**IMPACT OF ALTERNATIVE ENDOMETRITIS THERAPY ON FERTILITY OF LACTATING DAIRY COWS**

**NON-TECHNICAL SUMMARY:** Post-partum endometritis is an infection of the uterus in high-producing dairy cows that negatively impacts reproductive performance, thus diminishing profitability and sustainability. Antimicrobial agents, most often ceftiofur, are frequently used to treat this uterine disease. The use of a hypertonic sugar solution (50% dextrose in water) that targets the uterine environment may provide an alternative and/or adjunct to antimicrobial therapy, which only targets the bacteria involved in these infections. This project is significant for both conventional and organic dairy producers who need cost-effective strategies for the treatment of endometritis.

**OBJECTIVES:** Endometritis is a common uterine disorder in high-producing dairy cows that negatively impacts reproductive performance, thus diminishing profitability and sustainability. The overall goal of this study is to develop and identify cost-effective treatments and control strategies for lactating dairy cattle diagnosed with endometritis. The objective of this study is to determine whether an intrauterine flush (using 200 mL of a hypertonic solution; 50% dextrose in water) performed on lactating dairy cows diagnosed with endometritis will result in a comparable treatment response to conventional therapy (parenteral ceftiofur). The following are expected from this study: A) farm visits to commercial dairy operations will be conducted to assess the prevalence of endometritis in lactating dairy cows. B) Educational materials developed from this research project will be distributed to dairy producers through their veterinary practitioners. In addition, these materials will be available for our veterinary students to enhance their learning opportunities.

**APPROACH:** Lactating dairy cows from a commercial dairy farm will be screened for clinical endometritis at 26 plus or minus 3 days in milk. Those diagnosed with endometritis will be randomly assigned to 1 of the 3 treatment groups: 1) ceftiofur (n = 80; 6.6 mg/kg of body weight, single dose), 2) uterine flush with 50% dextrose (n = 80; two consecutive flushes in a single day), or 3) no treatment (n = 80). Prior to treatments, uterine swab samples will be collected for bacteriology. Uterine samples will be cultured onto blood and MacConkey agars and incubated at 35 degrees Celsius in 5% CO2 and ambient air respectively for up to 72 hours for bacteria isolation, identification and antimicrobial susceptibility testing. The following clinical parameters will be recorded: body condition score (BCS), prior history of metritis (from day 1 to 14 postpartum), tone of uterus, presence of ovarian structures (by ultrasonography), body temperature, and blood progesterone level to determine cyclicity. For cows presenting body temperature greater than or equal to 39.5 degrees Celsius after primary treatments, an escape therapy will be available (ceftiofur; 6.6 mg/kg of body weight single dose plus 2.2 mg/kg of body weight of flunixin meglumine). Fourteen days post-therapy, cows will be re-examined and uterine samples (using cytobrush) will be collected for cytology (smears on glass slides). All cows will be subjected to the same reproductive program postpartum and outcomes will be evaluated using logistic regression to determine the impact of the treatments and the association of clinical
variables on the fertility of these cattle. Results from this study will be disseminated to three targeted audiences: 1) dairy veterinary practitioners, 2) dairy producers and 3) veterinary students.

PROGRESS: 2009/08 TO 2010/12
OUTPUTS: The objectives of this study were to assess the responses to treatments (clinical cure and cow survival 14 d posttherapy) of cows with clinical endometritis (CE) that received intrauterine infusion of a hypertonic solution of 50% dextrose (DEX) or subcutaneous ceftiofur crystalline free acid (CCFA) and subsequent pregnancy per artificial insemination (P/AI) in cows with CE compared with cows without CE. Cows (n = 760) from 2 dairy herds were screened for CE using vaginoscopy and measurement of cervix diameters [exam 1; 26 ± 3 d in milk (DIM)]. Cows with vaginal discharge scores of 2 or 3 (scale 0-3) were stratified by parity and randomly allocated into 1 of 3 treatment groups: (1) intrauterine infusion (similar to 200 mL) of 50% DEX solution (n = 79); (2) 6.6 mg/kg single-dose of subcutaneous administration of CCFA (n = 75); or (3) untreated control animals (CON, n = 83). Fourteen days posttherapy (at 40 ± 3 DIM), cows with CE were re-examined (exam 2; 40 ± 3 DIM) to assess the response to treatments. All cows were presynchronized with 2 injections of PGF(2 alpha) given 14 d apart (starting at 26 ± 3 DIM) followed by Ovsynch (OV; GnRH-7 d-PGF-56 h-GnRH 16 h-timed-AI) 12 to 14 d later. Cows displaying signs of standing estrus any time during the protocol were inseminated, whereas the remaining cows were subjected to timed AI 16 h after the second GnRH of OV. Pregnancy diagnosis was performed via transrectal ultrasonography at 39 ± 3 d post-AI followed by pregnancy reconfirmation 30 d after the first pregnancy diagnosis.

PARTICIPANTS: Dr. Schuenemann is an assistant professor and extension veterinarian in the Department of Veterinary Preventive Medicine. TARGET AUDIENCES: Not relevant to this project. PROJECT MODIFICATIONS: Not relevant to this project.

IMPACT: 2009/08 TO 2010/12
Uterine swabs revealed that Arcanobacterium pyogenes and Escherichia coli were the most predominant bacteria isolated at the time of treatments. Mortality within 14 d posttherapy was not different among treatment groups. Cows with CE had greater cervical diameter at exam 1 and decreased P/AI compared with cows without CE. Treatment with CCFA or DEX increased the proportion of cows with clear vaginal discharge (score 0; clinical cure) 14 d posttherapy compared with CON cows. Pregnancy per AT from DEX (29.8 ± 4%) cows tended to differ from that of CON (21.1 ± 4%) or CCFA cows (19.7 ± 4%), but it resulted in similar P/AI as those cows without CE (39.1 ± 2%). The use of intrauterine DEX alone or as an adjunct of antibiotic therapy for the treatment of CE needs further investigation. The development of effective alternative therapies to antibodies for the treatment of uterine diseases such as CE and puerperal metritis is needed due to the emergence of multidrug-resistant bacteria associated with uterine infections in lactating dairy cows. This randomized clinical study showed that the administration of DEX or CCFA in conjunction with the prostaglandin improved clinical cure of cows with CE. The P/AI was lower among cows with CE than cows without CE. Although P/AI from DEX cows tended to differ from that of CON or CCFA cows, it resulted in similar P/AI as those cows without CE. The use of intrauterine infusion of DEX for the treatment of CE in lactating dairy cows provided useful information for the development of new hypotheses for future studies.

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http://cris.nifa.usda.gov/cgi-bin/starfinder/16388/crisassist.txt