and are parallel to the cardiac silhouette (extending from the fourth intercostal space to the cranial aspect of the diaphragmatic margin; Figure 2).

The differential diagnoses included extrathoracic abscess with rib, pleural space, and possible right middle lung lobe involvement (resulting from a migrating foreign body, previous trauma, or wound), rib neoplasia (primary or metastatic) with secondary soft tissue swelling, or less likely, soft tissue neoplasia invading bone.

Contrast-enhanced multidetector helical CT of the right forelimb and thorax was performed with the dog under sedation. The dog received a nonionic iodinated contrast medium (600 mg of iodine/kg [273 mg/lb], IV). A 16-slice helical CT scanner was used to obtain the CT images. Computed tomography revealed a hyperattenuating (approx 225 Hounsfield units) linear foreign body. The intrathoracic component of the linear foreign body originated at the level of the right cranioventral margin of the diaphragm and followed a craniodorsal course such that it penetrated the right caudal and middle lung lobes...
and fourth intercostal space. Ultimately, the linear foreign body terminated within the soft tissues of the right forelimb ventral to the scapula. Mildly irregular periosteal proliferation was seen at the fourth and fifth ribs, consistent with the radiographic findings (Figure 3).

Treatment and Outcome

A median sternotomy was performed, and a wooden skewer (16 cm in length; 4 × 2 mm in diameter) was found in the right hemithorax, with the base positioned lateral to the heart in contact with the pericardium. The body of the skewer was oriented in a cranialateral direction, with the tip exiting the thorax at the fourth intercostal space. Because of involvement with the right middle lung lobe, a partial lobectomy was performed and the skewer was then removed from the thoracic cavity. Biopsy specimens of lung tissues were obtained and submitted for bacterial culture and histologic examination. The patient had no postoperative complications and was discharged from the hospital 36 hours following surgery. At the time of discharge, the right forelimb lameness had improved and the swelling over the right scapula had decreased considerably. Aerobic and anaerobic cultures revealed Corynebacterium jeikeium, Fusobacterium spp, and Prevotella spp, and histopathologic findings included severe pyogranulomatous pleuritis with marked fibroplasia, neovascularization, and mesothelial hyperplasia.

Comments

This report describes the migration of a previously ingested gastric foreign body as a cause of chronic swelling and lameness affecting a forelimb. Although migration through the esophagus or thoracic wall cannot be ruled out definitively, migration of a gastric foreign body is considered most likely, given the clinical history and the orientation of the stick within the thoracic cavity. Migration of ingested wooden foreign bodies in dogs has been reported to result in a variety of clinical signs and physical examination findings, including the following: draining sinus (eg, at the caudal aspect of the sternum, left aspect of the cranial abdomen, and left 11th intercostal space), episodes of vomiting and inappetence, lethargy, sublumbar abscess formation followed by episodes of pyrexia, abdominal discomfort, and nonhealing wound on the left caudal aspect of the thorax.1–3 Extraluminal migration of wooden gastrointestinal foreign bodies may therefore result in inflammatory conditions affecting the thorax, abdomen, or pelvis.

Changes seen on survey radiographs that may be indicative of foreign body migration include bone proliferation and increased soft tissue opacities associated with local abscess formation or reactive fibrous tissue, both of which were identified in the case described in the present report. The degree of opacity of a wooden foreign body itself will depend on the amount of air trapped within, along with the overall water content. In acute settings, wooden foreign bodies have been mistaken for air on CT evaluation, as a result of internal air trapping.4 In a human case series describing chronically retained wooden foreign bodies, however, CT attenuation values were increased (> 100 Hounsfield units); this was presumptively due to a combination of low water content and possible calcification. Surgical exploration revealed fibrosis, granulation tissue, and abscess around the pieces of wood in all cases.5 In the dog of the present report, the imaging characteristics of the intrathoracic wooden foreign body and surrounding lung tissue were consistent with the chronic changes described in people.

Ultrasonographic detection of ingested and perforating wooden foreign bodies has been reported but may be limited in the identification of small wooden foreign bodies, especially if these are located adjacent to shadowing structures such as bone or gas.6 In a comparative imaging study of acute wooden foreign bodies in the manus of canine cadavers, CT was shown to be the most accurate imaging modality for foreign body detection, compared with ultrasonography and MRI. Advanced cross-sectional imaging, especially CT, is therefore the recommended preoperative imaging modality when other types of preliminary imaging do not provide a definitive diagnosis or when lesion margination is indistinct.

References


1. Omnipaque 300 Iohexol injection, GE Healthcare, Princeton, NJ.
2. GE Lightspeed 16 Slice CT, Milwaukee, Wis.