ence of pus on vaginal examination at day 28), 18% developed fever, and 51 and 31% developed subclinical endometritis at days 28 and 56, respectively. Cows with RP had a significantly (P<0.05) higher prevalence of *Escherichia coli* (week 1) and *Prevotella* sp (weeks 2, 3 and 4). Cows with metritis had a significantly (P<0.05) higher prevalence of *E. coli* (week 1), *Arcanobacterium pyogenes* (week 2), and *Prevotella* sp (weeks 1, 3 and 4). Cows with clinical endometritis had a significantly (P<0.05) higher prevalence of *E. coli* (weeks 1, 2 and 3) and *Fusobacterium necrophorum* (week 2). Cows with fever had a significantly (P<0.05) higher prevalence of *E. coli* (week 1), *A. pyogenes* (week 2) and *F. necrophorum* (week 2). Cows with subclinical endometritis (day 28) had a significantly (P<0.01) higher prevalence of *E. coli* (weeks 1, 2 and 3) and *A. pyogenes* (weeks 2 and 3). Cows with subclinical endometritis (day 56) had a significantly (P<0.05) higher prevalence of *E. coli* (week 1) and *Prevotella* sp (weeks 1 and 3). Cows with large calves (highest quartile birth weight, > 104 lb; 47.3 kg) had a significantly (P<0.05) higher prevalence of *E. coli* (week1) and *A. pyogenes* (weeks 2 and 3) compared to cows with small calves (lowest quartile birth weight, < 90 lb; 41 kg). Cows with RP, fever and metritis had significantly (P< 0.05) lower first service conception rates, compared to cows without these disorders. Cows with subclinical endometritis at day 56 had significantly (P < 0.05) lower first service conception rates and higher days open, compared to cows without subclinical endometritis at day 56.

Significance

These data suggest that uterine health disorders, large calves and fever in dairy cows are associated with a higher prevalence of major uterine bacterial pathogens during the first four weeks postpartum. *E. coli* and *A. pyogenes* during the early postpartum period were especially common in cows with uterine health disorders, large calves and fever. Furthermore, reproductive performance in cows with some uterine health disorders and fever was impaired. These data may help guide practitioners in providing appropriate therapies to reduce the impact of uterine pathogens on uterine health in postpartum dairy cows.

Effect of Different Prostaglandin Treatment Protocols on Luteolysis and Ovulation in Dairy Cows

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Introduction

During the past 25 years, several methods were developed to synchronize estrus in dairy cattle. Synchronization with prostaglandin F2α (PGF2α) is successful when cows are bred at a detected estrus because estrus detection rates and artificial insemination (AI) are more efficient than daily detection of estrus (Stevenson and Pursley, 1994). The success of estrous induction with PGF2α depends on the presence of a functional corpus luteum (CL). In case of a palpable CL, Archbald *et al* (1994) found that the percentage of milking cows observed in estrus within seven days after treatment (25 mg of PGF2α) was 55% (61/111). This management tool still does not control the time of AI, because estrus detection continues to be necessary, which is evidenced by the lower pregnancy rate after timed AI compared with AI after detected estrus. This might be partially explained by the variation in time of ovulation over periods of five days with respect to time of AI (Stevenson *et al*, 1987). Various attempts have been made to overcome this variability in response to PGF2α treatments. The administration of other hormones in conjunction with PGF2α, such as progesterone, estradiol benzoate, human chorionic gonadotropin (hCG) and gonadotropin releasing hormone (GnRH) (Deletang 1975; De Rensis and Peter 1999; Pursley *et al*, 1996), have been attempted. There was a better degree of synchronization but the pregnancy rate

was similar to that of untreated cows. Similarly, two prostaglandin injections at an eight-hour interval was more effective on the incidence of luteolysis than a single injection (Archbald *et al*, 1993). There are several studies dealing with the effect of prostaglandin on the area changes of corpus luteum and follicles in heifers (Kastellic and Ginther 1991), on corpus luteum size and plasma progesterone concentrations in cattle (Assey *et al*, 1993), and the effect of different doses of PGF2α on fertility (Lagar 1977), however the effect of different doses of PGF2α on the area changes of the corpus luteum, the largest follicle and the progesterone (P4) concentration has not been examined. The objective of our study was to compare the effect of different doses of PGF2α (first trial–0 mg, 25 mg, 35 mg; second trial–2 x PGF2α treatment at an eight-hour interval) on the corpus luteum, the largest follicle and the progesterone concentration in dairy cattle. The time to ovulation after AI in PGF2α-treated and untreated cows (third trial) was also determined.

Materials and Methods

Lactating dairy cows with a mature corpus luteum ≥ 17 mm in diameter, determined by ultrasonography, and having a follicle with a diameter ≥ 10 mm were randomly assigned to different groups. In the first trial, cows (n=49) were treated with a single dose of exogenous prostaglandin (25 mg in Group 1 versus 35 mg in Group 2), and the third group served as a control. In the second trial, cows (n=72) were treated with cloprostenol (single versus double dose at eight hours apart) or dinoprost (single or double dose at eight hours apart). The ovaries of each cow were scanned daily by means of ultrasonography to measure the changes in the areas of corpus luteum (CL) and the largest follicle (LF) during the five-day experiment. Estrus was checked twice daily. In addition, blood samples were taken from each cow daily for measuring P4 concentrations. In the third trial, the date of ovulation was determined by means of ultrasonography performed daily in cows treated with prostaglandin (n=39) and in control cows (n=41).

Results

In the first experiment, the incidence of estrus and AI within 10 days after treatment was 95% (19/20) in group 1, the conception rate was 31.6% and the average time to estrus after treatment was 3.7 days. In group 2, the incidence of estrus and AI was 84.2% (16/19), the conception rate was 31.2% and the average time to estrus after treatment was 2.8 days. In the untreated group only two cows (2/10) showed estrus during the examined period and none of them became pregnant. There were no significant differences between the two treated groups in reduction in the area of corpora lutea, progesterone concentrations or increased rate in the area of the dominant follicles. At the same time, the decrease in the percentage change relative to the area of corpora lutea and to the concentrations of P4 was statistically significant in both treated groups. In the second experiment, significant decreases in the percentage changes relative to areas of corpus luteum (P<0,001) and progesterone concentrations (P<0.039) on day 0 (before treatment) were detected in the four groups during the experiment. However, the type of drug and the number of treatments had a non-significant effect on both parameters. At the same time, the percentage changes in the area of the largest follicle on day 0 increased significantly (P<0,001) in each group during the experiment, however the type of drugs (P=0.299), and the number of treatments (P=0.429) had no significant effect. Based on the response to PGF2α, cows that ovulated with or without estrus were assigned to group A (n=48), and those had no estrus and ovulation to group B (n=24), respectively. The mean area of the corpus luteum (P=0.959) and the mean concentration of P4 (P=0.798) on day 0 did not differ between groups A and B. However, there was a significant difference (P=0.016) in the mean areas of the largest follicles between the two groups. Significant decreases in the percentage changes relative to the area of the luteal tissue and of progesterone level during the experiment were detected in both groups (P<0.001), however there were no differences between the two groups (P=0.074 and P=0.069). In contrast, there was a significant increase (P<0.001) in the percentage changes relative to the area of the largest follicle, but there was no group difference (P=0.786). In the third experiment, the highest pregnancy rate was achieved if AI was done on the same day as ovulation occurred in both groups (62.5% and 66.6% pregnancy rate in PGF2α treated and untreated group, respectively). If ovulation occurred on the first (54.5 versus 53.3%) or the second day (50 versus 44.4%) after AI the pregnancy rate decreased in both groups. The pregnancy rate for cows that ovulated before AI in the second group was 25%.

Significance

In the first trial, the CL area tended to decrease more rapidly and the largest follicle area increased faster in cows treated with 35 mg vs 25 mg dinoprost, and estrus began sooner in cows receiving the higher dose. However, these differences between groups were not statistically significant. At the same time, the decreases in the percentage changes relative to the area of CL and to the concentrations of P4 were significant in both groups. In the second trial, treatment of dairy cows with double injections of prostaglandins (cloprostenol or dinoprost) at an eight hour interval resulted in more cows being observed in estrus within five days after treatment and having significantly higher pregnancy rates than those

treated with a single prostaglandin injection. Further studies in progress should confirm the benefit of the higher doses of prostaglandin treatments on a larger scale. In the third trial, the overall conception rate was around 50% in both groups; however, when cows ovulated earlier or later in relation to the time of AI, the conception rate was significantly lower.

Effect of Parturition Induction of Term Pregnancies on Calf Survival, Production and Reproduction in Holstein Dairy Cows

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Introduction

Longer gestations are correlated with higher birth weights, and larger calves are correlated with an increased rate of stillbirths and dystocias. Cows that experience stillbirths have a higher risk for periparturient diseases such as retained placenta (RP), downer cow syndrome, metabolic diseases, lower milk production, decreased fertility and higher risk of dying or being culled. Preventing long gestations via parturition induction may prevent delivery of larger calves and dystocia in cows. Parturition induction has been reported as a management tool to maximize utilization of pastures in Australia and New Zealand. In that situation, all cows are induced to calve or abort independent of their gestation length, causing high incidence of RP and lower milk production in the subsequent lactation.

We hypothesize that a single dose of dexamethasone given to induce parturition in cows that are past the average due date (1) will decrease perinatal calf and dam mortality; (2) will decrease the incidence of RP; and (3) will have no negative effect on milk production in the subsequent lactation when compared to non-induced cows.

Materials and Methods

This observational study was conducted on a dairy with 1,500 milking cows in northeast Spain. Artificial insemination (AI) was the only breeding method practiced on the farm. Over a period of 17 months all cows and heifers that reached 282 days of gestation were induced by administering 0.1 mg/kg of dexamethasone IM, forming the treatment group (N=620). Induction day was arbitrarily set at 282 days of gestation (software default for calculation of due dates). To evaluate the effect of induction, all cows and heifers that reached 282 days of gestation during the 12 months following the induction period were used as control animals.

Production records were obtained electronically every day. Health, management and production records for every animal in the herd were maintained electronically in custom software. Data collected included lactation number, insemination date, calving date, "calving-ease" code, viability of newborns (24 h), incidence of RP (presence of fetal membranes for more than 24 hours after calving), total lactation length measured as days in milk (DIM) at dry-off, culling or death and average milk production for the subsequent lactation.

Results

A total of 1,213 calving records (singleton and twins) from cows with gestation length greater than 282 days, were obtained. There were 620 induced animals (cows and heifers) with a mean gestation length of 284.3 ± 1.2 days, which is statistically shorter than the mean gestation length of the 593 non-induced animals (285.1 ± 2.3, $P<0.001$). Inducing gestation at 282 days reduced both the mean gestation length and the standard deviation of gestation length ($P<0.001$).

Fifteen percent of first lactation heifers had a gestation longer than 282 days, compared to 30% of adult cows. Distribution of cows by lactation number in both groups was very similar in both groups (20-22% heifers and 78-80% cows). There were a higher proportion of cows with four or more lactations in the induced group.