Mystery of the Displaced Abomasum

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The mystery of the displaced abomasum

Along with dogs' ears, the cows' abomasum (fourth stomach) is one of the most poorly designed functional organs that have ever evolved. Due to its location, when an atonic (no muscular tone) abomasum fills with gas from fermentation, it is able to float into a displaced position. Remember, the cows' abomasum is like our stomach and when we fill up with gas, we belch it out! However, a cow has three stomachs in front of the abomasum, so belching abomasal gas is very difficult especially when rumen function is compromised.

LDA (left displaced abomasum) is a stomach disorder in which there is physical relocation of the abomasum from the floor of the abdomen to between the left body wall and rumen. On average approximately 2% of cows get LDA's. However, during some periods, rates can be as high as 25%. The vast majority of LDA's occur in the first month after calving. They can occasionally occur before calving or in later lactation and even in calves and bulls.

The primary aetiological factor is a reduction in abomasal motility with complete flaccidity in some cases. The main causes include:

?? Genetic likelihood - deep chested Holsteins have been selected for an increased susceptibility. In Holsteins the degree of heritability has been estimated at around 28% (1995, Journal of Dairy Science). The smaller, shallower ribbed cows with adequate chest width may have less of a tendency to displace due to low abdominal space available and lower DMI (dry matter intake) requirements. However, these cows will be fed a lower forage (NDF) diet to get the yields they are capable of; so will there be any benefit? Not the cow for me! Although it is thought by some that these cows last longer?

?? Poor nutrition - high concentration / low fibre rations cause an increase in volatile fatty acid production in the rumen by fermentation. When these move to the abomasum they lower the pH. This increase in acidity can potentially cause abomasal flaccidity. An analogy to this, as the abomasum is the equivalent of our stomach, would be if you and I drank strong, neat vinegar (acid)- not very comfortable! In the USA, high incidence of LDA appears to be related to the high proportion

of finely chopped maize silage. This may be due to a combination of high starch and low fibre in this type of forage based diet.

About 80% of LDA cows have had sub-clinical ketosis before diagnosis. It develops around calving when the energy intake is not high enough to meet the cows' metabolic needs. Milk fever directly predisposes to decreased abomasal motility as may metritis, mastitis, peritonitis and ketosis. Also twins, difficult calvings, still births and retained placenta often precede LDA's.

Mineral and trace element content of the dry cow ration is an influential factor. Deficiencies involving magnesium will affect the number of milk fevers, as will the level of calcium (depending if DCAB system is used). Vitamin E and Selenium deficiencies will contribute to retained placentas, which potentially cause metritis. Poor sanitation of calving pens will also contribute to retained placentas and metritis. The cow's water bag will touch the bedding, she will get up and the dirty placental membranes will go into the uterus and inoculate the fluid creating an infection. All of which have the potential to result in secondary LDA's.

?? Physical factors - such as deep chested cows with a concurrent decreased appetite and smaller size of rumen in late pregnancy. In late pregnancy, the dry matter intake decreases due to less abdominal size space available for rumen fill. When the cow calves there is an increase in free space, so raising the likelihood for LDA's, especially if the management factors are not correct. The pregnant uterus lifting up the rumen can also allow the abomasum to slip under.

Prevention is better / cheaper than cure!

Herd problems can be prevented by feeding the transitional and recently calved cows according to their needs. It is important that cows entering the dry period, transition period and at calving are in the correct body condition - approximate condition score 3 (on a 5 point scale).

As already mentioned, 80% of diagnosed LDA's had sub clinical Ketosis, so strategies to prevent this is a good place to start. This need be no more than general recommended practices of nutrition and feed trough management, by allowing sufficient feed space and keeping fresh food available. This is especially important for freshly calved heifers, being at their most susceptible due to their young age, unfamiliar surroundings and having also just given birth, which is as unfamiliar and traumatic as anything is. They get bullied out of the feed trough and are possibly unable to handle cubicles, which all in all results in a nutritionally and physically compromised animal and thus susceptible to LDA's. Heifer acclimatisation prior to calving is essential.

Cows and in-calf heifers should receive a transition ration before calving in order to adapt to the diet they receive after calving and introduce heifers to the surroundings and to the presence of older cows. Supplying sufficient energy before and after calving is crucial. Low dry matter intakes and resultant energy deficient diets can lead to a number of consequences. These include:

?? Fat mobilisation - where the cow attempts to provide energy from her body. This leads to fatty liver and ketosis resulting in impaired liver function.
?? Poor immune function - greater risk of mastitis, metritis and empty rumen syndrome.

All of the above increase the likelihood of LDA's

An adequate supply of quality protein (sufficient DUP) is essential for mother and calf health status. Colostrum quality, calf growth and cleansing are a few of the factors influenced by protein content. Detachment of the placental cotyledons from the mother's uterus is compromised if dry cow nutrition is inadequate, resulting in retained placentas.

Close ups consuming more dry matter on the day before calving had higher dry matter intake 21 days after calving (Hoards Dairyman). Anything you can do to improve intake at calving is a winner!
Forage intakes can be found on NDF (Neutral Detergent Fibre) levels where a maximum of 1% of body weight is required. If any more than energy intake is suppressed and if levels are low, cudding is reduced. This indicated the importance of energy density.

Breeding programs that select for a persistent lactation curve, high lifetime milk production and DMI capacity may have a long term effect in reducing incidence of LDA's. This would only occur if adequate DM and nutrients were provided.

The use of easy calving bulls on heifers needs to be considered since difficult calvings can lead to all manner of problems. Unfortunately we must be careful with these bulls, as their daughters will also have to calve eventually!

Transition cow programmes continue to be one key to high production, longer lasting cows with fewer health problems. Generally when cows transit easily into lactation, LDA's are few and far between. My father used to tell me, "The best men work for the cow, so we should try and breed the man for the cow". Nowadays we are tending to breed the cow for the individual and for the farming system we choose to use. A combination of both is certainly needed, especially if systems such as extended grazing are used.