History
A 9-year-old intact male Cocker Spaniel was referred for investigation of an 8-month history of hematochezia, fecal tenesmus, and intermittent diarrhea, with a fecal score ranging from 3/7 (log-shaped stools with moist surface) to 7/7 (watery stools), associated with vomiting for 48 hours.

Clinical and Gross Findings
On referral examination, vital parameters were within normal limits, with mild hepatomegaly on abdominal palpation. Transrectal palpation revealed multiple irregular rectal hemorrhagic nodules distributed circumferentially within the rectal mucosa approximately 4 cm from the anal margins. The rest of the physical assessment was unremarkable.

Hematology, serum biochemistry, and urinalysis were performed. Hematology revealed a slight leukocytosis (17.25 X 10^9/L; reference range, 5.05 X 10^9 to 16.76 X 10^9/L), neutrophilia (15.25 X 10^9/L; reference range, 2.95 X 10^9 to 11.64 X 10^9/L), and eosinopenia (0.05 X 10^9/L; reference range, 0.06 X 10^9 to 1.23 X 10^9/L). Serum biochemistry showed mildly elevated urea (15.73 mmol/L; reference range, 3.28 to 10.42 mmol/L), without hypercreatininemia (84 µmol/L; reference range, 35 to 124 µmol/L), and mild hypercholesterolemia (9.6 mmol/L; reference range, 2.87 to 8.07 mmol/L). Urinalysis showed no abnormalities.

Following exclusion of most causes of metabolic diseases resulting in gastrointestinal signs, an abdominal ultrasound was performed and revealed a moderate thickening of the gastric wall with normal layering (cross-sectional thickness of the gastric wall, 5.9-mm interfolds; normal range, 2 to 5 mm) and moderate gastric adenomegaly (13.3 X 7.4 mm; normal range, 10.8 X 5.3 mm). The rest of the ultrasonographic examination of the abdomen was unremarkable, including the portion of the colonic wall that was able to be visualized (cranial to the pubis). A gastroduodenoscopy and colonoscopy were then performed under general anesthesia. The lower gastrointestinal endoscopy revealed circumferential nodular proliferative lesions within the rectum and descending part of the colon, even in the part that was previously examined by ultrasound. On upper gastrointestinal endoscopy, several ulcers were identified within the lesser curvature of the stomach, associated with proliferative hyperemic nodular lesions within the gastric antrum (Figure 1). Endoscopic biopsies were submitted for histopathological analysis, along with cytological analysis of fine-needle aspirates of the gastric lymph node.

Formulate differential diagnoses, then continue reading.

Histopathologic and Cytologic Findings
Histological analysis of endoscopically guided biopsies revealed severe infiltration of the gastric and colonic mucosa by epithelioid macrophages, viable and degenerate neutrophils, lymphocytes, and plasma cells forming large, coalescing granulomas centered on extensive areas of necrosis. Numerous round intraliesional fungal elements, 3 to 20 µm in diameter and surrounded by a thick translucent capsule, were seen in the granulomas (Figure 2). Cytological analysis of fine-needle aspirates of the gastric lymph node revealed a major-
ity of small lymphocytes with a slightly increased proportion of blastic lymphoid cells and plasma cells, consistent with reactive lymphadenopathy (not shown).

Morphologic Diagnosis and Case Summary

Severe granulomatous and necrotizing gastritis and colitis with numerous intramucosal fungal elements, consistent with Cryptococcus spp.

Comments

Cryptococcosis is an uncommon worldwide fungal disease affecting dogs and cats. Contamination occurs by inhalation or ingestion of bird droppings, particularly pigeon droppings. Many forms have been documented, including ocular, respiratory, digestive, and neurologic forms.1 The literature suggests a low prevalence of atypical forms (ie, nonrespiratory or nervous forms) ranging from 5% to 17%. Cryptococcosis seems to preferentially affect young dogs, particularly those under 5 years of age.2 Among dogs, Cocker Spaniels, Doberman Pinschers, Great Danes, German Shepherd Dogs, Dalmatians, Boxers, and Border Collies seem to be overrepresented.3

In cases of cryptococcosis affecting the digestive tract, the lesions visible on abdominal ultrasound appear to be preferentially located in the small intestine, although fungal infiltration can be more extensive. Those are characterized by focal or multifocal lesions with loss of the normal digestive wall layering. The stomach appears to be less affected. Occasionally, a mass may be seen in the mesentery or pancreas. To the best of our knowledge, our case is the second to demonstrate colorectal involvement.4 It should be kept in mind that abdominal cryptococcosis does not always cause changes visible on ultrasound.2 Abdominal ultrasound remains the examination of choice as it can allow guided fine-needle...
aspirates of focal nodal or intestinal lesions, allowing for a quick and minimally invasive diagnosis in most cases. In our case, the gastric changes were discrete to moderate, and ultrasound did not allow for visualization of the intrapelvic portion of the colon.

If digestive lesions are not visible on ultrasound, or if cytological analysis of fine-needle aspirates of focal lesions does not provide a diagnosis, then gastroduodenoscopy and colonoscopy are the procedures of choice for further investigation, enabling digestive mucosa visualization and biopsies to be taken for histological analysis. The nodular, ulcerated, and erythematous appearance of the lesions, particularly on the lesser curvature of the stomach, led us to consider a neoplastic process at first sight. There have been 2 reports of similar findings, in which digestive cryptococcosis mimicked tumoral gastric lesions. These cases highlight the need to reach a definitive histological diagnosis even if a neoplastic process is strongly suspected macroscopically. Although less likely, a severe inflammatory lesion secondary to inflammatory bowel disease or a severe infectious bacterial or parasitic enteropathy should also be considered. Increased urea was suspected to be secondary to gastrointestinal hemorrhage and neutrophilic leukocytosis to systemic inflammation. Treatment of digestive cryptococcosis is based on the administration of azole antifungals and/or amphotericin B, ideally on the basis of culture and susceptibility. Surgical mass resection may be appropriate in individual cases. Antifungal treatment lasts from several months to several years. The prognosis for digestive cryptococcosis is guarded, and the median survival reported with medical treatment, medical and surgical treatment, or surgical treatment alone is 561, 730, or 140 days, respectively. There is no known correlation between infecting species and clinical signs, extent of lesions, or response to therapy in cases of abdominal cryptococcosis.

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