Uterine health problems – Risk factors and effects on herd performance

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Abstract

A successful calving event and the following transition period are critically important to the future reproductive performance and productivity of the dairy cow. Although the diagnosis and treatment of uterine diseases are generally considered straightforward by most veterinarians, there are many misconceptions and a lack of data to support many of the recommended treatments. Other metabolic disorders such as hypocalcemia and hyperketonemia can further complicate the diagnosis and treatment plan.

Not only is an understanding of reproductive physiology and normal uterine involution important, but also the economic outcomes of uterine disease. The effects on milk production, fertility, risk to other diseases, and exit from the herd need to be recognized by both the dairy herd managers and veterinarians alike.

This article will review the definitions, risk factors, treatment options and economics of uterine diseases: retained placenta (RP), metritis, and endometritis.

Key words: uterine health, metritis, transition cow disease

Introduction

High milk yield and reduced involuntary culling have been shown to improve overall herd profitability.[4,18] Uterine disease decreases milk yield,[a,20] fertility,[5] and herd survival.[12,14] Thus, it is expected that RP and metritis can have a major impact on the economics of a dairy operation. Understanding the risk factors and the prevention of uterine disease, along with proper diagnosis and treatment choices, is therefore important.

The transition period is generally defined as 3 weeks prior to 3 weeks following calving. This period has the greatest risk of metabolic disease, with some herds having 30 to 50% of transition cows affected by 1 or more diseases.[19] There are many risk factors for RP, metritis, and endometritis,[24] which, in turn, are risk factors for other metabolic diseases such as hypercalcemia, hyperketonemia, and displaced abomasum (DA).[7] Uterine damage from dystocia and more importantly, nutritional issues during the pre-calving close-up period, are major areas of focus for the prevention of disease.

Risk Factors

One important aspect in the discussion of uterine disease is the difference between contamination and infection of the uterus. Uterine contamination does not always lead to metritis or endometritis.[30] Uterine infections are generally considered non-specific in nature and are caused by environmental bacteria.[1]

Delayed uterine involution is the factor most commonly associated with uterine infection. Any disruption of normal calving such as dystocia, twins and stillbirth, increase the risk of delayed involution[15] and therefore can lead to infection.

Metabolic diseases such as hypocalcemia, hyperketonemia, and DA are also are associated with an increased risk of uterine disease. The exact mechanism underlying this association has not been determined, but a failure of the immune system is believed to play a part in this increased risk.[3]

Diagnosis

The diagnostic definition of RP is straightforward; visible fetal membranes greater than 24 hours after calving. The diagnosis of clinical metritis can be more challenging and is a current topic of discussion, but is defined as a fetid, watery uterine discharge often accompanied by fever and/or systemic signs of disease.[30] Clinical endometritis is defined as the presence of pus in the vagina > 21 days post-calving. Clinical endometritis must be differentiated from cases of vaginitis that can also present with a purulent discharge. This distinction can be difficult given that common methods of diagnosis (e.g. Metricheck device or gloved hand) cannot differentiate between vaginitis and endometritis.[26]

Treatment

Treatment protocols need to be based on an accurate diagnosis of the uterine disease along with any concurrent metabolic disorders. A quote from Frazer provides the current thinking on various treatment modalities: "This postpartum metritis-delayed uterine involution syndrome is extremely frustrating for a veterinary clinician to manage since there is no scientifically proven protocol that will enhance uterine contraction and promote evacuation of the fetid uterine contents. Supportive measures (anti-inflammatory

medication and systemic antibiotics) may help to maintain the cow's appetite and rumen motility, but this author remains unconvinced that any current hormonal therapy actually works."[8]

A detailed review of the treatment of RP, metritis, and endometritis can be found in the literature.[5] The current data does not support the use of prostaglandins for the treatment of RP or metritis.[6,11,21] Additionally, infusions of intrauterine disinfectants and/or antibiotics have not shown a benefit in terms of future fertility and may in fact be detrimental.[9] These treatments are also extra-label in the USA and present the risk for antibiotic residues.[13] Non-traditional treatments such as intra-uterine infusion of mannose or bacteriophage[23] or dextrose[2,23] have not been shown to be effective for the treatment of uterine infections.

For severe, acute toxic metritis, systemic antibiotics, non-steroidal anti-inflammatory drugs (NSAIDS), supportive care, and treatment of concurrent metabolic disease represent the accepted treatment regimen. The antibiotic choice should be based on spectrum of activity, withholding times and economics with the knowledge that *E coli*, *T. pyogenes*, and *F. necrophorum* are the most common isolates from metritic cows.[30] NSAIDS are generally used based on first-principle concepts for treatment of pyrexia, as literature support for such use appears to be lacking[5,16,22,27] and the routine use of flunixin meglumine in peri-parturient cows has been shown to increase the prevalence of RP and metritis.[25]

Prevention

Given the multifactorial pathophysiology of uterine diseases, prevention of uterine contamination and infection needs to be focused on overall transition cow management to minimize predisposing factors.[31] The role of nutrition in preventing metabolic disorders such as hyperketonemia, hypocalcemia, and DA is of major importance. Attention to maternity area hygiene is another important area for the reduction of uterine contamination at calving.[28] Training of maternity pen caregivers to ensure proper assistance at birthing, dystocia management and hygiene are other important considerations.[17,28,29]

The use of vaccines targeting uterine infection pathogens has been investigated[23] and holds potential promise for future commercial use. Immune modulators such as pegbovigrastim have not been shown to be beneficial for the prevention of uterine disease.[32]

Economics

There are a number of economic models that have been used to calculate the cost of transition cow diseases.[a,10,14,20] It is interesting to note that these models all calculate a very similar economic loss from uterine disease with an average cost per case for RP/metritis combined of $322 and $576 per case for primiparous and multiparous cows, respectively. Milk loss represents the largest component of the cost of metritis, with choice of treatment having a minimal effect on overall cost per case.[20]

Although these costs represent real economic losses, the overall low incidence of these diseases in most well-managed herds does not represent a significant economic return in the reduction of incidence. The goal is to always prevent disease, but the savings from reducing RP/metritis by 1% in a 1000-cow herd is less than $3000/year.[a] Therefore, prioritization of disease prevention strategies must be considered individually for each dairy and each disease.

Conclusions

High milk production and cow longevity are important factors for overall dairy farm profitability. Management of the nutritional and environmental needs of the dairy cow along with proper training of employees in maternity care are critically important to reduce the risk of postpartum disease and ensure a successful transition period. Transition cow diseases are multifactorial and interrelated. Attention to the prevention, correct diagnosis and effective treatment of uterine diseases can result in positive economic returns, but this must be prioritized with other management and prevention strategies that can perhaps yield greater returns.

Endnote

[a] Thomas MJ, Stangaferro ML. Unpublished data, 2019.

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