Prevention of Parturient Paresis by a Low-Calcium Diet Prepartum:
A Field Study

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Abstract
Twenty of 60 control cows fed a "normal" diet prepartum developed parturient paresis whereas none of 37 fed a low-calcium (13 to 18 g/cow per day) diet prepartum developed the disease.

Introduction
Goings et al. (2) reported complete success in prevention of parturient paresis during 12 parturitions of cows fed a calcium-deficient diet 14 days prepartum. Boda and Cole (1) have reported no parturient paresis in 16 cows fed a low-calcium, high-phosphorus diet prepartum. More recently, Westerhuis (7) reported complete prevention of parturient paresis in 45 parturient-paresis-prone cows by feeding a calcium-poor diet (33.1 to 43.9 g/day) prepartum and a calcium-rich diet (148.3 to 196.8 g/day) postpartum.

Our purpose was to evaluate the efficacy of feeding a commercially prepared low-calcium diet under dairy farm conditions to prevent parturient paresis.

Experimental Procedure
Dry cows with at least one lactation, in four Iowa Jersey herds, were divided into two groups according to number of parturitions and history of parturient paresis. The control groups were maintained under usual herd conditions. Treatment groups were fed 3.6 kg of commercially prepared low-calcium supplement plus 9 kg of the dairy farmer's corn silage for a scheduled 10 to 14 days prepartum. Actual range of feeding was 4 to 20 days prepartum. The commercially prepared supplement contained .12% calcium and .55% phosphorus. Ground shelled corn, steam rolled oats, and cottonseed meal were the main ingredients of the supplement. Data for Table 1 were derived from analyses of the various corn silages and from values given for prepared supplement. Calcium and phosphorus consumption (Table 1) was determined by NRC tables (3) and by presuming that all Jerseys weighed 450 kg and consumed a daily dry-matter intake equivalent to 2% of their body weight. Feed components and ratio of components fed were recorded by the dairy farmer. The main feed components of the diet of the "control" cows are listed in Table 1.

Results and Discussion
None of the 37 cows fed the low-calcium diet 4 to 20 days prepartum developed parturient paresis whereas 20 of the 60 "control" cows developed parturient paresis. The low-calcium diet did not have any adverse effects.

Initially, equal numbers of cows were...
scheduled to be fed the treatment diet or the "control" diet. However, cows that calved early and, in some instances, cows that were purchased during the experiment were allotted to the "control" group.

Ten to 14 day feeding of a low-calcium prepartum diet probably is the minimum that such a diet can be fed and still be effective in preventing parturient paresis. Ramberg et al. (5, 6) showed that it took about 10 days for total calcium input from gastrointestinal absorption to peak and also that, at this time, bone resorption started to contribute to total calcium input. Ramberg (4) also has shown that it takes about 10 days for cows fed a prepartal diet high in calcium to initiate mobilization of calcium from the bone. In contrast, cows fed a prepartal diet low in calcium are removing 10 g of calcium per day from the bone at parturition; at parturition, there is an immediate surge in calcium removal from the bone.

References


