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PARASITIC ZOONOSES

Veterinarians and veterinary technicians should be familiar with the potential dangers of parasitic zoonoses. The four internal parasites listed below are capable of causing serious disease in humans.

I. *Toxocara canis* (common roundworm of dogs)
   - very common parasite of the small intestine of dogs
   - dogs infected primarily by eating the egg or by prenatal infection of puppies
   - adult worms produce eggs which are passed in the feces and can persist in the environment for a year or more
   - eggs require a period of several weeks to reach the infective stage
   - humans infected when they ingest an infective egg
   - in small numbers parasite usually not too harmful unless it migrates to the eye, but in large numbers the parasite larvae may cause serious disease
   - avoid infection by disposing of dog feces promptly, washing hands thoroughly before eating
   - eggs are resistant to disinfectants but a 20% bleach solution removes the outer coat of the egg shell and makes the eggs less sticky and easier to wash away
   - cat roundworms may also cause this disease, but only rarely

II. *Toxoplasma gondii*
   - common parasite of cats and other felines
   - humans often infected by ingesting the oocyst passed in cat feces or by eating a cyst stage in raw or undercooked meat; in adults the infection produces signs that resemble flu
   - another important route of human infection is through the uterus in pregnant women, the parasite may cause serious disease in babies
   - anyone whose immune system is suppressed is also at risk of severe disease
   - avoid infection by not eating raw or undercooked meat, disposing of cat feces promptly (within 24 hours), washing hands before eating
   - parasite oocyst in the environment difficult to kill, drying out is effective

III. *Baylisascaris procyonis*
   - common parasite of raccoons, similar to dog roundworm
   - eggs passed in the feces are very resistant to environmental conditions
   - humans infected by ingesting eggs
   - larvae can migrate throughout the body, cause serious disease, especially in the CNS
   - avoid infection by washing hands thoroughly after contact with raccoons or areas contaminated with raccoon feces

IV. *Echinococcus multilocularis*
   - very small tapeworm of foxes, may also infect dogs and cats
   - primarily a problem in the upper Midwest
   - final host infected by eating a larval stage which develops in small rodents after the rodents eat the parasite egg
   - humans may take the place of rodents in the lifecycle
   - in rodents and humans the parasite undergoes extensive multiplication and development; it has been described as "growing like a cancer"
   - recently, concern has grown that it might be introduced into the southeastern United States by imported foxes, but no evidence of that as yet
   - avoid infection by washing hands thoroughly after handling foxes, disposing of feces promptly

---Anne Zajac, DVM, PhD, Associate Professor of Parasitology, VA-MD Regional College of Veterinary Medicine, Blacksburg, VA.
ANESTHESIA FOR DECLAWING AND CASTRATION IN CATS

Declawing (onychectomy) and/or castration (orchiectomy) in cats are routine practice in veterinary medicine. There are several commonly used injectable anesthetic combinations for these procedures: 1) Ketamine (15-20 mg/lb, IM) alone, 2) acepromazine (0.1 mg/lb, IM)-ketamine (10-12 mg/lb, IM), 3) acepromazine (0.1 mg/lb)-butorphanol (0.1 mg/lb, IM)-ketamine (10 mg/lb, IM). The advantages and disadvantages of each combination are listed in Table 1.

Recently, Telazol (A.H. Robins Company, Richmond, VA) has gained popularity as an anesthetic adjunct in small animal practice. Telazol is a non-narcotic, non-barbiturate injectable anesthetic mixture. Telazol consists of equal parts of tiletamine (250 mg), a dissociative anesthetic and zolazepam (250 mg), a benzodiazepine derivative. The pharmacologic action of these two drugs is complementary with tiletamine providing analgesia and immobilization and tranquilization. The package insert recommends that Telazol be reconstituted with 5 ml sterile water. The resulting solution contains 50 mg of tiletamine and 50 mg of zolazepam per ml.

I have used an injectable combination by mixing Telazol, Ketamine, and Xylazine (TKX) in the same vial for cat castration and declawing anesthesia. To make this TKX mixture, ketamine 4 ml (400 mg) and 10% xylazine 1 ml (100 mg/ml) are used as the diluent rather than sterile water. Consequently, each ml of the TKX mixture contained 50 mg of tiletamine, 50 mg of zolazepam, 80 mg of ketamine, and 20 mg of xylazine. The dosage of TKX for cats is 0.015 ml TKX/lb, IM. This resulted in a dose of 0.75 mg/lb tiletamine, 0.75 mg/lb zolazepam (or 1.5 mg/lb Telazol), 1.2 mg/lb ketamine, and 0.3 mg/lb of xylazine for a ten-pound cat. A vial of TKX mixture (i.e., 5 ml) at the anesthetic dose given, can be used for a total of 333 lbs body weight of cats.

Based on my clinical experience with this TKX intramuscular injection at the aforementioned dosage, a cat will show signs of sedation characterized by sternal recumbency and head dropping within two minutes. Induction is usually smooth and the cat will assume lateral recumbency within five minutes without outward signs of excitement. Tracheal intubation is easily achieved with the aid of a laryngoscope immediately after the cat assumes lateral recumbency. The cat has excellent muscle relaxation as evidenced by a minimal degree of muscle tone when manipulating their limbs. Characteristic ketamine-induced muscle rigidity is not seen. Apneustic breathing or breath holding patterns are usually observed following TKX injection, but do not impair ventilatory function. Analgesia lasts approximately 35-45 minutes following TKX injection and is usually sufficient for a practitioner to complete both castration and declawing in a cat.

I also use atropine with the TKX in a single intramuscular injection for two purposes: 1) to control sialorrhea induced by Telazol and ketamine, and 2) to increase the injection volume of TKX. The Telazol package insert recommends that Telazol powder reconstituted with sterile water should be discarded after four days when stored at room temperature or after 14 days when kept refrigerated. For TKX mixture, Telazol is diluted with xylazine and ketamine. It appears that the shelf-life for this mixture exceeds three months when stored at room temperature and light is avoided. This impression is based upon the consistent anesthetic action induced by my trial dose throughout the three and ½ month study period. A potential risk is assumed by the practitioner when using the liquid solutions of xylazine and ketamine as diluents instead of sterile water. Practitioners should be aware that the use of Telazol, contrary to the manufacturer's direction, may not be supported by the drug company if untoward reaction should occur.

In addition to cat castration and declawing, I have also used the TKX mixture in healthy cats, raccoons, and ferrets for anesthesia induction. An identical dose (i.e., 0.015 ml/lb, IM) of TKX is used in these animals for ovariohysterectomy. Following intramuscular injection of TKX with atropine, these animal can be intubated within eight-ten minutes and subsequently put on halothane or isoflurane at a vaporizer setting not exceeding 1.5 volume percent. Induction and recovery are usually smooth and uneventful. Prolonged recovery may be seen if surgery is prolonged (< two hours). This prolonged action is due to a synergistic sedative effect of TKX and inhalant which could be shortened by terminating the inhalation agent early before surgery is completed (i.e., 10-15 minutes before) and simply supply pure oxygen during this period.
If you have any questions regarding the TKX mixture and its use, please feel free to contact me at the Veterinary Teaching Hospital, Blacksburg, Virginia TEL: 703-231-4621.

Table 1. The Advantages and Disadvantages of Anesthetic Combinations for Cat Castration and Declawing

<table>
<thead>
<tr>
<th>Anesthetic Combination</th>
<th>Advantages</th>
<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Acepromazine-butorphanol-ketamine</td>
<td>1. Additional analgesia is provided by butorphanol. 2. Sedation is provided by acepromazine.</td>
<td>1. Slow onset of acepromazine and butorphanol. 2. Muscle rigidity. 3. Hypothermia. 4. Prolonged recovery.</td>
</tr>
<tr>
<td>Telazol-ketamine-xyazine</td>
<td>1. Additional analgesia is provided by tiletamine and xylazine. 2. Sedation is provided by zolazepam and xylazine. 3. Muscle relaxation is provided by zolazepam and xylazine. 4. Low dose of each drug is used when compared to large dose of a single drug to achieve a similar depth of anesthesia. 5. Rapid onset of induction and intubation can be easily achieved with intramuscular injection. 6. Excellent muscle relaxation. 7. Hypothermia is not usually seen during the recovery. 8. Low cost of the drug.</td>
<td>1. Telazol is a controlled substance. 2. Prolonged recovery may be seen if only used for castration in cats (i.e., short surgical procedures). 3. Risk of extra label use.</td>
</tr>
</tbody>
</table>

--Jeff C.H. Ko, DVM, MS, Assistant Professor of Anesthesiology, VA-MD Regional College of Veterinary Medicine, Blacksburg, VA.
METHYL PYRAZOLE: ANTIDOTE FOR ETHYLENE GLYCOL POISONING IN DOGS

Ethylene glycol, or antifreeze, which contains 95 percent ethylene glycol, is a common cause of intoxication in dogs. It is a central nervous system depressant which can enter the cerebrospinal fluid and cause ataxia and signs of drunkenness; it also induces diuresis and as a result dehydration; other toxic effects result from its metabolic conversion in the liver by alcohol dehydrogenase. Therapy with ethanol has several disadvantages. A more effective treatment should inhibit alcohol dehydrogenase without producing these effects. The inhibitor 4-methylpyrazole is a white, water-soluble crystalline compound; its effects are rapid and prolonged and its toxicity is low. The initial dose rate is 20 mg/kg, followed after 12 hours and 24 hours by 15 mg/kg and after 36 hours by 5 mg/kg. There are no adverse effects associated with the treatment. --Abstracted from El Bahri, L. Comp. on Cont. Educ. for the Pract. Vet. 13 (1991):1123. From Iowa State University, Communications in CE, 8/92, as reported in Veterinary Newsletter, Sept 1992, Utah State University, Logan, Utah.

CONTINUING EDUCATION OPPORTUNITIES
SPRING 1993

<table>
<thead>
<tr>
<th>Date</th>
<th>Program</th>
<th>Location</th>
<th>Contact Hours</th>
</tr>
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<tbody>
<tr>
<td>March 18</td>
<td>Small Animal Medicine Update</td>
<td>Charlottesville</td>
<td>4</td>
</tr>
<tr>
<td>*March 19-20</td>
<td>Thoracic Radiology</td>
<td>Blacksburg</td>
<td>10</td>
</tr>
<tr>
<td>*March 26-27</td>
<td>Cytology</td>
<td>Blacksburg</td>
<td>10</td>
</tr>
<tr>
<td>April 4</td>
<td>Small Animal Medicine Update</td>
<td>Charleston, WV</td>
<td>4</td>
</tr>
<tr>
<td>*April 16-17</td>
<td>Gastrointestinal Endoscopy (basic)</td>
<td>Blacksburg</td>
<td>10</td>
</tr>
<tr>
<td>*April 23-24</td>
<td>Ultrasonography</td>
<td>Blacksburg</td>
<td>10</td>
</tr>
</tbody>
</table>

*Limited enrollment course featuring hands-on experience.

Note: Program brochures are mailed 6-8 weeks prior to course dates. Course reservations cannot be accepted until the brochures are mailed. For CE course information, please contact:

Kent Roberts, DVM, VMRCVM, Blacksburg, VA 24061-0442
(703) 231-7181

VETERINARY TECHNICIAN CE

A small animal medicine update program for technicians will be offered in Charlottesville on March 18 concurrent with the session for veterinarians. Please see the program brochure for details.

Technicians are welcome to apply for the Cytology short course in Blacksburg, March 26-27.

THOUGHT FOR THE MONTH

Well drilling and grave digging are the only businesses where you start at the top.
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Nancy Temple, DVM
Stuart Jeffrey, DVM
Michael Davis, DVM
Patty Doyle, DVM

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Equine Surgery
Equine Medicine
Equine Surgery
Equine Medicine
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Resident-Surgery
Resident-Medicine
Resident-Medicine
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