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Kent C. Roberts, DVM
Extension Veterinarian
TERMINATION OF PREGNANCY IN THE BITCH

Bitches occasionally are mismated despite conscientious efforts by owners to confine animals during estrus. Unfortunately, no medical therapy currently exists that is safe and efficacious in terminating canine pregnancies. Prostaglandin F₂-alpha is not approved for use in dogs and does not appear to reliably terminate pregnancy during the first half of gestation. Estradiol cypionate (ECP) is approved for terminating canine pregnancies but has several side effects. First, the current bottle dosage (0.5 to 5.0 mg) for misalliance is incorrect. The currently recommended dose of ECP is 10 mcg/lb not to exceed 1.0 mg. The dose should not be repeated during a single estrous period. Bitches will frequently stand to be bred for 1 to 2 weeks following treatment but do not require additional estrogens if again mismated. Estrogens are responsible for behavioral estrus but behavioral estrus following administration of ECP does not mean ovulation has occurred again. Although the exact mechanism whereby estrogens terminate canine pregnancies is unknown, estrogens act to delay (or in some cases enhance) transport of ova through the oviducts. Therefore, ova which are too young or too old reach the uterus but are unable to implant. Optimally, estrogens should then be given when ova are in the oviducts (anytime from the third day of estrus to the fourth day of diestrus). However, we do not give estrogens during diestrus since the risk of pyometra seems higher during this period. If an owner insists on having a pregnancy terminated, 10 mcg/lb ECP should be given only once, and only if the bitch has an estrous vaginal smear. If estrogens are given too early (i.e. during proestrus), an increased incidence of cystic ovaries may result. ECP should never be repeated during a single estrus since the risk of fatal aplastic anemia dramatically increases with repeated administration (or dosages exceeding 10 mcg/lb).

We routinely advise owners against terminating pregnancies with estrogens due to the potentially devastating side effects.

The following table illustrates the efficacy of diethylstilbestrol (DES) and ECP in terminating canine pregnancies.

### EFFICACY OF ESTROGENS TO TERMINATE CANINE PREGNANCIES

<table>
<thead>
<tr>
<th>Times of drug administration</th>
<th>Drug/dose</th>
<th>Number of dogs</th>
<th>Pregnancy rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proestrus</td>
<td>DES/1 mg per</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>Estrus</td>
<td>30 lb orally</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>Diestrus (day 2)</td>
<td>for 7 days</td>
<td>4</td>
<td>75%</td>
</tr>
<tr>
<td>Proestrus</td>
<td>ECP - 10 mcg/lb</td>
<td>4</td>
<td>50%</td>
</tr>
<tr>
<td>Estrus</td>
<td>IM once</td>
<td>4</td>
<td>50%</td>
</tr>
<tr>
<td>Diestrus (day 2)</td>
<td></td>
<td>4</td>
<td>25%*</td>
</tr>
<tr>
<td>Proestrus</td>
<td>ECP - 20 mcg/lb</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>Estrus</td>
<td>IM once</td>
<td>4</td>
<td>0%</td>
</tr>
<tr>
<td>Diestrus (day 2)</td>
<td></td>
<td>4</td>
<td>0%</td>
</tr>
</tbody>
</table>

*One pyometra in each group*
Orally administreed DES appears totally inefficacious at the recommended dose (1 mg/30 lb daily for 7 days). Veterinarians should always evaluate a vaginal smear from a bitch before considering to administer estrogens. If the bitch is in proestrus or diestrus at the time of possible misalliance, no drug should be given (proestrous bitches may attract males but do not usually allow mating; diestrous bitches may attract males but do not usually allow mating; diestrous bitches may accept a male for a few days in diestrus but fertility is less than 10%). If a diestrous bitch was observed to be mated several days before being presented for mismating, estrogens should also not be given since the risk of inducing pyometra rises.

We have had several bitches presented to our Veterinary Teaching Hospital for "possible misalliance" where animals were attracting males (but not observed to be mated) because of vaginitis. Therefore, it is imperative that a vaginal smear be evaluated before considering administration of a potentially toxic drug. Only bitches with estrous smears should be considered candidates for estrogen therapy, and only these after owners have been forewarned of serious complications (maybe even death) following treatment. Sperm heads (but rarely intact spermatozoa) may be observed on vaginal smears obtained 48 hours following a natural mating in 50% of the cases. Since few heads are usually present, careful scanning of the smear is necessary.--Dr. Patty Olson; Dr. Richard Bowen; Dr. Steven Wheeler; Colorado State Univ.; Feb. 1984.

TREATMENT OF RESISTANT CASES OF CYSTIC OVARIES

Many studies show the best initial treatment for cystic ovaries is 5,000 units of human chorionic gonadotropin (HCG) in the vein, 10,000 units of HCG in the muscle, or 100 micrograms of gonadotropin releasing hormone or GnRH (Cystorelin, name for GnRH distributed by Ceva Laboratories) in muscle. These treatments produce about 75% first treatment recoveries from cystic ovaries.

Cows that fail to recover from cystic ovaries may be treated in several ways. First of all, research shows that cows generally require 15 to 30 days to fully recover from cysts and come into true estrus. Recovery is the result of maturation, luteinization and subsequent regression of the luteal tissue and normal follicle development. Therefore, it may be best not to retreat cows for cysts until 30 days have passed. Significantly more cows were retreated for cysts when cows were examined at two week intervals compared to four week intervals following treatment.

Studies also show that HCG may be used two to four times in cows before antihormones are produced. GnRH may be used as many times with only slight chances of antihormones being produced. Therefore, cows that fail to recover from cystic ovaries could be retreated with a different product after 30 days. Cows that fail to recover from two treatments may be given a third treatment after 30 days as follows: give a full dose of GnRH or HCG, wait only for days, and repeat the same dose. The rationale for this is the first dose stimulates maturation of follicles and the next dose stimulates luteinization of these mature follicles (along with luteinization of viable granulosa cells in the cyst). Thus, blood progesterone would increase and enhance a recovery from cysts. In one study of 225 cows, only 12 required three or more treatments.--Dr. Howard Whitmore, Head of Food Animal Medicine, Univ. of Illinois, College of Veterinary Medicine.
FDA/BVM CRITERIA FOR EXTRA-LABEL USE OF DRUGS WHICH WOULD NOT ORDINARILY CAUSE REGULATORY ACTION BY FDA

1. A medical diagnosis is made by an attending veterinarian.

2. A determination is made that (a) there are no marketed drugs specifically labeled for the conditions diagnosed, or (b) drug therapy at the dosage recommended by labeling has been found clinically ineffective in the animals to be treated.

3. The identity of the treated animals is carefully maintained.

4. Significantly extended time periods are assigned for drug withdrawal prior to the marketing of meat, milk, or eggs for food.

Even with the following of these criteria, however, FDA will consider regulatory action nonetheless if illegal drug residues are found in treated animals.--FDA Veterinarian, March, 1984.

BUTORPHANOL AS AN ADJUNCT TO XYLAZINE-KETAMINE

Butorphanol (BT) (Torbutrol: Bristol) is a synthetic analgesic with 30X the effect of pentazocine (Talwin: Winthrop), 3.5-7X that of morphine, and 30-40X that of meperidine (Demerol: Winthrop). For castration, 4 stallions were given xylazine IV at 1.1 mg/kg and, 2 min later, BT at 0.11 mg/kg, with ketamine IV at 2.2 mg/kg 4 min after the xylazine. At 15 min after xylazine injection, 1 testis was removed, and the horses were allowed to recover before the 2nd testis was removed, using the same anesthesia except BT was increased to 0.22 mg/kg.

In 3 of the stallions (Belgian, Appaloosa, Welsh Pony), both levels of BT produced good sedation, muscle relaxation and analgesia. The 4th horse, an Arabian, became hyperresponsive, wild-eyed and developed lip movement following both BT injections; during recovery he was hyperresponsive to noise and wanted to circle. These results indicate BT should be useful in surgery, but individual variations suggest need for further clinical evaluation.--W. Tranquilli et al. College of Veterinary Medicine, University of Illinois, Urbana. Butophanol tartrate as an adjunct to xylazine-ketamine anesthesia in the horse. Equine Pract 5(6):26-29, 1983.

PRACTICE TIPS

For Mild Sedation in 4-H Calves and Show Cattle - Give 1/8 to 1/4 cc RompunR orally. Allow 30 minutes for response.

For Sedation in Bulls - Surgery for foot trimming, etc.,: give 1 cc/1000 lbs body wt. IV of the 10 mg/cc TraveR for small animal use. The sedation is more dependable and desirable than RompunR - Dr. Lance Jones, Broken Bow, NE.

Question: What is the proper level of copper sulfate to use in a stock tank to keep down algae?

VETERINARY COLLEGE NEWS

An Open House conducted by the students of the Virginia-Maryland Regional College of Veterinary Medicine at Virginia Tech is scheduled for 9:00 AM - 5:00 PM on Saturday, April 28.

Tours of the College facilities will include explanations of the curriculum and equipment on display. Educational displays will be featured and refreshments provided. All are welcome.

Linda G. Shell, DVM has joined the faculty as an assistant professor with a speciality in internal medicine/neurology. A graduate of the University of Tennessee, with an internship at the University of Illinois, a residency at the University of Florida, and a post doctoral residency at Colorado State University in both large and small animal neurology, Dr. Shell practiced in Statesboro, NC before coming to Virginia Tech.

Theodore I. Lidsky, Ph.D. is a psychobiologist by training which he received at Queens College, City University of New York and the University of Rochester. He comes to Blacksburg as an associate professor conducting investigations into the nature and function of the basal ganglia of the brain for NIH.

Corinne Manetto, BS, MS is a research associate in psychobiology. She expects to earn her Ph.D. from the State University of New York at Stonybrook in June 1984.

Progress continues on the College's building program with architects completing drawings for Phase III, a 66,000 square foot structure that will expand the Teaching Hospital and provide instructional support space. The project is expected to be under construction by mid summer.

At the Equine Medical Center in Leesburg equipment is being installed and the Center director, Dr. Fred Fregin is actively recruiting staff personnel and planning for the opening of that facility in July.

Dr. John August, coordinator of medical services at the Teaching Hospital, presented an all day program on "Feline Infectious Diseases" before the District of Columbia Academy of Veterinary Medicine on March 1.

Dr. Craig Thatcher, large animal clinician, spoke to the Virginia Nutrition Council on "Nutrition As It Relates to the Health of the Cow and Calf" in Waynesboro on March 29.

FAST FOOD FACTS

McDonald's Restaurants opened 519 new outlets in 1983. They now have 7,800 restaurants worldwide serving 17 million customers each day. Net earnings of $343,000,000 (up 14%) were realized on sales of 8.7 billion dollars. Chicken McNuggets accounted for 12% of total sales. As reported in Feedstuffs, March 12, 1984.

THOUGHT FOR THE MONTH

You cannot help men permanently by doing for them what they could and should do for themselves.

Abraham Lincoln
SUCCESS IS NO ACCIDENT

The veterinarian is more often judged by clients on his social skills than on his technical veterinary ability. Clients assume an acceptable level of technical expertise if you are a graduate veterinarian.

The ability to communicate effectively with clients (or any other human for that matter) is basic to success and to a desirable professional image. Oral communication is a dynamic process between speaker and listener that requires conscious thought and effort to perfect on the part of the veterinarian. Clients are looking for clues in your speech and body language that indicate sincerity, honesty and compassion.

Be more aware of the message you are sending clients and coworkers. Make a genuine effort to become a more competent communicator.--Kent C. Roberts, VA-MD Regional College of Veterinary Medicine.

BOVINE HYSTERIA

Isolated instances of "hysteria" in cattle fed ammoniated forages have been reported in a number of states including Virginia. Clinical signs observed in cattle include running through fences, restlessness, bellowing, increased salivation, and paralysis. Death is rare. The syndrome resembles that reported with ammoniated molasses in the 1950s. Researchers at Kansas State University are evaluating 4-methyl-imidazole as the etiological agent. The syndrome has been associated with ammoniated sorghum, fescue, brome barley, and wheat hays. Usually only high carbohydrate forages harvested in the prebloom stage are affected. Removal of cattle from the ammoniated forage is all that is required in most cases. Pentobarbital sodium has prevented death in laboratory animals severely affected with 4-methylimidazole toxicosis.--Dennis Blodgett, DVM, Ph.D. and H. Fred Troutt, VMD, Ph.D., VA-MD Regional College of Veterinary Medicine.

MEETINGS

May 4, 1984  Food Animal Medicine Seminar
Holiday Inn, Harrisonburg, VA

May 6, 1984  Canine-Feline Behavior Seminar
Howard Johnson Midtown, Richmond, VA

May 17-20, 1984  American College of Veterinary Internal Medicine
Second Forum
Hyatt Regency, Washington, DC

June 15-17, 1984  VVMA - Mini-Convention, Gastroenterology
Kings Mill, Williamsburg, VA
GERIATRIC DIETS IN DOGS

Higher levels of dietary protein, expressed as available energy, are required for old dogs than for young adult relatively inactive dogs, during stress, and for dogs with diminished renal mass. As animals age, the metabolic rate slows and less food energy is needed, but lean body mass, total body protein reserve, and the efficiency of protein utilization all decrease, so relatively more protein is needed. The higher frequency of illness and stress in the elderly increases protein loss and decreases protein absorption; thus protein allowances require an increased safety margin. For adult dogs, 4.7% casein (nearly 100% digestible, biologic 80-85%) as available energy maintained nitrogen balance, but 4X as much was required to fill depleted protein stores and minimize drug-induced stress.

Renal insufficiency progressing to chronic renal failure is the most common cause of death in old dogs. In partially nephrectomized dogs, kidney functions (blood flow, filtration and secretion) were sustained for 48 mo, better in dogs fed commercial dog foods containing 56% or 27% protein than in dogs fed a special commercial kidney diet containing only 19% protein. This test invalidates the theory that a low-protein diet improves kidney function after 25-50% loss of normal capacity; it also indicates that low-protein diets are unsuitable for old dogs. None of the commercial geriatric diets contain enough utilizable protein for healthy old dogs, and dogs in ill health or under stress may need even more.

Retention of mental activity may be aided by a diet rich in tryptophan, tyrosine and choline. When a diet is changed to have a higher protein value, dogs may show increased physical activity, alertness and responsiveness as well as improved stools and coats. The hepatic urea cycle depends on arginine, which is derived from the diet and from renal synthesis. Arginine was the most deficient amino acid in 2 special low-protein diet products, compared to 2 ordinary products in a trial on azotemic dogs. The dietary arginine requirement may increase as the number of functional nephrons decreases. Stressed old dogs may have temporary nutritional needs similar to those of their growth period. Suitable diets might be puppy food, a mixture of dry and canned food, or geriatric diet supplemented with high-quality protein. --as reported in Veterinary Medicine Newsletter, University of Florida, February, 1984, by D. S. Kronfeld, School of Vet. Med., Univ. Penn., Comp. Cont. Ed. 5:136-142, 1983.

IMRAB RABIES VACCINE

On Friday, January 13, 1984, IMRAB Rabies Vaccine was officially approved for use on horses. On the same day, USDA officially extended the duration of immunity of IMRAB in domestic cats to three years. In consequence, instructions on the dosage and administration of IMRAB Rabies Vaccine can be amended with immediate effect as follows:

"Using aseptic technique, inject intramuscularly at one site in the thigh 1 ml for healthy dogs, cats and sheep, and 2 ml for healthy horses and cattle, when 3 months of age or older. All animals vaccinated under 12 months of age should be revaccinated one year later. Revaccinate horses and cattle annually, and dogs, cats, and sheep every three years." --as reported in Veterinary Medicine Newsletter, Univ. of Florida, Feb. 1984, by Dr. Michael Burridge, Dept. of Preventive Medicine, Univ. of Fla., January 17, 1984.
Virginia-Maryland Regional College of Veterinary Medicine Extension Staff:

Dr. C. T. Larsen - Extension Specialist - Avians
Dr. K. C. Roberts - Extension Specialist - Equine and Companion Animals
Dr. T. P. Siburt - Extension Specialist - Pharmacology and Toxicology
Dr. H. F. Troutt - Extension Specialist - Cattle and Swine

Mollie M. Heterick, Managing Editor of VIRGINIA VETERINARY NOTES