

Efficacy of Intrauterine Dextrose Therapy on Fertility of Lactating Dairy Cows Diagnosed with Clinical Endometritis

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Introduction

Clinical endometritis (CE) is a common uterine disorder in high producing dairy cows that negatively impacts reproductive performance, thus diminishing profitability and sustainability. Reducing pathogenic bacteria load and uterine inflammation while enhancing immune defense are the general principle for endometritis therapy. An *in vitro* study has shown mannose to inhibit the adhesion of bacteria to the epithelial cells of the equine endometrium (King *et al*, *AJVR* 61:446, 2000). The use of PGF₂α (PG) is generally recommended, but the lack of concrete experimental evidences makes it difficult to promote an effective therapy approach for CE. Therefore, the use of non-pharmaceutical antimicrobial therapy (50% dextrose in water) that targets the uterine environment rather than the bacterial pathogen itself may be a viable and cost-effective strategy for conventional and organic dairy cows. The objective of this study was to determine whether an intrauterine flushing with a hypertonic solution (50% dextrose in water) of lactating dairy cows diagnosed with CE result in comparable fertility to conventional therapy (parental ceftiofur) as opposed to non-treated CE animals (control group) and healthy cows (without CE).

Materials and Methods

Lactating dairy cows housed in free-stall barns in one commercial dairy were subjected to the same reproductive program (Presynch followed by Ovsynch). Briefly, all cows received the first PG (25 mg; Lutalyse, Pfizer Animal Health, NY) on day 26±3 and second PG on day 40±3 after calving (Presynch). Twelve days later, all cows were enrolled in the Ovsynch program (GnRH-7d-PG-56h-GnRH-16h-TAI). Cows showing signs of standing heat any time during the protocol were AI and the remaining animals were subjected to Timed-AI 16 h after second GnRH (100 ug; Cystorelin, Merial, Duluth, GA).

Dairy cows (n = 419) were screened using vaginoscopy for presence of CE at 26±3 days-in-milk (DIM) and scored using the 0-3 scale (0 = normal uterine discharge, 1 = flakes of purulent exudate in the uterine discharge, 2 = >50% of the uterine discharge is made up of purulent

exudate, 3 = hemorrhagic uterine discharge mixed with purulent exudate (Adapted from Williams *et al*, 2005; Sheldon *et al*, 2006). Cows scored as 2 or 3 were blocked by parity and randomly allocated into 1 of 3 treatment groups: 1) control (CON; no treatment; n = 43), 2) 3.0 mg/lb (6.6 mg/kg) ceftiofur crystalline free acid SQ (CEF; n = 41), and 3) intrauterine flush with a 50% dextrose solution (DEX; n = 39).

Fourteen days post-therapy (40±3 DIM), cows were subjected to a gynecological exam (vagoscopy) to determine the incidence of CE. Pregnancy diagnosis via ultrasonography was performed at 39±3 days post-breeding. The effectiveness of the treatments and their association with DIM to first service (DIMFS) and pregnancy per AI (P/AI) were assessed using MIXED (DIMFS) and GLIMMIX (P/AI) procedures of SAS (SAS Institute Inc., Cary, NC, USA). Data from healthy cows (HC; without CE; n = 296), were included in the statistical analysis.

Results

The prevalence of CE at 26±3 DIM in lactating dairy cows was 29.3% (123/419). The DIMFS for cows diagnosed with CE in CON (62.9±6.9), DEX (61.06±7.2 d), and CEF (61.8±7.1 d) were not different from DIMFS of HC (without CE; 62.4±3 d). P/AI in DEX (34.3±7.7%) was not different from that in HC (44.7±3%), CON (27.3±7%), and CEF (20.1±6.4%) groups; however, P/AI in HC was significantly higher than in CON and CEF ($P < 0.05$).

Significance

Although P/AI in lactating dairy cows with CE was not significantly different between the treatment groups, our preliminary results suggest that cows treated with DEX had higher P/AI than cows treated with antibiotics or those left untreated. Furthermore, P/AI in cows treated with DEX was not different from that in cows without CE. This project is significant for both conventional and organic dairy producers who need cost-effective strategies for the treatment of CE. Further investigation is needed to confirm these findings.