

DAIRY VETERINARY NEWSLETTER

January 2014

Utah Veterinary Diagnostic Laboratory has a new Clinical Pathologist

Dr. Johanna Rigas has joined the faculty of the Utah Veterinary Diagnostic Laboratory. We are very glad to have her and her expertise here. She introduces herself below:

Coming from the Pacific Northwest, I am excited to be starting a new clinical pathology service in Logan at the Utah State Veterinary Diagnostic Laboratory. Previously, I worked at Washington State University as a clinical pathologist and small animal practitioner. During my residency at Oregon State University, I practiced small animal medicine, and acted as a certified control judge for equine endurance competitions in both Washington and Oregon. I obtained my DVM at Oregon State University, and was a part of the second class to go through the full four-year program. Prior to my career in veterinary medicine, I worked at Oregon Health Sciences University in Portland, Oregon conducting biochemistry research. During that time, I earned a master's of science degree from Portland State University. It was the acquisition of a diabetic cat that helped me find my way to a career in veterinary medicine.

At this time, I welcome fine needle aspirate samples, fluid samples, and also samples for evaluation of PCV, plasma protein, and fibrinogen. We are also equipped to run urinalysis. By summer 2014, we hope to be accepting samples for CBC and serum biochemistry analysis. Progesterone, cortisol, and therapeutic drug monitoring will also be made available for our veterinary species with veterinary specific reference intervals.

In addition to these basic clinical pathology services, we plan to have available serum testing of betahydroxybutyrate (BHBA) and non-esterified fatty acids (NEFA). These are products of fat metabolism which are increased when a patient has a negative energy balance. Periparturient patients that are not compensating well with a negative energy balance often have decreased milk production, or poor reproductive performance^{1,2}. Evaluation of BHBAs and NEFAs allow practitioners to suggest alternative management practices to the client when these values are abnormally increased.

I enjoy assisting practitioners in obtaining that critical diagnosis, and I look forward providing essential clinical pathology services in Utah! Please visit our website for an updated list of available tests, prices, and current accession forms.

www.usu.edu/uvdl

I can also be reached by calling the UVDL at (435) 797-1895.

1. Ospina, P. D. Nydam, T. Stokol, T. Overton. Association of elevated nonesterified fatty acids and β -hydroxybutyrate concentrations with early lactation reproductive performance and milk production in transition dairy cattle in the northeastern United States. *J. Dairy Sci.* 2010; 93:1596-1603.
2. Ospina, P. D. Nydam, T. Stokol, T. Overton. Association between the proportion of sampled transition cows with increased nonesterified fatty acids and β -hydroxybutyrate and disease incidence, pregnancy rate, and milk production at the herd level. *J. Dairy Sci.* 2010; 93:3595-3601.

Another Look at the Practice of Selective Dry Cow Therapy

I find it amazing that so much of the dairy industry still accepts the concept of routine antibiotic therapy for all or most cows with clinical mastitis, which is financially questionable, but there is somewhat less adoption of blanket dry cow (non-lactating cow) therapy. Dry cow treatment of all cows at time of drying off has been shown consistently to be highly cost effective and a cardinal measure to help reduce the prevalence at the end of lactation, and the new infection rate of, bovine mastitis. Yet numerous publications and surveys continue to show that dry cow treatment of all cows is used on only approximately 80% of dairy farms, and an additional 10% implement selective dry cow treatment, choosing only certain cows to treat with antibiotics at time of drying off.

One challenge of selective dry cow therapy has been the inaccurate methods that have traditionally been used to select which cows to dry treat. Another has been the concern that dry cow treatment prevents some new intramammary infections (IMI) as well as curing most of the existing ones at time of drying off; therefore eliminating any cows from being dry treated means the preventive benefit is lost. Many producers who choose to apply selective dry cow treatment have relied upon recollection of past clinical mastitis episodes, current signs of clinical mastitis, or the most recent SCC based on a DHIA test to decide which cows to administer non-lactating cow antibiotic infusion tubes to. None of these are highly accurate in determining which quarters to treat with antibiotics when cows are dried off.

However, a new study reported in the January 2014 issue of the *J Dairy Sci* by Cameron et al. provides an interesting new look at this question. Citing the continuing issue of “growing concern regarding the impact of antimicrobial use in dairy production systems on the emergence of antimicrobial-resistant bacteria”, the authors studied use of dry cow antibiotic therapy with an internal teat sealant vs. the sealant only, in 16 dairy herds with bulk tank SCC < 250,000/ml. The authors mention the traditional use of methods to select cows or quarters for selective dry cow therapy (DCT), including milk culture, clinical mastitis history, CMT, NAGase enzyme in milk, and monthly SCC such as through DHIA. Previous work by the authors suggests that the Petrifilm-based on-farm culture system is a good test for diagnosis of intramammary infections (IMI) in low-SCC (how that was defined was not stated) cows at drying off, with a sensitivity of 85.2% (accurate detection of true positive IMI) and specificity of 73.2% (avoiding false positive detection of IMI).

Dairy herds and cows studied, and use of Petrifilm just before drying off

16 commercial dairy herds in Canada with monthly BTSCC below 250,000 cells/ml over the previous 12 mo that were enrolled in a DHIA program were studied. At time of drying off, cows with all of the last 3 monthly SCC < 200,000/ml, no clinical mastitis during the previous 3 mo, expected dry period of 1 to 3 mo, and no more than one blind quarter were enrolled.

One day before dryoff, aseptic quarter milk samples were collected and then cows were randomized in blocks of 6 cows, 3 to blanket DCT (BDCT), and 3 to selective DCT (SDCT). A portion of the SDCT cows'

milk samples were combined into a composite 1:10 dilution with sterile water and plated onto AC Petrifilm for culture. On dryoff day, the Petrifilm results were read by the dairy producer. Petrifilm-positive SDCT cows (more description in the paper) were dry treated (in all quarters) with ceftiofur (Spectramast DC) and then Orbeseal internal teat sealant. The Petrifilm-negative SDCT cows were treated only with Orbeseal. The BDCT cows were all dry treated with Spectramast DC and then Orbeseal.

Evaluation of cured IMI and new IMI following calving

The rest of the milk in the pre-dryoff quarter samples was cultured using NMC methods (not Petrifilm), and milk samples were also collected for culture at 3-4 DIM post-calving, 5-18 DIM, and only the first case of clinical mastitis from each quarter (if any) during the first 120 DIM. Clinical mastitis was “defined as visible changes in milk” independent of any other signs such as swollen quarter, etc. An IMI present in any quarter at the time of dryoff was defined as described in detail in the paper; most pathogens detected at ≥ 100 cfu/ml were defined as IMI. A dry period cure was defined as culture-positive at dryoff when the same organism was not detected at 3-4 DIM or at 5-18 DIM. All pathogens found in quarters with > 1 bacteria found at dryoff had to be eliminated in order for the quarter to be considered cured. Missing samples resulted in exclusion from the study.

Results

There is an excellent description in the paper of the 1584 cows dried off, with 855 cows excluded, most (753) because of high SCC or dry period expected to be too short or long. This left 729 cows enrolled, 369 in BDCT group, and 360 in SDCT group. Before or after calving, another 126 cows (64 in BDCT group, 62 in SDCT group) were lost, mainly because of dry periods that turned out to be < 30 d or > 90 d, or immediate antibiotic treatment following calving, presumably because of calving with clinical mastitis.

This left 305 BDCT cows and 298 SDCT cows studied. At dryoff, 12.4% of quarters in BDCT group had IMI, and 15.1% of quarters in SDCT group did, nearly significant at $P = 0.05$. Subsequent standard microbiological culture of the drying off samples showed that Petrifilm detection was not ideal; of 162 SDCT cows “positive on Petrifilm, 67.3% had at least 1 quarter with an IMI at drying off according to standard culture”. (As the authors discussed later, some antibiotic treatment of uninfected quarters is not so bad; the criticism of BDCT is that we do that all the time.)

After calving, prevalence of IMI (bacteria found in either one or both of the 2 post-calving milk samples) was not different between BDCT (15.3%) or SDCT (15.8%) ($P = 0.72$). Pathogens are described completely in the paper, but the most common were coagulase-negative staphylococci (10.1% of BDCT quarters, 9.8% of those in SDCT cows treated with Orbeseal only, 12.5% of those in SDCT cows treated with DCT plus Orbeseal), and non-agalactiae streptococci (4.5% of BDCT, 4.4% of SDCT Orbeseal only, 4.7% of SDCT DCT plus Orbeseal quarters, respectively.) None of the pathogens isolated was significantly different in prevalence among the 3 treatment groups except that 10 of the 14 cases of fungi and yeast were found in the BDCT group.

Quarter cure rates during the dry period (BDCT 84.5%, SDCT 89.0%; $P = 0.33$) and prevalence of new IMI post-calving (most of the fresh cow IMI described in the paragraph above and in detail in the paper were new infections because cure rates were high) were not significantly different between BDCT and SDCT groups.

Clinical mastitis cases during the first 120 DIM numbered 24 in BDCT group, 21 in SDCT group, not significantly different. Statistical analyses including a final logistic regression model were presented. The final model, shown in a table in the paper, includes rear quarter, calving in summer or fall, and a

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non-significant trend toward the quarter being infected at time of drying off as risk factors associated with increased likelihood of IMI in a quarter after calving. However, the treatment groups BDCT, SDCT Orbeseal only, and SDCT Spectramast plus Orbeseal were highly non-significant as far as relationship to IMI post-calving when the other factors in the model were accounted for.

The authors' discussion includes the fact that there was a 21% overall reduction in use of DCT, and that Petrifilm was not ideal at detecting IMI. They are currently studying the use of Petrifilm to culture each individual quarter at time of dryoff. The concept of selectively antibiotic-treating only certain quarters in cows already being treated with antibiotics in other quarters is interesting. Drug residue concerns following calving, and antibiotic treatment of the cow as opposed to using no antibiotics on that cow will not be avoided. The authors are also analyzing cost-effectiveness of the Petrifilm use, presumably to compare the antibiotic (or if the entire cow is not treated with antibiotics at drying off, the milk withholding as well) cost savings vs. all costs associated with use of Petrifilm. This was a good study about a timely question that is not going away, and future results should be of interest as well.

Please let us know your comments and also suggestions for future topics. I can be reached at (435) 760-3731 (Cell), (435) 797-1899 M-Tues, (435) 797-7120 W-F or David.Wilson@usu.edu.



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