

EFFECT OF TRIFLUPROMAZINE AND BUTORPHANOL ON CANINE GASTROINTESTINAL TRACT EMPTYING TIME USING BARIUM SULPHATE CONTRAST MEAL

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ABSTRACT

The gastrointestinal contrast study is an important diagnostic tool used in the identification of gastrointestinal diseases in small animals. In a randomized crossover design study, eighteen healthy adult mongrel dogs (12-24 months, 12-20 kg) were selected for barium meal contrast study. The animals were randomly divided into three groups of 6 animals each. In group-I normal transit time of canine gastrointestinal tract barium contrast meal was administered without giving any sedation, group II triflupromazine hydrochloride @2 mg/kg b.wt. I/M and in group III Butorphanol @ 0.2 mg/kg b.wt. I/M was administered to evaluate the effect of sedation on canine gastrointestinal tract emptying time using barium sulphate contrast meal. In summary, the total gastrointestinal tract emptying time was significantly prolonged by use of an triflupromazine hydrochloride and butorphanol in dogs as compare to non-sedated dogs. The study was useful to evaluate the effect of sedatives on the total GIT emptying time once a control value has been established.

Keywords: Barium sulphate, Butorphanol, Dog, Gastrointestinal tract, Triflupromazine

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The gastrointestinal contrast study is an important diagnostic tool used in the identification of gastrointestinal diseases in small animals. Gastric emptying time is a complicated process controlled by neural and hormonal mechanisms. Pressure differences and the degree of resistance at the gastroduodenal junction have a direct influence on the rate of gastric emptying in dogs. Abnormalities in gastric emptying times can indicate serious pathologic issues such as pyloric outlet obstruction, hypertrophic gastritis, protruding neoplasia and nerve dysfunction (Burns and Fox, 1986).

Barium sulphate is the most commonly used contrast medium for gastrointestinal tract, which comes in paste, liquid or powder form which is mixed with water (Kang *et al.*, 2020). Barium sulphate is an inert substance and is neither diluted nor digested during its passage through the gut, thus providing excellent mucosal detail. If it leaks out of the gut through a perforation, it causes granuloma and adhesion formation in the mediastinum or peritoneum, so if a perforation is suspected, a water soluble iodine-based contrast medium should be used instead of barium sulphate (Murphy, 2021).

Several non-invasive techniques have been proposed to evaluate stomach emptying and gastrointestinal tract transit of solid food in dogs. Barium sulphate suspension mixed with food is a simple and inexpensive method (Hogan and Aronson, 1988). Gastric emptying and transit times can be affected by anticholinergic drugs, various sedatives and tranquilizers, and psychic influences, such as

stress, fear, pain, anxiety, and rage (Mickael *et al.*, 2002). Oral administration of contrast medium is required, and animals in unfamiliar environments may become anxious, fractious, and difficult to handle. In these instances, sedation may be required to perform the examination. The ideal sedative is one that produces adequate restraint and affects transit time minimally, so that each segment of the gastrointestinal tract can be properly examined.

The purposes of this study were to evaluate complete gastrointestinal tract emptying time of healthy adult dogs using barium meal without sedation to compare and evaluate effects of triflupromazine hydrochloride and butorphanol on transit time of barium meal. Practicality of this technique is to detect alterations in total gastric emptying time in clinical situations in sedated and non-sedated dogs.

MATERIALS AND METHODS

In a randomized crossover design study, eighteen healthy adult mongrel dogs aged between 12-24 months, weighing 12-20 kg were selected for barium meal contrast study. Prior to being admitted to study, normal physical examination (Rectal Temperature, heart rate, respiration rate and colour of mucus membrane) and haematological parameters were examined. The animals were randomly divided into three groups with 6 animals each. In group I barium contrast meal was administered without giving any sedation, in group II triflupromazine hydrochloride @ 2mg/kg b.wt. I/M and in group III butorphanol @ 0.2 mg/kg b.wt. I/M was administered with barium sulphate contrast meal.

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Dogs were fasted for 12 hours prior to the study and water was offered adlib. Enemas were not given, so the study would more closely resemble general practice. On the day of examination, dogs were brought to radiology area 1 hour prior to the study. Commercially available barium sulphate powder (80% w/v) was orally administered at a dose rate of 7 ml/kg b.wt in all the animals of group I, group II and group III. Right lateral and ventro-dorsal radiographs were taken at 0 min. (immediately after administering barium sulphate), 30 mins, 60 mins, 120 mins, 240 mins. and after 12 hrs. in all the groups, until contrast medium reached the colon. The animals were restrained manually after the sedative effect was over. Gastrointestinal tract emptying time was considered as the time from administration of contrast medium to the point when contrast medium reached the descending colon.

RESULTS AND DISCUSSION

The gastrointestinal tract emptying time during each study were noted and mean values determined for sedated and non-sedated dogs. There was no statistical difference observed in the body weight (kg) (16.17 ± 1.15 , 16.33 ± 1.39 and 16.67 ± 1.26) and age (months) (17.17 ± 2.04 , 16.50 ± 1.15 and 16.33 ± 1.12) in all the three groups, respectively (Table 1, Fig. 1). On the basis of radiographic interpretation there was a significant difference was observed in gastrointestinal tract emptying time (Hrs) in all the three groups (3.92 ± 0.35 , 10.00 ± 0.65 and 9.25 ± 0.89 , respectively) (Table 1, Fig. 1). Lower doses of butorphanol are used for Barium Sulphate Contrast studies (Spillmann and Candido, 2019). Hence the total gastrointestinal tract emptying time was significantly prolonged by use of triflupromazine hydrochloride and butorphanol in dogs.

In the present study no statistical difference was observed in the body weight (kg) and age (months) in all the three groups. Bourreau *et al.* (2022) reported that gastric emptying rate is inversely related to body weight in dog breeds of different size and age. On the basis of radiographic interpretation there was a significant difference in gastrointestinal tract emptying time (hrs) in all the three groups. Burns and Fox (1986), Patricia *et al.* (1988) and Kumar *et al.* (2012) also observed the prolong effect of triflupromazine, acepromazine and butorphanol on positive-contrast upper gastrointestinal tract transit time in dogs. In this study normal GIT emptying time was 3.92 ± 0.35 hrs. Funkquist and Garmer (1967), Obrien (1978) and Miyabayashi *et al.* (1986) also reported that triflupromazine and butorphanol were used to compare the gastrointestinal tract emptying time using barium sulphate contrast meal in dogs with non-sedated dogs and reported total emptying time in the normal dog is 4.7 hrs. Study

Table 1. GIT Emptying time of barium sulphate contrast meal

Parameters	Group-I	Group-II	Group-III
Body Weight (Kg)	16.17 ± 1.15	16.33 ± 1.39	16.67 ± 1.26
Age (Months)	17.17 ± 2.04	16.50 ± 1.15	16.33 ± 1.12
GIT Emptying time (Hours)	$3.92^a \pm 0.35$	$10.00^b \pm 0.65$	$9.25^b \pm 0.89$

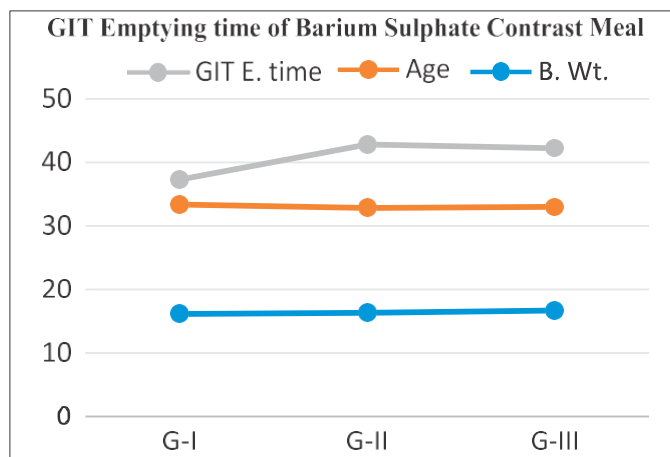


Fig. 1. GIT Emptying time of Barium Sulphate Contrast Meal in Different Groups

interpreted that if sedation is required low dose of butorphanol (0.05 mg/kg) may be used for barium sulphate contrast study. Scrivani *et al.* (1998) observed the same results. Evans and Laufer (1981) also recorded ventro-dorsal and right lateral recumbency radiographic views to evaluate total GIT emptying time in dogs.

CONCLUSION

The triflupromazine hydrochloride and butorphanol administration prolonged the GIT emptying time, decreased GI motility, and facilitated non-manual restraint for duration of the examination. Therefore, recommendations have been made to avoid the use of tranquilizers and sedatives when performing gastrointestinal contrast procedures. When animals in unfamiliar to environments may become anxious, fractious, and difficult to handle sedation may be required. For oral barium contrast medium study low dose of Butorphanol are used because it provides less GIT emptying time as compare to Triflupromazine hydrochloride. In summary, the total gastrointestinal tract emptying time was significantly prolonged by use of and triflupromazine hydrochloride and butorphanol in dogs as compare to non-sedated dogs. The study was useful to evaluate the effect of sedatives on the total GIT emptying time once a control value has been established.

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