

**AGRICULTURAL RESEARCH FOUNDATION
FINAL REPORT
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TITLE: Modification of the single Lutalyse injection protocol to reduce uterine infections and antibiotic use and improve reproductive efficiency in postpartum cows in an Oregon dairy

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COOPERATORS: None

SUMMARY: Uterine infections in postpartum dairy cows are a costly challenge for dairy producers because of the expense involved in treatment and the accompanying poor reproduction. In 2012, our laboratory reported improved uterine health and reproductive performance in cows receiving two injections of prostaglandin $F_{2\alpha}$ (Lutalyse) on either d 0 and 14 or 14 and 28 postpartum. In an effort to reduce the number of injections and animal handling, we conducted a follow-up study to evaluate uterine health and reproduction in Holstein cows at a commercial dairy receiving a single injection of Lutalyse delivered on d 14 postpartum. While on site at this dairy we observed a high incidence of uterine infections in postpartum cows between d 0-14. The risk of missing an important window of time for administration of Lutalyse prompted the development of this proposal where we decided to administer a single injection of Lutalyse on d 3 postpartum. Cows were injected with either Lutalyse or saline as the control and uterine swabs were performed to evaluate changes in bacterial and white blood cell (WBC) populations. After several cows were injected and uterine swabbing was conducted we observed tremendous variability in the bacterial populations that grew up on the plates, an observation not encountered in any of our previous experiments. Given what we found we predicted it would be impossible to ascertain statistically any effect of the Lutalyse injection on the uterine health parameters. We then opted to push the injection back to d 7 postpartum as we felt the recent trauma of parturition may be contributing to the variability seen on d 3. Although we are still working on this project to attain our total animal number of 200 cows, the data so far demonstrate improved reproduction as evidenced by decreases in both services per conception and days open in cows receiving Lutalyse compared to saline 7 d after parturition.

OBJECTIVES: The original objective of this experiment was to determine the effects of a single injection of Lutalyse delivered on d 3 postpartum on uterine health and reproductive performance in dairy cows. Because of variability encountered in the data obtained from the uterine swabbing we revised our objective to evaluate the effects of a single injection of Lutalyse administered on d 7 postpartum.

PROCEDURES: Cows in this study were from a dairy containing 3000 Holstein cows with 1500 cows in the milking string. Cows were supplied with water using a free-choice system. The ration fed included corn silage, grass silage, alfalfa, corn, cotton seed and soy bean meal. Postpartum cows were given a 55-d voluntary waiting period before estrous synchronization and artificial insemination. Pregnancy was detected by a veterinarian through rectal palpation and ultrasound at 40 d of gestation. Ovarian structures were also palpated in the event that pregnancy did not occur in order to identify whether inability to conceive was the result of failure of resumption of the estrous cycle.

A total of 94 cows at 7-d postpartum were given an intramuscular injection of either Lutalyse or saline. The first cow was chosen at random for injection and subsequent cows were injected with alternating treatments to ensure randomization. Uterine bacteria and WBC samples were obtained at 0 and 24 h after injection through rectal palpation and swabbing the inside of the uterine body. For the 0-h sample recovery, the swab was conducted just before the injection was administered.

For bacterial assessments, a guarded uterine swab was passed into the uterus and the swab was gently rolled against the inner wall. The swab was withdrawn from the reproductive tract and placed in a tube containing 10 ml of Dulbecco's phosphate buffered saline (DPBS). Samples were brought to the lab and a 1/10 dilution was made from the sample collected in the field using DPBS as the diluting fluid. One hundred microliters of each dilution (0 and 1/10) were spread onto each side of a Blood/MacConkey agar bacteriological culture biplate. The biplates were covered and left facing up for 1 h at room temperature and placed face down in an incubator at 37°C for 24 h. The numbers of colonies growing on either side of the biplates were counted and recorded.

To provide an assessment of the uterine WBC population, a guarded CytoBrush was passed into the uterus immediately following the uterine bacterial swabbing at Times 0 and 24. The CytoBrush was gently rolled against the inner wall of the uterus, retracted from the reproductive tract and rolled onto a microscope slide to create a cell smear. The smear was stained using the Wright staining procedure for assessing WBC populations and neutrophils and lymphocytes were specifically counted. Cows received their injections (saline or Lutalyse) following completion of the uterine swabbing and CytoBrush procedures at Time 0.

Services per conception and days open were recovered from breeding records maintained for the cows in the experiment.

Differences in numbers of bacteria and neutrophils between the 0 and 24-h swabbing, services per conception and days open were analyzed using one-way ANOVA with treatment (Lutalyse or saline) as the main effect. All analyses were conducted using the NCSS statistical software program (Number Cruncher Statistical System; 2000, Jerry Hintze, Kaysville, UT).

SIGNIFICANT ACCOMPLISHMENTS: Both services per conception and number of days open were lower for cows injected with Lutalyse compared to cows injected with saline.

BENEFITS & IMPACT: These data suggest Lutalyse administered to dairy cows 7-d postpartum reduces services per conception and number of days open. Dairy producers implementing this protocol should experience reduced costs associated with breeding and using Lutalyse would reduce the overall need for antibiotics.

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