VIRGINIA COOPERATIVE EXTENSION SERVICE
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THE FOOD ANIMAL VETERINARIAN

VIRGINIA-MARYLAND REGIONAL COLLEGE OF VETERINARY MEDICINE

Fall 2004 No. 31

Dear Food Animal Practitioner,

BSE has changed the cattle industry significantly. Among changes that we see in Virginia:

- Downer cows are not being taken for human consumption. Not a big loss I think. The dollars that were coming from these cows mostly went to traders and lower end slaughter facilities, not my dairyman client.
- Dead, down cattle aren't much sought after by rendering facilities. This change started after the ban for ruminant derived protein in ruminant diets in 1997. The rule under comment would ban Specified Risk Materials (SRM) including CNS tissue, skulls and vertebral columns from all cattle over 30 months of age at slaughter from all animal feeds. In the end, the cost of disposing of these materials will trickle back to cattle producers.
- Brains are being collected from high risk animals (downers, ones that have neurological signs, ones that die without a prior diagnosis) in Virginia to meet our allotment (2-3,000 brains) for the national program. This is a one-time effort that is supposed to be complete in 12 – 18 months. I had hoped this would be a little windfall for food animal practice vets but seems that the small fee doesn't make the rather difficult task of harvesting just the right portion of the brain attractive to many.
- Our threatened colostrum replacement product is back on the market. The Virginia Academy of Food Animal Practice, along with many others in the US, commented on the loss of this valuable product and science prevailed.
- Poultry litter can still be legally fed to cattle in Virginia. In the end, the decision will probably be made to take SRM from all animal feeds so that the spilled feed in poultry rations that is contained in litter will not be considered a risk.
- The US slowly crawls toward an animal ID system. The obstacles in this are being incredible. The goal of the system is to be able to trace any animal in the US back to its source in 48 hours. Most considered that it would be a tag with a radio frequency device so that animals could rapidly be tracked as they go through markets, feedlots, slaughter facilities, etc. Now the USDA, under threat of lawsuits from companies that make other ID technology, says our eventual system will be "technology neutral". How will that function at the speed of commerce? The first step in the ID plan is to give all producers a "premise ID". Some states have begun to issue these numbers on a voluntary basis. Virginia was not funded to start this in the initial round but application for additional dollars can be made in December. As I say, more questions than answers but there will be changes that affect food animal practice. Health certificates will certainly change. How involved in placing ID will food animal practitioners be?

Food animal practitioners will do well to keep their ears to the ground so that they can deal with changes that are being precipitated in the animal agriculture that we serve. Some changes will certainly have a major influence on our future practice.
My best,

Dr. Dee Whittier
Extension Veterinarian, Beef Cattle

Virginia Tech 1872

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Virginia State University Since 1882

Pirlimycin Therapy for *Streptococcus Uberis* Intramammary Infections in Lactating Dairy Cattle

Mastitis control methods, including teat disinfection, antibiotic therapy, and culling of chronically infected cows, has led to considerable progress in controlling mastitis caused by contagious pathogens such as *Streptococcus agalactiae* and *Staphylococcus aureus*. However, these mastitis control procedures are less effective against environmental mastitis pathogens. Environmental *Streptococcus* spp involved in bovine mastitis include *S. uberis, S. dysgalactiae. S. equinus, S. equi, and Enterococcus* species. Among the environmental streptococcus, *S. uberis* is the most prevalent in dairy cows, particularly during the dry period, around the time of calving, and during early lactation, and this organism is not effectively controlled by current mastitis control practices. Many *S. uberis* infections that originate during the dry period and near calving result in clinical and subclinical mastitis during early lactation.

Pirlimycin is a lincosaminide antibiotic that is active against many gram-positive mastitis pathogens. Pirlimycin functions by binding to the 40s ribosomal subunit of mRNA, inhibiting protein synthesis. In clinical studies, 50 mg of pirlimycin administered twice, with a 24-hour interval, into each affected mammary quarter was effective for treatment of mastitis caused by gram-positive pathogens in lactating dairy cattle. The length of time pirlimycin concentrations in milk remain above the minimum inhibitory concentration of the susceptible bacteria is key to efficacy of this compound. Theoretically, lengthening the duration of pirlimycin therapy should increase efficacy.

The efficacy of extended pirlimycin intramammary therapy regimens was investigated in 103 mammary glands of 68 dairy cows that became infected following experimental challenge with *S. uberis* during early lactation. Cows infected with *S. uberis* in one or both experimentally challenged mammary glands were randomly allocated to three groups, representing three different treatment regimens with pirlimycin, including 2-day (n = 21 cows, 31 mammary quarters),5-day (n = 21 cows, 32 quarters), and 8-day (n = 26 cows, 40 quarters). For all groups, pirlimycin was administered at a rate of 50 mg of pirlimycin hydrochloride via intramammary infusion. A cure was defined as an experimentally infected mammary gland that was treated with pirlimycin and was bacteriologically negative for the presence of *S. uberis* at 7, 14, 21, and 28 days after treatment.

Experimental *S. uberis* intramammary infections were eliminated in 58.1 % of the infected quarters treated with the pirlimycin 2-day regimen, 68.8% for the 5-day regimen, and 80.0% for the 8day regimen. Significant differences ($P<0.05$) in efficacy were observed between the 2-day and 8-day treatment regimens. Thus, it would appear increasing the duration of pirlimycin therapy increases treatment efficacy. This has been demonstrated for *S. uberis*, other environmental *Streptococcus* species, and *Staphylococcus* aureus.

Taken from: Oliver, S. P., et al Vet Therapeutics 4:299-307, 2003, as reported in VetMed, Volume 10, Issue 3, May 2004, Iowa State University, Ames, IA

Would You Believe?

Using an optimization algorithm (a mathematical formula) Waste Management Inc. was able to eliminate back tracking and overlapping truck routes which resulted in the elimination of 761 trucks and the savings of $91 million in annual operating costs. Such algorithms are produced in a new field of mathematics called 'linear programming' which can then be put on powerful computers to make extremely complicated computations quite easy. This same approach has been used to prepare the 2004 NFL schedule with it's many requirements involving 32 teams and 256 games.

Influence of Prepartum Pirlimycin Hydrochloride or Penicillin-Novobiocina Therapy on Mastitis in Heifers During Early Lactation

A study was conducted in 2 dairy research herds to determine whether prepartum therapy of heifer mammary glands with penicillin-novobiocin or pirlimycin hydrochloride was effective for reducing the percentage of heifers and mammary quarters infected with mastitis pathogens during early lactation. Almost 96% of Jersey heifers (67 of 70) and 71.3% of quarters (199 of 279) were infected 14 d before expected calving. Of the quarters infected at 14 d before expected parturition, 75% (54 of 72) were uninfected following treatment with penicillin-novobiocin; 87% (61 of 70) were uninfected following treatment with pirlimycin, and 56% (32 of 57) were uninfected in the untreated negative control group. The majority of intramammary infections in Jersey heifers were due to coagulase-negative staphylococci (61%), *Streptococcus* species, primarily *Streptococcus uberis* (19%), and *Staphylococcus aureus* (8%). Almost 73% of Holstein heifers (40 of 55) and 34.3% of mammary quarters (73 of 213) were infected 14 d before expected calving. Of the quarters infected at 14 d before expected parturition, 76% (19 of 25) were uninfected following treatment with penicillin-novabiocin; 59% (17 of 29) were uninfected following treatment with pirlimycin, and 26% (5 of 19) were uninfected in the untreated negative control group. The majority of intramammary infections in Holstein heifers were due to coagulase-negative staphylococci (44%) and *Staph. aureus* (30%). In both herds, the bacteriological cure rate was significantly higher in heifer mammary glands treated with penicillin-novobiocin or pirlimycin hydrochloride than in untreated controls. Prepartum therapy of heifer mammary glands with penicillin-novobiocin or pirlimycin hydrochloride significantly reduced the percentage of heifers and quarters infected with mastitis pathogens during early lactation.

S.P. Oliver, B.E. Gillespie, S.J. Ivey, M J. Lewis, D.L. Johnson, K.C. Lamar, H. Moorehead, H H. Dowlen, Department of Animal Science and the Food Safety Center of Excellence, Institute of Agriculture, The University of Tennessee, S.T. Chester and J.W. Hallberg, Pfizer Animal Health, Kalamazoo, MI

J. DairySci. 2004. 87:1727-1731, as reported in Penn State Veterinary News, July 2004, University Park, PA

Fertility of Holstein Dairy Heifers after Synchronization of Ovulation and Timed AI or AI after Removed Tail Chalk

Nonlactating Holstein dairy heifers (n = 352) 13 mo of age were managed using a 42-d artificial insemination (AI) breeding period in which they received AI after removed tail chalk evaluated once daily. At AI breeding period onset (d 0), heifers were randomly assigned to receive synchronization of ovulation (100 μg of GnRH, d 0; 25 mg of PGF2, d 6; 100 μg of GnRH, d 8) and timed AI (TAI; d 8) and AI after removed tail chalk for the entire AI breeding period (GPG; n = 175), or AI after removed tail chalk for the entire AI breeding period (TC; n = 177). As expected, 17.7% (31/175) of GPG heifers received AI after removed tail chalk before scheduled TAI. Pregnancy rate per artificial insemination (PR/AI) at ~30 d after first AI tended to be greater for TC (46.5%) than for GPG (38.3%) heifers. No treatment x inseminator interaction was detected; however, overall PR/AI was low for heifers in both treatments due to variation among the 3 inseminators (24.8, 30.0, and 58.0%). Pregnancy loss from ~30 to ~75 d after first AI was 10% and did not differ between treatments. Based on survival analysis, days to first AI was greater for TC than for GPG heifers, whereas days to pregnancy across the 42-d AI breeding period did not differ between treatments. Overall, 81.2% of GPG heifers receiving TAI synchronized luteal regression and ovulated within 48 h after the second GnRH injection. We conclude that this synchronization protocol can yield acceptable fertility in dairy heifers if AI to estrus is conducted between treatment with GnRH and PGF2 and AI efficiency is optimized.

H. Rivera, H. Lopez-and P. M. Fricke, Department of Dairy Science, University of Wisconsin, Madison, J. Dairy Sci. 2004. 87:2051-2061, as reported in Penn State Veterinary News, July 2004, University Park, PA

Enteritis in The Pre-Weaned Calf

Calf enteritis is the most common disease problem that afflicts the young bovine before weaning. While the pathogens involved are important, they can be found on farms with and without clinical disease. Most outbreaks are multifactorial and are an interaction between the environment, management, feeding and microorganisms. Thus, any investigation needs to concentrate on why the outbreak has occurred as much as on the infectious agents found.
A comprehensive investigation of calf enteritis in the United Kingdom involving both husbandry and pathogens involved 256 scour outbreaks from February 1997 to May 1998. This study showed that in 190 (74.2%) of the outbreaks, infectious organisms were found and these included 62 (24.2%) with mixed infections. The most likely cause of each outbreak was as follows:

Organism	% of 256 Outbreaks
Rotavirus	28.9
Cryptosporidia	20.3
Coccidia	11.3
Coronavirus	6.3
E. coli K99	4.3
Salmonella spp.	3.1
No Pathogen	25.8
TOTAL	**100**

When investigating disease outbreaks fecal samples should be taken to determine if infectious agents are involved.

What samples? These should be in the form of a fecal stool and not just a swab. The latter is likely to dry out and thus bacteria, etc., may die.
Equally, it will not be a useful sample to look for cryptosporidia or coccidial oocysts. The sample should be taken from the rectum which is not always that easy. About 15 gm is usually sufficient.

How many samples? The answer is as many as possible. At least 10% or five, whichever is the greater number.

What calves should be sampled? Those that have recently started to scour. However, in a sample of five, it is often useful to take samples from about three with clinical signs and two others in the same group apparently unaffected. The clinical history and findings should be recorded and these can then be related to the laboratory results.

What pathogens should be investigated? All the main pathogens that affect calves and so bacteriological (including *E. coli, Salmonella spp., Campylobacter spp., Clostridium spp., Proteus spp., Pseudomonas spp.*, etc.), virological (rotavirus, coronavirus, bovine viral diarrhea virus, calici-like virus, Breda virus, fringed particles, adenoviruses, enteroviruses, bovine herpes virus 1, astrovirus, etc.), fungal (*Candida* spp., etc.) and parasitological (*Cryptosporidium parrum, Eimeria* spp., etc.) investigations should be undertaken.

Words of warning - just because a particular pathogen is found it does not necessarily mean that this is the cause of the diarrhea outbreak. Equally, if no pathogen is found it does not mean to say it is not caused by an infectious agent (e.g. *Salmonella* spp., pre-patent coccidiosis, previous farmer treatments, etc.).
There are also many non-infectious causes of diarrhea which are not due to feeding and management. These include poisoning with substances such as antimicrobials, arsenic, copper, fluorine, mercury, molybdenum, mycotoxins, sodium chloride, plants, and other rare problems such as intestinal disaccharidase deficiency. Some management factors, such as calf-to-calf access and hay feeding, did not affect the prevalence of diarrhea. However, diarrhea was 3.2 times more likely to occur when calves were reared in groups and 1.9 times more likely when wet bedding was present, but only 0.6 times as likely when there was disinfection between groups.

Taken from: Andrews, A. H., Cattle Practice, 1 2: 1 00- 11 4, 2004, as reported in VetMed, Volume 10, Issue 4, July 2004, Iowa State University, Ames, IA

Why Test For Persistently Infected BVD?

Three years ago, the very well managed University commercial cow herd at Cal-State, Fresno started to have a high mortality rate (over 10%) of pre-weaned calves. Cattle raised in the herd had been vaccinated twice at weaning time and given an annual booster for the respiratory diseases such as BVD and IBR.

Upon diagnostic testing, a high incidence of "*persistently infected*" (PI) BVD cattle were found. Persistently Infected calves can develop in the uterus of their mother, if the cow is exposed to the virus during the first part of gestation, between about 40 to 125 days pregnant. PI cattle often appear healthy, but are carriers for BVD virus and are shedding the virus to young, unprotected calves.

To get BVD out of the Fresno herds, all animals in both the commercial and purebred herds had a skin notch tested for the virus. The PI carriers were identified and culled from the commercial herd. The purebred herd had no PI carriers.

They found that "keeping any PI animals had the risk of re-infecting the whole herd with BVD virus on a daily basis." Now the Cal-State, Fresno purebred herd enjoys a marketing advantage of the seedstock cattle they offer for sale. They are one of the first herds in California to have a designation of being free of BVD persistent infection. They are now able to offer cattle that are guaranteed to be persistent infection free. Look for more herds to follow their lead. In fact, Dr. John Maas, California State Extension Veterinarian expects that within a year, many California purebred herds will be tested and offering "PI-BVD-free" bulls and females.

Dr. Glenn Selk Oklahoma State University, From: OK-State University Cow/Calf Newsletter, April 2004, as reported in Utah Beef Quarterly, September 2004, Utah State University, Logan, Utah

New Form of Antibiotic

A new form of antibiotic has just become available for cattle and is so unique that it deserves a special introduction along with some guides on use. The new product is called "EXCEED" and it is produced and distributed by the Pharmacia and Upjohn Division of Pfizer Inc.

The active ingredient in EXCEED is ceftiofur, the same as in Naxcel, so that is not different. But, this product is injected subcutaneously (under the skin) on the top (posterior) surface of the ear and it maintains an adequate blood level for seven days. Those are unique, new features for an antibiotic. Additionally, if used properly (follow the label directions) there is no pre-slaughter withdrawal period. This will make it an excellent product to consider for use against bovine respiratory disease (BRD) in calves. EXCEED is not to be used in female dairy animals that are over 20 months of age.

A few precautions that you need to observe. It is an Rx (prescription) drug, to be used "by or on the order of a licensed veterinarian". Be sure to spend a few minutes initially with your veterinarian in getting some instructions on how to administer the product. Then be sure to properly instruct your employees and family who are administering the product, so they can do it right.

There are some arteries near the area of injection on the ear and if EXCEED is given into one of those arteries, it will very likely kill the animal. A special type of needle comes for use with EXCEED to aid in avoiding intra-arterial injection; be sure to use those needles for the injections.

Also, the ears can become soiled with that "stuff" that is always around cattle. If they are soiled, be prepared and take the few seconds to clean the "soiled" off. At some times of year, the hair may even need to be clipped so the arteries can be seen and better avoided.

It would seem reasonable that if a large portion of the drug leaks back out of the needle hole and onto the ground, it won't do a whole lot of good for the animal. If the injection is being given properly, only a couple of small droplets should escape. If it is more than that, re-evaluate the technique and ask for some advice from your veterinarian.

One of the great challenges in using this new product may be to be patient. You have been taught that if the animal is not improving in 24-48 hours, it should be put back through the chute, examined and probably treated with a different antibiotic. That is not the case with EXCEED and the trials conducted have shown that with more time from injection the percent of recovery continues to increase. It will take some experience to learn how to use and evaluate response to this new product. Again, your veterinarian can give you guidance on making some treatment and re-treatment decisions.

Clell V. Bagley, D.V.M., Extension Veterinarian, as reported in Utah Beef Quarterly, September 2004, Utah State University, Logan, Utah

Changes in Milk Composition as Affected by Subclinical Mastitis in Goats

The mechanism of the effects of subclinical mastitis (SM) at the glandular level in dairy goats on milk yield and its composition as expressed in curd yield (Yc) was studied. Twenty-five Israeli goats of various crossbreeds were chosen; one udder half was naturally infected with identified coagulase-negative staphylococci, and the contralateral gland was free of bacteria.

The milk yield of the infected halves was significantly lower than that of the uninfected ones. Somatic cell count and N-acetyl-β-D-glucosaminidase activity were significantly higher in the infected halves. The lactose concentration in the infected glands was significantly lower than that in the uninfected ones, casein concentrations did not differ, and the whey protein and albumin concentrations were significantly higher in the infected glands.

Plasmin activity was significantly higher in the infected glands, whereas plasminogen activity was undetectable. Concentrations of Ca2+ did not differ, whereas Ca2+ activity was significantly lower in the infected glands. The proteose peptone concentration was 1.5 times as great in the infected glands as in the uninfected ones. The Yc was significantly lower in the infected halves, and clotting time was significantly longer.

The mechanisms of the effects of SM on milk yield and Yc in goats and sheep are discussed and compared.

J. DairySci. 2004. 87:1719-1726, G. Leitner, National Mastitis Reference Center, Kimron Veterinary Institute, Bet Dagan, Israel, U. Merin, Department of Food Science, Institute of Technology and Storage of Agricultural Products and, N. Silanikove, Ruminant Physiology, Institute of Animal Science, Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel, as reported in Penn State Veterinary News, Penn State, University Park, PA

Transrectal Ultrasonic Diagnosis of Ovarian Follicular Cysts in Goats and Treatment with GnRH

Cystic ovarian disease is an important cause of reproductive failure. The objective of this study was to evaluate transrectal ultrasonography as a diagnostic tool and gonadotropin-releasing hormone (GnRH) as a therapeutic approach for ovarian follicular cysts in goats. Goats were considered to have a follicular cyst(s) if a non-echoic structure >10 mm in diameter was detected in the absence of corpora lutea (CL) in three ultrasonic examinations performed at 5-day intervals. After diagnosis (Day 0), goats with ovarian follicular cysts (n=5) were treated with a single bolus injection of 10.5 g synthetic GnRH followed by administration of 125 g prostaglandin F2 (PGF2) 10 days later. Five blood samples were collected at 5-day intervals for determination of progesterone and estradiol-17. For detection of LH surge, blood samples were collected every 2 h. Ovulation rate was determined and pregnancy was confirmed by transrectal ultrasonography. The results showed that transrectal ultrasonography is reliable for diagnosis of ovarian follicular cysts and the mean diameter of the follicular cysts was 12.6±0.4 mm. Plasma concentrations of progesterone and estradiol-17 at the time of diagnosis of follicular cysts (Day O) were 0.7±0.2 ng/ml and 12.7±0.9 pg/ml, respectively. The concentration of progesterone increased to 4.0±O.5 ng/ml 10 days after administration of GnRH indicating luteinization of the ovarian follicular cysts concomitant with a decrease in the concentration of estradiol-17 (3.5±0.4 pg/ml). Administration of GnRH to cystic goats resulted in a surge of LH within 2 h of treatment. The interval from PGF2 injection to the preovulatory LH surge was 62.8~1.4 h.

All goats exhibited estrus 55.2±2.3 h after PGF2 injection and four goats out of the five ovulated. The ovulation rate was 1.5±0.3. In conclusion, results of this study suggest that transrectal ultrasonography is a reliable tool for diagnosis of ovarian follicular cysts. In addition, GnRH can be used to effectively treat ovarian follicular cysts in goats with 80% success rate.

Domestic Animal Endocrinology Volume 27, Issue 2, August 2004, Pages 115-124
M. S. Medan, G. Watanabe, and K. Taya, Laboratory of Veterinary Physiology, Tokyo University of Agriculture and Technology, Saiwai-cho, Fuchu, Tokyo, Japan,Department of Theriogenology, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt, K. Sasaki, Hitachi, Ltd., Central Research Laboratory, Tokyo, Japan, as reported in Penn State Veterinary News, Penn State, University Park, PA

Currin New Cattle Specialist

Dr. John Currin was appointed as an Extension Veterinarian on September 1, 2004. Dr. Currin will serve the dairy industry of Virginia as well as the beef industry.

John Currin has been a faculty member at the Virginia-Maryland Regional College of Veterinary Medicine since 1997. He has worked in the Production Management Medicine section and has provided veterinary service to producers in the Blacksburg area as he has instructed senior students at the College of Veterinary Medicine. He has filled the role of teaching practical food animal medicine and surgery by taking students onto farms in Southwest Virginia to prevent and treat disease. In this position he has been very popular with students, honored by them as the outstanding teacher in 2001.

Dr. Currin is a native of Sugar Grove, Virginia and received a bachelor's degree in Biochemistry from Virginia Tech in 1990. He went on to complete the veterinary program where he graduated from Virginia-Maryland Regional College of Veterinary Medicine at Virginia Tech in 1993.

Following graduation from veterinary school Dr. Currin returned to his native Smith County and practiced at the Chilhowie Animal Clinic. He later moved to Abingdon, VA where he was an associate in the Washington County Veterinary Services group.

As an Extension Veterinarian Dr. Currin will serve three audiences: 1) Extension agents located in the counties and cities of Virginia; 2) Veterinarians and; 3) Cattle producers through their interactions with their Extension agents and veterinarians. Through his efforts cattle producers will be supported in producing milk and beef more efficiently and with a minimum of loss from disease. In addition, the food products will be more wholesome and healthful.

Dr. Currin has a special interest in the interaction between nutrition and health. He is also an expert in pharmaceutical and biological products used to prevent and treat animal disease.

Dr. Currin is "looking forward to working with Virginia's dairy and beef producers. My hope is to assist them in providing quality milk and meat for today's market place."

Pleasant New Equine Specialist

Dr. Scott Pleasant is the newly appointed Equine Extension Specialist. Dr. Pleasant is a 1980 graduate of Virginia Tech and a member of the Virginia - Maryland Regional College of Veterinary Medicine's charter class of 1984. Dr. Pleasant spent the first four years of his career in private practice in eastern Virginia. He then went to the University of Illinois where he completed a three year Large Animal Surgery Residency. Following, in 1991, he retuned to Virginia joining the faculty of the Virginia-Maryland Regional College of Veterinary Medicine as an Assistant Professor and Equine Field Service clinician. In 1993, he became a member of the College's Large Animal Surgery section. He was promoted to Associate Professor in 1997, and served as Chief of Large Animal Surgery from 1999 – 2004.

Dr. Pleasant is board certified in veterinary surgery by the American College of Veterinary Surgeons. His research interests include equine lameness and podiatry. He has authored or co - authored over 75 manuscripts, abstracts, and book chapters. Active in continuing education and outreach, he has given more than 100 presentations to professional and lay groups in Virginia as well as other states and internationally.

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Dr. Scott Pleasant — Extension Specialist - Equine
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