

Hypokalemia and Recumbency in Dairy Cattle

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Introduction

This is a retrospective case series designed to highlight the clinical presentation, risk factors and treatment of severe hypokalemia associated with muscle weakness and recumbency in lactating dairy cattle.

Materials and Methods

All cows in this report were presented to either the ambulatory medicine service or the large animal internal medicine service at the New York State College of Veterinary Medicine at Cornell University between 1992 and 1998. Cattle demonstrating a serum or plasma potassium of ≤ 2.1 mEq/L and that were normocalcemic, normomagnesemic and either normoglycemic or hyperglycemic at presentation were selected.

Results

A total of 15 lactating cattle from 14 different farms were identified. Of the 15, 11 cows were recumbent at presentation while the remaining 4 became recumbent within 6 hours of presentation. Both multiparous cows ($n = 10$) and first calf heifers ($n = 5$) were affected. Median days in milk were 21 (range 5 – 110). Recurrent ketosis was the most common antecedent medical condition in affected cattle (13 of 15 cases). Medical treatment of cases with recurrent ketosis had been attempted with a variety of conventional therapeutic agents in-

cluding corticosteroids, intravenous dextrose, insulin and multivitamins. The remaining 2 cases had been treated for clinical mastitis by repeated intramammary infusion with a corticosteroid. The corticosteroid isofluprednone acetate was administered in 11 cases, one cow had received both isofluprednone acetate and dexamethasone, and 3 had received dexamethasone only. In all cases of isofluprednone acetate therapy, the dosage exceeded of manufacturer's current recommendations. Six of the 15 cattle recovered with aggressive supportive treatment, including intravenous and oral potassium therapy.

Conclusions

Hypokalemia should be considered in the differential diagnosis of weakness and recumbency in the early lactational period, particularly in individuals with a history of recurrent clinical ketosis. A number of factors could have contributed to development of severe hypokalemia in the cattle of this report. They include prolonged anorexia, intracellular shifting of potassium due to insulin release-either as a primary therapeutic agent or secondary to repeated administration of glucose precursors-and enhanced urinary potassium excretion due to excessive use of exogenous corticosteroids with mineralocorticoid activity. It is advised that clinicians consider oral and/or potassium supplementation to at-risk cattle, particularly individuals with recurrent episodes of primary ketosis in early lactation.