

# Evaluation of Rectal Temperature and Calving Related Factors on the Incidence of Metritis in Postpartum Dairy Cows

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## Introduction

Metritis is a serious condition in dairy cows since it affects production, fertility and can be life-threatening. A better understanding of calving-related factors that predispose cows to metritis would aid in prevention, diagnosis and treatment of this condition. The objectives of this study were to: 1) evaluate the association of calving status, parity and season on the incidence of postpartum metritis in lactating dairy cows; 2) examine the role of rectal temperature as a predictor of this condition; and 3) document the effect of metritis on subsequent reproductive performance.

## Materials and Methods

This prospective longitudinal study was conducted in a 1000-cow dairy farm in north Florida between August 1, 2002 and April 15, 2003. The farm employed a post-partum health monitoring program, and calving status was determined by whether or not the cow experienced dystocia, retained fetal membranes (RFM) and twins. Cows with a normal calving status (Nc) were those without any calving-related problems. Cows with an abnormal calving status (Ac) were those with dystocia, RFM with or without dystocia or twins at calving.

Daily rectal temperature (RT) of all cows was taken between 0700 and 0900 h from days 3 to 13 post-partum, and health examinations were performed by the on-farm veterinarian. Cows that appeared sick (depressed, eyes tented) or had a RT of 103.0° F (39.4° C) or higher were examined for metritis. The criterion for diagnosis of metritis was the presence of a watery, brown-colored, fetid discharge from the vulva (noted after rectal palpation of the uterus), with or without a RT of 103.0° F or higher. Cows diagnosed with metritis were treated with systemic antibiotics, anti-inflammatory agents, calcium and energy supplements. The thermal heat index (THI =  $td - [.55 - .55RH] [td - 58]$ ) was calculated using the daily ambient temperature (td) and percent relative humidity (RH) recorded at the closest weather station. Two seasons were defined based on THI: a cool

season THI < 76.2 from October to April, and a warm season THI  $\geq$  76.2 from May to September.

Data for the incidence of metritis by calving status, parity and season for the 13 day post-partum period were analyzed by survival analysis (Proc Life test and Cox regression). Two- and three-way interactions between the main effects (calving status, season, parity) for the incidence of metritis were tested by the General Linear Model procedure of SAS. Data for daily rectal temperatures were analyzed from days 3 to 13 post-partum, and for the five days prior to diagnosis of metritis. Rectal temperatures were analyzed with the Mixed Model Procedure of SAS to evaluate the effect of calving status with or without metritis, parity and day as main effects, as well as two- and three-way interactions. Repeated measurements of RT also were analyzed by testing homogeneity of regression curves for day trends. A single polynomial regression for day was fitted for RT, and the differences from fitting individual regressions for the effect of calving status, metritis, parity and their interactions were tested. Pregnancy was determined per rectum palpation of the uterus between 40 and 47 days after insemination. Accumulated pregnancy rate up to 150 days post-partum was analyzed by Logistic Regression.

## Results

Of the 450 calvings evaluated during the study period, 327 (73%) were normal and 123 (27%) were abnormal. Cows with a normal calving status had a lower incidence of metritis compared to cows with an abnormal calving status (43/327 [13%] vs. 51/123 [41%], respectively;  $P < 0.01$ ). For primiparous cows the incidence ( $\pm$  SE) of metritis was higher in the cool season regardless of calving status (Nc-cool:  $28 \pm 4\%$  > Nc-warm:  $0 \pm 7\%$ ; Ac-cool:  $63 \pm 5\%$  > Ac-warm:  $30 \pm 12\%$ ). In contrast, no difference in the incidence ( $\pm$  SE) of metritis was detected in multiparous cows for either cool or warm seasons (Nc-cool:  $6 \pm 3\%$  and Nc-warm:  $13 \pm 6\%$ ; Ac-cool:  $27 \pm 5\%$  and Ac-warm:  $28 \pm 7\%$ ; calving status x season x parity; [ $P < 0.01$ ]). In both primiparous and

multiparous cows, rectal temperatures (during days 3 to 13 post-partum and for five days prior to diagnosis of metritis) were higher in cows that developed metritis regardless of calving status. Rectal temperature measurements delineated three categories of cows: 1) without metritis and no change in RT (mean = 101.5° F [38.2° C]; n = 356); 2) metritis, cows that had an elevated RT (mean = 102.0° F [38.8° C]; n = 55) without an increase in RT during the last 48 hours prior to diagnosis; and 3) septic metritis, cows that had an elevated RT (mean = 102.2° F [38.6° C]; n = 38) with an increased RT during the last 48 hours to a mean of 103.6° F (39.3° C) at diagnosis. All cows experiencing metritis and septic metritis were treated therapeutically as described above. There were no detected differences in accumulated pregnancy rate by 150 days post-partum (mean = 50%) among normal cows and cows experiencing metritis and treated for the condition. As expected, a season effect was detected (cool season [40 %] > than warm season [28 %; P < 0.02]).

## Significance

Occurrence of metritis was higher in cows experiencing an abnormal calving. Primiparous cows had a greater incidence of metritis in the cool season for both normal and abnormal calvings. In contrast, multiparous cows showed no seasonality in the occurrence of metritis. Evaluation of daily RT distinguished septic from non-septic metritis prior to diagnosis; sequential increases in RT on two consecutive days prior to the actual diagnosis can serve as a predictor of septic metritis and warrants an earlier treatment. Likewise, cows experiencing metritis had a mean increase in basal RT of 0.5° F (0.28° C). Early therapeutic treatment of all cows diagnosed with metritis or septic metritis resulted in pregnancy rates comparable to normal or abnormal calving status cows, not experiencing metritis.

# Pregnancy Diagnosis in Dairy Cows by Palpation or Ultrasound: a Survey of US Veterinarians

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## Introduction

Our objective was to study palpation and ultrasound pregnancy-diagnostic practices used for dairy cows by US veterinarians.

## Materials and Methods

A questionnaire was mailed to 1171 AABP members in the fall 2003 followed by a reminder postcard two weeks later.

## Results

Five hundred eighty-eight (50%) veterinarians responded. The following results are based on answers from 522 individuals who were currently in dairy practice and regularly checked dairy cows for pregnancy.

Four hundred one (77%) veterinarians diagnosed pregnancy in dairy cows by rectal palpation only, while 116 (22%) also used ultrasound. Five (1%) used only ultrasound for pregnancy diagnosis.

Median lower cut-off for days since breeding used to check cows was 34 days for palpation and 27 days for ultrasound. When asked the earliest gestation length they were confident diagnosing cows as pregnant, the median response was 32 days for palpation and 27 days for ultrasound. Median for earliest days since breeding they were comfortable administering prostaglandin to cows diagnosed open (non-pregnant) was 35 days for palpation and 28 days for ultrasound.

Not including call fees, median charge per cow was \$3 (USD) for palpation and \$4.75 for ultrasound. For veterinarians charging by the hour, median cost per cow was estimated based on number of cows checked per hour and ranged from \$1.50 to \$3 for palpation and \$2.40 to \$4.50 for ultrasound.

## Significance

The study provides an overview of pregnancy diagnostic procedures for US dairy cows and can be used as the basis for future economic studies.