Getting Anovular Cows Pregnant

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Introduction

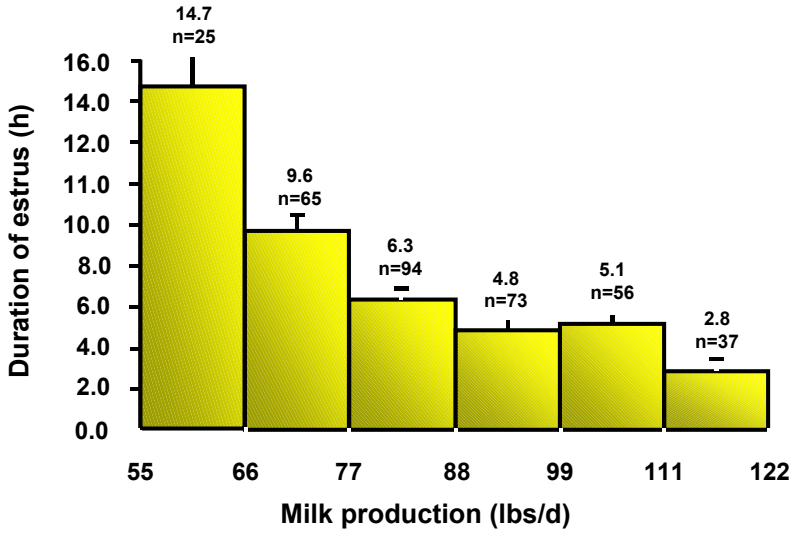
I will be using the term anovular in this presentation. This means that a cow is not ovulating. Some people prefer the term anestrus. This means a cow is not showing heat or may not be cycling. We are generally evaluating the ovaries in our studies and so we can accurately tell which cows are ovulating but not showing heat and which cows are not ovulating whether or not they are showing heat. In this paper I will discuss 2 problems related to anovular cows. First, how can anovular cows be identified? Second, how should anovular cows be treated?

I. Identification of Anovular Cows

A. Anestrus versus Anovular

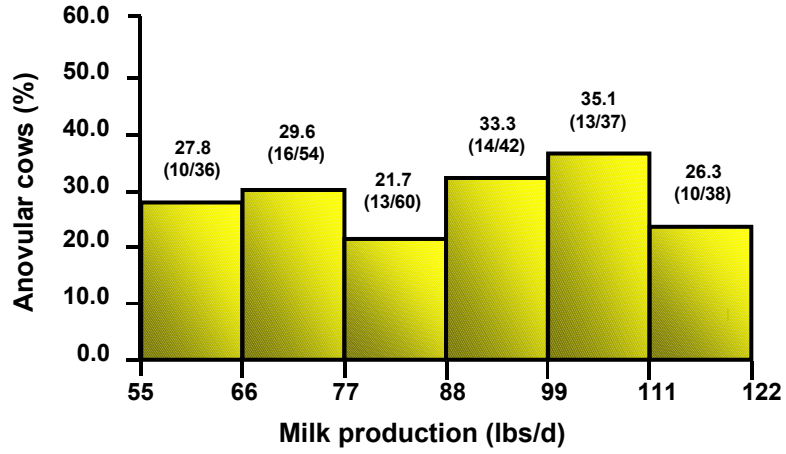
Cows that are not detected in heat will be, many times, assumed to not be cycling or ovulating. However, this is not the case in many instances. There are many reasons that cows may not manifest standing heat even though they have an LH surge and ovulate. Obviously, one of the critical problems is the type of footing that is provided for the cows during heat detection. In addition, the methods and amount of time spent in heat detection can result in more or fewer cows being detected in heat.

Recently we have used a system that allows around the clock heat detection (HeatWatch, DDX Technologies) to evaluate the effect of milk production on expression of estrus. We found that cows that have high milk production have a much shorter duration of standing estrus. As shown in Figure 1, the higher the milk production, the shorter the duration of estrus. There are probably a number of different reasons for this relationship but it produces a situation in which producers are less likely to be found in estrus. We also were evaluating the ovaries on a weekly basis and so we could accurately tell if cows were not cycling. We did the same analysis of the relationship between milk production and whether cows were not ovulating (Figure 2). It is clear that there is no effect of milk production on the percentage of cows that were anovular in this herd. This indicates that there are probably different factors that are causing cows not to ovulate as compared to the problems that are causing high milk producing cows not to show long heats.



•Analysis included all single ovulations (n=350) except first postpartum ovulations
•Average milk production during the 10 days before estrus

Figure 1. Relationship between level of milk production and duration of estrus.



•Analysis included all cows (n=267)
•Average milk production from 50 to 70 days postpartum

Figure 2. Lack of a relationship between milk production and percentage of cows that were anovular at 71 days in milk.

B. Size of Follicles in Anovular Cows

Some cows that are not cycling have relatively small ovaries. They do not grow follicles to sufficient size to increase estrogen concentrations to a high concentration. These cows do not show heat or ovulate because they do not grow big enough follicles. These cows are many times in negative energy balance and may have low body condition score.

On the other hand, some cows that are not ovulating have very large ovaries. These cows are usually designated as having follicular cysts. Most cows with follicular cysts do not show estrus but a few will show estrus every 3-5 days. Figure 3 shows the type of follicle growth pattern in a heifer that developed follicular cysts because of a rectal infection. She was in heat every 3-7 days. We treated her with the Ovsynch protocol and she recovered from the follicular cysts and became pregnant. In Figure 4 is shown a cow that developed follicular cysts. We removed the dominant follicle and then treated her with estradiol benzoate. She did not have a follicle that could ovulate and she became anovular after the estradiol benzoate treatment. As can be seen, this cow continues to grow follicles even in the presence of larger follicles (>20 mm). We treated this cow with a CIDR and she ovulated and recovered from the follicular cysts. Figure 5 shows another cow that developed follicular cysts. This cow was also treated with a CIDR and you can see that it recovered and ovulated. However, the large follicles that were on the ovary did not disappear even though the cow was ovulating normally. Sometimes cows will have large structures on their ovaries that feel like follicular cysts but that are non-functional. These structures are probably causing no overt problems with fertility and should be ignored. They do not seem to disappear very rapidly after hormonal treatments.

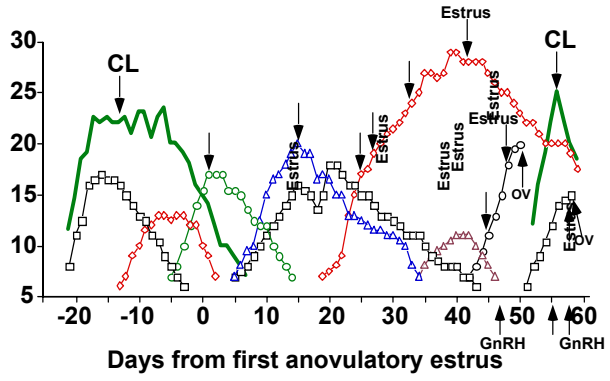


Figure 3. Follicular dynamics of a heifer that became cystic, showed multiple periods of estrous behavior, and was later treated with Ovsynch.

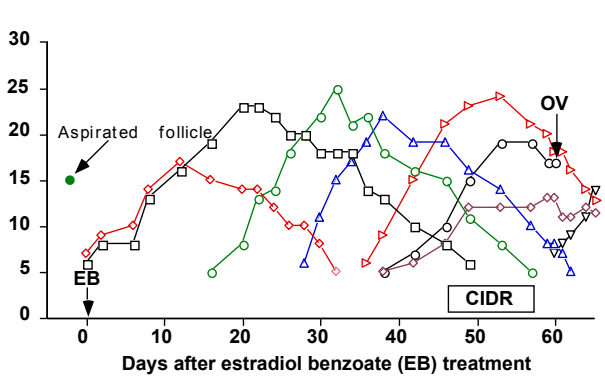


Figure 4. Follicular profile for a lactating dairy cow that was induced into follicular cysts by a single injection with estradiol benzoate 2 d after aspiration of the dominant follicle.

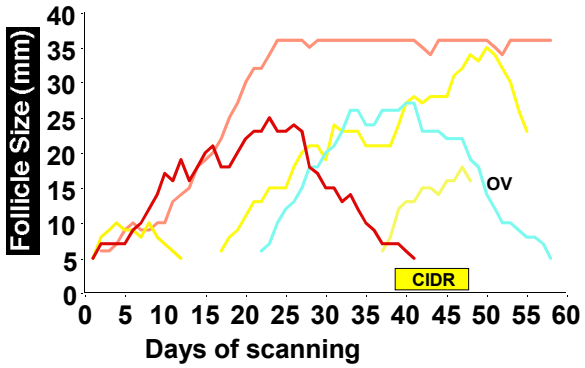


Figure 5. Follicular profile for a lactating cow that developed follicular cysts and was treated with a CIDR. A follicle ovulated following the CIDR treatment; however, it was not the largest follicle. The largest follicles either did not regress or slowly regressed after CIDR treatment.

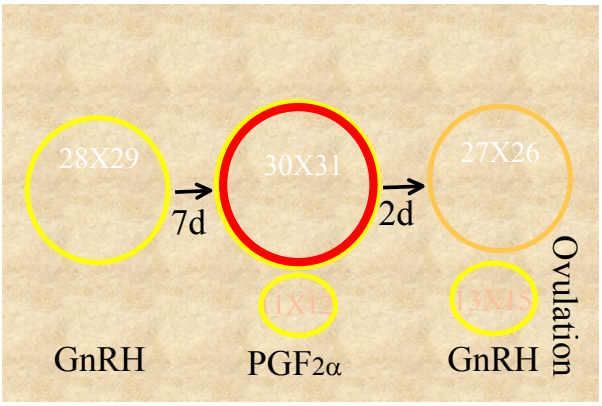
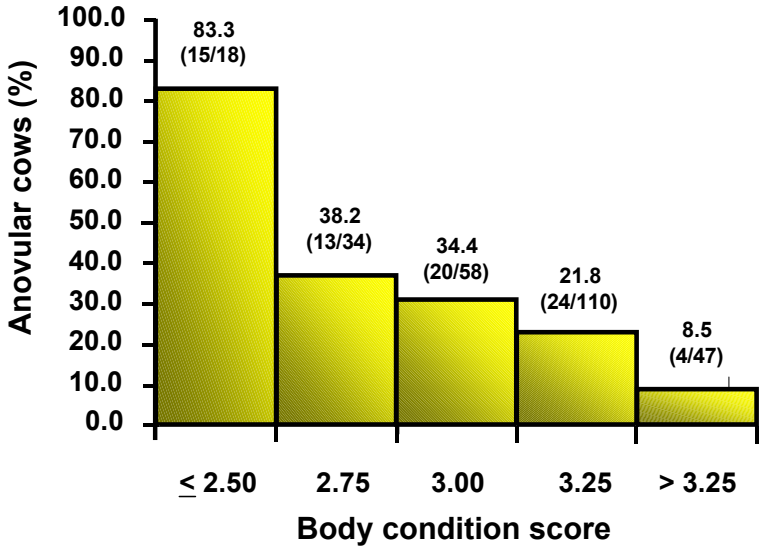


Figure 6. Response of cow with a single follicular cyst to treatment with Ovsynch. As can be seen, the follicle did not ovulate after the first GnRH treatment but it luteinized. Another follicle began to grow on the ovary. The luteal tissue in the cyst regressed after the PGF2a injection. The growing follicle ovulated after the second GnRH and this cow became pregnant.

C. Body Condition Score and Anovular Cows

It has been known for some time that cows with low body condition score have a greater likelihood to not be ovulating. In Figure 7 is shown the relationship between body condition score at day 70 after calving and percentage of cows that are anovular. It is clear that most cows that have a low body condition score at this time are anovular. Thus, of the 18 cows that had a body condition score of less than 2.5, 15 of these cows were found to be anovular. These cows generally have small follicles. However, the majority of cows that are anovular are found in the cows with good body condition scores of more than 2.75. Even more than 20% of cows with 3.25 body condition score were found to be anovular. These cows generally have follicles that are larger than ovulatory size (17 mm) and usually larger than 20 mm. They also sometimes have very large follicular cysts. The intriguing thing about these data is that although clearly cows with low body condition score are likely to be anovular, most of the anovular cows in the dairy herd do not have low body condition scores.



•Analysis included all cows (n=267)
•Body condition score closest to 60 days postpartum

Figure 7. Relationship between body condition score and percentage of cows that were found to be anovular at 70 days in milk.

II. Treatment of Anovular Cows

An obvious treatment for anovular dairy cows is to treat them with the Ovsynch protocol. Unfortunately, our results have not been as encouraging as we hoped with this protocol. We performed an experiment in which we evaluated the ovaries of 316 lactating dairy cows on a commercial dairy using ultrasound. After weekly evaluations we classified the cows as either ovular (cycling) or anovular (not cycling). We then randomly assigned the cows to either receive the Ovsynch protocol or be checked for estrus during a 21 day time period. The Ovsynch protocol began on day 60 and the cows bred to heat detection (Estrous) also began to be checked for heat and inseminated after day 60. The Ovsynch cows were all bred on the 10th day of the treatment period with a timed AI. As can be seen more Ovsynch cows were bred than heat detection in the ovular or anovular groups. The conception rate was similar for ovular cows that were bred to a standing heat or to the Ovsynch protocol. However, anovular cows had a very low conception rate and pregnancy rate after either reproductive management system. Thus, Ovsynch does not appear to be an effective treatment for anovular cows.

Table 1. Comparison of ovular and anovular cows in the estrous detection vs. Ovsynch group.

	Ovular cows			Anovular cows		
	Estrous n = 135	Ovsynch n = 117	*P*-value	Estrous n = 31	Ovsynch n = 33	*P*-value
Inseminated during 21-d period [a]	72 % 97/135	100 % 117/117	0.0001	29 % 9/31	100 % 33/33	0.0001
Double ovulation rate[b]	16 % 19/120	12 % 14/114	0.4351	38 % 5/13	13 % 4/31	0.0551
Conception rate at ~ 60 d	35 % 34/97	32 % 37/117	0.5960	11 % 1/9	9 % 3/33	0.8547
Pregnancy rate at ~ 60 d	29 % 39[c]/135	32 % 37/117	0.6370	3 % 1/31	9 % 3/33	0.3326
Embryo loss from 28 to 64 d	11 % 4/38	14 % 6/43	0.6398	50 % 1/2	0 % 0/3	---

We have evaluated if combining CIDR with Ovsynch would be a more effective treatment for anovular cows. In this experiment 634 cows were evaluated to determine which cows were anovular. This was done by taking blood samples 10 days apart. If progesterone was low in both blood samples then the cows were designated as anovular. All cows were randomly assigned to either receive Ovsynch or receive Ovsynch with a CIDR inserted from the first GnRH until the time of PGF2a. This protocol has sometimes been designated as CIDR-Synch. Overall, the cows that were treated with the CIDR-Synch program had a 42% conception rate as compared to a 32% conception rate for the Ovsynch cows. However, if we evaluated only the cows that were ovular before Ovsynch, then Ovsynch and CIDR-synch gave similar results. The CIDR-Synch program primarily improved reproduction in the non-cycling cows. There were 24.4% of the cows that were non-cycling (anovular) in this study. If anovular cows were treated with Ovsynch alone then 22.2% got pregnant. However, if anovular cows were treated with CIDR-Synch then 36% of cows became pregnant. This was similar to the conception rate in ovular cows (39%). Thus, the CIDR-Synch program seems to work better than the Ovsynch program alone in anovular cows but does not appear to improve conception rates in ovular cows.