

**Effects of Human Chorionic Gonadotropin on Follicle Size and Accessory
Corpus Luteum Formation
in Lactating Holstein and Jersey Dairy Cows**
Suit MJ, King JM, McSweeney KD

Introduction

Dairy cattle fertility has been declining at a dramatic rate over the last 20 years in North America, Europe, Israel and Australia. Reasons for this decline are poorly defined and appear to be multi-factorial. One hypothesis to explain some of the decline in fertility is decreasing serum progesterone levels in lactating dairy cattle. This theory suggests that by maximizing feed intake in dairy cattle portal blood flow has been increased, resulting in increased progesterone catabolism by the liver. This increased catabolism leads to lower serum progesterone levels, which can reduce embryo survivability. One way to overcome this decline in serum progesterone is to create accessory corpora lutea, and thus increased progesterone secretion, by administering hCG (human chorionic gonadotropin) post breeding. The objectives of this study were to evaluate the size of follicles and number of cows that responded to human chorionic gonadotropin (hCG) administration on day five post-artificial insemination (AI).

Materials and Methods

The study was conducted on a commercial dairy farm in the front range of Colorado. A total of 25 lactating cows were selected. Cows selected for the study were housed in four free-stall barns and milked three times daily. Cows were fed a free choice total mixed ration twice daily. Studied cows had been bred three times or greater. On day five post-insemination, ovarian ultrasonography (Sonosite 180 plus, 4-9 MHz sector transducer) was conducted on each cow to record follicle diameter and number of pre-existing corpora lutea. Following ultrasonography, cows were injected intramuscularly with 3,300 IU of hCG (AspenBio, Inc.). Ovarian ultrasonography was performed 7 days post-hCG injection (12 days post-insemination) to record number of corpora lutea.

Results

Following treatment with 3,300 IU IM of hCG on day 5 post-insemination, 75% (16/25) of the cows developed at least one additional corpus luteum. Four of these cows developed two additional corpora lutea. The follicles that created an accessory corpus luteum had a mean follicle size of 14.32mm (median size of 13.4mm), and ranged in size from 4.9mm to 25.9mm. Follicles that did not create an accessory corpus luteum had mean follicle size of 11.37mm (median size of 9.8mm), and ranged in size from 6.8mm to 19.0mm.

Conclusions

Without a control group we cannot definitely attribute the development of accessory corpora lutea to the administration of hCG. However, treatment with 3,300 IU IM of human chorionic gonadotropin (hCG) on day 5 post artificial insemination appeared to induce additional ovulations and the formation of accessory corpora lutea. The average size follicle that appeared to respond to hCG in our study was 14.32mm. Day 5 seems to be a good time to administer hCG postbreeding because the next follicle wave usually has a follicle larger than 11.37mm by this time, and thus is more likely to respond to hCG and create an accessory corpus luteum.

