STUDIES OF RADIOPAQUE MARKERS IN CATS AND DOGS

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Abstract

Radiopaque markers (RM) have been used to gain understanding of and assess gastrointestinal motility disorders in human medicine for some time. Development and validation of their use in veterinary medicine has commenced. The purpose of the present work was to further the knowledge and understanding of the use of RM in dogs and cats.

The physiology of gastrointestinal motility, the influence of fibre on the gastrointestinal tract and the gastric emptying of indigestible solids was reviewed to aid the reader in the interpretation of the experimental data. The disease processes affecting motility and the different methods used to diagnose dysmotilities were also summarised.

Reference values for the gastric emptying, small intestinal transit and large intestinal transit of a proprietary RM (BIPS, NZ Vet, Christchurch) fed in a high fibre diet (Hills Prescription Diet r/d) to healthy dogs were determined. The information was presented as box plots for veterinarians to use as reference curves in clinical practice.

Factors other than size and density may influence how indigestible particles empty from the stomach, such as the strength of antral contractions induced by the diet ingested. The objective of the next study was to investigate whether the size of the pieces of meat ingested along with indigestible particles (RM) affected how they emptied from the stomach.

The 50%, 75% and 90% gastric emptying times (GET) of each size of marker with each size of steak were compared by the Wilcoxon Sign Rank test. In addition, the area under the gastric emptying curves (AUC) of the RM were compared by a two-factor ANOVA. Fisher's Least Significant Difference (LSD) test was then used to compare means for the test meals.

The 50% GET of the small RM was found to be significantly faster than the large RM in the 10 mm^3 steak meal. The 50% and 75% GET of the small RM were significantly faster than the large RM in the 1 mm^3 and 20 mm^3 steak meals.

The mean AUCs of the large RM were significantly different between the test meals ($p < 0.0068$). The large RM left the stomach significantly faster in the 10 mm^3 steak compared to the 20 mm^3 steak ($p=0.0029$).

The size steak fed with the large RM can influence how they empty from the stomach. An increased lag time appeared to be responsible for the slower emptying of the RM with the 20 mm^3 steak compared to the 10 mm^3.

Preliminary veterinary use of RM in the assessment of gastrointestinal transit is encouraging. The objective of the last study was to assess the situations in which RM have been most often used in veterinary medicine, assess the motility abnormalities they highlight and assess how useful they have been to the diagnostic outcome. The case records of 120 dogs and 67 cats admitted to Massey University Veterinary Teaching Hospital which had undergone RM studies were utilised.

Vomiting was most common presenting sign resulting in a RM study being carried out. About half of both canine and feline studies were considered abnormal. Of the abnormal studies, delayed gastric emptying (DGE) was the most common finding. A wide range of diagnoses were associated with DGE. Other radiopaque marker patterns observed in cats and dogs were: rapid orocolic transit, adynamic ileus, delayed colonic transit (cats only) and bunching pattern.

In general, RM only rarely diagnosed primary gastrointestinal dysmotilities but regularly highlighted secondary dysmotilities. Knowledge of the gastrointestinal motility in a particular patient may allow the clinician to provide more tailored therapy to each patient. They are also useful to rule out physical obstructions in vomiting animals and have a place in the full work up of an animal with gastrointestinal disease.

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Table of Contents

Chapter Three **Effects of Fibre on the Gastrointestinal tract**

Chapter Four **The Gastric Emptying of Solids**

Digestible Solids

Indigestible Solids

Chapter Five **Gastrointestinal Motility Diseases and their Diagnosis**

Diseases Affecting Intestinal Motility

Diagnosis of Motility Disease

List of Tables

List of Figures