

Article

Efficacy of simethicone for treatment of bloat in ruminants

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Abstract: The objective of the study was to evaluate the efficacy of simethicone against bloat in ruminants. The investigation was conducted in Potiya Upazila under the Chittagong district where routine veterinary services were in operation by the Community-based Dairy Veterinary Foundation (CDVF), Bangladesh Agricultural University, Mymensingh, Bangladesh. The diagnosis of bloat in animals was done based on clinical history, clinical signs and examination of animals. A total of 90 ruminants (60 cattle, 10 sheep and 20 goats) affected with bloat were treated with simethicone containing two commercial products marketed in Bangladesh (One product such as Bloat Stop®, marketed by ACME Laboratories, Bangladesh and another imported product by other pharmaceutical company). For treatment, 1 gm simethicone in 100 ml solution in cattle and 200 mg simethicone in 20 ml solution in sheep and goats were administered once at a time. The efficacy of simethicone from two commercial products was evaluated on the basis of recovery rate of affected animals. The overall recovery rates in ruminants after treatment with Bloat Stop® and other commercial product were 80% and 76%, respectively. In cattle recovery rate was numerically higher (83%) when treated with commercial product than that of other product (80%). In sheep, recovery rate was numerically higher (80%) when treated with Bloat Stop® than that of imported product (60%). In goats, the recovery rate was 70% after treatment of bloat with both products. However, the recovery rates in ruminant did not differ statistically between two drugs used for treatment of bloat ($p>0.05$). In conclusion simethicone is an effective drug for clinical treatment of bloat in ruminants.

Keywords: bloat; ruminants; simethicone

1. Introduction

Bloat is an over distention of the rumenoreticulum with the gases of fermentation, either in the form of persistent foam mixed with the ruminal contents, called primary or frothy bloat, or in the form of free gas separated from the rumen content, called secondary or free-gas bloat. It is predominantly a disorder of cattle but may also be seen in sheep and goats. Bloat is mainly dietary in origin and occurs most frequently in ruminants in Bangladesh (Sutradhar *et al.*, 2000). The most common cause of frothy bloat in cattle is the consumption of bloat-causing legumes and cereal grain (Merck Veterinary Manual, 2006). Bloat is clinically characterized by marked distension of abdomen with severe distress and dyspnea. The occurrence of bloat in ruminants of Bangladesh is about 9% (Sarkar *et al.*, 2013). Moreover, the prevalence of bloat in cattle and goats of Bangladesh is reported to be 2.2% and 2.5%, respectively (Rahman *et al.*, 2012). Similar rates in occurrence of bloat (1.83%) in cattle and (3.98%) goats have also been reported elsewhere (Samad, 2001). If bloat is not

treated as early as possible, it is fatal and life threatening for animals. Death rates due to bloat may be as high as 20% in cattle grazing bloat-prone pasture, and in pastoral areas, the annual mortality rate from bloat in dairy cows may be 1% (Merck Veterinary Manual, 2006). There are also economic losses by death and by culling of bloat prone animals, losses of production from animals due to the disruption of normal farm work and the cost of preventive measures and treatment.

The most effective way to treat and prevent frothy bloat is to administer an antifoaming agent and many pharmaceutical companies market simethicone as an antifoaming agent at different trade names. Ideally, animals should be able to produce enough saliva, a natural antifoaming agent, to keep rumen froth to a minimum. However, decreased salivation is one of the key characteristics of the bloat condition in animals (Howarth, 1975). Simethicone acts in the stomach to decrease surface tension of gas bubble enabling their breakdown and the formation of larger bubbles. In this way it is believed that gas can be eliminated more easily. Simethicone is the chemically inert mixture of polydimethylsiloxane and hydrated silica gel which is classified as an antifoaming agent. It is physiologically inactive and is not toxic when administered orally in animals (Brečević *et al.*, 1994). The pharmacological data suggest that simethicone has an antifoaming effect which is 10^3 – 10^4 times higher than either substance alone (Birtley *et al.*, 1974). However, limited study has been conducted to know the efficacy of simethicone for treatment of bloat in ruminants. Therefore, this study was conducted to determine the efficacy of simethicone for treatment of bloat in cattle, sheep and goats under field condition in Bangladesh.

2. Material and Methods

The study was conducted in selected farms at Potiya Upazila under the Chittagong district from November 2011 to June 2012 where routine veterinary services are given by the Community-based Dairy Veterinary Foundation (CDVF), Bangladesh Agricultural University, Mymensingh.

2.1. Selection and treatment of animals

A total of 90 ruminants (cattle 60, goats 20, and sheep 10) suffering from acute bloat from different farms were diagnosed by CDVF veterinarian on the basis of history and clinical signs. Bloat affected ruminants were treated randomly either with simethicone preparation produced locally by ACME Laboratories Ltd, Bangladesh (Bloat Stop®; simethicone 1 gm in 100 ml bottle) or with similar imported product marketed in Bangladesh (commercial name is not mentioned here; simethicone 1 gm in 100 ml bottle). Each of 30 affected cattle was treated with 100 ml oral administration of Bloat Stop® at a time and each of another 30 affected cattle was treated with equal amount of imported drug administered orally at a time. Each of 10 affected goats and 5 affected sheep was treated with 20 ml oral administration of Bloat Stop® at a time and each of another 10 affected goats and each of 5 sheep was treated with equal amount of imported drug administered orally at a time. After treatment of ruminants with simethicone, all animals were monitored for 24 hours to observed recovery from bloat as indicated by normal appetite and normal distention of abdomen.

2.2. Statistical analysis

During experimental period, number of animal treated and number of animals recovered from bloat was recorded with respect to drug used and descriptive statistics was performed. Moreover, Chi squared test was performed to determine the statistical difference between two treated groups nil. The difference between two treated groups was considered significant when the P value was less than 0.05.

3. Results

In the present investigation, the efficacy of simethicone for the treatment of bloat in ruminants on the basis of recovery rate from illness was compared between two commercial products widely used in Bangladesh (Locally produced Bloat Stop® vs. imported one). Comparison between two commercial simethicone preparations on recovery rates from bloat after treatment in ruminants are presented in Table 1. The recovery rate after treatment with Bloat Stop® in ruminants was 80.0% (36 out of 45) and the recovery rate after treatment with imported drug in ruminants was 75.6% (34 out of 45). The recovery rates in ruminant did not differ statistically between 2 drugs used for treatment of bloat ($p > 0.05$). Moreover, the overall recovery rate in ruminant after treatment of bloat with simethicone was 77.8%.

Species wise recovery rates from bloat after treatment in ruminant are presented in Table 2. The recovery rate after treatment with Bloat Stop® in cattle was 83.3% (25 out of 30) and the recovery rate after treatment with imported drug in cattle was 80.0% (24 out of 30). The recovery rates in cattle did not differ statistically between 2 drugs used for treatment of bloat ($p > 0.05$). The recovery rate after treatment with either Bloat Stop® or

imported product in goats was 70.0% (7 out of 10). The recovery rate after treatment with Bloat Stop® nil was 80.0% (4 out of 5) and the recovery rate after treatment with imported drug in sheep was 60.0% (3 out of 5). The recovery rates in sheep did not differ statistically between two drugs used for treatment of bloat ($p>0.05$).

Table 1. Comparison of recovery rates from bloat in ruminants between 2 products of simethicone.

Drugs used for treatment	Number of treated ruminant	Number of ruminant recovered	Recovery rate (%)
Bloat Stop®	45	36	80.0
Imported product	45	34	75.6
Overall	90	70	77.8

Table 2. Comparison of recovery rates from bloat in 3 species of ruminant between 2 products of simethicone.

Species of ruminant	Drugs used for treatment	Number of treated ruminant	Number of ruminant recovered	Recovery rate (%)
Cattle	Bloat Stop®	30	25	83.3
	Imported product	30	24	80.0
Goat	Bloat Stop®	10	7	70.0
	Imported product	10	7	70.0
Sheep	Bloat Stop®	5	4	80.0
	Imported product	5	3	60.0

The recovery rates in ruminant did not differ statistically between 2 drugs used for treatment of bloat ($p>0.05$).

4. Discussion

The present investigation clearly showed that simethicone was highly effective against treatment of bloat in ruminants. We can choose a variety of other sources for antifoaming agents such as oil, fat, synthetic non-ionic surfactant and ionophore antibiotic for treatment of bloat in animals (Majak *et al.*, 2003). Moreover, animal fat, vegetable oil and mineral oil may work equally in the rumen for treatment of bloat (Austin, 1981). Simethicone has a foam-inhibiting action, which has been studied in an anionic surfactant, a cationic surfactant and a soap solution (Brečević *et al.*, 1994). The defoaming properties simethicone have also been examined both in vitro and in vivo (Rider, 1968). Simethicone is an anti-foaming agent that decreases the surface tension of gas bubbles, causing them to combine into larger bubbles in the stomach that can be passed more easily. Simethicone does not reduce or prevent the formation of gas in the digestive tract; rather, it increases the rate of expulsion of gas when it exits in the rumen (Norton and William, 2005). Simethicone can relieve pain caused by gas in the intestines by decreasing foaming, which then allows for easier passing of flatulence. Simethicone is not absorbed by the body into the blood stream and is therefore considered relatively safe. National Institutes of Health (NIH) reports that there are usually no side effects when simethicone is taken as directed. Simethicone is an antifoaming agent that improved symptoms of upper abdominal bloating in a study, although this agent has not been evaluated in a prospective fashion using Rome-classified patients (Bernstein and Kasich, 1974). Simethicone antifoam agents are often employed to prevent and/or treat frothy bloat in cattle (Owens, 1991). Sutradhar *et al.* (2000) reported that recover rate was 100% when treated with simethicone mixed with tarpin oil.

5. Conclusions

It can be concluded that simethicone is an effective drug for the treatment of bloat in cattle, sheep and goats at field condition in Bangladesh.

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Conflict of interest

None to declare.

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