Systematic Review of Ketosis Treatment in Lactating Dairy Cattle

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Introduction

Subclinical and clinical ketosis are a significant health problem in dairy cattle. Ketosis can lead to poor reproductive performance, production losses, and increased risk of other health problems. The cumulative lactational incidence varies widely between farms, but is often near 30% and may be as high as 61%. With a cost per case as high as $350, ketosis can be a time consuming and expensive challenge for farmers.

The problem of effective ketosis treatment has been plaguing practitioners for decades. Many different treatment regimens have been utilized with varying degrees of success. Our objective was to systematically review the literature to identify efficacious treatments for ketosis and directions for further investigation.

Materials and Methods

An electronic search of four databases (Google Scholar, CAB, Agricola, and PubMed) was performed in September of 2010, using the search terms "ketosis treatment cattle" and "acetonemia treatment cattle". Studies were included in the analysis only if they involved treatment of naturally occurring ketosis in lactating dairy cattle, included clearly defined outcome and measure of variance, and included a control group. Control groups had to consist of affected cows, but could either be untreated or given a baseline medication consistent with the treated group for that study.

Result

The literature search yielded 1,402 citations, 346 of which were excluded as duplicate citations or for data duplication. This left 1,056 unique articles, theses, and conference abstracts. These materials represented over 35 distinct treatment modalities used alone or in combinations. Only 42 of the articles were appropriate for inclusion in the analysis. The most common types of exclusion were papers on related subjects, such as ketosis prevention and risk factors (n=338), review papers (n=204), and papers that were lacking a control group (n=226). The remainder of the articles were excluded because they included the wrong species (n=13) or production category (n=23), examined biochemical changes found in ketotic cows (n=73), validated diagnostic tests (n=48), or were a case study or survey (n=89). Propylene glycol, 300-500g per day for three to five days, was the only commonly used product to show consistent improvement in cure rates for subclinical and clinical ketosis, decreased risk of clinical ketosis, and increased milk production. The results for dextrose and insulin varied from a detrimental to beneficial effect, depending on the study. Steroids, such as dexamethasone, showed the poorest performance and often increased the duration of ketosis in affected cattle, increased the risk of development of clinical ketosis and increased the risk of other disease, such as pneumonia.

Significance

These data bring to light the serious deficit of appropriately designed ketosis treatment trials currently available in the literature. It highlights the small amount of evidence on which many common ketosis treatments are based, and supports the need for more well-designed ketosis treatment studies. Based on currently available data, drenching with propylene glycol appears to be a rational treatment for cows with ketosis.