DIGITAL DERMATITIS AND RISK OF MILK RESIDUES

Cristian Vergara, DVM, MS
Technical Service Consultant

Lameness continues to be a big concern for dairy producers. For us involved in dairy cows’ reproduction, we know firsthand the effect of this disease on heat expression, but also in severe cases we have seen the whole cow compromised in terms of her body condition, metabolic status and consequently, immunity.

Highly related to cow comfort, in the Midwest, the lameness prevalence has been decreasing in the last 10 years from around 20% in sand bedded herds to 11%. Whereas in herds with mattress stalls, the prevalence went from 30% to 18%, according Dr. Nigel Cook’s recent research (2013).

Despite the reduction in prevalence and all the improvements and new knowledge in regards to cow housing, in the same 10 year period the most common foot lesion been diagnosed in the U.S. has been digital dermatitis (DeFrain et al, 2011), perhaps acting as bottleneck for further improvements in lameness reduction. Worldwide this disease is described as showing prevalence from 10% to 30%, with the U.S. being among the countries with highest prevalence.

As a result, digital dermatitis (DD) will remain a challenge for dairy producers and one of the key areas of focus. As a matter of fact, this has been one of the most active topics in the newest research from scientists linked to dairy lameness and it was a key topic during the last MN Dairy Health Conference in May 2015. There still many things to learn in regards to DD, but recent understanding of the pathogenesis and epidemiologic dynamic have been crucial.

DD is an infectious disease caused by a gram negative strictly anaerobic spirochete, and experimental clinical cases have been induced with Treponema sp. The treponema in his life cycle has a spiral stage that can penetrate, like a corkscrew, the epidermis and dermis of the foot, associated to wet anaerobic environments (manure, among others), creating at the beginning a subclinical (M1) but later clinical active lesion (M2). Once inside the dermis, the treponema will alter the dermal growth pattern creating the characteristic acute ulcerative and proliferative lesion (M2, strawberry like). The lesion will progress to healing (M3) and to a chronic stage (M4). However, at this point, the treponema has reached deep in the dermis and encysted, which causes the disease to reactivate from the chronic stage.

Knowing the cycle is helpful, because in easy terms we are able to understand that once the infection is chronic, the only strategy of control is to avoid the reactivation of the lesion. This can be achieved with periodic 10-12 feet long hoof baths of cooper sulfate (5-10%), hygiene and
corrective trimming twice in lactation, among others. On the other hand, the widely used topical Oxytetracycline (OTC) would be only efficient in early stages of the lesion cycle, before treponema gets deeper in the dermis. The antibiotic has been proved effective before the treponema gets to the encysted stage of new and reactivated lesions.

As a result of the well known OTC therapeutic effect, it is not surprising that the drug is widely used by trimmers, but interestingly without a clear or standardized dose. OTC is not presently labeled for the treatment of DD, there is no specific dosage or milk or meat withholding time after a cow receives treatment. “If it were to require a prescription, that means the dairy’s veterinarian assumes the risk when determining how much tetracycline the hoof trimmer can apply, how it can be applied and the withdrawal period,” stated Dr. Gerard Cramer of the University of Minnesota.

OTC usage remains in a grey area for many farms right now and represents a drug of interest for the FDA and milk processors (currently testing). Therefore, a veterinary prescription and veterinary client patient relationship (VCPR) may soon be required for use.

With those antecedents, the University of Guelph and University of Minnesota have been working on the potential risk of residues coming from topical treatment with OTC. They were testing different dose concentrations of powder OTC with or without wrap (2, 5 and 25 g per foot, as shown in picture). The legal limit for the drug in milk is 300 ppb in the U.S. and 100 ppb in Canada, but some processors may run a test that can detect 10-30 ppb.

Anecdotally, while running the experiments, they were using common fresh milk from a grocery store as standard, but they noticed this milk already had OTC residues, though below the maximum residue limit. They were forced to get organic milk for the lab assays after the impasse.

In their experiment conclusions at the cow level, they were able to trace back residues in the teat (either from contact contamination or absorption, not known) and milk within 8 to 27 hours after treatment, within the legal limits but detectable for processors. This suggests that despite being topical treatment, absorption may occur especially in extensive and highly ulcerative lesions.

As a take home message, Dr. Cramer encouraged the audience to “know” the OTC dose, he suggested that 2-3 g/lesion is adequate to treat active stages of DD. He also encouraged keeping track of the number of cows treated simultaneously at any specific time, because a massive treatment may accumulate and trigger a bulk residue detection, especially in small herds.

For further assistance in hoof bath dimensions and bath dosages, request for a TS consultant to send the University of Wisconsin Dairyland Initiative recommendations

Best regards,

Cristian Vergara Mur.
cristian.vergara@genusplc.com