Reproductive Differences in Cows Treated with rBST Compared to Cows Not Treated

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Introduction

Numerous studies have reported decreased reproductive performance associated with administration of recombinant bovine somatotropin (rBST) to lactating dairy cows. However, most reports have been based on observations from studies conducted with small sample sizes or from target animal safety studies not designed to detect reproductive changes. This study was designed as a prospective clinical trial to provide more accurate measurement of reproductive changes associated with rBST use per label directions. The objectives of this study were to determine the effects of rBST on the survivability of the conceptus conceived within 24 days prior to the initiation of rBST, as well as effects on heat detection, conception and pregnancy rates after initiation of rBST treatment.

Materials and Methods

A total of 1194 animals that calved within a 45 day period from eight large dairies participated in this trial. Animals were excluded if they began the current lactation with an abortion or if they had any previously diagnosed conditions, such as chronic lameness or difficult dystocia, which may have made them a higher risk for delayed conception or early culling. Two dairies elected not to use first lactation animals. Animals on each dairy were randomly divided into 2 groups totalling 530 treatment cows (415 lact>1 and 164 lact=1) and 564 control cows (419 lact>1 and 189 lact=1). Cows were enrolled in the study biweekly when they were 57-70 DIM (Days in milk). Treated animals were injected with rBST per label directions every 12-14 days. Computerized reproductive records were collected until all study animals had a known reproductive outcome at 150 DIM.

Results

Survivability of the PreBST conceptus

This study showed that there was no difference between proportion pregnant when rBST was initiated within 24 days after conception compared to controls. Two hundred and seventy-five treated cows and 300 control cows had inseminations prior to their study enrollment date, and 47.6% and 46.4% respectively conceived on the last insemination prior to enrollment. Although there were large variations within dairies, we found no differences within lactation groups, housing types, previous 305ME, days from insemination to enrollment, or most recent milk weight prior to enrollment.

Animals with observed estrus prior to beginning rBST:

In those animals bred prior to beginning treatment but failing to conceive, we found a significant decrease in the rate of heat detection in the first 21 days after beginning treatment (43% in treated cows compared to 66% in control cows). These differences were independent of parity. We also found a significant decrease in conception rate during this initial 21-day period (17% in treated cows compared to 45% in control cows) in multiparous animals. Heat detection and conception rate differences appears to be transient however, as after the initial 21-day period of treatment, pregnancy rates were similar.

Animals without observed estrus prior to beginning rBST

A difference in reproduction in primiparous animals was not observed. We also found no significant difference in heat detection rate (53% in treated cows compared to 54% in control cows) or in conception rates (35% in treated cows compared to 38% in control cows) in multiparous animals in the first 21 days after treat-

ment start. Heat detection rate following prostaglandin use for unobserved estrus was decreased in treated animals compared to controls (44% compared to 69%) however, there was no difference in pregnancy rate in these animals (25% compared to 22%). Multiparous animals treated with rBST experienced a significant decrease in pregnancy rate after the initial 21 day period of treatment through the end of the study period (150 DIM) compared to controls (29% in treated compared to 43% in controls).

Overall

Multiparous treated animals appeared to have the greatest reproductive loss compared to controls. We observed a 11-12% decrease in percent pregnant at 150 DIM in multiparous animals independent of early estrus observation. However the pregnancy rates over time were different in animals observed in estrus prior to initiating treatment compared to animals without observed estrus. If animals were observed in estrus prior to initiating rBST there was a transient reduction in pregnancy rate followed by similar pregnancy rates through 150 DIM. Multiparous animals not observed in estrus prior to initiating rBST initially had similar pregnancy rates, but as lactation progressed, cumulative pregnancy rates lagged when compared to controls. In primiparous animals there was a 5% decrease in percent pregnant at 150 days in animals with observed estrus prior to treatment start and 10% decrease in animals without observed estrus prior to initiating rBST. These differences were smaller than those in multiparous animals and statistically nonsignificant, perhaps due to fewer observations.

It was interesting to note that the dairies with the best overall milk yield response tended to have minimal decreases in reproductive performance. Also, we observed that cows with early observed estrus activity had a greater milk yield response than cows with no observed estrus prior to initiating rBST.

A Field Study of Calves Persistently Infected with the Bovine Viral Diarrhea Virus, Type I and II, in a Pennsylvania Dairy Herd

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An outbreak of bovine viral diarrhea (BVD) virus infection with severe clinical manifestations occurred in seven herds of cattle primarily in Northwest PA during the spring of 1994. The acute deaths and respiratory disease with high morbidity and mortality occurring in these herds were atypical of known BVD infections which usually occur as mucosal disease or abortions.

The largest of the seven herds, composed of approximately 250 adult cattle, experienced about 50% morbidity and 10% mortality. A minimum of 15 cows aborted and many abnormal calves were delivered in the months succeeding the clinical disease outbreak. Based on virologic blood testing of calves during this period, five calves persistently infected (PI) with the BVD virus and seven calves not persistently infected but with varying amounts of serum neutralizing antibody to the virus were housed as a study group.

The study was designed to evaluate the pathogenesis and dynamics of the infection in a field situation by routine sampling of body fluids, secretions, and excretions for virus isolation, microplate ELISA assay to detect PI animals, and serum neutralization to ascertain the level of circulating antibody to the BVD virus. Calves that died or became terminally ill during the course of the study were necropsied and the tissues evaluated by immunohistochemistry, virus isolation, and