TAKE HOME MESSAGES

- Bacterial contamination of the uterus occurs in up to 90 percent of dairy cows during the first week post partum.
- Antibiotic intra-uterine therapy has not been effective in restoring normal reproductive performance of cows with metritis, can result in costly milk discard, and is a risk for antibiotic residue in bulk tank milk.
- Uterine disorders have a major impact on dry matter intake and subsequent milk production. Prevention is essential!

Dairy producers and veterinarians have many decisions and dilemmas facing them when considering therapeutic regimes for post partum uterine infections. The main decision is to treat or not to treat. The dilemmas include finding economically effective treatments, restoring reproductive capacity, and avoiding antibiotic residues in meat and milk; all while trying to find ways to prevent cows from developing uterine disease in the first place. Cows that are systemically ill from uterine infections (acute metritis) require the immediate attention of a veterinarian. In this case, there are few decisions, but all the dilemmas still exist.

DEFINING THE PROBLEM

The internal lining of the post partum uterus is in constant contact with fluid and tissue debris that can support bacterial growth. Bacterial contamination occurs in up to 90 percent of dairy cows during the first week post partum. The outcome of uterine contamination depends on the number and virulence of the organisms present as well as the condition of the uterus and its inherent defense mechanisms. Many different bacteria can be isolated from the early post partum uterus. Most of these are environmental contaminants that are gradually eliminated during the first six weeks post calving. Normal post partum cows will resolve uterine infections by rapid involution of the uterus and cervix, discharge of uterine contents, and mobilization of natural defense mechanisms (mucus, antibodies and white blood cells). Cows with certain periparturient problems have reduced ability to control uterine infections. Excessive stretching of the uterus (such as twins or calving difficulties) or metabolic disorders can decrease uterine contractility. This leads to retention of fluid and membranes beyond the normal period providing excellent media for bacterial growth. Calving problems, retained placenta and/or metritis reduces the ability of uterine white-blood cells to remove bacteria. The duration of infertility associated with uterine infection depends on the severity and duration of inflammation. Resolution of the inflammation occurs with time. Fertility is restored in the normal cow by 40 to 50 days in milk.

TO TREAT OR NOT TO TREAT?

Retained placenta has been defined as a condition where cows fail to lose their fetal membranes within 24 hours of calving. The fact that a cow fails to release her placenta within 24 hours is not, in and of itself, cause for intra-uterine antibiotic therapy. If the retained placenta progresses to metritis and is responsible for systemic signs like elevated
temperature, in appetite, and reduced milk production, then intervention may be required. The major dilemma is that there are no drugs cleared by the Food and Drug Administration for the treatment of metritis, whether by intra-uterine or intra-muscular route. Any intra-uterine infusion of antibiotics in cattle is an extra-label use of the antibiotic. This requires veterinarian involvement and withholding periods for meat and milk from treated cows must be sufficiently extended.

Tests for detecting antibiotic residues in milk and meat have become increasingly more sensitive. This has raised concerns among producers and veterinarians that extra-label use of antibiotics for treatment of metritis may lead to violative antibiotic residues in bulk tank milk or in the carcass of cows sent to slaughter. Intra-uterine antibiotic therapy for cows systemically ill from metritis require therapy in order to restore the health of the cow. However, for the cows not systemically ill, alternatives to antibiotic therapy could reduce the risk of violative antibiotic residues in milk. The arguments for intra-uterine therapy are less convincing for the cow two or more weeks into lactation.

Oxytetracycline is an antibiotic routinely used in an extra-label manner for intrauterine therapy. Research supporting the efficacy of intrauterine antibiotics is minimal, yet the practice is common. A study was performed to establish the duration of oxytetracycline residues in milk from cows treated for retained placenta by intra-uterine infusion. The study also investigated whether the number of infusions or the presence of fever affected the duration of residues. Fifty-four Holstein cows with retained fetal membranes on a single 1,400-cow commercial dairy were used in this study. Cows were treated once a day with 5 g of oxytetracycline by intrauterine infusion for at least two days, or until the membranes were expelled. Cows that became clinically ill (fever and off-feed) were also given penicillin, IM daily for 2 to 4 days.

Oxytetracycline was detected in milk of all cows during treatment. Duration of oxytetracycline residues after the last infusion ranged from zero to 144 hours (6 days). Neither the number of infusions received nor development of rectal temperature greater than 103.5°F affected the maximum concentration or the duration of oxytetracycline residues in milk. Milk obtained from cows that are treated for retained fetal membranes by intrauterine infusion of oxytetracycline may contain the drug for variable lengths of time. Milk should always be discarded to avoid illegal residues.

The response of cows to treatment with intra-uterine infusion of antibiotics is relatively poor. When the uterus has sustained injury or damage from an active uterine infection, it needs time to resolve or heal the injury. Antibiotic intra-uterine infusions in cows that have cleared uterine infections are not going to hasten the healing process. In fact, the infusion of irritants into an already inflamed uterus may actually be detrimental to subsequent fertility. One relatively large study demonstrated that when cows with normal uteri had intra-uterine infusions of an iodine compound, their reproductive performance was similar to non-infused normal cows. However, the reproductive performance of infused cows with metritis was poorer than non-infused herd mates with metritis. The infusion of an irritant into an already inflamed uterus was detrimental to subsequent fertility.
ALTERNATIVE APPROACHES TO UTERINE INFECTIONS OF DAIRY COWS

For the above reasons, veterinarians and dairy producers have developed increased interest in finding effective, economical alternatives to antibiotic treatment for metritis in cows that are not systemically ill. Prostaglandin (PGF) has been used in many trials to evaluate the effectiveness of treatment for metritis/endometritis and/or for improving the reproductive performance of dairy cows. There is little difference in days open between PGF-treated cows and non-treated herd mates in studies involving normal calving cows. However, in the trials involving cows with abnormal calvings, the days open for PGF-treated cows was 5.3 days less than non-treated herd-mates. A German study evaluated the response from 130 cows which required C-sections. Half of the cows were treated with PGF post surgically. Eighty percent of the treated cows expelled their placenta within 12 hours while only 58.5 percent of control cows cleaned. Only routine treatment of cows with abnormal calvings seems to have the potential of being economically justifiable.

Studies have demonstrated that there is no advantage to the routine post-calving use of PGF in herds with less than 100 days open. However, there is a significant reduction in days open in PGF-treated cows in herds where days open are greater than 100. Selection of herds for routine post-calving PGF therapy should begin by evaluating days open. In general, there is an improvement in first service conception rate in PGF-treated cows in herds where first service conception rate in less than 55 percent. The lower first service conception rate, the greater the benefit of PGF therapy.

Few trials have evaluated the time of PGF treatment on subsequent reproductive performance. One study showed that as the interval from calving to PGF treatment was increased, the days open increased and first service conception rate decreased. From this trial and others, a beneficial response to PGF treatment occurs when PGF is given between 14 and 28 days in milk. There is evidence to suggest an advantage in treating cows with post-calving health problems twice with PGF at a two week interval. In one trial, the first service conception rate for 116 cows treated twice with PGF at 12 and 26 days in milk was 43 percent compared to 24 percent for 113 abnormal untreated herd mates. Based on limited evidence, it seems rational to recommend two PGF treatments at a two week interval for cows with post-calving reproductive health problems.
PREVENTION IS ESSENTIAL!

The two charts above demonstrate the relationship between retained placenta/metritis (RP/MET) and normal dry matter intake and milk production. Of 32 multiparous cows from the University of Illinois dairy herd calving in the same time span, 22 had no adverse health event while 10 had RP/MET. Beginning at day one and progressing through the 20 day evaluation period, the cows with RP/MET had between 4 and 14 pounds lower dry matter intake than unaffected cows. All affected cows received some form of therapy once the disease was identified. Milk production was similar until the third to fourth day. Even though RP/MET cows received therapy, they never fully regained the milk production of unaffected herd mates within the first 20 days.

Retained placenta/metritis has been associated with other metabolic disorders. Cows with RP/MET were 16 times more likely to develop complicated ketosis and 2.4 times more likely to develop displaced abomasum. The increased probability of delayed conception has already been covered. Economically, dairy producers cannot afford to have cows begin their lactations with uterine disease.

Retained placenta/metritis complex is a multi-factorial disease. Factors that can contribute to uterine disease include shortened gestational length (abortions), twinning, infectious diseases, improper assistance during delivery, stress, and nutritional imbalances from energy and/or protein deficiencies, phosphorus and/or vitamin A deficiencies, and vitamin E and/or selenium deficiencies. Over conditioned dry cows are at higher risk for retained placenta. Dissatisfactory anion/cation balance leading to subclinical hypocalcemia has been associated with inefficient uterine contractility. Cows may be able to expel their placenta but uterine involution may be delayed leading to infection and inflammation. Reducing or eliminating these conditions will allow cows to start their lactation profitably.

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