Season's Greetings from all of us at AMVS to all of you! May your holidays be bright and your new year abundant.

What's New at AMVS
Studley, a five-year-old domestic short hair cat, initially presented to emergency services with a possible urethral obstruction. Due to financial concerns, his owners were unable to pay for his care. They started to think about the possibility of euthanasia. The Aspen Meadow Veterinary Specialists' (AMVS) team discussed the situation and decided to offer the owners a chance to relinquish Studley to the clinic as an in-house feline blood donor. The owners agreed.

Studley was treated for an obstruction and taken care of in hospital. Currently, he is being cared for by Dr. Wendy Yaphe, our internal medicine specialist. Dr. Yaphe is treating Studley for historical urinary tract obstruction (two episodes), resolving cystitis, FLUTD, mild anemia, obesity, and resolved episode pulmonary edema.

In addition to our regular ER hours, AMVS is providing emergency and critical care services to your patients:

Fridays, all day
303-678-8844
Studley roams through the clinic receiving tons of attention from all of the staff, who have fallen in love with him. Not only does he have a special place here at AMVS, but, as a blood donor, he helps save the lives of other cats.

**Choosing the Best Anti-Emetic Therapy**

*By Danielle Huval
Emergency Veterinarian*

1. Vomiting is a reflex caused by humoral stimulation that activates the chemoreceptor trigger zone (CRTZ) or by neural stimulation of the emetic center.

2. Maropitant (Cerenia) should only be used for five consecutive days at the anti-emetic dose and two consecutive days at the motion sickness dose. A dose dependent 48-hour or 72-hour washout is required.

3. Vestibular disease associated nausea responds best to antihistamines, such as diphenhydramine and meclizine.

4. Ondansetron (Zofran) is now available in generic form. It is effective in preventing vomiting associated with chemotherapy drugs if given pre-treatment.

5. In severe cases of intractable vomiting or nausea maropitant, 5HT3 antagonists (ondansetron or dolasetron), antihistamines (prochlorperazine or chlorpromazine) and metoclopramide can be used concurrently.

When a patient presents for vomiting, it is important to differentiate regurgitation, coughing associated with upper airway inflammation, gagging, or dysphagia. While a definitive diagnosis is not always possible, a better...
understanding of the pathogenesis of vomiting may allow us to better tailor a treatment for our patients. Vomiting occurs through the activation of the CRTZ by blood-borne substances (humoral) or by stimulation of the emetic center from vagosympathetic, CRTZ, vestibular, or cerebrocortical neurons (neural). Examples of humoral stimulation are chemotherapy drugs, uremic toxins, hepatic failure, endotoxemia, septicemia, digitalis toxicity, and apomorphine. Examples of neural stimulation include inflammation, infection, toxicity, gastroenteritis, pancreatitis, peritonitis, and motion sickness.

Several different neurotransmitters are responsible for stimulation in the CRTZ. In the dog, dopamine, substance P and histamine are significant neurotransmitters. For the cat, a2-adrenergic and 5-HT3 seratonergic appear to be more important in the CRTZ. This explains why in the cat, xylazine (a2 agonist) is emetogenic, and why metoclopramide (dopaminergic antagonist) and apomorphine (dopaminergic agonist) are less effective.

Below is a description of common in hospital antiemetics and applications for use with common disease processes.

Metoclopramide is a D2-dopaminergic antagonist that acts at the CRTZ. Metoclopramide stimulates motility of the lower esophageal sphincter, stomach and duodenum by stimulating D2-dopaminergic receptors. It is less effective in the cat. Metoclopramide is contraindicated in patients with GI hemorrhage, obstruction or perforation. It is best used for vomiting associated with delayed gastric emptying. It is also effective in uremic patients.

Maropitant is an NK-1 receptor antagonist that blocks substance P. It is effective in both the emetic center and CRTZ. Maropitant is effective in suppressing emesis caused by humoral and neural stimulation.

With prolonged use maropitant depletes substance P and will cause tremors. With a five-day-on, two-day-off schedule, maropitant is thought to be safe to use long term. Although only labeled for the treatment of nausea and vomiting in cats and dogs, there have been recent discussions involving NK-1 receptor antagonists and other potential uses. It has been suggested that maropitant can
potentially be used extra-label for pain, inflammation, antitussive activity, allergies, post surgical neuropathic pain, CNS and spinal cord injury, and mast cell diseases. The theory is that by blocking substance P at the NK-1 receptors, maropitant reduces neurogenic transmission and thereby reduces inflammation, pain, nausea, vomiting, exudation and edema, neuropathic pain and associated allergic reactions. Further discussion on maropitant and its other potential uses can be found on VIN, search criteria "cerenia."

Ondansetron is a 5-HT3 serotonergic antagonist. It is best used for drug induced vomiting (chemotherapeutics, digitalis, antibiotics). Ondansetron may act in the CRTZ or on peripheral receptors. Chemotherapy drugs stimulate 5-HT3 serotonergic receptors and NK-1 receptors. Ondansetron can be given pre-treatment to prevent vomiting that is induced by 5-HT release and 5-HT3 receptor activation. It is also very effective in treating emesis caused by ingested toxins, cell degeneration or necrosis, inflammation, and luminal distension by blocking receptors in afferent vagal fibers in the dog or the CRTZ in the cat.

Diphenhydramine and meclizine are antihistamines that can be used as anti-emetics in patients with motion sickness and vestibular disease. Motion sickness is mediated by M1-cholinergic receptors and H1-histaminergic receptors in the inner ear. Cats do not have histamine receptors in the CRTZ and therefore diphenhydramine is generally ineffective in this species. Prochlorperazine and chlorpromazine are more effective in cats.

Other less common anti-emetics include a2 adrenergic antagonists (chlorpromazine/ yohimbine), M1 muscarinic cholinergic antagonists (prochlorperazine), ENK enkephalinergic agonists/antagonists (butorphanol), 5HT3 serotonergic agonists (cisapride), and motilin agonists (low dose erythromycin in the dog).

In addition to anti-emetics, addressing gastric acidity to prevent gastric and duodenal ulceration can be helpful in controlling symptoms. Gastroprotective agents act peripherally to control emetic stimulation and are very important in treating disease processes that cause ulcerations (uremia, NSAID toxicity, etc). Gastroprotective drugs include H2 antagonists, proton pump inhibitors, sucralfate, and misoprostal.

With the addition of more effective antiemetics such as maropitant and with the decreased cost of ondansetron, drugs with potential complications and side effects can be used less frequently. This also allows for combination...
therapy in patients whose nausea and vomiting are not easily controlled.

Thank you for your continued support. 
And once again, Happy Holidays! 
-Aspen Meadow Veterinary Specialists

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