Twinning in Dairy Cattle

Twinning is an unavoidable outcome of reproduction in dairy cattle and is undesirable in your dairy operation because it reduces overall profitability and reproductive efficiency. Studies estimate that every twin birth incurs a $108-$250 economic loss compared with a single birth. Twinning also reduces reproductive performance by increasing average days open and services per conception of the dam during the subsequent lactation. In addition, the source of many pre and postpartum diseases in cattle are associated with twin births. Cow calving twins have higher risks for:

- Stillbirth
- Retained placenta
- Metritis
- Displaced abomasums
- Ketosis
- Increased abortion risk (29.3% vs 12%)
- Increased incidence of calf mortality (15.7% vs 3.2%)
- Reduced birth weight (30.6kg vs 43.5kg)
- Retained placenta (34% vs 7%) also are greater in twins
- Producing less milk
- Reduced fertility (2.5 services per conception with twins vs 1.5 services per conception single calf)
- Culling
- Reduced body condition scores
- Reduced dry matter intake
- Rapid weight loss before and after calving

The reduced gestation length and increased incidence of dystocia (difficult birthing) among cows calving twins results in more calf mortality and reduced birth weight. Culling rates are also greater for cows calving twins.
One impact of twinning is a reported reduction in the number of fertile heifers available for use as replacements in the dairy herd. This decrease arises from increased calf mortality of twins and the creation of freemartin heifers (non-breeders).

**Mechanism of Twinning**

Cattle are a species that, under most circumstances, a successful pregnancy results in the birth of a single calf. The physiologic mechanism responsible for regulating the number of follicles that become dominant within each follicular wave usually results in selection of a single dominant follicle capable of ovulation (a single ovulation occurs normally). On occasion, however, two follicles are selected to continue growth from among the group of growing follicles in a follicular wave resulting in a double ovulation. If the eggs from the double ovulation are successfully fertilized twins will result. Twins created this way can be the same or opposite in sex and are no more alike phenotypically or genetically than sibling with the same parents born during different gestations.

Ovulation of a single dormant follicle also can, on rare occasions, result in twins when the single fertilized egg splits after fertilization. Twins resulting from ovulation and fertilization of a single oocyte are called monozygous (identical) twins. Monozygous twins are genetically and phenotypically identical and therefore are always the same sex. The rate of monozygous twinning in cattle is low (13.6%).

**Why Twins Occur in Dairy Cattle**

Risk factors (causes) for twinning in cattle include effects of breed type, lactation number (parity). The percentage of twins born also varies among seasons of the year, with a trend toward more twin births during the summer months. This seasonal effect on twinning has been attributed to an increased plane of nutrition during the fall when cow calving during the summer would have conceived, a decreased light period, and a decrease in the viability of early stage embryos conceived during summer months compared with those conceived during the summer would have conceived, a decreasing light period, and a decrease in the viability of early stage embryos conceived during summer months compared with those conceived during cooler fall months. **High cumulative milk production and previous twinning, heredity** are additional factors that increase the risk of twinning.

In general, the twinning rate for most beef breeds of cattle is less than 1%. **The reported incidence of twinning in dairy cattle ranges from 2.5 to 5.8% and is dramatically affected by parity, ranging from 1% for first parity to nearly 10% during later lactations (parities).**

The effect of parity on twinning rate is not clearly understood but may be explained by an increased ability of older cows to support twins throughout gestation, an increase in the rate of double ovulation, or an interaction of both of these factors. Increased uterine capacity of cows calving twins has been reported. Furthermore, the incidence of double ovulation in lactating dairy cows is around 14% and as with the incidence of twinning, increases with parity.

A study by Kinsel and Fricke et al (1998) from the University of Wisconsin reported an increased rate of twinning over a 10-year period. The single largest contributor to this increase was the increase in peak milk production that occurred over that period. They also suggested that feeding higher energy diets to high producing cows may be increasing the incidence of double ovulations, and hence the rate of twinning.
Abortion Rate with Twin Pregnancies

A comprehensive study of 211 twin pregnancies diagnosed between 36 – 42 days after insemination and then monitored throughout gestation produced the following abortion statistics involving twin pregnancies.

- 86 of 211 (40.8%) had 1 calf in each horn (bilateral pregnancies)
- 125 of 211 (59.2%) had 2 calves in 1 horn (unilateral pregnancies)
- Total pregnancy loss before Day 90 of pregnancy (mean 69 +/- 14 days) was registered in 51 (24.2%) off all cows carrying twins:
  - 7 of 86 (8%) of bilateral pregnancies aborted
  - 44 of 125 (35.2%) of unilateral pregnancies aborted
- Interesting note: 35 of 211 pregnancies had a death of only 1 embryo. The single embryo death rate was significantly lower for cows with bilateral twins (9.3%, 8/86) than for total cows with unilateral twins (21.6%, 27/125)

By way of overall conclusion, embryo reduction can occur in dairy cattle, and the practical perspective remains that most embryonic mortality in twins (one of the two embryos) occurs around Day 35 - 40 of gestation, the period when pregnancy diagnosis is generally performed. It is very important to recheck all pregnancy diagnosis after 40 days. The loss of twin pregnancies occurs around day 69 post-breeding. Twins sharing the same horn have a significantly higher abortion rate than twins that are in each horn.

Managing Cows Carrying Twins

Twin pregnancies represent a management problem in dairy cattle since the risk of pregnancy loss increases, and the profitablility of the herd diminishes drastically as the frequency of twin births increases. As you increase production in your dairy herd you are increasing the risk of twins in your herd. Twins increase the incidence of retained placenta, metritis, ketosis and LDA’s. Cows carrying twins calve early (~275 days vs 283 days).

The use of ultrasound examination for pregnancy diagnosis has increased our ability to diagnose twins, determine if they are in the same horn or not and to determine the viability of the twin pregnancies as we monitor their growth and development.

Once a twin pregnancy is diagnosed they should be considered a high risk for future problems and thus should receive special attention. Suggested management procedures include:

- Identifying the cow as pregnant with twins – single horn or both horns – in DC305/AFI-Farm records
- Physically identify the cow as a twin carrier – plastic cable ties attached to neck strap, ear tag or leg
- Dry the cows early anticipating an early calving
- Once the cow is dry move her immediately to the close-up dry group
• Administer a Rumensin CRC bolus early anticipating and early calving
• At calving be prepared to intervene quickly to aid calving as calving problems are 4-5x’s more likely to occur
• Ensure you feed a properly balance dry cow ration
• Ensure all dry cows have adequate bunk space (3 feet per cow)
• Do not overcrowd the dry cows
• A medical issue such as lameness in a cow carrying twins should be considered a medical emergency and be dealt with immediately.

Summary

The incidence of twinning is increasing. The most common risk factor is high production. Twin pregnancies have a high risk of aborting (~25%). Diagnosis of twins is made by ultrasound examination. Please note that not all pregnancies are found at pregnancy diagnosis. Diagnosis of twins depends on the age of the cow at time of diagnosis. Cows diagnosed with twin pregnancies should be considered high risk for abortion, dystocia and future metabolic diseases. Managing cows with twins includes early dry off, movement early to the close-up ration, administering a Rumensin CRC bolus early 4 – 6 weeks before expected calving and early intervention of calving assistance. All cows with twins should be identified in written records and visually with a cable tie to enhance management of these high risk cows.
CQM Corner

We have held two in-class CQM training sessions in September and have trained all our clients who are due for validation up to March. We plan on holding our next in-class training session in November.

CQM is a HACCP based program that covers both milk and meat. As part of CQM you are required to record treatments of all cattle including bull calves and your SOP #6 requires that all animals being shipped have met all withdrawals or a note stating withdrawals accompanies the animal. Ontario has a bob calf industry and calves as young as two weeks of age are being slaughtered. Any animal that has a carcass weight of less than 175kg is tested for antibiotics and anti-inflammatory such as Cronyxin or Metacam. Testing of bob calves has found residues for antibiotics used to treat pneumonia or diarrhea, anti-inflammatories and a few calves have residues from drinking treated waste milk. Remember some of the longer meat withdrawals for these products given at the labeled dosage by the labeled route:

- Resflor – 60 days
- Zactan – 49 days
- Draxxin – 44 days
- Micotil – 28 days
- Biomycin – 28 days
- Neo-Sulfalyte – 30 days
- Scour-Plug – 30 days
- Calf Span – 28 days
- Metacam – 20 days

Electronic Version of the Newsletter

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