

## **Milk Fever (Hypocalcaemia)**

### **A metabolic disease resulting from low blood calcium levels**

Milk fever can occur from 2 days before to 2 weeks after calving although highest risk is the day of calving and for the next 3 days. A contributing factor is a dietary imbalance of calcium and magnesium, especially if excessive levels of potassium and nitrogen are involved. The sudden demand for calcium at the onset of lactation may not be met by the diet and the hormonal control of blood levels is inefficient at this time.

Calcium blood levels are controlled by a small gland in the neck called the parathyroid. The gland produces a hormone that boosts blood calcium by various mechanisms, but especially by resorbing it from bone. It normally takes a few days after calving for this mechanism to function fully, which is why we usually see milk fever at that time. The gland needs good levels of magnesium to work properly, so milk fever is sometimes also associated with low magnesium intake. However, we can get the gland up and running a bit earlier either by acidifying the diet of the springers and/or feeding them something with low calcium and potassium content, for example maize (see below).

Susceptibility to milk fever can be inherited, tends to affect high producing 5 year and older cows and those with Jersey in their ancestry. Over-conditioned animals fed a low fibre diet with inadequate magnesium are most at risk.

Most fully certified organic farms have a low incidence of milk fever due to the grass being in better balance through more consistent growth.

### **Clinical signs**

- The signs we see with milk fever are due to paralysis. It affects all body systems including the gut plus any gland that produces fluid.
- First signs are restlessness and disorientation, followed by weakness in the hind legs, staggering and recumbency.
- Initially the cow is able to sit up. The neck assumes an S shape but the head eventually folds around to lie against the flank.
- Body temperature drops. Eyes become glazed and the nose becomes dry.
- Eventually she can sit up no longer and lies flat out on her side. Bloating may then occur as her gut becomes paralysed. This is a dangerous situation. Excessive bloating may cause vomiting which, due to paralysed swallowing reflexes, often results in stomach contents finding their way into the lungs
- Even without bloating, untreated milk fever can lead to coma and death within a few hours.

There is a test available (using fluid from the eye of a freshly dead animal) to get accurate information on calcium and magnesium levels at the time of death. Ask your vet for details.

## Prevention – before calving

- Manipulating the diet of the springer mob helps reduce the incidence of milk fever. First and foremost is ensuring adequate magnesium levels in the cows by careful supplementation. Feeding them something with low calcium and potassium content (maize, hay) also helps.
- Ensure the diet is not high in potassium (K) which interferes with magnesium absorption. Don't calve on effluent paddocks - high K levels (and *Strep uberis* )
- If there is a **high risk** of milk fever, acidifying the diet of the springers (thus lowering the DCAD) by adding magnesium chloride or sulphate to the system is an option. Chloride probably works better. The only problem is getting enough into the cows: 120 - 150 g/cow/day. The best way is to dissolve it in water and pour onto supplement but unless that supplement is maize, something to disguise the somewhat bitter taste is usually needed - molasses is good. If this still does not provide quite enough magnesium (see 'Grass Staggers' below) a little Causmag can be added as well.

**Note** this should be done with the **springer mob only**. If the diet of dry cows is acidified, they get used to it after 3 weeks or so and it won't work. Once cows have calved, you can switch to Causmag only.

- Calcium should never be supplemented before calving as this slows the response of the parathyroid gland. Be careful with autumn lime application on volcanic soils as this may boost pasture levels significantly.
- Vitamin D helps absorption of calcium from the gut and helps prevent milk fever when given a week or so before calving but currently there are no safe preparations certified for use.

## Prevention – after calving

- Drench at-risk cows with an oral preparation for a day or 2 after calving. Make up a mix of lime flour (a couple of handfuls), causmag (a handful) and fish or vegetable oil and shake it up in warm water. You could also add apple cider vinegar and/or molasses (molasses helps absorption)
- Consider adding lime flour (40 - 100g per cow) to supplement fed to the colostrum mob. If you're feeding maize after calving, lime flour is essential.
- If in doubt, have some cows blood tested before calving (to check magnesium levels) and after calving (to check calcium levels).
- Weekly doses of homoeopathic Cal Phos and Mag Phos in the trough the first 4 weeks of lactation to help the animal metabolise both.
- Feed hay that contains a good percentage of clover. This will increase the calcium content, while at the same time through the extra chewing, increase the amount of saliva reaching the gut and therefore helping to stabilise ruminal pH.

## Treatment

### (1) Oral

- No commercial oral preparations are certified but you can make up your own mix.

Suggested recipe: dissolve calcium chloride (around 150g, but no more than 200) in 200ml of warm cider vinegar. Make sure it's properly dissolved before adding a similar amount of fish or vegetable oil, then add 50g Causmag and make it up to 5 - 600 ml with molasses. Shake thoroughly – it's important to ensure the oil is well suspended as it helps protect the gut against irritation due to the calcium chloride. Note calcium chloride absorbs much quicker than lime flour so is better as an oral treatment. However, it is quite irritant and can cause stomach ulcers if used repeatedly so it is not recommended to give more than three treatments with this product. If prolonged treatment is required, replace calcium chloride with lime flour.

This mix is only suitable for cows that have swallowing reflexes! That means cows that are still on their feet or have only just sat down but can still hold their heads up. Even so, be VERY careful with these cows - make sure the stuff is going down the right way!

## **(2) Intravenous**

- Check with your certifier which CBG products are allowed. You need to get them written into your management plan. Note they are for intravenous use only – once the cow is sitting up and has regained her swallowing reflexes, follow up with an oral drench.

### **If she still won't stand up:**

Common sense with any downer cow is to warm the cow up. Parallel to treatments is the importance to get her out of the wind and off wet ground. Put her in the barn on a soft surface, pack hay around her with a cover on top or whatever you have to do to get her warm. It's vital to ensure blood circulation through the back legs is maintained while she is down so move her from one side to another at least 4 times a day. Periodically tip her on her side and vigorously bend and straighten both back legs for few minutes. (Don't stand *behind* the legs when you do this – she might still be capable of booting you). Provide feed, water and oral drenches. If there's no progress after a few days, your vet can carry out a blood test which estimates her chances of survival.

Other suggestions from farmers:

- Do not milk the cow out completely for 2-3 days; alternatively, leave the calf on the cow for 36 hours. Watch for mastitis – cows not milked fully are more at risk.
- Plants rich in calcium – watercress, crushed nettles, molasses, chickweed, comfrey, alfalfa, willow twigs and boughs, root crops, poplar, tagasaste. birch, barberry, plantain, red clover, raspberry, rosemary, shepherd's purse. Many have a balance of calcium and magnesium. Plant them or make a tincture with cider vinegar when they are growing to drench the animals with at calving.
- Immediately give calcium and iodine rich drench with 2 handfuls powdered seaweed mixed with 1 kg molasses. This is then mixed with warm water or milk to make it runny, drinkable consistency. Repeat this hourly.
- 1 cup molasses, 4 tablespoons linseed oil or meal, 2 tablespoons salt, 2 tablespoons causmag or dolomite. Give as a lick on feed.

- A salt lick recipe used:
  - 10 litre bucket of seaweed powder
  - 10 litres cider vinegar
  - 10 litres water or molasses
  - 20 litre bucket of salt
  - 1 sack of dolomite
 Mix all together in a concrete mixer, liquids first then solids. Epsom salts can be added or replace the salt to add more magnesium.
- Check with your homeopath for milk fever treatment remedies

Remember: always check with your certifier before giving any homemade remedy

Milking goats can also get milk fever in the first few days after kidding and will display the same symptoms as cows. Treatment is similar in proportion to their size.

### **Grass Staggers (Hypomagnesaemia)**

- A metabolic disease resulting from low blood magnesium
- Wide variation in clinical signs
- Sudden stress can trigger an extreme episode
- May occur along with milk fever or ketosis
- Prevention prior to calving is best

#### **What is it?**

Magnesium is held in the muscle and used by the muscles and nerves. It has a rapid turnover in the body and there are no stores on which the cow can draw. High producing cows are most at risk due to obligatory loss of magnesium in the milk thus a tendency to this illness can be inherited.

Grass staggers can occur up to 12 weeks post calving in the spring when the grass is short and growing rapidly and may also be seen in the autumn. Excessive potassium (K) in the diet suppresses magnesium absorption from the rumen. Young grass is generally rich in protein and potassium and low in magnesium. Mature grass is normally much more balanced but a key indicator is often soil temperature – until temperatures reach a consistent 12 – 14 degrees in the late spring, rapidly growing grass is a risky diet. Be particularly aware of magnesium problems when going into the second grazing round.

High potassium (K) will be an issue for many farms still in the conversion process and/or on soils with a naturally high available K. Also heavily manured farms and farms using effluent will be more prone to grass staggers. However, as the organic system develops, the risk of metabolic disease should decline.

## Clinical Signs

- Irritability in the shed is often the first sign of a herd problem. Magnesium can also have a very significant effect on production (up to a 20% drop in deficient herds)
- In individual cases you may see nervousness, irritability, twitching eyelids, anti-social behaviour, eyes glaring, frothing at the mouth, aggression (be careful, although they don't usually have the co-ordination to get you).
- This may progress to staggering and high stepping.
- Collapse with an epileptic-type fit, eventually coma, leading to death. Brain damage can result. This may occur with no warning. It's due to a sudden drop in magnesium levels in the CSF (the fluid that bathes the brain) and is most likely in cows that have had low blood magnesium levels for some time. The sudden drop in CSF levels is usually triggered by sudden stress (such as cold weather or coming on heat) but the stress factor may actually be quite minor. They commonly occur in the yard at milking.
- **Note:** Hypomagnesaemia can often be a complication of milk fever or ketosis. They all occur at the same time of the year. Cows which have been low in magnesium and then subsequently get milk fever as well are often much more difficult to treat. They tend to be the cows that are down for longer periods.

## Prevention

Prevention should start at least 2 weeks prior to calving for good insurance. There's a big variation. Some parts of the country and some farms need to start earlier and finish later.

Strictly speaking, any minerals (apart from licks) need to be fed on supplement so this means having sufficient hay or silage in reserve for the risk period. In any case, a bit of fibre in the diet through mid spring can only be of benefit. It doesn't have to be much – half a kilo is fine, so long as every cow has the opportunity to get some.

Magnesium products are all restricted and need to be written into your management plan:

- Causmag: also known as calcined magnesite or magnesium oxide. Note 'calcined' means heat treated – it has nothing to do with calcium. Causmag is alkaline. Magnesium content – 55%
- Magnesium chloride: Acidic. Magnesium content - 11%
- Magnesium sulphate (Epsom salts). Acidic. Magnesium content – 12%

Note the differences in magnesium content. The bitterness of chloride and sulphate means the cows may not take enough in without using something to disguise the taste (see also the section on acidifying the diet to prevent milk fever). As a guide, 10 – 30g of elemental Mg per cow per day is required through the risk period. However, it depends on the risk – some farms can get away with just small amounts of Epsom salts. Others, especially those on volcanic soils at altitude, need lots of Causmag. Also, every season is different. If in doubt, have some cows blood tested.

Causmag needs to be applied wet onto hay otherwise the cows will shake it off. Mix it up with plenty of water – if there's too little water, it'll get hot and turn to concrete. Pour it onto the cut edge of small bales or onto (but not through!) a round bale once it's rolled out. Adding a bit of molasses will also help it stick.

Self-help systems on their own are generally less effective at keeping magnesium levels up, but can be quite useful as an adjunct to supplementation. For example:

- Mineral licks before and after calving. Make sure they are OK with your certifying agency. Don't feed anything with salt to springers (excessive bagging up, especially heifers).
- Home made mix: 25kg Epsom salts, 25 kg Causmag and 8 litres molasses.
- Homeopathic Cal Phos/Mag Phos and Kali Phos 30c in trough weekly 2 months before and after calving. This can be done in conjunction with the above suggestions.

#### Other considerations

- If you need to lime, topdressing with dolomite will help boost pasture magnesium. Dolomite has calcium and magnesium in it. Check its heavy metal levels first. **Note** dolomite works faster and releases more magnesium than serpentine.
- Avoid sudden feed changes. Try to 'ease' the herd onto second round grass. If this is not possible, increase the amount of hay or silage to 1Kg per cow. Put cider vinegar in the trough each day.
- Spray pastures with biodynamic preparation 501 during the ascending phase to bring light into the pasture and strengthen it.
- Give the animals sheltered paddocks in cold and stormy weather.

#### Emergency treatment

- For a cow in the stage of epileptic-type fitting, options are limited. Intravenous magnesium is required but the only safe way to administer it without killing the cow is in combination with calcium to protect the heart. Using a 60ml syringe, inject 3 syringe-fulls (180ml) of 20% magnesium sulphate into a bag of calcium via the little short tube with the rubber plug in the end. Run it into the vein as quick as it will go through a needle but don't squeeze the bag. If you need to give a second bag, run it in slowly. Once the cow has settled down, you can follow this with a bag of dextrose. Also as a follow up, magnesium sulphate can be given as an enema (absorbs quicker than if given under the skin) – you may wish your vet to do this. If the cow continues to fit after intravenous treatment, call your vet who may decide to anaesthetise her.
- For a cow still on her feet, make up a mix of Causmag (2 handfuls) plus Epsom salts or mag chloride (1 handful), molasses or sugar and apple cider vinegar shaken up in warm water. Grass staggers cows are excitable – be careful when drenching or it may go onto the lungs. Stop pouring every few seconds to make sure she is swallowing it.

- *Homoeopathically*: To help them recover and limit the damage to the central nervous system give Mag Phos 30c plus. Ask your homeopath for other treatments.
- Keep them warm, quiet and avoid loud and sudden noises.

### **Ketosis (acetonaemia or ‘acidosis’)**

This can be confused with grass staggers or milk fever. It classically occurs 4 –10 weeks post calving and affects high producing cows which calved in excellent condition. More commonly it is a secondary disease associated with anything which suppresses appetite. Ketosis is an energy crisis where the dietary intake of energy is insufficient for the proper breakdown of fat. Instead the level of blood ketone by-products rises accompanied by declining production and a rapid loss of body condition.

High protein, highly digestible feeds, shortage of feed, poor quality feed especially during late pregnancy, metabolic disease, stress and/or adverse weather can set the scene for Ketosis.

### **Clinical signs**

Note: Always check for the presence of another disease

- Poor appetite, rapid condition loss, declining production (may be sudden)
- Acetone smell on breath
- Strange behaviour such as licking or chewing rails or dirt, sham grazing (not very common).
- In extreme cases, nervous signs, especially *aggression*. Extreme cases are quite rare and may be confused with grass staggers. Be **very careful** with these cows. Unlike with grass staggers, these animals are still fully co-ordinated and are quite capable of nailing you.

Your vet can do a blood or urine test to confirm Ketosis.

### **Treatment options:**

- Intravenous glucose (dextrose)
- Drench with 250ml glycerine and 250 ml molasses.
- Cider Vinegar (500ml) as an energy source and to aid digestion.
- Homoeopathic Lycopodium

In the near future, we may be allowed to use injectable vitamins, in which case a shot of vitamins B1/B12 will aid recovery.