Prevent milk fever with calcium boluses

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Data from the National Animal Disease Information Service (NADIS) reported that the incidence of milk fever in UK dairy cows rose considerably in July 2007 reaching, for the first time in recent years, the long term average.

The occurrence of metabolic disorders continues to increase from season to season, with no indication of the cause of the increase. However, farmers and veterinarians can introduce a range of management practices and nutritional interventions to help reduce the risk of animal suffering and economic loss. In contrast to other minerals, blood calcium levels are hormonally controlled within a narrow band. Milk fever affects 5-7% of cows in the first one to two days after calving.

Furthermore, a sub-clinical level of hypocalcaemia may occur in 23-39% of cows post-partum. Incidences also increase with age and parity as older cattle become less responsive to the hormonal calcium control mechanisms.

To get an idea of the magnitude of the problem for the modern dairy cow, the production of 10kg of colostrum requires 23g of calcium. A cow producing 25kg of colostrum would have to replace her total blood calcium every hour. Helping animals cope with 'the delay' in adjusting to this huge change in the demand for calcium by using slow release calcium boluses is now proving to be both popular and effective.

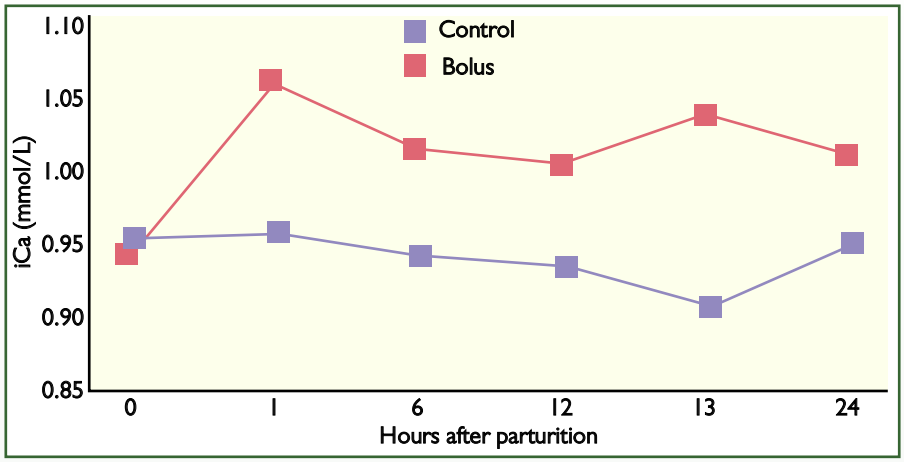

Fig. 1. Mean iodised blood calcium levels following bolus administration at 0 and 12 hours (Sampson et al, 2007).

Boehringer Ingelheim has launched study data showing the beneficial effects of the product Bovikalc on blood calcium levels in dairy cows and its ability to maintain a normal calcium level in the critical 'milk fever' period after calving.

The study was set up to investigate the effects of Bovikalc on calcium homeostasis during the first 24 hours after calving.

Specifically, the report documents the effects of Bovikalc versus a negative control group of hypocalcaemic parturient cows.

Blood samples from a group of 20 Holstein cows were taken at approximately 24 and 48 hours prior to calving and immediately after calving to measure the ionised blood calcium (iCa) level. Only cows that were slightly hypocalaemic were selected for the study i.e. those with ionised calcium level of 1.10 mmol/L or less at 0 hours.

The average ionised blood calcium (iCa) level following supplementation with Bovikalc at 0 and 12 hours was 1.03mmol/L in the first 24 hours after calving. In contrast, the iCa values of the control group were on average 8.2% lower after calving with an average value of 0.94mmol/L from one to 24 hours.

An interesting aspect of the study was the urine pH of the Bovikalc group also decreased. One way of manipulating the homeostatic control of calcium metabolism is to provide acidic salts in the dry cow ration for three to five weeks (DCAB). It has been shown that the response to the parathyroid hormone is increased when the cow is acidotic. Whether there is a short term benefit to the chloride and sulphate anions in the post calving period requires further investigation.

The study was undertaken by Julie Sampson and Dr Spain from the University of Missouri and Dr Craig Jones and Dr Lone Carstensen from Boehringer Ingelheim Inc.

It was presented at the Joint meeting of the American Dairy Science (ADSA) in San Antonio, Texas in July 2007.

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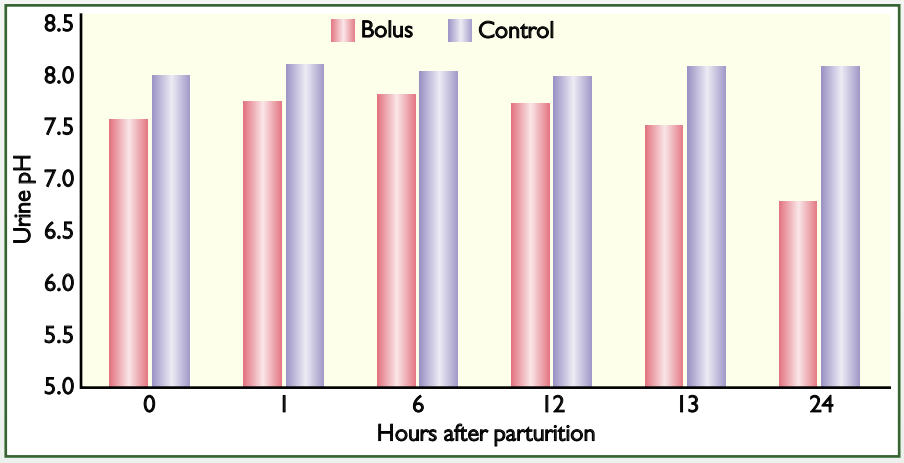
Fig. 2. Mean urine pH levels following bolus administration at 0 and 12 hours (Sampson et al, 2007).



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A combination of academic and industry research is behind the design of Bovikalc boluses, which dissolve within 20 minutes and quickly deliver 43g of calcium to the rumen. Calcium is then released in two forms, calcium chloride and calcium sulphate, which is available over a 36 hour period. Furthermore, Bovikalc has been designed to avoid the palatability problems associated with gels and pastes

Jim J. Parkins, BSc (Hons), PhD, C. Biol, F.I.Biol is Professor of Animal Health at the University of Glasgow and Director of the University Farm and Research Centre, an 850 acre grassland dairy, beef and sheep unit. After several milk fever fatalities, he started using Bovikalc as a preventative aid on the institute's herds with extremely positive results.

"In the Glasgow herd, one adverse effect of our programme of genetic and nutritional improvement has been an increase in the incidence of hypocalcaemia and clinical cases of milk fever. As the individual milk yield increased so did the problem of metabolic disorders.

"After losing several cows, we looked at dry cow management and nutrition as well as using Bovikalc calcium boluses immediately at post-calving. It is an invaluable nutritional tool, which differs from other more rudimentary calcium supplements. Calcium chloride is an excellent source of dietary calcium but is caustic and can damage the gullet tissue if given as a paste. The coating of the bolus prevents this and is quick to administer. After dissolving in the rumen, the calcium is rapidly absorbed and so helps maintain the blood levels at this critical period. Timing of administration of the bolus is very important and close observation of the cow is still necessary."

Dairy Farmer Simon Jones found that milk fever was running at around 10% in his 230 strong pedigree herd.

"The problem was severe enough to warrant some action, particularly when you consider that we also lost, on average, two cows each year with toxic mastitis – which, in my opinion, was the direct result of them going down with milk fever. I believe milk fever caused enormous stress and this lowered their ability to fight off infections."

Simon took advice from a herd nutritionist and started administering Bovikalc calcium boluses to cows that needed an extra boost at calving.

"You can start to see the first signs of falling blood calcium and, if you are quick, a clinical condition can be prevented. We're nipping any potential problems in the bud with Bovikalc and as well as helping reduce the incidence of milk fever, the problem of toxic mastitis has also disappeared. The cows are stronger at and around calving and do not succumb to infection. Administering a bolus is quick and easy – there are no excuses and so, as a result, there are fewer subsequent problems."

Professor Parkins commented further that hypocalcaemia (milk fever) has become an increasing occurrence in recent years as the individual milk yield of the cows increases year on year following genetic and nutritional improvement programmes.

This year milk fever cases locally and elsewhere seem to be unusually increased, but the exact reasons for this are far from clear. Higher individual milk yields in younger cows early on in lactation may be drawing hugely on the calcium demand such as to overwhelm the natural abilities of the parathyroid hormone to mobilise bone reserves of exchangeable calcium. Plus the dietary uptake may still be limited even with vitamin D – now acting as a hormone – to increase the gut uptake of calcium in the food.

It is important to stimulate hormonal removal of bone calcium in advance of calving by reducing the intake of dietary calcium – but lush summer grass is a rich source of calcium. In an ideal world you would want to confine a cow 10 days before calving or move them onto 'bare' pasture. However, this is becoming more difficult to achieve with ever increasing herd sizes.

With regard to calcium supplements, extra calcium as calcium carbonate in early lactation does not work as there is no increased uptake from the gut – it just gets excreted.

Calcium chloride provides an ionic calcium source, which is absorbed much more efficiently from the gut and helps maintain blood levels. ■