

Interpretive Summaries

SMALL ANIMALS/EXOTIC

Efficacy of *Giardia* vaccination in the treatment of giardiasis in cats

Sixteen young-adult cats were used in a study to assess efficacy of *Giardia* vaccination as a treatment for giardiasis in experimentally infected cats. Cats were experimentally infected by orogastric administration of *Giardia* cysts, and on weeks 4, 6, and 10, cats in the treatment group (n = 8) were given *Giardia* vaccine SC. For the first 28 weeks after infection, 3 fecal samples from each cat were examined weekly for *Giardia* cysts, and cyst numbers were counted. Fecal consistency was scored daily for the duration of the study. Results from vaccinated and unvaccinated cats were compared by logistic regression.

All cats became infected and were shedding *Giardia* cysts by the end of week 2. Throughout the study, diarrhea was rare. By week 28, 5 of 8 vaccinated cats and 7 of 8 control cats had patent *Giardia* infections. Magnitude of infection, based on number of fecal samples with cysts and number of cysts per sample, decreased progressively in both groups over time. Vaccination did not completely eliminate the organism from experimentally infected cats, but because clinical signs were minimal in both groups of cats, it could not be determined whether vaccination lessened severity of clinical disease. Whether *Giardia* vaccination is an effective treatment for giardiasis in naturally infected cats remains to be determined.—J. E. Stein et al (*J Am Vet Med Assoc* 2003;222:1548–1551).

Evaluation of methods for assessment of pain associated with chronic osteoarthritis in dogs

Forty-one dogs with osteoarthritis associated with hip dysplasia were included in a study to compare methods of assessing chronic pain in dogs. Owners completed a questionnaire regarding behavior and locomotion (descriptive scale, 0 to 4) and pain and locomotion (visual analog scales). Veterinarians evaluated the dogs' lameness. For all dogs, plasma concentrations of catecholamines, β -endorphin, cortisol, and vasopressin were determined, and hip joints were examined radiographically. As controls, 23 apparently healthy dogs with no history of pain provided blood samples, and the owners of 24 similarly healthy dogs completed the questionnaire. This study highlights the difficulty in establishing an objective assessment method for chronic pain in dogs. Certain changes in demeanor, behavior, and locomotion seemed to be indicative of pain, but the degree of pain could not be estimated objectively. Radiologic evaluation and hor-

mone concentrations did not provide information about the extent of pain in dogs. Data obtained in this study suggested variables for construction of a chronic pain index.—A. K. Hielm-Björkman et al (*J Am Vet Med Assoc* 2003;222:1552–1558).

Minimum alveolar concentration of isoflurane in green iguanas and the effect of butorphanol on minimum alveolar concentration

Ten healthy mature iguanas were used to determine minimum alveolar concentration (MAC) of isoflurane and effects of butorphanol on MAC. In each iguana, MAC was measured 3 times: twice after induction of anesthesia with isoflurane and once after induction of anesthesia with isoflurane and IM administration of butorphanol (1 mg/kg [0.45 mg/lb]). The MAC was determined with a standard bracketing technique; an electrical current was used as the supramaximal stimulus. Animals were artificially ventilated with a ventilator set to deliver a tidal volume of 30 mL/kg (14 mL/lb) at a rate of 4 breaths/min.

Mean \pm SD MAC values during the 3 trials (2 without and 1 with butorphanol) were 2.0 ± 0.6 , 2.1 ± 0.6 , and $1.7 \pm 0.7\%$, respectively, which were not significantly different from each other. Heart rate and end-tidal partial pressure of CO₂ were also not significantly different among the 3 trials. Mean \pm SD heart rate was 48 ± 10 beats/min; mean end-tidal partial pressure of CO₂ was 22 ± 10 mm Hg. There were no significant differences in blood-gas values for samples obtained at the beginning versus the end of the anesthetic period. Results suggest that butorphanol does not have any significant isoflurane-sparing effects in iguanas.—C. A. E. Mosley et al (*J Am Vet Med Assoc* 2003;222:1559–1564).

The cardiac anesthetic index of isoflurane in green iguanas

Seven healthy mature iguanas were used to determine the cardiac anesthetic index (CAI) of isoflurane in green iguanas and whether butorphanol affected the CAI. In 5 iguanas, CAI was determined after induction of anesthesia with isoflurane alone, and in 5 iguanas, CAI was determined after induction of anesthesia with isoflurane and IM administration of butorphanol (1 mg/kg [0.45 mg/lb]). Three iguanas underwent both treatments. Animals were equilibrated for 20 minutes at 1.5 times the minimum alveolar concentration (MAC) of isoflurane and observed for evidence of cardiovascular arrest. If there was no evidence of cardiovascular arrest, end-tidal isoflurane concentration was

increased by 20%, and animals were allowed to equilibrate for another 20 minutes. This process was repeated until cardiovascular arrest occurred or vaporizer output could no longer be consistently increased. The CAI was calculated by dividing the highest end-tidal isoflurane concentration by the MAC.

None of the iguanas developed cardiovascular arrest and all survived. Mean \pm SD highest end-tidal isoflurane during anesthesia with isoflurane alone ($9.2 \pm 0.60\%$) was not significantly different from mean concentration during anesthesia with isoflurane and butorphanol ($9.0 \pm 0.43\%$). The CAI was > 4.32 and was not affected by administration of butorphanol. Results suggest that isoflurane is a safe anesthetic in green iguanas.—C. A. E. Mosley et al (*J Am Vet Med Assoc* 2003;222:1565–1568).

Use of positive contrast rhinography and intranasal sinography for diagnosis of a nasofacial sinus tract in a dog

Twelve days after a dog fight, a 2-year-old sexually intact female Bulldog was evaluated because of subcutaneous emphysema of increasing severity throughout the dog's body. Thoracic radiography revealed severe pneumomediastinum from which free air had extended into the retroperitoneal space, resulting in pneumoperitoneum. Tracheoscopic examination did not reveal a discontinuity of the trachea, pharynx, or larynx. A breach between the nasal cavity and subcutaneous tissues of the nasal region was suspected. Further diagnostic investigations included positive contrast rhinography and intranasal sinography. Via an angiographic catheter inserted into the left naris, positive contrast intranasal sinography revealed a sinus tract extending between the left nasal cavity and the subcutaneous tissue of the dorsal aspect of the nasal planum. Resolution of subcutaneous emphysema, pneumomediastinum, and pneumoretroperitoneum began 1 day after surgical closure of the intranasal opening of the sinus tract. To the authors' knowledge, this radiographic technique has not been reported.—R. de J. Cruz-Arámulo et al (*J Am Vet Med Assoc* 2003;222:1569–1572).

Spontaneous pneumothorax in two cats with small airway disease

Two adult domestic shorthair cats were examined because of pneumothorax. Neither had a history of trauma, and spontaneous pneumothorax secondary to small airway disease was diagnosed. In both cats, treatment consisted of thoracocentesis for evacuation of air and administration of anti-inflammatory agents. One cat had multiple episodes of pneumothorax and eventually died; the other had only a single episode of pneumothorax. Small airway disease should be considered as a potential underlying cause in cats that develop spontaneous pneumothorax. Additionally, the potential for pneumothorax should be considered in cats with small airway disease, particularly when clinical signs suddenly become much worse.—H. L. White et al (*J Am Vet Med Assoc* 2003;222:1573–1575).

Antegrade pyelography for suspected ureteral obstruction in cats: 11 cases (1995–2001)

Medical records of 11 cats that had radiography, ultrasonography, and antegrade pyelography performed for suspected ureteral obstruction were reviewed. Cats with surgical or necropsy confirmation of ureteral obstruction were included. Sensitivity and specificity of survey radiography, ultrasonography, and antegrade pyelography in identification of ureteral obstructions were calculated with surgical or necropsy findings used as the standard for comparison. Leakage of contrast material developed in 8 of 18 kidneys during antegrade pyelography and prevented diagnostic interpretation in 5 of 18 studies. For the 13 diagnostic antegrade pyelography studies evaluated, sensitivity and specificity in identification of ureteral obstructions were 100%. Antegrade pyelography can be a useful diagnostic test for ureteral obstructions in azotemic cats, although leakage of contrast material may prevent interpretation of the study.—C. A. Adin et al (*J Am Vet Med Assoc* 2003;222:1576–1581).

RUMINANTS

Antimicrobial resistance of bacteria isolated from dairy cow milk samples submitted for bacterial culture: 8,905 samples (1994–2001)

Results of antimicrobial susceptibility testing of 8,905 bacterial isolates obtained from dairy cow milk samples submitted to the Wisconsin Veterinary Diagnostic Laboratory between January 1994 and June 2001 were reviewed to determine whether antimicrobial resistance patterns of major mastitis pathogens have changed over time. Antimicrobial susceptibility was determined by means of the Kirby-Bauer disk diffusion method. Logistic regression was used to determine whether percentages of isolates resistant to various antimicrobials increased over time.

For the gram-positive mastitis pathogens, percentages of isolates resistant to various β -lactam antimicrobials decreased over the course of the study. Percentage of *Staphylococcus aureus* isolates resistant to penicillin decreased from 49 to 30%; percentage of *Streptococcus* isolates resistant to penicillin decreased from 6 to 1%. Increased resistance to several macrolide antibiotics was identified for some mastitis pathogens. Percentages of isolates resistant to erythromycin increased for *S aureus*, *Escherichia coli*, *Enterobacter* spp, *Enterococcus* spp, and *Pasteurella* spp. Percentage of isolates resistant to lincomycin increased for *S aureus* and *Staphylococcus* spp. Percentage of *Staphylococcus* isolates resistant to pirlimycin increased from 6 to 19%. For several pathogens, percentages of isolates resistant to sulfisoxazole and trimethoprim-sulfamethoxazole decreased. No pathogens had a significant increase in the percentage of isolates resistant to novobiocin-penicillin. Results did not indicate a trend toward increased antimicrobial resistance among mastitis pathogens isolated from milk samples from dairy cows between 1994 and 2001.—J. A. Makovec and P. L. Ruegg (*J Am Vet Med Assoc* 2003;222:1582–1589).