

Characterization and Pattern of Early Embryonic Loss and the Effect of Human

Chorionic Gonadotropin on Pregnancy Rates in Lactating Dairy Cattle

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Introduction

When adjusted for time, first service conception rate in British Holstein-Friesians has been declining at the rate of one percentage point per year for the last twenty years (Royal 2000). The average days open in western U.S. dairy herds increased 23.6 days from 1990 to 2000 (DHIA Provo). One hypothesis for this decline in fertility is that by maximizing feed intake in dairy cattle we have increased the rate of progesterone catabolism in the liver. This increased catabolism leads to lower serum progesterone levels, which can reduce embryo survivability. In this study we investigated whether administering hCG (human chorionic gonadotropin) day 5 post breeding to lactating dairy cattle would improve overall conception rates by creating accessory corpus lutea and increasing serum progesterone. We also characterized the extent and pattern of embryonic loss for lactating dairy cattle on a commercial Colorado dairy.

Methods and materials

This study was conducted on a 500 cow commercial Colorado dairy farm. Pregnancies were tracked on 162 pregnant lactating Holstein and Jersey dairy cows during a 7-month period from March to November 2003. 117 third service or greater lactating Holstein and Jersey dairy cows, both multiparous and nulliparous, were administered 3,300 International Units (IU) of hCG intramuscularly (IM) day 5 post breeding. Pregnancy status was determined by reproductive ultrasonography (Sonosite 180 plus, 4-9 MHz sector transducer) at 28-30 days of gestation. All cattle diagnosed pregnant at days 28-30 were re-examined using the ultrasound one week later (day 35-37). Rectal palpation was used to reconfirm pregnancy status again at days 51-58 and 97-104. Positive diagnosis of pregnancy with ultrasound was based on the presence of the embryo and a heartbeat. Positive diagnosis of pregnancy with rectal palpation was based on identification of an amniotic vesicle or a fetus.

Results

Conception rates for hCG treated cows vs. control cows were 29.1% and 27.1% respectively at day 28-30 pregnancy determination. The total embryonic loss was 14% between days 28 and 100 of gestation. The extent and pattern of embryonic loss were as follows: loss between days 28 and 35 was 8% (57% of total embryonic loss), loss between 35 and 55 days was 5% (35% of total embryonic loss) and loss between 55 and 100 days was 1% (8% of total embryonic loss).

Discussion

Treatment of cows with hCG did seem to slightly improve overall conception rates in this study compared to control cows, however, this study was conducted with a limited number of cows and we would need a larger sample to confirm a significant improvement in conception rates. Some other recent studies have shown that hCG can significantly increase conception rates and these rates fluctuate depending on the time of the year (cooler season being better). Also demonstrated in this project was the significant impact embryonic loss can have on reproductive failure in lactating dairy cattle. Thus, reproductive management should be aimed at identifying cows that have embryonic loss, so that necessary measures can be implemented to reinseminate these cows as quickly as possible. With the poor estrous expression and detection that takes place on most large commercial dairies open cows can go undetected for months

