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Metritis diagnosis and treatment practices in 45 dairy farms in California

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ABSTRACT

Minimizing the risk of antimicrobial-resistant organisms and antimicrobial residues in dairy and dairy beef products is a topic of nationwide interest. To design an effective outreach program on judicious use of antimicrobials, it is imperative to describe actual practices on dairies. Thus, our objective was to report current practices for metritis treatment in 45 dairies in California. Data were collected using a survey tool that included questions on systemic antimicrobial treatments, intrauterine treatments, supportive treatments, and treatment records. Researchers collected information based on cow-side observations and responses from fresh cow evaluators. Most dairies (n = 33; 70%) performed rectal exams for vaginal discharge (VD) evaluation and based systemic antimicrobial administration on the presence of (a) abnormal VD (fetid and nonfetid), regardless of fever (n = 11; 25%); (b) fever regardless of the odor of abnormal VD (n = 11; 25%); (c) fetid VD and fever (n = 1; 2%); (d) fetid VD (n = 3; 9%); or (e) fetid VD or fever (n = 3; 9%). Some dairies (n = 11; 24%) only detected abnormal VD if visible on tail, vulva, or floor; treatment decisions were based on the presence of abnormal VD (n = 9; 20%) or abnormal VD and fever (n = 2; 4%). On 3 (6%) dairies, VD characteristics were evaluated after rectal palpation, but no systemic treatments were administered. Cows exhibiting 1 nonspecific sign of health disorder (depressed general appearance, lack of appetite, or drop in milk yield) plus fever (n = 13; 29%), or even regardless of fever (n = 6; 13%), were treated with systemic antimicrobials. Overall, 8 (18%) dairies justified systemic antimicrobial treatment based on fever alone. Systemic antimicrobials used were ceftiofur products [ceftiofur hydrochloride (n = 26; 55%), ceftiofur sodium (n = 3; 7%), and ceftiofur crystalline-free acid (n = 8; 18%)], penicillin procaine (n = 8; 18%), and ampicillin (n = 3; 7%). Intrauterine infusions were done with penicillin procaine (n = 1; 2%) or oxytetracycline (n = 12; 27%). The dose and treatment length varied across dairies for i.m. ceftiofur hydrochloride (15 to 45 mL/d for 3 to 5 d), s.c. ceftiofur crystalline-free acid (20 to 25 mL once or twice), i.m. ceftiofur sodium (15 to 30 mL/d for 3 to 5 d), i.m. penicillin procaine (20 to 60 mL/d for 3 to 6 d), and i.m. ampicillin (25 to 35 mL/d for 3 to 6 d). The antimicrobial drug of choice, the dose, and the treatment length for metritis varied across the study dairies. Based on accepted industry best-management practices for metritis, a need exists to educate fresh cow evaluators on signs of health disorder indicative of metritis and on appropriate antimicrobial treatment regimens.
Key words: metritis, antimicrobial treatments, signs of health disorder

INTRODUCTION

Puerperal metritis is an important herd health concern in postpartum dairy cows that can affect 5 to 20% of cows in a herd (LeBlanc, 2014). At present, we lack a validated diagnostic criteria to identify cows with this disease. However, Sheldon et al. (2006) proposed defining puerperal metritis as an inflammation of the uterus that results in fetid red-brown watery vaginal discharge (**VD**), fever (>39.5°C), and signs of systemic illness such as decreased milk yield, dullness, or other signs of toxemia. The economic losses associated with this disease are estimated at approximately $358 per case, including treatment cost, reduction in milk yield, and an increase in culling (Overton and Fetrow, 2008).

Bacteria isolated from cows with uterine disease are very diverse, including *Trueperella pyogenes*, *Escherichia coli*, *Fusobacterium necrophorum*, and *Prevotella* spp. (Sheldon and Dobson, 2004; Williams et al., 2005). Thus, broad-spectrum antimicrobials are warranted as treatment options for metritis. Recommended treatments include systemic penicillin and ampicillin as well as intrauterine oxytetracycline (Gustafsson, 1984; Smith et al., 1998). However, currently in the United States, only ceftiofur hydrochloride (**CHCl**), ceftiofur crystalline-free acid (**CCFA**), and an injectable oxytetracycline are labeled as treatment options for metritis.

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Limited information is available on industry practices for metritis treatment, including signs of disease used as a guideline for treatment options as well as the type, the dosage, and the length of treatments. Current information available on antimicrobial choices for metritis treatment is based on questionnaires addressed to dairy producers (Zwald et al., 2004; Sawant et al., 2005; Pol and Ruegg, 2007). Results from those questionnaires indicated that ceftiofur, tetracycline, ampicillin, penicillin, and sulfonamides were treatment choices for metritis on US dairies. However, no information has been reported on what signs of health disorder were treated and the length and dose of treatment.

Over the years, antimicrobials have been proven to be efficacious for the treatment of infectious diseases. Nonetheless, antimicrobial resistance has become a worldwide health concern. Judicious use of antimicrobials in veterinary medicine has been proposed as a strategy to slow the emergence of antimicrobial-resistant bacteria and reduce unsuccessful treatment of illness caused by those pathogens. To support this strategy, the State of California (2015) has implemented Senate Bill 27, "Livestock: Use of antimicrobial drugs" (SB-27; 2015), effective January 1, 2018. As of that date, all injectable antimicrobial drugs administered to livestock, including those previously available over the counter (i.e., tetracycline, penicillin procaine), require a veterinary prescription.

On large dairy operations, the identification and treatment of sick animals is mostly performed by dairy employees (Espadamala et al., 2016). A better understanding of the attitudes and practices of fresh cow evaluators regarding metritis treatment will help to develop effective measures to reduce the use of antimicrobial drugs in US dairies. Thus, our objective was to provide baseline information of current diagnosis criteria and treatment practices for metritis on 45 dairies in California.

MATERIALS AND METHODS

We acquired an exemption from the University of California, Davis Institutional Review Board before conducting field visits. General herd information and description of how data were collected was previously reported in Espadamala et al. (2016). A convenience sample of 45 dairies from the San Joaquin Valley of California was identified by California county extension advisors, dairy veterinarians, and dairy consultants. Dairy visits were conducted from February to August 2015. Enrolled dairies were numbered from 1 (9,500 cows) to 45 (450 cows) based on herd size (larger to smaller). To collect information, a survey tool was designed with questions on systemic antimicrobial treatments, intrauterine treatments with antimicrobial and nonantimicrobial components, supportive therapy, and treatment records (Table 1). On 38 of the visited dairies, researchers (A. Espadamala and P. Pallarés) were able to observe how fresh cow evaluators treated metritis; however, on 7 dairies fresh cow evaluators did not detect any fresh cow with clinical signs of metritis. During each herd visit, researchers initially focused on observing fresh cow evaluators and on taking written notes of their actions. As the assessment progressed, they formulated questions while fresh cow evaluators carried out their work. At the end of each fresh cow evaluation, both researchers interviewed the fresh cow evaluator using the survey tool to compile all the information necessary to describe metritis treatments. The survey tool was initially β-tested on 5 dairies and modified afterward to gather information on second treatment choices.

To minimize behavioral changes or reactivity during the assessment, fresh cow evaluators were assured that data would be collected for research purposes only. To increase data accuracy, questions were asked twice at different times during the interview process. Furthermore, when possible, responses were corroborated with observations. If disagreements were noted between field observations and the responses obtained from fresh cow evaluators, only observations were included in the final data set. Each day upon returning from the field visit, A. Espadamala and P. Pallarés met for 2 to 3 h to compare their field notes, write a report, and enter data into spreadsheets for analysis (Microsoft Office Excel 2010, Microsoft Corp., Redmond, WA). Reported percentages were rounded to the nearest whole percentage point.

RESULTS AND DISCUSSION

The baseline information provided in our study about current diagnostic criteria and treatment practices for metritis should be carefully interpreted, as it includes a limited number of dairies (n = 45) from a single region (central valley of California); therefore, our results might not necessarily represent industry practices elsewhere. On the study dairies, nonsupervisor employees (n = 29), supervisor employees (n = 13), or dairy owners (n = 3) were in charge of identifying and treating cows with metritis. Based on the testimony from fresh cow evaluators, on most dairies veterinarians had little direct involvement on fresh cow evaluations (n = 33) or were limited to endometritis screening at 3 to 4 wk postpartum (n = 11). However, on dairy 30, the veterinarian performed fresh cow evaluations once a week; he advised on treatment protocols and performed nonantimicrobial intrauterine flushings.