

Public Abstract

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Title:Effect of Subclinical Endometritis on ovarian and uterine response to a timed AI protocol in dairy cows

After parturition the uterus of the dairy cow is under inflammatory conditions. Tissue damage and bacterial infection are leading the immunological response. Most of the cows are able to clear infection, however, around 20% of cows remain with infection and a prolonged inflammatory process after calving. Uterine disease with clinical or subclinical signs [subclinical endometritis (SCE)] can develop. Uterine disease impairs fertility by decreasing pregnancy rate and increasing embryonic loss.

The short or long term effects of uterine disease on the ovary and uterus are still unclear. This study evaluated the effects of SCE diagnosed by cytobrush on ovarian and uterine response to a timed AI protocol in dairy cows.

The study was done at Foremost Dairy Farm, University of Missouri. A total of 107 lactating Holstein cows were used. Cows were inseminated between 68 to 77 DIM within the Presynch-Ovsynch 56 timed AI protocol. Two cytobrush exams were performed to assess polymorphonuclear neutrophils (PMN) from the uterine luminal epithelium as an indicator of SCE. One cytobrush was done between 30 to 39 DIM (CB1) and the second cytobrush between 64 to 73 DIM (CB2). A cut point of equal or greater 6 % of PMN and equal or greater 4 % of PMN was used for CB1 and CB2 respectively. Cows above those cut points were considered positive for SCE. Ultrasound was used to assess ovarian structures at specific times during the timed AI protocol. Ovarian structures (corpora lutea and follicles) were evaluated to test the effect of SCE on the size of corpora lutea, size of follicles and for the number of follicles categorized in classes. Blood samples were taken to evaluate plasma progesterone and IGF1 concentrations before and after timed AI. Uterine response to the Interferon tau was measured as an indicator of early embryonic development. The expression of ISG15 from peripheral blood leukocytes was evaluated for cows with different SCE status at days 18, 20 and 22 after timed AI. Pregnancy detection by ISG15 expression at days 18, 20 and 22 after timed AI, pregnancy associated glycoproteins test (PAG) at day 25 and ultrasound evaluations at days 32 and 45 after timed AI were done to evaluate embryonic survivability in cows with and without SCE.

Thirty-one cows were diagnosed with SCE based on CB1 and 11 cows based on CB2. No major alterations were found in cows diagnosed with SCE at CB1 on the diameter of corpora lutea, number of follicles or diameter of the second largest follicle ($P > 0.05$). The largest follicle was affected by SCE. Cows with SCE had smaller diameter of the largest follicle before timed AI ($P = 0.04$). The percentage of cows ovulating after timed AI did not differ for SCE status ($P > 0.05$). Plasma progesterone concentrations were not affected by SCE ($P > 0.05$) before or after timed AI. The plasma IGF1 concentrations were greater in cows with SCE after timed AI ($P < 0.05$). The uterine response measured by ISG15 expression on peripheral blood leukocytes was not affected by SCE ($P > 0.05$) within the timed AI protocol. Pregnancy rate from day 18 to 45 after timed AI was similar in uterine healthy cows and in cows with SCE at CB1 ($P > 0.05$), however numerical differences showed that cows with SCE had lesser embryonic survivability from day 25 to 45 after timed AI than uterine healthy cows. For the evaluation of embryonic survivability based on CB2, 100 % of embryonic losses were found from day 25 to 45 after timed AI.

In conclusion, most cows were not inseminated under inflammatory conditions because there was a high self-cure rate of SCE. This study was unable to find major differences in ovarian structures in cows with or without SCE. Probably the timed AI protocol is able to overcome the effects of SCE. If SCE is affecting the secretion of interferon tau or the uterine response of ISG15 is earlier or later than the evaluated period. This study did not find significant associations between pregnancy and SCE based on CB1, however, the embryonic survivability is affected when cows are diagnosed with SCE 4 days before timed AI.