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Human topical toxicities

Problems are most often reported with estrogen-based products, used for hormonal disorders, and vitamin D3 products, used for psoriasis. The estrogen-based products can cause vulval enlargement in females, along with enlargement of the nipples and hair loss, often most noticeable around the perineal region. There have also been reports of vaginal prolapse and liver failure, attributed to accidental exposure to topical estrogen products. In male dogs, the penis may become smaller, along with enlargement of the nipples and mammary tissue. Most dogs do not become systemically ill, but the physical changes are a major concern to owners. The author has seen two spayed female dogs that underwent exploratory laparotomy for presumed ovarian remnant syndrome, when in fact the signs were due to inadvertent exposure to the owner's estrogen product. The vitamin D3 products can cause severe illness, as the active ingredient causes hypercalcemia, hyperphoshatemia and secondary renal failure. After inadvertent ingestion, clinical signs may be noted within 1-3 days, and include polyuria, vomiting and weakness. Patients with substantial exposure may die of acute renal failure.

Audrey K. Cook, BVM&S, MRCVS, Dip ACVIM
NAVC Clin Brf, Dec 2010

INSIDE THIS ISSUE

Bloodroot for cancer

The commercially available botanical extract of the bloodroot plant, Neoplasene (Buck Mountain Animal Health; buckmountainbotanicals.net), has been marketed for topical or systemic treatment of various maladies in companion animals, including cancer. Several active ingredients have been identified in bloodroot extract, including sanguinarine, which exerts anticarcinogenic and antiinflammatory effects. The likely mechanism for how Neoplasene kills animal cells, both cancerous and normal, is by inhibiting cellular sodium, potassium-adenosine triphosphatase (ATPase) activity. Loss of sodium, potassium-ATPase activity results in cellular swelling and subsequent necrotic cell death. When bloodroot extract is applied to tumors, either topically or intralesionally, cancer cells and surrounding normal cells will die and potentially leave a large necrotic defect in the anatomically treated area. Given the undesirable necrotic cell death effects, veterinarians and pet owners opting to use bloodroot extracts as a form of herbal chemotherapy should expect and be prepared to manage large open wounds for several weeks until healthy granulation tissue has formed and wound closure is achieved. Because of these facts, the medically judicious use of bloodroot extracts should be limited to very small or superficial cancerous lesions.

Timothy M. Fan, DVM, PhD, Dip ACVIM
Vet Med, May 2011

Birth control pills toxicity

Contraceptive pills generally come in 28-tablet packs with 21 hormone tablets (estrogen and/or progesterone) and seven placebo tablets. Most hormone pills contain 0.035 mg of estrogen or less. In general, estrogen doses of less than 1 mg/kg are not of concern. At higher doses, bone marrow suppression may be seen. However, due to the low estroen content of the pills, estrogen exposure is generally not sufficient to require treatment. Some placebos may contain an iron supplement; elemental iron doses of >20 mg/kg may require decontamination and other treatments.

Sharon M. Gwaltney-Brant
74th AAHA Conf Procd

ProMeris and pemphigus foliaceus

A recent groundbreaking study of pemphigus foliaceus (PF) shows evidence that it can occur as an adverse drug reaction to the flea and tick preventive, ProMeris. As a result the drug will be discontinued. How to diagnose generalized ProMeris-triggered pemphigus foliaceus (PTPF): 1) History of ProMeris application. This may have begun months before onset of clinical signs. 2) Development of skin lesions at the site of ProMeris application. 3) Later development of skin lesions at sites distant from ProMeris application. 4) Systemic signs may be present in most dogs. 5) Submit biopsy for histopathology. How to treat generalized PTPF:

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1) Do not reapply ProMeris. 2) Use a mid-potency steroid at site of skin lesion if possible. 3) Use glucocorticoid at immunosuppressive dosage (e.g. prednisone or similar at 2-4 mg/kg/day. 4) If signs do not remiss within one month or if they recur after dose tapering, add azathioprine (2 mg/kg/day) or cyclosporine (7-10 mg/kg/day). Treat until remission and taper drug doses until withdrawal. Prognosis is good.

Thiery Olivry, DrVet, PhD, Dip ACVD et al.
Vet Pract News, Jun 2011

Treatment of Giardia in cats

Fenbendazole is a benzimidazole anti-parasitic that appears to be an effective option in cats with giardiasis, without the hematologic complications associated with albendazole. Concern has been expressed regarding the efficacy of fenbendazole against Giardia species in certain cases. Although both fenbendazole and metronidazole are recommended as sole therapies for treating giardiasis, the Companion Animal Parasite Council also advocates the combination of fenbendazole at 50 mg/kg, once daily with metronidazole at 25 mg/kg, twice daily for 5 days. Fenbendazole appears to have a wide safety margin but is not FDA-approved for use in cats.

Vet Med, 105:7

Treating hypothermia

Rewarming occurs though passive and active mechanisms. *Passive rewarming* is simple, and prevents further heat loss through placement of blankets over the animal and between the animal and the floor or cage. Wrapping bubble wrap or plastic wrap over the animal's paws is a passive means to help minimize heat loss from the footpad surface during anesthesia and surgery. *Active rewarming* increases the temperature of the air and surface around the animal. Forced warm air blankets (Bair Hugger, Arizant Healthcare, www.bairhugger.com/arizanthealth-care/faw.shtml), circulating warm water blankets or tablets, warmed intravenous fluid bags, and warm water bottles can be used for active rewarming, provided that caution and careful monitoring are exercised. The aggressiveness of patient rewarming depends largely on the cause and degree of hypothermia. If an animal presents emergently with moderate to severe primary hypothermia, passive and active rewarming should be considered. As a general rule of thumb, core body temperature should be raised approximately 1°F per hour. When an animal's core body temperature is <97°F, too-rapid rewarming can be complicated by ventricular dysrhythmias and metabolic derangements that increase morbidity and mortality.

Elisa Mazzaferro, DVM, MS, PhD, Dip ACVECC
NAVC Clin Brf, 5:8

Cautions for generic sevoflurane

Sevoflurane is available as proprietary and generic preparations. While both preparations contain the same molecule, have the same efficacy, and can be used in veterinary patients, the proprietary product has high water content, and the generic product, low water content. The manufacturers use different methods to control production of hydrofluoric acid during storage and in vaporizers. High water content controls the amount of hydrofluoric acid which can be a degradation product of proprietary sevoflurane. Conversely, hydrofluoric acid production can be prevented by storage of sevoflurane in containers that are coated with a material that retards the chemical reaction. The generic product should not be used in Penlon vaporizers manufactured before October of 2006; the manufacturer or distributor of the vaporizer should be able to provide information to confirm whether or not a specific vaporizer can be used with generic sevoflurane. The proprietary product can be used in most vaporizers designed and properly calibrated for sevoflurane.

Sandee M. Hartsfield, DVM, MS, Dip ACVA
83rd West Vet Conf Procd

Measuring GFR

Serum creatinine concentration is a commonly used marker of renal function because of its simplicity, availability, and cost. Unfortunately, it is an insensitive marker of renal function, in that the glomerular filtration rate (GFR) must be 75% below normal for the creatinine concentration to be elevated. Multiple plasma markers and test protocols have been investigated, and no optimal protocol has been identified, but some methods of GFR measurement such as iohexol clearance and exogenous creatinine clearance can be readily performed in private practice with sufficient accuracy for clinical decision-making. In iohexol clearance test, 300 mg/kg of iohexol, a commonly used radiographic contrast agent, is administered IV, and blood samples are typically drawn two, three, and four hours later. The timing of sample collection is flexible, but the exact time the samples were drawn needs to be accurately recorded so the precise time elapsed since injection can be calculated. The most commonly used veterinary diagnostic lab that offers measurement of iohexol concentrations and calculated GFR is at Michigan State University's Diagnostic Center (animalhealth.msu.edu/Submittal_Forms/AD.ADM.FORM.017.pdf), and results are generally available within a week.

Cathy E. Langston, DVM, Dip ACVIM
Vet Med, Jan 2011

Neonatal resuscitation

The newborn may need assistance in clearing its airway with a towel, and rubbing the skin over the lumbar area may help stimulate it to cry, further clearing the airway. If the airway is still plugged, apply gentle suction with a rubber bulb syringe to the nose and mouth. Swinging or slinging is not recommended to clear the airways, as it can result in dropping the

animal, cerebral hemorrhage, or aspiration of stomach contents, leading to pneumonia. If a neonate remains unresponsive after the airway has been cleared, administer supplemental oxygen. Use a tight-fitting mask, size 1 or 2 uncuffed endotracheal tube, or size 12- to 16-ga IV catheter, and ventilate (applying 20-30 cm H2O pressure) until the chest wall expands. Once the lungs have been inflated, continue ventilation at a rate of 30 breaths/min at no more than 10 cm H2O pressure, pausing intermittently to check for spontaneous breathing. Discontinue ventilatory support after the neonate is breathing on its own. Continue to rub the neonate with a warm towel to help stimulate spontaneous respiration. A 25-ga needle inserted into the nasal philtrum, known as the *Renzhong, Jenchung*, or GV *26 acupuncture point,* is another method that can be attempted to produce spontaneous respiration.

Olivia Wilson, DVM and Mushtaq A. Memon, BVSc, PhD
Vet Med, Jan 2011

Treatment of urethral spasm in male cats

Drugs recommended for the treatment of urethral spasm include analgesic, antiinflammatory, antibacterial, and spasmolytic agents. Injection of diluted lidocaine solution through the urethral catheter at the time of its removal has been advocated by some to reduce urethral spasms, but this has not been critically evaluated. Also, the local effects of lidocaine on urothelial healing are unknown. If used, lidocaine should be diluted and injected slowly at low pressure – excessive amounts of systemically absorbed (>0.5 mg/kg, IV) lidocaine can cause seizures. Systemic treatment with a fentanyl patch, low dose morphine (0.05-0.2 mg/kg, IM), butorphanol (0.05-0.2 mg/kg, IM), and/or low dose medetomidine (2-5 µg/kg, IM) for relief of pain seems reasonable. It is possible that relief of pain will decrease urethral and bladder muscle spasms.

Dennis J. Chew, DVM and CA Tony Buffington, DVM
71st CO Vet Conf Procd

Fecal centrifugation vs. test kits

Practitioners frequently elect to conduct simple flotation with or without a commercial test kit because of the perceived time savings. Although the centrifugation procedure includes an extra step compared with the commercial test kit procedures, the overall test time is about the same. Feces should be centrifuged for 5 minutes at 1,200 rpm using a fixed- or swing-head centrifuge. The solution should stand for another 5-10 minutes before the coverslip is examined under a microscope — first under 10x and then at higher power if needed. The overall time is 10-15 minutes, whereas with passive flotation, the samples must stand for 15 minutes. Another problem with commercial assays is that they encourage examination of small fecal samples. One gram is the standard recommendation, but the authors recommend collecting larger amounts. Five grams of feces, which is about 1 teaspoon, is ideal. Because of the small sample size, a negative result for a fecal loop sample is meaningless. In addition, the type of solution used makes a difference. The author's research has shown that the Sheather's sugar solution is better able to recover Taenia tapeworm eggs because of its higher concentration.

Anne Zajac, DVM, PhD et al.
Vet For, 24:4

Treating heatstroke

Misconception; Ice-water baths are effective and necessary for cooling heatstroke patients. **Reality:** The most important component of treating heatstroke patients is quick and efficient core cooling to prevent thermal injury to vital organs. A retrospective study of dogs with heatstroke showed a mortality rate of 42% in dogs that were not cooled by their owners before presentation compared with 19% in dogs whose owners began cooling methods in advance. This suggests that early initiation of cooling is essential to a successful outcome. However, care must be taken to avoid excessive cooling, which may instead induce heat-provoking mechanisms, iatrogenic hypothermia, or even more serious complications. Ice-water baths should be avoided because they can induce peripheral vasoconstriction, thereby shunting warm blood to the core and inhibiting heat loss. Shivering also occurs in response to extreme cold, thereby producing more heat and counteracting efforts to cool patients. Ice-water baths may also cause capillary sludging and induce disseminated intravascular coagulation. Instead, recommended cooling methods include cool-water rinses, fans, administration of cool IV fluids and cool-water enemas, and cool gastric or peritoneal lavage. Regardless of the method chosen, the goal should be to reduce the patient's temperature to 103°F. It is important not to reduce the temperature below this level because iatrogenic hypothermia could occur, resulting in a poorer prognosis.

Marie K. Holowaychuk, DVM and Linda G. Martin, DVM, MS
Comp, 28:6

Noise phobia

Although diazepam and clorazepate have been commonly used to treat noise reactivity, the medication of choice in most dogs is alprazolam, in part because it does not use the N-desmethyldiazepam metabolic pathway. Any medication with N-desmethyldiazepam in its metabolic path can be sedating—an effect that's not desirable if using a medication frequently and hoping to avoid physiologic tolerance. Alprazolam is not metabolized into N-desmethyldiazepam, so when it is given appropriately, it should not sedate the dog. The

optimal dose of alprazolam for most dogs that have any element of panic to their response is 0.02-0.04 mg/kg. Because alprazolam comes in 0.25-, 0.5-, 1- and 2-mg tablets that are scored, it's easy to find a dose that works for most animals. For a medium-sized dog, starting with an initial 0.25-mg dose is best. As needed is generally interpreted to be every 4-6 hours, the approximate half-life of many benzodiazepines.

Karen L. Overall, MA, VMD, PhD, Dip ACVB
DVM, Jan 2011

Sterilizing instruments

If you use chemical indicator strips, the first question is, do you look at them before using your instruments? The second question is, are you aware that autoclave tape, on the outside, and chemical indicator strips, on the inside, are not 100 percent reliable? Arguably, the best sterility indicators are biological. They are reasonably affordable, maybe around $5 each, and contain bacteria. If the bacteria have been killed by the sterilization cycle, then you can rest assured that the instruments are truly sterile. Biological indicators probably don't need to be used daily. In general practice, they could be used every other week. Cold sterilization is often misused. It takes 8- 24 hours to sterilize instruments in cold sterile. If you use an instrument and put it back into the solution, then it takes another 8- 24 hours for all instruments to be sterile again. In any case, using instruments from cold sterile to perform a procedure inside a body cavity is widely considered inappropriate.

Scott Weese, DVM, Dip ACVIM
Vet Pract News, Feb 2011

Post-delivery care of the neonate

If narcotics were a part of the anesthetic protocol, naloxone should be administered to the neonate. The narcotic antagonist may be given sublingually (1-5 drops from a 22-gauge needle; approximately 1-5 mg), SC, or IM. Naloxone administration may have to be repeated should renarcotization occur. Doxapram (1-5 mg) may be given sublingually, SQ, or via the umbilical vein if respiratory stimulation is necessary. Atropine administration has also been described in the neonate for the treatment of bradycardia (HR < 80 bpm). Remember that hypoxia leads to bradycardia, and atropine should not be substituted for oxygen therapy in the bradycardic, hypoxemic animal.

John R. Dodam, DVM, MS, PhD, Dip ACVA
CVC San Diego, Nov 2010

Preventing infection in orthopedic surgery

Clipping of hair around the surgical site of furred animals is still the standard of care, even though many human surgeons no longer shave widely, but rather scrub the hair. It is important to recognize that clipping hair causes microtrauma to the skin, which is colonized and infected by resident bacteria within a few hours. This increases the bacterial load in the area tremendously, and these bacteria are then dragged into the wound during the operation. Clipping before anesthetic induction leads to infection rates 3 times that of those clipped after induction. This increase in infection was seen even in those wounds clipped less than 4 hours before induction. Therefore, it is recommended that clipping of the area not be performed until immediately before the surgery. This unfortunately results in more time under anesthesia, which is a risk factor for infection.

Marc Wosar, DVM, MSpVM, Dip ACVS
N Amer Vet Conf Procd, Vol 21

Extravasation of doxorubicin

Doxorubicin is a powerful vesicant when given perivascularly; only clean "first-stick" catheters should be used, and catheters being used for intravenous fluid administration should not be used. If accidental extravasation occurs, intravenous administration of dexrazoxane should be considered: Give dexrazoxane at 10x the mg dose of doxorubicin within 3 hours *or* give 400 to 600 mg/m^2 of dexrazoxane intravenously over 15 minutes. The selected dexrazoxane dose should be repeated 24 and 48 hours after extravasation. This treatment has a high likelihood of preventing severe tissue necrosis but should be accompanied by ice-packing (to patient's tolerance). Under no circumstances should the area be flooded with saline as this will further disperse the doxorubicin and enlarge the extravasation reaction.

Antony Moore, BVSc, MVSc, Dip ACVIM
NAVC Clin Brf, 8:10

Buprenorphine transmucosally

These authors concluded that 120 µg of buprenorphine/kg administered via the oral transmucosal (OT) route before ovariohysterectomy was an effective analgesic with minimal intraoperative and postoperative adverse effects. The higher dose of buprenorphine administered via the OTM route resulted in a unique pharmacokinetic profile that minimized individual pain sensation and provided long-lasting analgesia in dogs. Results of the present study indicated that OTM administration of buprenorphine can be used as an alternative method for pain management in dogs and strongly supported the hypothesis that postoperative pain could be managed with preoperative administration of 120 µg of buprenorphine/kg via the OTM route in dogs undergoing ovariohysterectomy when multimodal analgesic combinations or frequent administration of analgesics is not possible.

Jeff C. Ko, DVM, MS, Dip ACVA et al.
JAVMA, Feb 1, 2011