

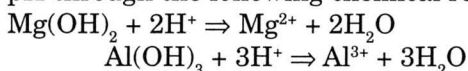
Effect of an Orally Administered Antacid Agent Containing $\text{Mg}(\text{OH})_2$ and $\text{Al}(\text{OH})_3$ on Abomasal pH in Milk-fed Calves

A.F. Ahmed; P.D. Constable; N.A. Misk

Department of Veterinary Clinical Medicine, College of Veterinary Medicine, University of Illinois, Urbana, IL
Faculty of Veterinary Medicine, Assiut University, Assiut, Egypt

Introduction

Abomasal ulceration occurs commonly in milk-fed calves and adult cattle, and severe ulceration can result in abomasal perforation, peritonitis and death. An important therapeutic goal in treating gastric ulceration in monogastric animals is maintaining gastric pH >3.5 by administering oral antacid agents, proton pump inhibitors, or histamine H_2 -receptor antagonists. Because the efficacy of oral antacid agents in increasing abomasal pH is unknown in cattle, the purpose of this study was to determine the effect of a widely available oral antacid agent (Extra-strength Maalox®) on abomasal pH in calves. This antacid contains 90 mg of $\text{Mg}(\text{OH})_2$ and 100 mg of $\text{Al}(\text{OH})_3$ per mL, and the antacid increases gastric pH through the following chemical reactions:



Purportedly, $\text{Mg}(\text{OH})_2$ / $\text{Al}(\text{OH})_3$ antacid agents have clinical efficacy in the treatment of abomasal ulceration in adult cattle. There do not appear to be any data available to support or refute such a claim.

Materials and Methods

Five male Holstein-Friesian calves (aged 15 to 27 days) with abomasal fundic and antral cannulas were administered the following three treatments in a randomized crossover design with a 24h wash out period between treatments: 1.) milk replacer (60 mL/kg, q 12h; untreated control), or milk replacer (60 mL/kg, q 12h) and 2.) 25 or 3.) 50 mL of a commercially available oral antacid agent (Extra-strength Maalox®). The same dose

of antacid agent was also administered at 8h and 16h. Fundic and antral pH were measured every second for 24h using a flexible pH glass electrode, and pH values were digitized for off-line analysis.

Results and Conclusions

Suckling of milk replacer immediately increased fundic and antral pH from 1.4 to 6.2 (pH of milk replacer) followed by a gradual decrease in pH to basal values by 6h. Abomasal pH then remained constant at approximately 1.4 until milk was fed at 12h, when a similar increase and fall in abomasal pH was observed following suckling. Oral administration of 25 mL and 50 mL of antacid agent with milk replacer mildly increased abomasal pH by <0.5 pH units, and administration of antacid at 8h and 16h caused a small and transient (<3h) increase in abomasal pH of 1.5 (25 mL) and 3.0 (50 mL) pH units. Oral administration of 100 mL of the antacid agent consistently induced severe and immediate watery diarrhea, whereas oral administration of 50 mL of antacid occasionally induced diarrhea. The diarrhea was attributed to the osmotic action of unabsorbed Mg^{2+} and Al^{3+} .

Results indicate that orally administered antacid agents are likely to have minimal therapeutic efficacy in treating adult cattle with abomasal ulceration, as the duration of action is <3 hours. This indicates that frequent administration (>6 times/day) of oral antacid agents is needed for therapeutic efficacy in cattle. Moreover, it is likely that orally administered antacid agents are diluted by the forestomach contents in adult cattle, decreasing their ability to increase abomasal pH for a sufficient time to be therapeutically effective.