DAIRY VETERINARY NEWSLETTER

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Is Routinely Medicating Cows' Feet or Bandaging After Treating Lesions Detrimental?

When I was a junior in veterinary school at Ohio State, a new resident arrived and began teaching several aspects of dairy cow medicine to our class. I was initially introduced to him by a classmate and knew him as "Jan". I soon learned his last name and called him Dr. Shearer. He was a good teacher. In the years since then, I imagine that he finds like I do that veterinary students look a little younger to us than they used to. Dr. Jan Shearer has also become a widely known dairy cow veterinarian, teaching at the University of Florida for many years, and now for quite a few years at Iowa State University. He is never much for self-promotion; when I recently saw him at the American Dairy Science Association meeting in July he did not mention a new study he has completed that is garnering quite a bit of attention in the dairy industry press. The study concerns management and treatment of dairy cow claw lesions.

One of the reports on this study was written by G. Wren, the Communications Specialist at AABP, in the September 2015 Bovine Veterinarian. With funding from the AABP Foundation and the Hoof Trimmers Association (HTA), professional hoof trimmers and dairy veterinarians were surveyed regarding lame cattle treatment practices. Shearer noted that this source of funding " - - permitted us to work on a clinically important issue that is nearly impossible to get support for from other granting agencies or companies."

The survey response was impressive. There were 345 respondents: 196 members of AABP, 111 members of HTA, 9 members of both organizations, and 29 providing no affiliation. The final analysis included 307 respondents. It appears that those who responded as either AABP or HTA members were included; at any rate those categories add to 307. Shearer said, "I applaud my colleagues in both organizations for taking the time to [respond to the survey]", noting that many of us do not find the time to complete surveys.

Survey findings regarding treatment of foot lesions in dairy cattle

- topical medications were applied to claw lesions by 59% of veterinarians and 53% of hoof trimmers
- tetracycline and oxytetracycline powder were used by 48% of veterinarians and 81% of hoof trimmers; copper sulfate was next most common for veterinarians, ichthammol ointment for foot trimmers

- a bandage or wrap on claw lesions was routinely used by 53% of veterinarians and 53% of hoof trimmers

Figure 1 from Shearer et al., Veterinary Medicine: Research and Reports, June 2015 "Cow with sole ulcer and excessive granulation tissue at 21 days posttreatment with oxytetracycline soluble powder."

How well do published studies support these practices?

The article notes that refereed publications do not support these practices, although the major conclusion was that refereed studies are lacking regarding many aspects of treatment of dairy cow foot lesions. The results were also presented as part of a refereed literature review paper in the open access journal Veterinary Medicine: Research and Reports, June 2015. The review paper is 20 pages long and cannot be fully covered here. It is a good paper and to read all of it, use the link is below: https://www.dovepress.com/perspectives-on-the-treatment-of-claw-lesions-in-cattle-peer-reviewed-fulltext-article-VMRR#ref26

The paper describes the pathogenesis including at the cellular level for different kinds of hoof lesions and how they heal. By the very nature of cows' claws, deep wounds, sometimes with abscessation, and healing by granulation are nearly universal. Foot wounds in cattle, including when foreign bodies, bruises, or abscesses are treated by opening up the foot, heal by inflammation, granulation, re-epithelialization, and finally by scar formation. Therefore as everyone who has trimmed or treated cow feet has observed, they heal in a gradual way such that the bottom of the foot is open to dirt, water, manure, etc. in the cows' environment.

Topical application of tetracycline or other antibiotics has had little experimental study. Shearer found that foot lesions treated with oxytetracycline or copper sulfate had increased inflammation and necrosis by the next day, and significantly increased "excessive granulation tissue" 21 days after treatment compared with control cows. See Figure 1 above. The authors speculated, "If [topical treatment caused the excessive inflammation and granulation, delaying wound healing], it suggests that topical treatment with tetracycline or oxytetracycline may be contraindicated for claw lesions." Preliminary observations found increased discomfort in cows whose feet were treated with tetracycline and/or oxytetracycline. It is well known that tetracycline compounds tend to be irritating. The paper states, "Reasons for this may be the acidic nature of these compounds that causes additional discomfort when used topically on claw lesions." Copper sulfate and irritation were not mentioned.

Is there antibiotic residue risk with topical antibiotic treatment of foot lesions?

Dr. Shearer's group tested blood and milk samples from 11 cows following foot lesion topical treatment with oxytetracycline (n = 7) or tetracycline (n = 4) soluble powder. The drugs were detected from all cows, with maximum levels after 7 milkings (3X, morning of day 3) and 6 milkings (2X, evening of day 2), respectively. However, the concentrations were always at least 15 times below (~6% of) regulatory actionable levels.

How much does bandaging or wrapping feet help healing?

One study cited in the paper compared three methods of treatment for "sole lesions", which apparently were mostly sole ulcers or bruises that were opened up using hoof knives or other instruments not specified. The results were:

Treatment 1: Wooden block glued to the unaffected claw (39 cows)

Treatment 2: Rubberized block applied to the unaffected claw (42 cows)

Treatment 3: Padded bandage applied to the whole foot (31 cows)

Using a 3 point lameness scoring scale, percentages of cows recovered following the 3 treatments were:

3 days: 49%, 45%, and 19%, respectively

7 days: 66%, 76 %, and 32%, respectively

By 2 weeks posttreatment, there was "no significant difference in recovery rate between the three treatments"; the percentages were not reported in the review, but presumably were in the original paper. It was also stated that the block treated cows walked normally sooner than the bandaged cows. Similar results were observed in a study of 24 cows treated for sole ulcers that also compared blocks to bandaging.

The only research regarding physiological reasons why bandages may delay wound healing in large animals has been done on equines. Therefore the authors point out that extrapolation is questionable. However, oxygen depletion underneath bandages delays wound healing in horses. I never liked bandaging feet after foot trimming and discovering an abscess or some wound that needed opening up, or after working on a foot specifically for an injury. It seemed to me that occasionally the bandage fell off too soon (in order to prevent this, one only has to tape it up extensively but then it may never wear off), or someone had to remove it, which some producers do not get around to very well, or it wore off which meant that sometimes it was half off and trailing like a wick in manure, water, etc. However some producers years ago would expect bandaging.

The paper states, "In a controlled environment [bandaging providing protection to a wound] is probably true, but in most confinement-type dairy environments any benefit from preventing contamination through the use of a bandage is lost within a matter of minutes to hours. Manure slurry, moisture, and the use of a foot bath at least once a day quickly results in a bandage that becomes heavily contaminated with organic matter and footbath solutions."

Foot trimming and treatment equipment used by veterinarians and foot trimmers

A 2014 survey referenced in the review paper found that 61% of U.S. veterinarians reported using restraint ropes for working on cows' feet. This was in contrast to 100% of trimmers that reported using either a manual chute (6%), hydraulic standing-type chute (45%), or a tilt table (49%). The first practice that I worked in did a

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substantial amount of foot trimming on beef and dairy cattle, and I strongly preferred our custom built mobile tilt table, along with my subsequent experiences using a farm's own tilt table in comparison with tying a cows' foot up in a milking parlor. Even that was much better than the dreadful use of a beam hook for tying a cows' foot up in a tiestall or stanchion barn. It seems to me that today, most dairy farms have either their own tilt table or they employ a professional foot trimmer - sometimes a veterinarian - who brings in their own tilt table. This includes my experiences on dairy farms in the upper Midwest and Northeast U.S. until moving to Utah 9 years ago. Farms relying on tying up feet, etc. often had much poorer condition of the cows' feet in their herds than those utilizing a tilt table, whether their own or that of a foot trimmer.

It is clear that the authors support the use of foot blocks applied to the bottom of the normal claw over routine bandaging - assuming that only one claw on the foot had a lesion needing treatment - and question topical antibiotic treatment and bandaging. As they state, further controlled study of hoof care is needed.

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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