Risk Factors, Impacts, and Therapy for Endometritis in Dairy Cows

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Introduction

Endometritis is diagnosed cytologically, as endometrial inflammation, or clinically as purulent or mucopurulent vaginal discharge. Cytological endometritis (CYTO) is based on an increased proportion of polymorphonuclear cells in endometrial cytology. Purulent vaginal discharge (PVD) has only moderate diagnostic agreement with CYTO. The prevalence of CYTO and PVD have been reported to be as high as 53 and 40%, respectively. Reported risk factors for PVD include dystocia, retained placenta (RP), and metritis. Little information is available on the risk factors for CYTO. Cytological endometritis and PVD were shown independently to have detrimental effects on subsequent reproductive performance. Conflicting results have been reported regarding the effect of prostaglandin F2alpha (PGF) on uterine health and reproduction. The hypotheses were that CYTO and PVD would have different risk factors because they represent different reproductive diseases, and that treatment with PGF would mitigate the impact of CYTO and PVD. The objectives of this study were to investigate risk factors and impacts of CYTO and PVD in postpartum dairy cows, and to determine the efficacy of PGF for treating CYTO and PVD and for improving reproductive performance.

Materials and Methods

A total of 2178 Holstein cows were enrolled in a randomized clinical trial. Cows were randomly assigned to receive 25 mg of dinoprost intramuscularly (PGF; Lutalyse, Pfizer Animal Health, Kirkland, Quebec) twice, at 35 (+-3) and 49 (+-3) days-in-milk (DIM), or to be untreated controls. Cows were examined for CYTO (cytobrush technique) and PVD (Metricheck technique) at 35 (+-3; EXAM1) and 56 (+-3; EXAM2) DIM. Blood samples were collected weekly from cows in weeks 1, 2, and 3 for measurement of non-esterified fatty acids (NEFA), beta-hydroxybutyric acid (BHBA), and haptoglobin (HAPTO), and in weeks 3, 5, 7, and 9 postpartum for progesterone (PROG). Periparturient disease data were collected until 63 DIM. Body condition was scored at 0 and 63 DIM. Milk production, reproduction, and culling data were collected until at least 300 DIM. Injections of PGF were not used for synchronization. Cows were bred on detected estrus after 63 DIM, or using Ovsynch alone >75 DIM. Statistical analyses were conducted in SAS, using CYTO, PVD, milk production, reproductive performance, and culling as outcomes. All statistical models accounted for the effect of herd clustering.

Results

The prevalence of CYTO and PVD at 35 DIM were 20 and 16%, respectively. Risk factors for CYTO at 35 DIM included thin body condition score at parturition (BCS; ≤2.75; OR=2.0; P=0.03), hyperketonemia (≥1100 μmol/L; OR=1.4; P=0.03), and increased haptoglobin (≥0.8 g/L; OR=1.6; P<0.01) in the first week postpartum. Risk factors for PVD at 35 DIM included twinning (OR=2.2; P=0.03), dystocia (OR=2.1; P<0.01), metritis (OR=2.3; P<0.01), and increased haptoglobin (≥0.8 g/L; OR=2.0; P<0.01) in the first week postpartum. Cytological endometritis and PVD at 35 DIM increased median time to pregnancy by 24 and 36 days (P<0.05), respectively, compared with healthy cows. These detrimental impacts on reproduction were additive when present together. Both CYTO and PVD at 35 DIM had no impact on milk production and culling up to 300 DIM. There was no effect of PGF for treating CYTO (prevalence EXAM2: No PGF=17%, PGF=15%; P=0.33) or PVD (prevalence EXAM2: No PGF=18%, PGF=15%; P=0.21), whether or not the cows had PROG >1 ng/mL (active CL) at the time of administration of PGF (35 or 49 DIM). There was no effect of PGF on first service pregnancy risk or on median time to pregnancy.

Significance

These data demonstrate that CYTO and PVD have different risk factors and additive detrimental impacts on subsequent reproductive performance, which suggest that they may represent different conditions. Administration of PGF was not effective for treating CYTO or PVD. Approaches to treatment of CYTO and PVD require reassessment.