History

A 14-year-old neutered male Miniature Schnauzer was evaluated at the Louisiana State University Veterinary Teaching Hospital emergency service because of tenesmus. The dog had inappetence, stranguria, and defecation of small amounts of soft stool with increased frequency for 3 days prior. The dog also had a history of intervertebral disk disease that was being medically managed by the primary veterinarian. The dog was housed primarily indoors with no other pets and had supervised access to a fenced backyard. The owner was with the dog all morning prior to evaluation. The dog’s status on vaccines and heartworm prevention was current.

Clinical and Gross Findings

Physical examination findings at the time of the initial evaluation included weight of 6.3 kg (13.9 lb), rectal temperature of 40.7°C (105.4°F), heart rate of 160 beats/min, respiratory rate of 44 breaths/min, and capillary refill time of < 2 seconds. The dog had tacky mucous membranes suggestive of mild dehydration and a tense abdomen with signs of diffuse abdominal pain on palpation. Neurologic examination revealed conscious proprioceptive deficits in both pelvic limbs.

On initial evaluation, PCV was 58% (reference range, 37% to 59%), total solids concentration was 7.0 g/dL (reference range, 6.5 to 7.9 g/dL), blood glucose concentration was 57 mg/dL (reference range, 111 to 205 mg/dL), and blood lactate concentration was 3.2 mmol/L (reference range, < 2.9 mmol/L). Abdominal radiography revealed decreased serosal detail consistent with an abdominal effusion. The entire gastrointestinal tract had irregular borders and contained a moderate amount of gas. The liver margins were difficult to assess radiographically. Other radiographic findings included 2 well-defined mineralized opacities at the base of the os penis, consistent with urethral calculi. The intervertebral disk space at T13-L1 was collapsed with sclerotic endplates. Spondylosis deformans was seen at T13-L1 and at the lumbosacral junction. Focused abdominal sonography for trauma of the abdomen was performed and confirmed abdominal effusion. A focal area of mixed echogenicity with irregular margins was present in the liver. Ultrasound-guided abdominocentesis yielded hemorrhagic fluid with a PCV of 17%. Further diagnostic testing, including a CBC, serum biochemical panel, and coagulation profile as well as exploratory laparotomy, was discussed. Owing to financial constraints and a guarded prognosis, the owners elected euthanasia.

On necropsy, the abdomen contained 100 mL of bloodtinged fluid. A 5 × 2-cm cavity containing a blood clot was observed on the ventral surface of the right lateral liver lobe (Figure 1). An oval (2 × 3-mm) brown calculus was observed in the urethra associated with a focal ulcer. No other gross abnormalities were noted.

Formulate differential diagnoses from the history, clinical findings, and Figure 1—then turn the page →
Histopathologic Findings

Tissue samples from the liver, spleen, urinary bladder, bone marrow, heart, lungs, kidneys, brain, and intestines were examined. Histologic evaluation of the liver lesion revealed a linear and locally extensive accumulation of fibrin and neutrophils with mild incipient neovascularization, portal fibrosis, and a few fibrin thrombi. These changes involved only the margins of the neoformed subserosal cavity containing the blood clot (Figure 2). The evaluation of the hepatic parenchyma revealed diffuse moderate sinusoid congestion and dilatation with mild portal lymphoplasmacytic hepatitis and multifocal mild hemosiderosis (Figure 3). No notable abnormalities were detected in other tissues.

Morphologic Diagnosis and Case Summary

Morphologic diagnosis and case summary: hepatic hematoma with subcapsular rupture in a dog.

Comments

Nontraumatic hemoabdomen is the accumulation of blood in the abdominal cavity without known trauma as a predisposing factor. It has long been associated with benign or malignant intra-abdominal neoplasia, splenic hematoma or torsion, coagulopathies, or liver lobe torsion. Clinical evidence of nontraumatic hemoabdomen generally includes signs associated with hypovolemic shock such as weakness, collapse, pale mucous membranes, tachypnea, and tachycardia. Signs of abdominal pain, hematuria, diarrhea, and hematocrit elevations have also been described for affected dogs. Common clinicopathologic findings may include low PCV, low total solids concentration, and high lactate concentration. However, the PCV and total solids concentration may be within reference intervals in cases of acute hemorrhage.

The dog described in this report had signs of abdominal discomfort, soft stool, and fever. The PCV slightly exceeded the reference range and total solids concentration was within the reference range, suggestive of acute hemorrhage. As acute blood loss occurs, a number of compensatory mechanisms help maintain blood flow to vital organs. The slightly high PCV can be explained by splenic contraction as a response to the intra-abdominal hemorrhage or by the mild dehydrated status of the dog. When approximately 30% of blood volume is lost, compensatory mechanisms may fail and signs of hemorrhagic shock may develop. In the case described in this report, the dog lost approximately 18% of its blood volume, which explains why it was hemodynamically stable at the time of initial evaluation. In general, hemorrhagic peritoneal fluid with a PCV that is considerably lower than the PCV of a blood sample suggests blood dilution by fluid and therefore the likelihood of a subacute rather than acute bleeding event. For the dog of this report, the interpretation of subacute intra-abdominal hemorrhage was supported by the histologic observation of mild hemosiderosis and mild incipient neovascularization in association with the hepatic hematoma. Radiographic features of free peritoneal fluid include local or generalized loss of abdominal organ serosal detail, as evident in the present case.

On the basis of findings of abdominocentesis, differential diagnoses for this dog’s nontraumatic hemoperitoneum included neoplasia, coagulopathies, or torsion of the spleen or liver. Given the dog’s age and signalment, neoplasia was the foremost differential...
diagnosis. Among dogs, malignant neoplasia, most frequently involving the spleen, is the most commonly reported cause of acute nontraumatic hemoabdomen, with the second being splenic hematoma. In one study, 14 of 16 cats had hemoabdomen that was liver related, as did 26 of 65 (40%) cats in another study. Both neoplastic and nonneoplastic (coagulopathies or hepatic necrosis) causes for hemoabdomen were equally distributed in the latter study. In dogs, splenic and liver lobe torsions have been associated with hemorrhagic peritoneal effusions but are difficult to diagnose without exploratory laparotomy. The evaluation of tissue sections obtained from the dog of the present report did not reveal potential predisposing factors such as infection, vascular anomaly, hemangiomata, and neoplasia. In particular, there was no evidence of hemangiomata or hemangiosarcoma.

Coagulopathy-related hemoperitoneum should be suspected in animals that have sustained minimal or no trauma and when other abdominal abnormalities cannot be identified. This situation is very rare in cats and dogs. Rodenticide toxicity was considered unlikely in the case described in the present report, given that the dog was under direct supervision and there had been no reported use of rodenticides by the owner. On further discussion, it was discovered that the dog had received a low dose of aspirin (81 mg) prior to initial evaluation because of suspected back pain. The recommended dosage of aspirin for analgesia in dogs is 10 to 25 mg/kg (4.5 to 11.4 mg/lb), PO, every 8 to 12 hours. The most common usage of aspirin in dogs is for the treatment of acute nontraumatic hemoabdomen, with the second being spontaneous hemoperitoneum in cats. In one study, 14 of 16 cats had hemoabdomen that was liver related, as did 26 of 65 (40%) cats in another study. Both neoplastic and nonneoplastic (coagulopathies or hepatic necrosis) causes for hemoabdomen were equally distributed in the latter study.

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In humans, hepatic subcapsular hematoma with rupture in women develops most commonly as a complication of pregnancy-induced hypertension associated with preeclampsia, eclampsia, or HELLP (hemolysis, high circulating liver enzyme activities, and low platelet count) syndrome. The hematoma is usually located on the right lobe of the liver. It has been speculated that this predilection for the right lobe may be sufficient to cause rupture of a preexisting subcapsular hematoma.

Some researchers suggest that minor increases in intra-abdominal pressure (eg, parturition, patient transport, and emesis) may be sufficient to cause rupture of a preexisting subcapsular hematoma. In the dog of the present report, urethral obstruction and straining to urinate may have contributed to an increase in intra-abdominal pressure, thereby leading to rupture of the hematoma.

Liver necrosis from inadvertent vascular injury may lead to translocation of pyogenic bacteria to the liver. Hepatic clearance of bacteria via the portal system may be compromised with biliary obstruction, poor perfusion, or microembolization. It is possible that the dog described in this report may have developed septic peritonitis from a previous bleeding episode, which may explain the hypoglycemia; however, further clinicopathologic analysis and cytologic evaluation of abdominal fluid to confirm septic peritonitis were not performed. Another consideration is that hypoglycemia was an artifact, as occurs when serum is not separated from RBCs in a blood sample within an hour after collection; however, this seems unlikely in this case, considering that the blood sample was transported directly from the patient to a glucometer.

In the case described in the present report, clinical signs included tenesmus with inappetence, stranguria, and defecation of small amounts of soft stool with increased frequency for 3 days. A tense abdomen with signs of diffuse abdominal pain was evident on palpation; abdominal fluid was detected during ultrasonographic examination, and hemoabdomen was identified on abdominocentesis. It is important that hepatic hematoma with subcapsular rupture be considered as a differential diagnosis in dogs with signs of abdominal pain and hemoabdomen.

References