

Hypomagnesaemia



Figure 1. Dietary supplementation

Magnesium (Mg) is a vital component of metabolic events. It is especially important to ensure correct nerve and muscle function, as well as bone formation. Hypomagnesaemia (low blood magnesium), often known as Grass staggers or Grass tetany, is a condition deriving from an insufficient magnesium intake and is also a significant risk for the development of clinical or subclinical hypocalcaemia (milk fever).

The estimated mean annual incidence of hypomagnesaemia is less than 1%. These cases often present in spring-calving beef suckler cows, but can occur in dairy cows, especially when not supplemented in the dry period. Subclinical/chronic disease often goes unrecognised but investigations have revealed an annual rate of 3–4% in lactating dairy cows.

Main cause

Cows are almost entirely dependent on a continual daily dietary intake of Mg as there is only a small available pool of the mineral internally to cover shortfalls. A lack of dietary supply (i.e. diets with less than 0.4% of Mg, DM basis) and/or intake of Mg (low dry matter intake) will, therefore, lead to the development of hypomagnesaemia.

Risk factors

- Low dietary Mg content
- Low dry matter intake
- Rumen pH: when it increases, will decrease the solubility of Mg, making it less absorbable. Forages with high potassium (K) content and those heavily fertilised with potash lead to rumen pH increases

- High levels of ammonia from nitrogen (N) fertilisers can inhibit Mg absorption
- High dietary K can directly reduce Mg absorption in the rumen
- Very low dietary sodium (Na) may reduce Mg uptake in the rumen
- Lush, wet pastures increase the rate of passage through the rumen and reduce the absorption of Mg
- Some unsaturated fatty acids (linoleic, linolenic acids) can form insoluble salts of Mg and reduce its absorption
- Older cows absorb less Mg

Normal Mg levels should be 0.8–1.0 mmol/L. Blood levels less than 0.8 mmol/L are associated with clinical signs of hypomagnesaemia.

Economic impacts

Due to the high risk of culling in affected individuals and the possibility for outbreaks, the potential cost of this disease can be significant.

Observed signs

A range of clinical signs can be present, but the most common presentation is acute disease or sudden death. This is a veterinary emergency and must be treated immediately. In many instances, Mg levels can decline slowly over weeks without clinical disease.

Hypomagnesaemia doesn't correlate well with clinical signs. The signs can often be seen as either a single affected individual or outbreaks of disease in large groups of cattle.

Other signs are reduced dry matter intake, nervousness, a reluctance to be milked or herded, reduced milk fat and yield. This may progress to the development of neurological signs including incoordinated movements, hyperexcitability, muscle spasms and seizures (chomping of jaws and frothy salivation). The final stages are characterised by lateral recumbency (unable to stand voluntarily) and death.

Hypomagnesaemia and hypocalcaemia

Mg plays a significant role in the secretion of the hormone that controls blood calcium and the responsiveness of tissues to that hormone. It is estimated that more than 75% of hypocalcaemia cases seen in mid-lactation are due to inadequate dietary Mg supply.

Preventative strategies

Ensure appropriate supplementation of all groups by reviewing dietary levels. Consider seasonal risk periods, i.e. post turnout, especially during periods of rapid grass growth.

Ensure complete mineral review of diets and forages every 6 months.

- Close up dry cows: reach dietary levels of 0.39–0.5% DM. The higher end of the range is required with higher levels (>1.5%) of dietary potassium (K)
- Lactating cows: reach dietary levels of 0.25–0.3%

Ways of supplementing Mg

There are different ways of supplementing magnesium; choose the way that works best for your system.

- Free minerals and licks
- Compound feeds
- Boluses (not very long lasting)
- Water – magnesium chloride flakes can be added to the water. The recommended concentration for lactating cows is 250 g for 100 L. Do not exceed the dosage because water can become unpalatable, stopping the cows from drinking
- Pasture dressing (every 10–14 days with calcined magnesite)

Some Mg sources, i.e. MgSO_4 and MgCl_2 , contain only 9% and 12–18% Mg respectively. In addition, they are unpalatable and provide no buffering action.

Calcined magnesite (MgO) contains circa 55% Mg and, therefore, can be fed in smaller amounts, is more palatable and is a more effective rumen buffer.

Monitoring

Sample a representative population of cows/group.

- Within 12 hours of calving, assess that blood magnesium levels are adequate. Suboptimal levels may either indicate a lack of Mg in the diet or a problem with absorption

- In early lactation, to ensure adequacy of the diet
- Target ≥ 0.8 mmol/L

Review the magnesium content in the diet on a regular basis, especially during high-risk periods.

Treatment options

Individual

- Immediate treatment is required by a vet, as this is an emergency
- Clinical response can often be unsuccessful, depending on time between onset and treatment
- Do not encourage rising for at least 30 minutes post-treatment, to avoid the stimulation of tetany (muscular spasms) and convulsions
- Recovery will often be achieved in 1 hour if successful, although relapses occur regularly within the subsequent 12 hours
- When the cow can reach a stable sternal recumbency (lying on her breast bone), you can provide oral Mg to support longer-lasting magnesium levels, as other treatments may only support adequate levels for 3–6 hours
- Offer feed to ensure intake and prevent further relapse
- Individual cases can often represent the 'tip of the iceberg': the group or herd status, i.e. testing and supplementation must also be considered

Herd health planning

- Adopt preventative strategies and assess the risk at certain times of the year

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