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nomma, lymphoma, and cutaneous neoplasms. Rabbit dental disease, anesthe sia, and reproductive surgery are some of the topics covered in the chapter about these animals. The chapter concerning hamsters and gerbils contains especially useful anatomical line drawings and tables for antiparasitic agents, as well as information about tumors seen in these species, details for recommended routes for drug administration, and a formulary for antibiotics and emergency drugs. The hedgehog chapter has diagrams that show the muscles that hedgehogs use for curling the body and the spinal control of this process as well as good information about handling and restraint of these animals.

The last chapter on treatment of wildlife in the veterinary hospital will prove to be especially useful for the practitioner. It emphasizes the importance of veterinary participation in wildlife care, what factors to consider in making the decision about whether to treat wildlife, knowing federal and state regulations about what can and cannot be done when working with wildlife, and preparing the veterinary hospital for wildlife, including the equipment necessary to work effectively with these animals. In addition, zoonotic diseases, handling and restraint, common species presentations, reasons for euthanasia, orphan care, and release criteria are all discussed. This is a very broad subject that is well covered in this chapter, giving the practitioner a good foundation to begin working with wildlife species.

In addition to the excellent information in this book, there are many high-quality and useful color photographs interspersed throughout the text. The references and suggested readings at the end of each chapter as well as the index at the end of the book are thoroughly researched. The Manual of Exotic Pet Practice is a well-organized, well-written, and high-quality textbook for the exotic animal practitioner. This reviewer highly recommends this new publication and believes that it will be an extremely useful text for any veterinarian who treats the broad range of exotic pet patients.

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Abstracts

Hernandez-Divers S, Stahl SJ, Cooper T, et al: Comparison between CO2 laser and 4.0 Mhz radiosurgery for incising skin in white Carneau Pigeons (Columba livia). J Avian Med Surg 22(2): 103-107, 2008

The purpose of this study was to compare skin incisions created by radiosurgery (RS) and CO2 laser (LS) in a pigeon model and report the degree of collateral injury associated with each modality relative to a scalpel-blade control. Ten adult white Carneau pigeons were used in this study. Pigeons were anesthetized with isoflurane, and the ventrum of the bird was prepared for surgery. With the radiosurgery unit adjusted to digital setting 8 (22 W), three 3-cm parallel craniocaudal skin incisions were made in the pectoral skin. Similar incisions were made in the pectoral skin of the same bird with a 0.3-mm ceramic tip attached to a CO2 laser and a superpulsed focused beam at 12-W output. As a control, a #15 scalpel blade was used to create similar incisions in the pectoral skin. The pectoral skin was then removed and preserved in 10% buffered formalin, and the pigeons were humanely euthanatized. The scalpel blade incisions all resulted in significant hemorrhage relative to the LS and RS incisions, which were essentially bloodless. General microscopic features of the incised skin margins created by LS or RS were identical and consisted of a variably thickened layer of hyperesinophilic tissue from the epidermis through the dermis and panniculus. Scalpel blade incisions were least traumatic, and there was a significantly lower degree of thermal injury created by radiosurgery relative to CO2 laser. The authors believe that this represents an important benefit of radiosurgery over CO2 laser for avian surgery.

Kistler AL, Gancz A, Clubb S, et al: Recovery of divergent avian bornaviruses from cases of proventricular dilation disease: identification of a candidate etiologic agent. Virol J 5:88, 2008

Proventricular dilation disease (PDD) is a fatal disorder threatening domesticated and wild psittacine birds worldwide. It is characterized by lymphoplasmacytic infiltration of the ganglia of the central and peripheral nervous system, leading to central nervous system disorders as well as disordered enteric motility and associated wasting. Analysis of 2 PDD case-control series collected independently on different continents revealed a bornavirus hybridization signature in 62.5% of
the PDD cases (5/8) and none of the controls (0/8). Sequencing revealed a bornavirus-like genome organization for this agent with a high degree of sequence divergence from all prior bornavirus isolates. The authors propose the name avian bornavirus (ABV) for this agent. Further, specific ABV polymerase chain reaction analysis of an additional set of independently collected PDD cases and controls yielded a significant difference in ABV detection rate among PDD cases (71%, n = 7) compared with controls (0%, n = 14). Partial sequence analysis of a total of 16 ABV isolates and an additional set of cases reveals at least 5 distinct ABV genetic subgroups. These studies provide a compelling candidate in the search for an etiologic agent of PDD.

Kroenlein KR, Sleeman JM, Holladay SD, et al: Inability to induce tympanic squamous metaplasia using organochlorine compounds in vitamin A-deficient red-eared sliders (Trachemys scripta elegans). J Wildl Dis 44(3):664-669, 2008

A previous study by the authors reported that wild eastern box turtles (Terrapene carolina carolina) with aural abscesses contained higher body burdens of organochlorine (OC) compounds than those without the lesion. This suggested that if OC compounds induce hypovitaminosis A, and hypovitaminosis A causes aural abscesses, then OC exposure would cause aural abscess development. The purpose of the present study was to experimentally determine whether exposure to an OC mixture resulted in the development of aural abscesses in red-eared sliders. Twenty-four turtles were divided into 4 equal groups. Groups 2 and 4 received a diet containing 5 IU/g vitamin A, whereas groups 1 and 3 were fed a diet devoid of vitamin A. Three OC compounds were selected as possible inducers of squamous metaplasia in this study: chlordane, lindane, and aroclor 1254. Turtles in groups 1 and 2 received these compounds based on weight once weekly. After 6 months of exposure, each turtle was euthanized, blood was collected, the head was removed for histopathology, and liver samples were frozen for vitamin A and OC analysis. None of the livers in groups 3 and 4 (no OC exposure) contained any detectable chlordane, lindane, or aroclor 1254. The livers from all the turtles in groups 1 and 2 (OC exposure) contained all 3 of the OC compounds. No significant differences were observed in the tympanic epithelial pathologic scores (1-4), liver vitamin A levels, or serum vitamin A levels among any of the 4 study groups. The results of this study suggest that OC exposure may not contribute to the formation of squamous metaplasia of the tympanic epithelium and aural abscesses in red-eared sliders. In addition, 6 months of OC exposure does not seem to alter vitamin A metabolism in these turtles. A striking result of this study was that vitamin A levels were not reduced in turtles being fed diets void of vitamin A compared with those turtles fed diets containing vitamin A. The authors suggest that perhaps the study did not progress long enough to produce hypovitaminosis A. Another possible complicating factor could be species variation because, in the authors’ observations, aquatic turtles tend to have a higher fat content to their livers, in addition to other adipose stores, than terrestrial species. It is possible that, until the animal is required to use these fat stores, thereby liberating the OC compound, a clinical problem would not arise.

Patnayak DP, Prasad M, Malik YS, et al: Efficacy of disinfectants and hand sanitizers against avian respiratory viruses. Avian Dis 52:199-202, 2008

This study evaluated the virucidal efficacy of 9 commonly used disinfectants on a nonporous surface (stainless-steel discs) contaminated experimentally with avian metapneumovirus (aMPV), avian influenza virus (AIV), or Newcastle disease virus (NDV). The disinfectants included phenolic compounds, quaternary ammonium compounds (QACs), 2.6% glutaraldehyde, peroxyacetic acid, sodium hypochlorite, and Virkon S. All products were tested at 50%, 100%, and 200% of manufacturers’ recommended concentrations. Four different contact times (1, 3, 5, and 10 minutes) were studied. As a negative control, phosphate-buffered saline solution was applied to virus-contaminated, stainless-steel discs. A disinfectant was considered effective if it reduced virus titers by 3 log10 (99%) or greater compared with the saline solution control. When used at the manufacturers’ recommended concentration, phenolic compounds were the most effective against all 3 viruses. Glutaraldehyde and potassium peroxymonosulfate (Virkon-S) were also effective against all 3 viruses. The QACs were effective against aMPV, but less effective against AIV and NDV. Sodium hypochlorite was effective against only NDV. Several hand sanitizers were also evaluated for their efficacy against 2 of the 3 viruses (aMPV and NDV). In the human hand study, all 3 hand sanitizers were found effective against the 2 vi-
Perpiñan D, López C: Clinical aspects of systemic granulomatous inflammatory syndrome in ferrets (Mustela putorius furo). Vet Record 162:180-184, 2008

In 2004, a novel and fatal syndrome characterized by mesenteric lymphadenopathy and hypergammaglobulinemia was observed in domestic ferrets in Spain. The dead animals had lesions similar to those of the nonenveloped form of feline infectious peritonitis, and immunohistochemistry detected coronavirus antigen in several organs. This article describes the clinical aspects of the condition in 9 ferrets that had been diagnosed histopathologically with systemic granulomatous inflammation and that were positive for coronavirus antigen by immunohistochemistry. In most ferrets, the clinical signs appeared when they were between 5 and 38 weeks of age. In 7 of the ferrets, brown or yellow-green diarrhea was the first clinical sign. Lethargy, hyporexia or anorexia, weight loss, or the inability to gain weight were also early signs observed in 6 of the ferrets. The hindlimbs of 6 of the ferrets became progressively weaker. Tremors and convulsions preceded death in 2 of the animals. All ferrets showed intermittent signs of improvement during the course of the disease. Hematologic changes included nonregenerative anemia in 4, neutrophilic leukocytosis in 2, and total lymphopenia in 3 ferrets. Hyperglobulinemia with polyclonal gammopathy was detected in the plasma of all animals. The interval between onset of clinical signs and death was from 1 to 6 months in 6 of 9 ferrets. On postmortem examination, all 9 ferrets showed mesenteric lymphadenomegaly, and splenomegaly was seen in 8. Differential diagnoses for ferrets with mesenteric lymphadenomegaly and hypergammaglobulinemia include Aleutian disease, lymphoma, and chronic inflammatory bowel disease. An exploratory laparotomy to obtain biopsies of mesenteric lymph nodes for histology is recommended for diagnosis. Immunosuppression due to stress may contribute to the pathogenesis of this disease. Exposure to cats is also theorized to play a role in disease transmission.

Sladky KK, Kinney ME, Johnson SM: Analgesic efficacy of butorphanol and morphine in bearded dragons and corn snakes. J Am Vet Med Assoc 233(2):267-273, 2008

This study was undertaken to test the hypothesis that administration of butorphanol or morphine induces antinociception in bearded dragons and corn snakes. Twelve juvenile and adult bearded dragons and 13 corn snakes were used in this study. A crossover experimental design was used in which each reptile was exposed to each treatment condition with a minimum washout period of 2 weeks between treatments. Each bearded dragon received physiologic saline solution as a control treatment and 2 doses of butorphanol (2 and 20 mg/kg). A subset of bearded dragons received 4 doses of morphine (1, 5, 10, and 20 mg/kg). A subset of corn snakes (n = 7) received physiologic saline solution as a control treatment and 2 doses of butorphanol (2 and 20 mg/kg). In a separate experiment, a subset of snakes (n = 13) received physiologic saline solution as a control treatment and 5 doses of morphine (1, 5, 10, 20, and 40 mg/kg). Analgesimetry consisted of measuring the latency of the hind limb or tail withdrawal reflex in response to a noxious infrared radiant heat stimulus. In bearded dragons, butorphanol (2 or 20 mg/kg) did not alter hind limb thermal withdrawal latencies (TWDLs) at 2 and 24 hours after administration. However, at 8 hours after administration, morphine (10 and 20 mg/kg) significantly increased hind limb TWDLs from baseline values. For corn snakes, butorphanol (20 mg/kg) significantly increased tail TWDLs at 8 hours after administration; the low dose (2 mg/kg) had no effect. Morphine injections in corn snakes did not increase TWDLs at 2 to 24 hours after administration. However, high doses of morphine and butorphanol may cause severe respiratory depression. In addition, the TWDL test may not be ecologically or physiologically relevant for all reptile species, therefore it is difficult, if not impractical, to extrapolate these results to other reptiles.

Souza MJ, Greenacre CB, Cox SK: Pharmacokinetics of orally administered tramadol in domestic rabbits (Oryctolagus cuniculus). Am J Vet Res 29(8):979-982, 2008

Tramadol is a centrally acting analgesic that has agonist activity at µ-opioid receptors and also
inhibits reuptake of norepinephrine and serotonin. Little sedation or respiratory depression has been associated with administration of tramadol in humans. It is not a controlled drug, is inexpensive, and can be orally administered. The purpose of the study reported here was to determine the pharmacokinetics of an orally administered dose of tramadol in domestic rabbits. Six adult New Zealand White rabbits were used. Tramadol was orally administered to each rabbit at a dosage of 11 mg/kg. Blood samples were collected from IV catheters inserted into a medial saphenous or jugular vein at 10, 20, 30, 45, 60, 90, 120, 180, 240, 300 and 360 minutes after treatment. Plasma samples were analyzed for concentrations of tramadol and a metabolite by use of reverse-phase high-performance liquid chromatography. No adverse effects were detected in rabbits after tramadol administration. Mean ± SD half-life of tramadol after administration was 145.4 ± 81.0 min, and mean ± SD maximum plasma concentration was 135.3 ± 89.1 ng/mL. Human therapeutic concentrations of tramadol were not reached in any rabbit after treatment. This may be due to many factors including administration of an incomplete dose, differences in absorption rates among rabbits, existence of food in the stomach, influence of hepatic first-pass effect, and altered motility of the gastrointestinal tract in rabbits. The authors conclude that oral administration of tramadol in excess of 11 mg/kg would be required to provide analgesia to rabbits.

Stahl SJ, Hernandez-Divers SJ, Cooper TL, et al: Evaluation of transcutaneous pulmonoscopy for examination and biopsy of the lungs of ball pythons and determination of preferred biopsy specimen handling and fixation procedures. J Am Vet Med Assoc 233(3):440-445, 2008

The purpose of this study was to establish a safe and effective technique for transcutaneous endoscopic examination and biopsy of the lungs of snakes by use of a 2.7-mm rigid endoscope. Seventeen adult ball pythons were used in the study. Each python was premedicated with butorphanol tartrate at 1 mg/kg intramuscularly followed by intracardiac injection of propofol at 5 mg/kg. The surgical entry site was identified at 90 ventral scales caudal to the head and 9 scales lateral on the right side. This site was specifically chosen to coincide with the reduced vascularity of the semisaccular (transitional) portion of the lung. This equates to 44% of the total snout to vent length. The ease of entry into the lung was scored, and the endoscopist also scored the ease of location and observation of various structures associated with the right side of the lower respiratory tract. Three biopsies were endoscopically performed. Hemorrhage from the biopsy sites was also scored. After completion of the procedures, the skin was closed by use of a single horizontal mattress suture. Six pythons were euthanized after this first surgery. Eleven snakes were allowed to recover from anesthesia and were maintained for 12 months before undergoing repeat anesthesia and transcutaneous pulmonoscopy. The second entry site was at 95 ventral scales caudal to the head and 9 scales lateral on the right side. No major anesthetic, surgical, or biopsy-associated complications were detected in any snake. In 16 of 17 pythons, ease of right lung entry was satisfactory to excellent, with views of major anatomical landmarks graded as excellent. After 1 year, pulmonoscopy revealed healing of the previous transcutaneous lung entry and biopsy sites. Diagnostic quality of the biopsy specimens that were shaken from biopsy forceps into physiologic saline solution before fixation in 2% glutaraldehyde or neutral-buffered 10% formalin was considered good to excellent.

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