Utilization of broth-infused gauze wipes for canine oral gavage dosing

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Introduction

Dose administration via oral gavage, while common in laboratory animal research, requires well-trained and careful technicians to maintain animal health, welfare and data integrity. An animal reacting during dose administration can cause many complications, including increased stress for animals and technical staff, increased indices of behavior-based observations and the risk of a dosing-related error. This can compromise research data, as it can be difficult to distinguish a transient adverse reaction or observation versus the stress stemming from repetitive restraint and procedures.

Typically, during oral gavage-dosing, a gauze square that has been submerged in water and wrung out is used to wipe the gavage tube prior to placement. We propose a slight alteration to this process by utilizing broth-infused gauze wipes (one/animal) during dose administration to help alleviate the stress caused by the procedure while also rewarding the animals with a sapid treat. We noted in a 40-dog oral gavage study and a BID 32-dog oral gavage study, both over a course of 28 days, that the introduction of broth wipes caused a moderate decrease in clinical observations relating to dosing. Utilizing data from these two studies, we can conclude that the introduction of broth wipes during oral gavage procedures can moderately reduce clinical observations including vocalizations during gavage tube placement and the number of animals reacting during dose administration.

This trial study was conducted using a control group that follows our standard gavage process and two separate groups of different flavored broth (beef and chicken). Behavior during dosing is assessed during this trial study using a scoring system to determine if the use of broth is beneficial for oral gavage dosing.

Materials

Gavage equipment: 24FR BARD Rectal Tube – 8006400; Cardinal Health Monoject Plastic Syringe – 8881535770; McKesson Plastic Syringe – 904

Gauze squares: Covidien Curity™ All-Purpose Sponges – 9024

Broth: Sysco Beef Broth – 5568233, Sysco Chicken Broth – 5568241

Water: Greenfield, IN city water was used for control gauze and PO dose administration.

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Methods

During oral gavage dosing, the gavage tube was wiped with a gauze square soaked in tap water prior to tube placement to remove any excess salivate and test material from the tube. It also acted as a lubricant to help place the tube directly into the esophagus.

In both safety studies, the tap water was replaced with broth (either beef or chicken) and a new gauze square was used for each animal; one study being introduced at week 2 of dosing and the other being introduced at dose initiation. In both safety assessment studies, animals were not acclimated to the broth, but were acclimated to the dose apparatus, restraint and procedure.

The trial study extended over a 5-day period and consisted of 9 naïve stock colony beagles from Marshall Bioresources (3/group). Each animal was administered 15 mL of local city tap water once daily. The gavage tube of the control animals was rinsed with local city tap water, group 2 rinsed with beef broth and group 3 rinsed with chicken broth. Animals were assessed using a behavioral scoring system on a scale from 1 to 3 (Table 1).

Animal care and use was performed in accordance with applicable animal welfare regulations at an AAALAC International accredited animal program.

Score 1	Score 2	Score 3
Animal reacted excessively during dose administration and/or vocalized during tube placement and dose administration	Animal acted as expected, little amount of resistance/vocalization during tube placement and dose administration	Animal showed no resistance and was compliant during tube placement and dose administration

Table 1. Behavioral scoring system used in trial study.

Results

Through the duration of the trial study, the control group behavior scores decreased by 0.7 from day 1 to day 5. The beef broth group scores decreased over time but showed an increase from days 2-4. Meanwhile, the chicken broth group scores remained the same throughout the duration of the study.

None of the groups in the trial study showed any adverse clinical signs and none were shown to affect the quality of food consumption. While groups 1 and 2 did not have a significant change in body weight, group 3 had a total average weight gain of 0.8 kg from day 1 to day 5.

In both oral gavage toxicity studies, there was a moderate decrease in vocalizations over the course of the studies. They both showed a decrease in behavioral observations (reacting during dosing) except for week 4 as shown in Figure 1 and Figure 2.

With the reduction in clinical observations, we can reduce the number of technicians required to perform the dosing procedure, which can in turn potentially cause less stress on the animals.

In making this experience less stressful for the animals, we can reduce the likelihood of animal and technician injury.

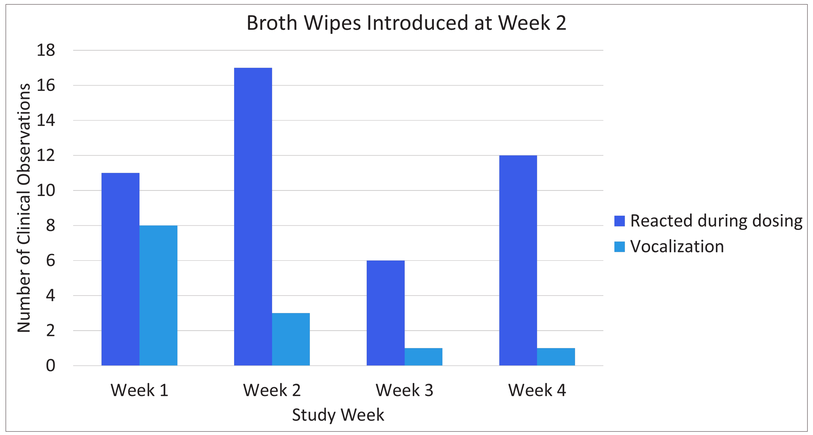

Figure 1. Toxicity study results when broth is introduced at week 2.

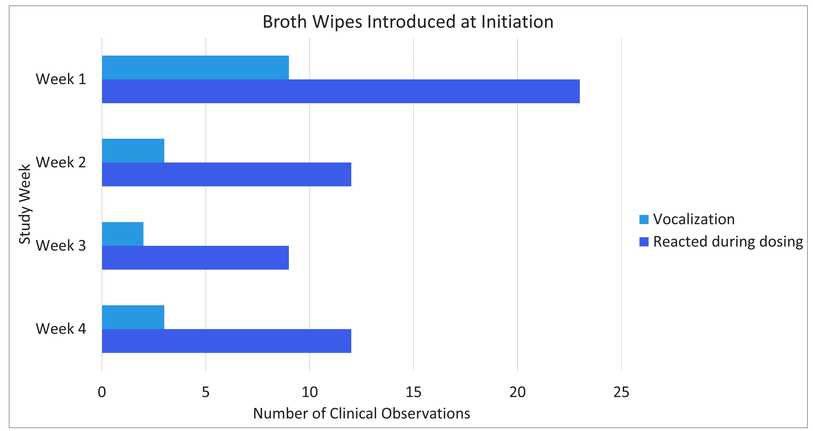

Figure 2. Toxicity study results when broth is introduced at initiation.

Conclusions

While no definitive conclusions can be made based on results of the trial study, we can suggest that the broth is beneficial to acclimation for oral gavage with study alterations.

One consideration is usage of the broth during gavage acclimation to act as a reward. It is important to consider that results could differ between colony animals that have been exposed to sham dosing procedures versus naive animals. Behavior could also vary in animals from one supplier to another.

Despite the benefits of the broth, this may not be feasible depending on the longevity of a study due to the amount of time dedicated to preparing the wipes and the cost of broth but can still act as a positive reinforcer during dosing procedures and acclimation.

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