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TECHNICAL UPDATE

Reducing the Risk of Bloat in the Young Calf

Calves fed more milk will not be dBloat is a condition found in both the dairy and beef industries; certain situations appear to have increased the number of cases in young calves in recent years. Bloat can affect either the abomasum or the rumen. The exact cause of abomasal bloat is unknown but it is clear certain things must happen to produce abomasal bloat:

1. **An excess of fermentable carbohydrate in the stomach (from milk, milk replacer or an electrolyte solution)**
2. **A fermentative enzyme (produced by bacteria, many of which are present in the calf stomach all the time) capable of sustaining rapid fermentation resulting in the production of excessive gas that builds up and cannot escape**
3. **Something that slows the rate of abomasal emptying – anything that slows down the rate at which milk empties from the abomasum, will give the bacteria already present more time to ferment the milk**

Clearly the calf has to be provided with milk (a fermentable carbohydrate), and many of the bacteria responsible for fermenting the milk are present at all times. Therefore, controlling how long the milk sits in the stomach is important. There are two main factors involved in controlling the rate of abomasal emptying; 1) milk volume per feed, and 2) osmolality (i.e. the concentration) of the milk.

Milk Volume

The larger the volume of milk per feed – the longer it takes for the milk to empty from the abomasum (this is a way of controlling how quickly nutrients are presented to the small intestine). As a guide, 2 litres of milk empties in about 90 minutes, compared to 4 to 5 litres taking 3 to 5 hours. When using a computerised feeder, it is best to limit milk volume to a maximum of 2 to 2.5 litres per feed; but make sure that the total volume fed per day is split into equal meal sizes. For example, if the total volume of milk fed per day is 6 litres, allow the calf 2 litres of milk three times a day. When using a twice daily feeding system, milk feeds should be limited to a maximum of 3 litres per feed. Never feed the calf 4 litres (or more) in a single feed, and don't feed the calf a large volume once a day only.

Milk Osmolality

The second factor influencing how long the milk sits in the stomach is the osmolality of the milk; osmolality refers to how concentrated the milk solution is. Always mix milk replacer according to the manufacturers recommendation, and mix at the chosen concentration consistently. If using a computerised feeder, the feeder should be calibrated (using a jug and weigh scales) at least twice a week to ensure the correct concentration of milk is being fed. For all types of milk feeding systems, it is important to

remember that when starting a new batch of milk replacer, the system must always be calibrated.

As a guide, mix milk replacer from 12.5% (i.e. 125g milk powder per litre of mixed milk) to 15% (i.e. 150g milk powder per litre of mixed milk). Always mix at the chosen concentration consistently. The osmolality of many good quality milk replacers mixed at 15% will be fine for the calf but it is important to remember that once the milk is mixed at the correct concentration, other on-farm factors can subsequently increase the osmolality of the milk. These factors include i) poor calf health (e.g. scours, since a scouring calf will be dehydrated), ii) the addition of water-soluble antimicrobials or coccidiostats and rehydration fluids to the milk replacer, iii) using soft water to mix the milk replacer (since soft water will have a high sodium content), and iv) poor water availability and low water intakes.

Water

Water intake is key. If a calf does not drink enough water, this could lead to a high osmolality and subsequently slow the rate of abomasal emptying. To encourage water intake, it is important to provide fresh, clean ad libitum water from day 1. Water bowls must be kept clean. Ensure there is an adequate supply of water; if there are more than 20 calves per group, provide the calves with 2 water points. Water intake is difficult to monitor – a simple way to check calves are drinking water is to spend some time watching the calves; are the calves drinking water regularly throughout the day? If calves do not appear to be drinking water, consider moving the water point, and find a location that encourages them to drink, or consider the water source / quality. Remember a calf should be drinking about 1 litre per day at 1 to 2 weeks of age, 3 litres per day at 3 to 4 weeks, and about 5 litres for each 1 kg of dry feed consumed as weaning approaches.

The rate of abomasal emptying has a part to play in the onset of bloat, but there are also many other risk factors.

Colostrum

Colostrum is key for providing the calf with initial protection, as it contains antibodies to help protect the calf against disease in the first weeks of life, until its own immune system becomes functional. Colostrum must be kept clean. The storage and feeding equipment used for colostrum must be clean and disinfected - any contamination during collection, transfer or feeding puts the calf at risk by introducing bacteria when the calf has no active immunity to fight infection.

Colostrum Feeding Method

It is recommended to always use a bottle and teat to feed colostrum, since the incorrect use of an oesophageal tube could damage the vagal nerve (a long nerve extending from the brain to the abdomen, where it is responsible for abomasal motility). Any damage to the vagal nerve can make the calf more susceptible to bloat. If a calf is unable to suck and it is necessary to feed colostrum with a tube, check the tube is clean, soft, and in good condition, and inserted by a trained individual. Remember, a cold, hard tube will be harder to insert and more likely to result in damage. A calf should only be tubed once – do not use a tube for a second feed.

Bacteria

Many of the gas-producing bacteria (such as Clostridial bacteria) that are suspected to be the cause of abomasal bloat are present in the calf's stomach at all times. In small amounts, these bacteria are generally harmless. Anything that encourages the growth of these bacteria will increase the risk of a calf developing bloat. A good level of cleaning and hygiene of the feeding equipment (used to feed both colostrum and milk, whether using buckets or a computerised feeder) is essential in making any system a success. The young calf is under an enormous pressure in the first few weeks of life, and they simply won't tolerate high levels of bacteria in their environment. An excellent level of hygiene will help minimise the bacterial load and will benefit calf health and help to reduce the risk of bloat. Areas to focus on are colostrum handling, computerised feeders and water quality.

Computerised Feeders

Strict adherence to the recommended cleaning protocol for a computerised feeder is essential to minimise the bacterial load, with particular attention to the teats and tubes / pipes. At the start of a new calving season, it is recommended to place brand new teats and tubes on the feeder. The teat should then be swapped for a clean one daily (some producers are changing teats twice a day). The teat should be removed, washed with a brush in warm water using washing up liquid, rinsed under running tap water, and placed in a clean bucket with a sterilising solution (e.g. Milton sterilising fluid). The teat can be left in the bucket for up to 24 hours (i.e. ready for the next day). If using other products, it is important to ensure the teat is not tainted and rinsed properly. Teats should always be in a good condition – any teat that is damaged, worn or has a large hole should be disposed of. Computerised feeders have both automated and manual cleaning functions; running automated cleaning functions several times a day, together with manual cleaning, will reduce bacterial contamination in the milk being fed. It is important to consider the type of detergent being used – most computerised feeders are set to operate at temperatures of 45 to 55 °C thus it is important to use a detergent that is designed to work at these lower temperatures. Remember, detergents for use in the milking parlour are often designed to work at higher temperatures, and thus will not be effective for use in a computerised feeder.

Water Source

Using water with a high bacterial load to mix the milk replacer and / or as a source of drinking water, will introduce bacteria, and increase the risk of poor calf health and bloat. Wet weather conditions can have an impact on the microbiological quality of water obtained from a private supply (well, borehole or spring). Therefore, if a private water supply is used, consider testing for bacterial content.

Stress

Another preventative measure is to minimise stress; group size and milk volume are key. Bigger groups are associated with more competition, more stress, more disease, and poor health. Calves in larger groups will tend to drink their milk feed more quickly than calves housed in smaller groups. The ideal group size for young calves is 12 to 15 calves per group (maximum of 20 calves per group). Many computerised feeders are designed to feed 30 to 35 calves per feed station. Therefore, if calves are housed in larger groups of up to 30 to 35, minimise the age range between these calves within the group (ideally 7 days, maximum 21 days range), ensure calves have enough access to resources (i.e. feed calves more milk to reduce the competition at the feeder), and ensure there are enough water points (as a guide, allow 2 water points per 20 calves).

The primary source of nutrition for a calf during the first 3 to 4 weeks of life is milk, since the intake of starter is minimal. During the first 2 weeks, the calf experiences significant health and environmental stresses – feeding more milk (i.e. providing the calf with more energy) will help minimise stress and improve health during this period. As a guide, following the colostrum feeding period of approximately 1 to 3 days, feed 5 litres of milk until one week of age, then from one week onwards offer a minimum of 6 litres of milk per day. Ensure calves reach their peak milk allowance by 2 weeks of age at the latest.

The onset of bloat is a complex issue and is thought to be caused by a combination of many factors, involving both the management and nutrition of the calf. Always discuss the health status of your calves with your veterinarian. To learn more about reducing the risk of bloat on farm, ask your business manager for a copy of our Farmer Guide to Bloat.

Top Points:

1. Colostrum management – remember the 4 Qs (quickly, quantity, quality, sQueaky clean)
2. Colostrum feeding method – use a bottle & teat
3. Milk volume per feed – feed 2 to 2.5 litres per feed (3 litres maximum for twice daily feeding systems)
4. Mixing rate - preferably do not go beyond a mixing rate of 15% (i.e. 150g milk powder per litre of mixed milk) & always mix consistently
5. Milk curve - provide calves with at least 6 litres of milk per day from 1 week of age
6. Do not add anything to the milk replacer
7. Water intake – make sure calves are drinking enough water (1 L per day at 1-2 weeks, 3 L per day at 3-4 weeks, & about 5 L per day as weaning approaches)
8. Water source - ideally use mains water to ensure good water quality
9. Clean feeding equipment is essential - change & clean the teat daily
10. Group size – the ideal group size is 12-15 calves per group (with a maximum of 20 calves per group)

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