

Fresh cow disease investigation

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Abstract

Breakdowns in the transition period are very expensive to both the dairy producer and the cow herself. Correctly diagnosing transition issues and identifying their root cause are essential skills for any dairy practitioner. Evaluating the individual cow, cohorts in the dry period and post-fresh pen as well as ration and pen dynamics are all necessary when identifying the underlying cause to a transition issue. The primary tool necessary to identify issues during this stressful period are the veterinarian's observational skills and ability to organize retrospective and current data. Outside of observational skills metabolic indicators such as nonesterified fatty acids, urine pH, ketone levels and serum calcium/phosphorus levels are useful tools. Taking a holistic look at both the dry period and post-fresh period balanced with client perceptions will ultimately lead to the root cause(s) of any issues in the transition period.

Key words: transition period, hyperketonemia, ketosis, hypocalcemia, milk fever, retained placenta, metritis, blood BHBA, NEFA, urine pH, transition disorder

Introduction

Evaluation of the transition cow has evolved from a skill possessed only by dairy practitioners to one performed by lay people daily with variable veterinary oversight. However, proper diagnosis and treatment in the transition period determines the success of the cow in her current and subsequent lactations. Key aspects to a cow's success in the transition period start in the dry period with appropriate body condition, appropriate acidification (if feeding a dietary cation-anion difference [DCAD]), and appropriate energy mobilization evaluated by body condition score, urine pH (when appropriate) and non-esterified fatty acids (NEFA). In the post-fresh period appropriate body condition, appropriate serum calcium and serum phosphorus levels, appropriate blood/urine/milk ketone levels and appropriate classification of uterine disorders are important. This area of the dairy is one where the young veterinarian can make an impact and build a consultative portfolio quickly and without significant up front cost by their employer. By understanding how to approach a transition cow crisis and monitor for early signs of a transition issue, the young veterinarian can help their clients achieve success both before, during and after an issue arises.

Uterine disorders – retained placenta and metritis

Common uterine disorders in dairy cattle include retained placenta and metritis. Retained placenta can be defined as the failure to expel fetal membranes within 24 hours of calving. In many cases, retained placentas are treated within 48 hours of calving after evaluating the animal's appetite, attitude, body temperature and presence of retained fetal membranes. Comparatively, metritis can be defined as a foul vaginal discharge, with or without a fever, inappetence and decreased milk production. Metritis cases can be treated up to two weeks after calving. These disorders are often presented to the veterinarian as cows that aren't cleaning or a foul-smelling fresh pen.

Diagnostics involved in working-up uterine disorders rely primarily on the veterinarian's observational skills and evaluation of what is happening to the cow in the present moment after understanding the herd's baseline. For example, is this an acute problem, a chronic problem, does the herd run a moderately high level of uterine disorders and have recently experienced an acute spike in cases? In the fresh pen, cows should be evaluated for their body condition score, both clinical and non-clinical cases, the presence of additional disease processes and dry period length. Outside of the cow, the fresh pen should be evaluated for cleanliness, stocking density and ration adequacy in both the pre- and post-fresh pen. Calving pens and pre-fresh pens should be evaluated for cleanliness and stocking density as well. Differentiating between the diagnosis of metritis and retained placentas will determine which areas require more focus in working up the cause of uterine disorders.

Hypocalcemia – milk fever

Clinical milk fever can be defined as a cow who is unable to rise, hypothermic, tachypneic, quiet and unresponsive often with a characteristic "S" curve to the neck. In all reality, there are degrees to severity of hypocalcemia which can result in incomplete presence of all clinical signs. When measured, hypocalcemia is defined as a serum calcium level < 6.5mg/dL.¹ Subclinical milk fever can present as cows with suppressed milk production, variable weakness in the post-fresh pen and a slower start to lactation. When measured, hypocalcemia can be defined as a serum calcium level between 6.5 and 8.0mg/dL.¹ This is often presented to the veterinarian as a high number of milk fever cows, having to IV a lot of cows recently, or cows that are struggling in the fresh pen.

Work-up of hypocalcemia relies directly on the veterinarian's observational skills for the individual cow as well as group dynamics. Evaluating the body condition score of affected animals, evaluating the dry period length, timing in the pre-fresh pen, and the timing of hypocalcemia relative to freshening. It is also important to evaluate the animal's ability to respond to treatment with intravenous calcium to differentiate from hypophosphatemia which can present similarly. In addition to understanding what is happening to the individual animal, it is important to understand if there have been any changes to how animals are treated in the transition period and ration changes in both the pre- and post-fresh pens. It is also essential to understand if this is a perceived or real deviation from baseline for the herd you are working with.

Hyperketonemia – ketosis

Subclinical ketosis can present as a slight decrease in milk production with or without inappetence. Clinical ketosis can be defined as an anorexic, lethargic cow with decreased milk production and weight loss. In some cases, the breath may have an acetone or sweet smell, and in severe cases, neurologic signs may present as well. These cases are often presented to the veterinarian as off-feed cows in the fresh pen or possible displaced abomasum (DA) cows.

Veterinarians are most commonly asked to work up and identify causes of clinical ketosis as subclinical ketosis often goes undetected in a herd unless ketosis monitoring is a part of routine fresh cow monitoring and results are recorded. Diagnosing ketosis relies on the ability to identify ketone levels in the body through either blood, urine or milk ketone levels, listed in order from most to least sensitive. It is also important to consider the body condition score of the ketotic animals. Animals that are severely over-conditioned are more likely to present with ketosis due to inadequate liver function and animals that are severely underconditioned may also present with ketosis after being off feed for some period of time during the transition period. In addition to body condition score knowing how many days in milk (DIM) a cow is at ketosis diagnosis can help identify the source of ketosis. For example, a cow presenting with ketosis < 7 DIM is more likely to have a root cause in the dry period as compared to a cow presenting > 7 DIM who is more likely to have a root cause in the post-fresh period. It is also important to consider compounding disease processes as in many cases a breakdown in the transition period can result in multiple issues. Identifying the primary issue then becomes the task of the veterinarian.

As ketosis is primarily a feed-related disorder, it is important to evaluate the entire post-fresh pen. Have an understanding if any ration changes have been made within a week of identifying the ketosis issue. Identifying the current stocking density of the fresh pen as it pertains to headlock space as well as free stall space, when applicable, and understanding if the current stocking density is a deviation from normal. Identifying any time frame in which animals are without feed and if that time change has been altered within a week of the ketosis issue arising. Looking back even further and identifying the stocking density of the dry cow pen both now and when the ketotic animals were housed there is also important. In the case of ketosis, understanding the entirety of the animals' environment is an important part of identifying and correcting the root cause. In many cases it will be multifactorial and may correct itself to some extent before the root cause is identified. However, in the process of working up a ketosis disaster on farm, a veterinarian may implement a fresh cow screening process that can turn into a long term consulting opportunity and aid in identifying breakdowns more rapidly in the future by identifying subclinical ketosis before clinical ketosis presents itself.

Transition period monitoring basics – dry period

Evaluating an animal's body condition score at key points in her lactation is one area that is often overlooked by veterinarians, but is quite simple to not only perform, but track and use as an analytic tool combined with other monitoring strategies. During the dry period, an animal should not lose body condition or gain excessive body condition, but rather maintain her body condition until calving. Seasonality plays a major role in how an animal can maintain her body condition throughout her lactation and dry period. By routinely monitoring and recording an animal's body condition score, the veterinarian can communicate and work closely with herd owners and nutritionists, but also anticipate issues in the post-fresh period before they arise. Animals that dry off underconditioned require more energy in the dry period to calve at an appropriate condition whereas animals who calve over conditioned are best suited to maintain condition through the dry period and aim to adjust during their

next lactation as opposed to decreasing condition during the dry period.² Utilization of body condition score during the dry period is not only a great monitoring tool to anticipate problems in the post-fresh period, but is also an indicator of the health of the herd as they finish their lactation.

Some herds utilize a dietary cation-anion difference (DCAD) diet during the close-up portion of the dry period. When fed appropriately, the DCAD diet works by acidifying the cow's overall pH to approximately 5.5-6.0 which will improve calcium mobilization and decrease the incidence of hypocalcemia after calving. Routinely monitoring the herds urine pH is a simple task that can be performed as a part of routine herd health or delegated to veterinary technicians. To monitor the DCAD, urine samples are collected from cows that are at a minimum of 14 days post-dry-off/movement into the close-up group and evaluated using a pH meter or pH paper. Over acidification can lead to loss of body condition due to inappetence which leads to increased clinical/subclinical ketosis in the post-fresh period while under acidification is ineffective in decreasing the clinical incidence of milk fever.³ Variation in urine pH can be caused by inconsistent mixing, inconsistent feeding rates, changes to other aspects of the ration impacting palatability and dry matter intake. Routine monitoring aids in rapid identification in variability outside of the target range and minimization of issues in the post-fresh period.

Evaluation of non-esterified fatty acids (NEFAs) in the pre-fresh period can be an excellent evaluation of the state of an animal's energy balance as she enters the stressful calving period. NEFAs should be measured 2-14 days pre-calving with a threshold of > 0.3mEq/dL.⁴ While NEFA testing can be done at the individual cow level, it is most commonly used as a surveillance tool in the pre-partum period. Herds with a NEFA level > 0.3mEq/dL in 15-20% of the herd are more likely to have a higher incidence of transition disorders vs. herds with a lower percentage > 0.3mEq/dL.⁴ When paired with post-partum NEFA levels or post-partum BHBA levels this can be a very useful tool in understanding how stressful the calving period is on a herd basis.

Basics of transition cow disorder diagnosis – post-fresh period

Evaluation of the cow in the post-fresh period is something all veterinarians should be equipped to do on an individual cow basis. Utilizing the tools we have available to clinically evaluate the post-fresh cow for individual diagnosis we can create herd level thresholds when routinely monitoring the post-fresh group. Similarly to monitoring in the dry period evaluating the post-fresh period allows the veterinarian to pinpoint breakdowns in the transition period and address them before they become a larger issue. In larger herds it is common for employees to screen post-fresh cows routinely up to three weeks post-freshening. Employees then follow a decision tree appropriately treat the animal based on their findings of animal body temperature, presence of malodorous discharge, ketone levels and general appearance. Understanding what this looks like on individual farms is essential for the veterinarian to provide protocol oversight as well as determine if the farm is properly diagnosing and treating specific disorders.

The simplest area of intervention is understanding how individual farms are identifying and recording their transition events. In this veterinarian's experience, the most misconstrued disorder classification is retained placenta vs. metritis. Some herds

will split this out diligently with treatments for each disorder. Other herds will lump both together and treat them the same regardless of the animal's clinical presentation. Understanding how your clients are not only identifying and treating animals but also how they are recording animals is essential to a full understanding when evaluating a transition period crisis.

Body condition scoring is again a very useful area to consider when working up transition disorders that is often overlooked by veterinarians and consultants. Animals should target a body condition score of 3.25-3.75 at calving.⁶ When evaluating post-fresh we can anticipate that an animal will have dropped her body condition score up to 0.25 of a point in the first three weeks through the stress of calving and transitioning into her lactation. Animals that are extremely over conditioned are more likely to experience related to inadequate metabolism, hepatic lipidosis related to ketosis, milk fever and a slow start to lactation during the post-fresh period. Under-conditioned animals are more likely to experience issues in the transition period related to inadequate energy, this can present as uterine disorders, ketosis, and milk fever, but may not exhibit a slow start to their lactation. Understanding how an animal's body condition has changed from her time in the dry period to post-freshening is a strong indicator of the amount of stress that animal has undergone during the transition period. Stress during the transition period can result in any of the transition disorders discussed here.

Evaluating animals for ketosis is something that has a very low barrier to entry for young veterinarians as the tools needed for screening are the same tools needed for diagnosing ketosis. Blood beta-hydroxybutyrate (BHBA) measuring is the most reliable way to diagnose and screen animals and can be done on a routine basis evaluating a subset of animals to identify subclinical ketosis prior to a ketosis break in the transition cows. To screen cows for subclinical ketosis, cows should be evaluated between three and 15 DIM and approximately five hours post-feeding. Depending on herd size the number of animals evaluated will vary. For herds where more than 20 animals meet the DIM criteria, 20 animals should be sampled on routine basis. By evaluating animals five hours after fresh feed is delivered, veterinarians will most accurately capture subclinical ketosis as BHBA has been shown to be the highest four to five hours after feed drop.⁵ This can be weekly, bi-weekly or monthly depending on the degree of concern for the herd. When sampling this way, the veterinarian should target less than 15% of the animals demonstrating a BHBA level greater than 12mg/dL. A level greater than 15% reveals the presence of subclinical ketosis and corrective action should be taken under the guidance of the herd nutritionist. Screening in this manner can prevent a clinical ketosis outbreak and prevent future displaced abomasum cows by catching and treating early while taking corrective action for the whole herd.

Comparatively, NEFAs can also be measured post-fresh. When coupled with pre-fresh NEFA values, post-fresh NEFA values can aid in identifying the severity of transition period stress a herd is experiencing. When performed routinely a herd baseline can be established and deviations from normal can be identified early resulting in more timely corrective action. NEFA concentrations > 0.6mEq/L in animals 2-14 days postpartum demonstrates a significantly increased risk of metritis, clinical ketosis and left displaced abomasum later in the post-fresh period.⁴ For herd level screening, > 15% of animals with > 0.6mEq/dL indicates that animals are undergoing too much stress during the transition period and corrective action needs

to be taken to prevent further issues and losses. Ideally, a group of 20 animals would be sampled during the post-fresh period. For small herds, this may indicate that all animals between 2-14 DIM are sampled, whereas on larger herds, random sampling is needed to limit sampling to 20 animals. Post-Fresh NEFAs are less commonly performed due to the ease and low cost of utilizing blood BHBA which return results cow side without the use of a reference laboratory.

Conclusion

Working up transition disorders can be both frustrating and rewarding for the veterinarian. Understanding the clinical animal is important, however, a deeper look at her environment in both the pre- and post-fresh pens will aid in identifying the root causes of transition outbreaks. This includes evaluating the body condition score of animals in both groups, changes to the rations, stocking densities, periods without feed and overall stall cleanliness. Deviations from the herd baseline in any of these areas can result in major breakdowns in the transition period. However, in many cases issues are multifactorial and can be influenced by the season as well. By looking at the full picture of what is happening to the animals in this stressful period of life veterinarians can not only correct current issues but can develop a consulting portfolio to identify and prevent further issues in the future.

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