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Gastroduodenal Ulcer Disease

(Ulcers in the Stomach and Upper Small Intestine [Duodenum])

Basics

OVERVIEW

- "Gastro-" refers to the stomach; "duodenal" refers to the upper small intestine or duodenum
- Ulcers in the stomach and upper small intestine (duodenum) are called "gastroduodenal ulcers"; the ulcers extend through the lining (known as the "mucosa") of the stomach and intestines and into the muscle layer of the stomach and intestines (known as the "muscularis mucosae")

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats—less common

Breed Predilections

- German Shepherd dogs are most susceptible to stomach ulceration after being given ibuprofen (NOTE: use of human over-the-counter pain relievers *always* should be discussed with your pet's veterinarian prior to administration; these medications can cause serious side effects, such as stomach ulcers)
- Rottweilers have increased likelihood of tearing of the stomach and/or upper small intestine (duodenum) for unknown cause (known as "spontaneous gastroduodenal perforation")
- Elite canine athletes have increased incidence of stomach ulceration, erosion (shallow ulcers), and/or bleeding during sustained strenuous exercise
- Chow chows (dogs) and Siamese (cats) appear to have an increased likelihood of stomach cancer (known as "gastric adenocarcinoma") as compared to other dog and cat breeds, respectively

Mean Age and Range

- All ages

Predominant Sex

- Male dogs have increased likelihood of having stomach cancer (known as "gastric carcinoma") as compared to female dogs

SIGNS/OBSERVED CHANGES IN THE PET

- Some pets may not show any signs/changes, despite significant ulcers in the stomach or upper small intestine (duodenum)
- Vomiting: most common clinical sign

- Vomiting blood (known as “hematemesis”) may be present
- Black, tarry stools (known as “melena”), due to the presence of digested blood in the bowel movement, may be present
- Abdominal pain in the front of the abdomen (that is, near the rib cage)—pet may stand hunched over in the back or assume the “praying position”
- Lack of appetite (known as “anorexia)
- Sluggishness (lethargy)
- Weight loss or extreme weight loss with muscle wasting (known as “cachexia”)
- Weakness, pale gums and moist tissues of the body, and/or collapse, if severe low red-blood cell count (known as “anemia”) or tearing (perforation) of the stomach or upper intestine with subsequent inflammation of the lining of the abdomen (known as “peritonitis”) develops
- Cats are less likely to show clinical evidence of bleeding from the stomach or upper small intestine (duodenum)
- Rapid heart rate (known as “tachycardia”); low blood pressure (known as “hypotension”); the pink color of the gums is slow to return when the gums are blanched by finger pressure (known as “prolonged capillary refill time”) if the pet has shock due to low volume of circulating blood (known as “hypovolemic shock”) or due to tearing (perforation) of the stomach or upper intestine (duodenum) with subsequent inflammation of the lining of the abdomen (peritonitis); high body temperature (known as “hyperthermia”)
- Abdominal distention may be present with tearing (perforation) of the stomach or upper intestine (duodenum) with subsequent inflammation of the lining of the abdomen (peritonitis)
- Fluid buildup in the tissues of the body (known as “edema”)—from blood/plasma loss causing low levels of protein in the blood (known as “hypoproteinemia”)

CAUSES

Drugs

- Nonsteroidal anti-inflammatory drugs (NSAIDs); steroids

Gastrointestinal Diseases

- Inflammatory bowel disease
- Cancer involving the mouth, esophagus (tube from the throat to the stomach), stomach or upper small intestine (duodenum)
- Foreign body in the mouth, esophagus, stomach or upper small intestine (duodenum)
- Excessive acid production by the stomach (known as “gastric hyperacidity”)
- Stomach dilates with gas and/or fluid (known as “gastric dilatation”), and subsequently rotates around its short axis (known as “volvulus”)—condition known as “gastric dilatation-volvulus” or “bloat”
- Folding of one segment of the intestine into another segment (known as “intussusception”)
- Blockage of movement of stomach contents into the upper small intestine (known as “pyloric outflow obstruction”)

Infectious Diseases

- Parasites in the stomach and/or intestines
- Rickettsial diseases (examples of rickettsial diseases include Rocky Mountain spotted fever and ehrlichiosis)
- *Pythium*, a water mold that causes “pythiosis”
- *Helicobacter*, bacteria associated with inflammation of the stomach (gastritis) and stomach ulcers
- Viral, fungal, or bacterial inflammation of the stomach and intestines (known as “gastroenteritis”)

Metabolic Diseases

- Kidney failure
- Liver failure
- Inadequate production of steroids by the adrenal glands (known as “hypoadrenocorticism” or “Addison's disease”)
- Inflammation of the pancreas (known as “pancreatitis”)

Toxicity

- Heavy metal poisoning (such as arsenic, zinc, thallium, iron, or lead)
- Plant intoxication (such as *Dieffenbachia*, sago palm, mushroom, castor bean)
- Chemical intoxication (such as phenol, ethylene glycol, corrosive agents, psoriasis creams—vitamin D

analogues)
- Pesticide/rodenticide toxicity (such as cholecalciferol [vitamin D3])

Cancer
- Mastocytosis (condition in which an abnormal number of mast cells are present in multiple tissues; mast cells contain histamine, and if it is released, it stimulates stomach-acid secretion)
- Gastrinoma (a type of tumor usually found in the pancreas that secretes "gastrin," a hormone that stimulates acid production in the stomach)
- APUDoma (one of a group of tumor that produces hormones; a gastrinoma is one type of APUDoma)

Neurologic Diseases
- Head trauma
- Spinal cord disease

Stress/Major Medical Illness
- Generalized bacterial infection (known as "sepsis")
- Shock
- Severe illness
- Burns
- Heat stroke
- Major surgery
- Trauma
- Low blood pressure (hypotension) or high blood pressure (known as "hypertension")
- Blood clots (known as "thromboembolic disease")
- Sustained strenuous exercise

RISK FACTORS
- Administration of drugs known to cause ulcers of the stomach or upper small intestines—nonsteroidal anti-inflammatory drugs or steroids
- Critically ill pets
- Shock due to low circulating blood volume (hypovolemic shock) or due to generalized bacterial infection (known as "septic shock")
- Pythiosis has a regional distribution—states that border the Gulf of Mexico

Treatment

HEALTH CARE
- Treat any underlying causes
- The veterinarian may use a special lighted instrument, called an "endoscope" (a lighted medical instrument that is passed through the mouth into the esophagus [the tube from the throat to the stomach] and into the stomach and possibly the upper small intestine [duodenum]) to evaluate the ulcers and/or bleeding
- Treat on an outpatient basis if the cause is identified and removed, vomiting is not excessive, and bleeding is minimal in the stomach and/or upper small intestine (duodenum)
- Inpatient treatment for severe bleeding in the stomach and/or upper small intestine (duodenum) and/or tearing of the stomach or upper small intestine at the site of the ulcer (known as "ulcer perforation"); excessive vomiting; and/or shock
- May need emergency management of bleeding, shock or bacterial infection/inflammation of the lining of the abdomen (known as "septic peritonitis")
- Intravenous fluids to maintain hydration, to maintain blood flow to the lining of the stomach, and/or to treat shock
- May need transfusions (whole blood or packed red-blood cells) or oxygen-carrying hemoglobin solution infusions in pets with severe bleeding in the stomach and/or upper small intestine (duodenum)
- Pets with very low levels of protein in their blood (hypoproteinemia) may require colloids and/or plasma to improve blood volume; colloids are fluids that contain larger molecules that stay within the circulating blood to help maintain circulating blood volume, examples are dextran and hetastarch
- In severe cases of vomiting blood—to stop the bleeding into the stomach and/or upper small intestine

(duodenum), ice water flush (known as a “lavage”) or lavage with norepinephrine diluted in ice water can be attempted

ACTIVITY

- Restricted

DIET

- Discontinue intake of food and/or water by mouth, if vomiting
- When feeding is resumed, feed small amounts in multiple feedings.
- Recommended highly digestible diet with low- to moderate-fat (high dietary fat delays stomach emptying) and low-fiber content

SURGERY

- Surgical treatment is indicated if medical treatment fails after 7–10 days; bleeding is uncontrolled and severe; tearing of the stomach or upper small intestine at the site of the ulcer (ulcer perforation); and/or a tumor is identified that potentially could be removed surgically

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Histamine (H2) blockers competitively inhibit stomach acid secretion and are the initial drug of choice (such as cimetidine, ranitidine, famotidine, nizatidine); H2-blockers differ in potency and duration of action—famotidine is most potent, followed by ranitidine and then cimetidine—treat for at least 6–8 weeks; rebound excessive production of stomach acid may occur when H2-blockers are discontinued, but can be minimized by tapering the dose as it is discontinued
- Antacids neutralize stomach acid and some induce local production of compounds that protect the lining of the stomach and upper small intestine (known as “mucosal protectants”), but must be given at least four to six times per day to be effective
- Sucralfate suspension protects ulcerated tissue by binding to ulcer sites and stimulating production of prostaglandins; binding is greater in upper small intestinal (duodenal) ulcers than in stomach ulcers
- Antibiotic(s) should be given by injection, if a break in the lining of the stomach or upper small intestine is suspected or if aspiration pneumonia (inflammation of the lungs, caused by accidentally inhaling food, vomit, or liquids) is present
- Drugs to stop or control vomiting (known as “antiemetics,” such as chlorpromazine, prochlorperazine, ondansetron, metoclopramide, and maropitant) are administered if vomiting occurs frequently or results in significant fluid losses
- Omeprazole—most potent inhibitor of secretion of stomach acid; treatment of choice for gastrinomas (tumors usually found in the pancreas that secrete “gastrin,” a hormone that stimulates acid production in the stomach) with evidence of spread (that is, metastasis) or that cannot be removed surgically (known as “non-resectable disease”) and disease of the stomach and upper small intestine (duodenum) that has not responded to H2-blocker therapy
- Misoprostol, a synthetic prostaglandin analogue, may decrease the secretion of stomach acid and also protect the lining of the stomach and upper small intestine; helps prevent and treat nonsteroidal anti-inflammatory drug–induced ulcers; it may have some effect in treating ulcers of the stomach and upper small intestine (duodenum) from other causes

Follow-Up Care

PATIENT MONITORING

- Improvement may be assessed on resolution of clinical signs; monitoring packed cell volume and total protein (blood tests that determine the volume of red blood cells as compared to the fluid portion of the blood and the concentration of protein in the blood, respectively); fecal occult blood (in which the presence or absence of blood in the bowel movement is evaluated); and blood urea nitrogen or BUN (blood test that indicates the level of urea

in the blood—elevated urea levels can be a sign of dehydration) may help to detect continued blood loss and dehydration
- Repeat evaluation using an endoscope is recommended for advanced cases to help determine appropriate duration of therapy
- Depending on the underlying cause, specific laboratory or imaging tests (such as x-rays [radiographs], contrast x-rays [contrast radiographs], ultrasound examination) may be necessary to monitor response to therapy

PREVENTIONS AND AVOIDANCE

- Avoid medications that irritate the stomach (gastric irritants, such as nonsteroidal anti-inflammatory drugs; steroids)
- Use misoprostol when treating with NSAIDs, to protect the lining of the stomach and upper small intestine
- Administer NSAIDs with food, to try to minimize irritation of the stomach and upper small intestine
- COX-2 selective or dual LOX/COX inhibitors may have less adverse effects on the stomach and upper small intestine than non-selective NSAIDS

POSSIBLE COMPLICATIONS

- Severe blood loss requiring transfusion
- Generalized bacterial infection (sepsis)
- Tearing of the stomach or upper small intestine at the site of the ulcer (ulcer perforation)
- Death
- Aspiration pneumonia (inflammation of the lungs, caused by accidentally inhaling food, vomit, or liquids)—rare

EXPECTED COURSE AND PROGNOSIS

- Vary with underlying cause
- Pets with stomach cancer, kidney failure, liver failure, pythiosis, systemic mastocytosis, generalized bacterial infection (sepsis), and/or gastric perforation—prognosis is guarded to poor
- Ulcers involving the stomach and/or upper small intestine (duodenum) secondary to nonsteroidal anti-inflammatory drug administration, inflammatory bowel disease, or inadequate production of steroids by the adrenal glands (known as “hypoadrenocorticism” or “Addison's disease”)—prognosis may be good to excellent, depending on severity of disease

Key Points

- Ulcers in the stomach and upper small intestine (duodenum) are called “gastroduodenal ulcers”; the ulcers extend through the lining (known as the “mucosa”) of the stomach and intestines and into the muscle layer of the stomach and intestines (known as the “muscularis mucosae”)
- Nonsteroidal anti-inflammatory drugs should be administered to pets only under the guidance of a veterinarian
- Administration of NSAIDs can result in ulceration and tearing (perforation) of the stomach and upper small intestine (duodenum)
- Adverse effects of NSAIDs can be reduced by giving the medication with food and giving a synthetic prostaglandin analogue (such as misoprostol) to protect the lining of the stomach and upper small intestine (duodenum)

Notes

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