Gastrointestinal (GI) mucosal protectants including acid suppressants, antacids, misoprostol, and coating agents (sucralfate, barium) are commonly used for the prevention and treatment of gastritis and ulcerative disease in dogs and cats. However, results of veterinary studies investigating these drugs are heterogeneous with some studies failing to demonstrate a benefit. Inappropriate dosing and misuse of these medications for diseases in which they have not proven to be beneficial are likely to blame. Recently published dosing recommendations and suggested indications for use of GI mucosal protectants are likely to improve the outcome of dogs and cats with and at risk for erosive and ulcerative disease. Evidence and indications for the use of acid suppressants can be found as a separate proceedings.

Coating agents
Sucralfate is a polyaluminum sucrose sulfate that is activated in the acidic environment of the stomach. Its primary mechanism of action is to coat injured and denuded gastroesophageal mucosal epithelium. Other proposed mechanisms of action include prostaglandin stimulation and inhibition of substances that could be injurious to the subepithelium including pepsin and bile acids. Very few studies have evaluated the efficacy of sucralfate for treatment of mucosal injury. In one of the only available studies, sucralfate was not effective in treatment of GI bleeding in dogs undergoing spinal surgery and receiving high dose steroids. However, sucralfate is relatively benign with few side effects aside from constipation and potential drug interactions, thus many clinicians including myself administer the medication to dogs and cats with or at-risk for gastric bleeding. More studies are needed to determine if this practice is beneficial for dogs and cats. Sucralfate is available in both tablet and suspension form. Drug interaction studies suggest that sucralfate is not as effective when administered as a tablet. Therefore, prior to administration, the tablets should be crushed and mixed with water to create an oral slurry. The aluminum component of the sucralfate suspension can interfere with the absorption of other drugs including tetracyclines and fluoroquinolones. Thus, sucralfate administration should be delayed by at least 2 hours prior to administration of these drugs. Since activation of sucralfate is dependent on an acidic pH, drugs that increase gastric pH (e.g., antacids, acid suppressants) should be delayed for at least 1 hr following sucralfate administration.

Barium is speculated to have mucoprotective and pro-coagulant effects. It has been reported to have hemostatic effects for a variety of causes of gastrointestinal bleeding in humans. To my knowledge, it has not been studied in companion animals but is used frequently in clinical practice. I do not use it in my practice but know many veterinarians who like to use it in combination with acid suppressants for patients who have severe gastric bleeding and can tolerate oral medications. Endoscopy should be delayed at least 24 hours following administration of barium as barium can hinder visualization of the gastrointestinal mucosa and can obstruct the endoscope instrument channel if aspirated. Barium should not be used if gastrointestinal perforation is suspected.

Antacids
Antacids (e.g., calcium carbonate, aluminum hydroxide, magnesium hydroxide) are often incorrectly referred to as acid suppressants. Unlike acid suppressants, which target the production of gastric acid by the parietal cell, antacids are acid-neutralizing drugs and have no effect on the parietal cell proton pump. Therefore, antacids have to be administered more frequently to avoid rebound gastric acid secretion. For this reason, effective administration of antacids can be problematic in vomiting or anorectic patients. Other proposed mechanisms of action of antacids include decreased pepsin activation as a result of increased gastric pH, stimulation of bicarbonate secretion, and formation of complexes with refluxed bile salts. Other common adverse effects of antacids include undesired drug interactions (as mentioned for sucralfate), constipation (aluminum preparations), and diarrhea (magnesium preparations). Similar to the coating agents, antacids are a vastly understudied class of drugs in veterinary medicine. Because of their requirement for frequent administration and the perceived superiority of acid suppressants, I rarely use antacids for gastric bleeding.

Acid Suppressants
Gastric parietal cells are responsible for the production and secretion of gastric acid. Parietal cells are stimulated by neural and hormonal inputs. Acid suppressant drugs act to block acid production either at the receptors for these inputs or directly at the parietal cell proton pumps. Acid suppressants are more effective and have a longer duration
of action and have therefore supplanted antacids as the treatment of choice for documented or suspected acid-related injury and/or gastric hyperacidity in dogs and cats. Two classes of acid suppressants, histamine-2 receptor antagonists (H2RAs) and proton pump inhibitors (PPIs), are used in veterinary medicine. H2RAs are competitive inhibitors for the interaction of histamine with its receptor but differ in potency (famotidine > ranitidine > cimetidine hydrochloride). Peak concentration of H2RAs occurs within hours after oral dosing. In contrast, PPIs (e.g., omeprazole, pantoprazole, esomeprazole) form covalent bonds with active proton pumps and are thus inactivators. New proton pumps are subsequently recruited and require further inactivation; thus delaying the peak effect (approximately 1–4 days) with PPIs. Pharmacokinetic and pharmacodynamic differences exist between PPI drugs that might affect clinical response depending on the individual patient and disease. However, most clinicians use drugs within the PPI class interchangeably.

PGE Analogs

Misoprostal is a drug that mimics endogenous prostaglandin E1 (PGE1). Its mechanisms of action parallel that of the endogenous eicosanoid including stimulation of mucus and bicarbonate secretion, increased mucosal blood flow and epithelial repair. Misoprostal may prevent or reduce gastric hemorrhage secondary to NSAID administration but is not effective for prevention of steroid-induced GI bleeding even when administered thrice-daily at high doses (4–6 mcg/kg PO).5 Misoprostal should be reserved for animals with or at high-risk (e.g., older animal, dogs receiving drugs with predominately COX1 selectivity) for NSAID toxicity. Adverse effects include diarrhea, inappetence, and abdominal pain. Misoprostal can stimulate uterine contractions and thus should not be used in pregnant animals. Twice-daily administration may be sufficient as a preventative for at-risk animals but I recommend thrice-daily administration for animals with documented toxicity.6,7

Neutraceuticals

Zinc-ʟ-carnosine formulated with vitamin E (GastriCalm®) is a neutraceutical marketed for treatment of gastric mucosal injury. Zinc-carnosine has been demonstrated to reduce and/or prevent gastrointestinal lesions in rats; however, two placebo-controlled studies failed to demonstrate a benefit to the use of GastriCalm in dogs with drug-induced gastritis.8,9 Thus, I do not currently recommend GastriCalm for the treatment of gastric mucosal injury in dogs and cats.

Herbals

Herbal medications including sea buckthorn oil10 and yunnan baiyao have been marketed for their hemostatic properties. I have used yunnan baiyao for hospice care in dogs and cats with terminal nasal and gastric cancers with some success. However, most herbal medications do not undergo rigorous safety testing and therefore caution is advised with their use.

References


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