UNIVERSITI PUTRA MALAYSIA

A RETROSPECTIVE STUDY ON PREDILECTION SITES OF FOREIGN BODY IN THE GASTROINTESTINAL TRACT AND ITS ASSOCIATED OUTCOMES OF MANAGEMENT IN DOGS AND CATS PRESENTED TO UNIVERSITY VETERINARY HOSPITAL (UVH), MALAYSIA FROM 2012 TO 2016.

RUTH LAU YI YING

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RUTH LAU YI YING

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It is hereby certified that we have read this project paper entitled "A Retrospective Study on Predilection Sites of Foreign Body in The Gastrointestinal Tract and Its Associated Outcomes of Management in Dogs and Cats Presented to University Veterinary Hospital (UVH), Malaysia from 2012 to 2016", by Ruth Lau Yi Ying and in our opinion is satisfactory in terms of scope, quality and presentation as partial fulfilment of the requirement for the course VPD 4999 - Final Year Project.

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Specially dedicated to my family, fur kids and friends who have supported me directly or indirectly throughout the project.

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CONTENTS

List of Abbreviations

FB	Foreign body
GIT	Gastrointestinal tract
LFB	Linear foreign body
NLFB	Nonlinear foreign body
SPSS	Statistical Program for Social Science

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ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar bagi memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek Tahun Akhir

KAJIAN RETROSPEKTIF BERKAITAN KECENDERUNGAN LOKASI JASAD ASING DI SALUR GASTROUSUS DAN HASIL PENGURUSANNYA DALAM ANJING DAN KUCING YANG DIPERSEMBAHKAN DI HOSPITAL VETERINAR UNIVERSITI (UVH), MALAYSIA DARI TAHUN 2012 HINGGA 2016.

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Jasad asing di salur gastrousus merupakan kehadiran bahan-bahan asing dalam salur gastrousus yang ditelan oleh anjing dan kucing dan tidak mudah melalui salur gastrousus. Objektif kajian ini adalah untuk mengenalpasti kecenderungan lokasi jasad asing di salur gastrousus dalam anjing dan kucing dan untuk mengenalpasti hasil pengurusan jasad asing salur gastrousus dalam anjing dan kucing di Hospital Veterinar

Universiti (UVH) dari tahun 2012 hingga tahun 2016. Sebanyak 17 kes jasad asing (10 anjing dan 7 kucing) dikenalpasti dalam kajian ini. Rekod perubatan pesakit-pesakit berkenaan seperti signalmen pesakit, tanda-tanda klinikal, ujian diagnostik, rawatan, rekod pembedahan dan komplikasi selepas rawatan. Lokasi jasad asing paling kerap dijumpai di bahagian perut (41.7%) dan usus kecil (41.7%) diikuti usus besar (16.7%) dalam spesies anjing. Bagi spesies kucing, jasad asing paling kerap dijumpai di bahagian usus besar (44.4%) diikuti usus kecil (33.3%), perut (11.1%) dan omentum dan abdomen (11.1%). Komplikasi ringan selepas rawatan dalam spesies anjing adalah pendarahan ringan daripada penyingkiran endoskopik (10%), bengkak di tapak jahitan (10%) dan lebam di tempat jahitan (10%). Semua kes kucing tidak mempunyai komplikasi selepas rawatan. Kesimpulannya, kajian ini menunjukkan bahawa respons pesakit-pesakit terhadap pilihan rawatan yang dilakukan berdasarkan lokasi yang berbeza adalah baik walaupun terdapat sesetengah komplikasi ringan selepas rawatan.

Kata kunci: Jasad asing, anjing, kucing, Hospital Universiti Veterinar, lokasi

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of the course VPD 4999 – Final Year Project

A RETROSPECTIVE STUDY ON PREDILECTION SITES OF FOREIGN BODY IN THE GASTROINTESTINAL TRACT AND ITS ASSOCIATED OUTCOMES OF MANAGEMENT IN DOGS AND CATS PRESENTED TO UNIVERSITY VETERINARY HOSPITAL (UVH), MALAYSIA FROM 2012 TO 2016.

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Gastrointestinal foreign body is the presence of foreign materials in the gastrointestinal tract (GIT) which consumed by cats and dogs that are not easily passed through their GIT. The objectives of this study is to determine the predilection sites of gastrointestinal foreign body in dogs and cats; and to investigate the outcome of management of the GIT foreign body in dogs and cats presented to University Veterinary Hospital (UVH), Malaysia from 2012 to 2016. A total of 17 foreign body

cases (10 dogs and 7 cats) were identified in this study. The patients' medical records were retrieved and reviewed for the signalment, clinical presentation, diagnostic workouts, treatment, surgical approaches and complications post-treatment. The most common location for gastrointestinal foreign body in dogs based on the number of cases is the stomach (41.7%), small intestines (41.7%) and large intestines (16.7%). In cats, the most common location is the large intestines (44.4%) followed by small intestines (33.3%), stomach (11.1%) and omentum and abdomen (11.1%). Minor complications post-treatment in dogs were mild haemorrhage from endoscopic removal (10%), swelling at suture site (10%) and bruises at suture site (10%). All cats had no complications after treatment. This study showed that the overall response to any treatment options done based on different locations are good.

Keywords: Foreign body, cats, dogs, University Veterinary Hospital, location

1.0 Introduction

Gastrointestinal (GIT) foreign body (FB) is the presence of foreign materials in the GIT which may or may not cause a blockage in the part of the GIT affected. The clinical signs shown by the animal are usually non-specific such as anorexia, vomiting, diarrhea, abdominal discomfort and lethargy (Hobday et al., 2014). The variety of clinical signs presented depend on the location, degree and duration of obstruction (Hayes, 2009). Furthermore, dogs are more prone to have GIT foreign bodies (FB) as compared to cats due to the indiscriminate nature of what dogs ingest (Tobias, 2011).

The identification of foreign bodies can be done using abdominal radiographs and ultrasound together with the presenting clinical signs in the animal. Plain abdominal radiographs maybe unremarkable and only suggestive of the FB (Fazio, 2006). However, some foreign bodies can be still be seen clearly on abdominal radiographs especially radiopaque objects. Tams (2003) stated that the part of the intestine proximal to the FB may also appear dilated with fluid or gas. A barium study can be used to aid in diagnosis when suspected whereby soft tissue or air-filled foreign objects in the stomach and intestines would appear as lucent filling defects (Tams, 2003). In addition, the author also reported that plication of small intestinal loops can be observed when contrast medium is used. Ultrasound is secondary to plain radiographs when FB is suspected in the patient. The advantage was that ultrasound could measure bowel thickness, lymph node size and abdominal organ architecture (Fazio 2006).

The foreign bodies can be divided into two categories which are the linear foreign bodies (LFB) and non-linear foreign bodies (NLFB). Small irregular or LFBs

can cause partial obstruction whereas complete obstruction may be due to larger circular FBs which are NLFB (Papazoglou, et. al, 2003).

There are various methods on treating FB which are through conservative, endoscopic and surgical methods. The choice of treatment depends on the severity and duration of clinical signs observed as well as the presenting condition of the patient. Conservative management includes stabilising the patient and through giving medications and supplements such as lactulose and sucralfate. Endoscopic methods are usually performed for esophageal and gastric foreign bodies. LFB can be removed endoscopically if it has been present for only a short time (Fossum, 2013). Surgical intervention would include gastrotomy, enterotomy and for non-viable intestinal segments, intestinal anastomosis. Surgical removal of foreign body is only done when conservative management and endoscopic management had failed or cannot be done.

The outcome of any of the management methods of choice includes complications that arise after the removal of FB was done. A study by Basher and Fowler revealed that the outcome of conservative management in cats were poor as only 9 out of 19 cats recovered whereas the remaining 10 cats had worsened conditions which required surgery. For endoscopic management, the complications that may occur are haemorrhage, gastric ulceration, esophageal rupture which would lead to subsequent pneumomediastinum, pneumothorax and pyothorax (Kader & Farghali, 2015; Moon et al., 2012). When gastrotomy and enterotomy are performed, the complications that are commonly expected are septic peritonitis, dehiscence, gastric irritation and ileus (Brisson, 2015; Tobias, 2009). According to Allen (1992) (as cited by Brisson, 2015), the chance of dehiscence after intestinal anastomosis is higher as

compared to after enterotomy suggesting that more manipulation of the intestines increases the risk of dehiscence.

1.1 Justification

This study will be able to differentiate the types of foreign bodies ingested between dogs and cats presented to University Veterinary Hospital. Furthermore, this study will give a better idea on the type of management pursued based on the location of the FB in dogs and cats in Malaysia and the possible outcomes that result from these management methods. Clinicians encountering FB cases will be able to make better judgement on which treatment option will prove the best results for the patient based on the location of the foreign body.

1.2 Objectives of Study

My study aims:

1. To determine the predilection sites of gastrointestinal foreign body dogs and cats presented to University Veterinary Hospital (UVH), Malaysia from 2012 to 2016.
2. To investigate the outcome of management of the GIT foreign body based on the location of the FB in dogs and cats presented to University Veterinary Hospital (UVH), Malaysia from 2012 to 2016.

2.0 Literature Review

2.1 Types of Foreign Bodies

There are two types of foreign bodies causing obstruction in the gastrointestinal tract which are the non-linear foreign body (NLFB) and linear foreign body (LFB). According to Papazoglou, et al., 2003, NLFB that are commonly found in dogs include stones, plastics, fabrics, coins, rubber objects, food wrappings, toys, bottle caps, fish hooks, sewing needles, marbles, corn cobs, hairballs, fruit seeds, tampons, and bones. However, cats do not usually ingest NLFB as compared to dogs with the exception of trichobezoar (Papazoglou, et al., 2003). LFB that are found in both species are thread, rope string or other string-like materials whereby more cases were reported in cats rather than dogs (Trevor, 2002). Hayes (2009) reported 154 out of 184 dogs had NLFB as compared to 30 out of 184 dogs with LFB. The author's study also showed that 16 out of 24 cats had NLFB and the remaining 8 cats had LFB. The study showed that the more common FB found in dogs and cats are NLFB.

The appearance of the foreign bodies can vary when observed on the radiographs. Mineral and metal opacity objects such as bones, rocks, fish hooks and dense rubber can be easily identified since the objects are radiopaque (Muhlbauer & Kneller, 2013; Dennis et al., 2010). They also reported that some soft tissue opacity objects such as wood, string, cloth and trichobezoar may be highlighted if the object was surrounded by air.

2.2 Location of Foreign Bodies

2.2.1 Stomach

The stomach consists of three parts which are the cardiac, body and pylorus whereby the FB could potentially be lodged at. According to a research done by Hayes (2009) for NLFB, 16% of the dogs and 24% of the cats with GIT FB in the study had FBs in the stomach. If the FB is in the pyloric antrum, the animal may show signs of vomiting due to the noxious stimulation which in the case of stimulation of fundus, would not have vomiting (Fossum, 2013).

2.2.2 Small Intestines

The small intestine is divided into three parts which are the duodenum, jejunum and ileum. In a study of 177 cases of NLFB by Hayes (2009), 16% of dogs and 24% of cats had FB in the duodenum, 23% of dogs and 29% of cats had FB in the proximal jejunum, 26% of dogs and 18% of cats had FB in the middle jejunum, 6% of dogs had FB in in the distal jejunum and 3% of dogs and 6% of cats had FB in the ileum. However, in a study by Koike et al. (1981), there was no significant difference between site of obstruction in the small intestines (ileum, duodenum, jejunum).

2.2.3 Large Intestines

The large intestines consist of the caecum, ascending colon, transverse colon and descending colon. Large intestinal obstruction is very rare since most objects could have just passed together with the faeces without much complications (Bebchuk, 2002). Hayes (2009) stated that 4% of the dogs with NLFB had the FB in the colon but none found in cats.

2.3 Foreign Body Management

When dealing with GIT FBs, the treatment largely depends on the location, clinical signs, time since ingestion of item and size, shape and nature of the foreign body (Webb, 2014). The FB can be managed conservatively, endoscopically or surgically depending on the factors aforementioned. Basher & Fowler (1987) suggested that surgical intervention be considered if a LFB has not passed out with conservative treatment within 3 days.

2.3.1 Gastric Foreign Bodies

FBs in the stomach can be removed either endoscopically or surgically. According to Webb (2014), gastrotomy is usually indicated when the FB is very large, numerous and sharp because endoscopic removal require longer anesthetic time and esophagus may be damaged in the process.

LFB can be removed by endoscope if it has been present for only a short time. . If the endoscopy fails to do so, another method is available which is to first to insert the endoscope between the FB and pylorus. The tip of the endoscope is advanced to the distal end of the FB before grasping it to pull the object out. It is imperative to take an abdominal radiograph after the procedure to make sure that there is no signs of perforation. (Fossum, 2013)

The surgical option for gastric FB is gastrotomy. This procedure requires the animal to be placed on a dorsal recumbency. A celiotomy is performed by making a ventral midline incision from the xiphoid to the pubis. The entire GIT tract is first explored and inspected before incising into the stomach. To avoid contamination to the organs in close proximity to the stomach, the stomach is packed with moistened

sterile laparotomy sponges soaked with warm sterile 0.9% saline solution. Stay sutures are then placed to assist positioning before making a stab incision in a less vascular area of the ventral stomach. The incision is enlarged using Metzenbaum scissors to allow FB removal. The contents of the stomach had to be checked for any other foreign bodies and injuries to the wall before closure. The stomach is closed using 2-0 or 3-0 absorbable suture material. The first layer includes serosa, muscularis and submucosa layers of the stomach sutured using Cushing or simple continuous pattern. The second layer involves oversew of the serosal and muscularis layers using Lembert or Cushing pattern. The incision and abdomen are flushed using sterile electrolyte solution before perform routine closure of the celiotomy incision. (Fossum, 2012; Nash, 2006).

2.3.2 Small and Large Intestinal Foreign Bodies

According to Basher and Fowler (1987), FBs in the intestines can be managed conservatively if the animal is stable, peritonitis not suspected and presented early with lingually attached FB (Tobias, 2011). Basher (1987) also stated that 9 of 19 cats had string remnants that passed through the GIT in 1 to 3 days after attachment to the tongue was removed. However, Evans et al. (1994) stated that there are no conservative management described in dogs due to the lodging of FB mostly in the pylorus (Tobias, 2011). Fossum (2012) stated that endoscopic technique can also be used to retrieve FB in the duodenum once it can be visualised to allow careful retrieval.

The surgical procedure for intestinal FB is enterotomy. The animal is placed on dorsal recumbency. A ventral midline abdominal incision is first made from the xiphoid to the pubis and the abdomen is explored thoroughly for abnormalities. The FB is located and the loop of intestine affected is isolated by packing it off with

moistened laparotomy sponges. The intestines are assessed for its viability based on parameters such as colour, texture and peristalsis. A longitudinal incision is made distal to the location of the FB where there is healthy tissue on the antimesentric border. The FB can then be gently milked through the incision. Once removed, the intestines are examined for viability and other FBs. If there are parts of the intestines that are not viable, the non-viable segments should be removed and reconnected using intestinal anastomosis. The incision site for the enterotomy procedure is closed using 3-0 or 4-0 absorbable suture in a single layer with a simple continuous of simple interrupted suture pattern. (Nash, 2006)

2.4 Outcome of Management

2.4.1 Conservative management

Papazoglou et al. (2003) stated that some foreign bodies especially small objects if left in the GIT would pass out eventually given time due to the mural withdrawal reflex in the intestines. Furthermore, they pointed out that abdominal radiographs should be taken and reviewed on a regular basis to determine the transit time of the FB through the intestines to ensure uncomplicated FB passage. Basher and Fowler's study (as cited in Tobias, 2011) showed a case of nine out of 19 cats that had the string remnant passed through the GIT after conservative management while the remaining 10 cats' conditions worsened which required surgery. Administration of semisolid petrolatum-based laxatives for lubrication and elimination of hairball can also be done as part of conservative management of intestinal FBs (Papazoglou et al., 2003).

2.4.2 Endoscopic Management

Based on a retrospective study by Moon et al., (2012), endoscopic removal of gastric FBs was successful in all dogs affected within 5 days after removal. However, 7 out of 9 dogs with gastric FBs had erosions and focal ulceration on the gastric mucosa (Moon et al., 2012). Other complications that could occur include haemorrhage, esophageal rupture which would lead to subsequent pneumomediastinum, pneumothorax and pyothorax (Kader & Farghali, 2015).

2.4.3 Surgical Management

Prognosis for removals of gastric FBs in cats is good (Bebchuk, 2002) but the prognosis in dogs have not been evaluated. The most common clinical sign post-gastrotomy is vomiting which could be due to ileus, electrolyte abnormalities, pain and gastric irritation (Tobias, 2009). She also mentioned that the stomach has rapid healing qualities and a vast network of blood supply which makes dehiscence of gastrotomy closure rare.

For intestinal surgery involving enterotomy and intestinal anastomosis, dehiscence and septic peritonitis are the most common complications involving 3-16% of the patients in one study (Brisson, 2015). The survival rate for cats (63%) and dogs (80%) with LFB in Hayes' (2009) were quite high but still lower as compared to NLFB in cats (100%) and dogs (94%). Delayed time from onset of clinical signs to surgery can increase mortality rate due to metabolic derangements and compromised bowel in the animal (Tobias, 2009). According to Brisson (2015), another common complication that occurs after FB enterotomies is ileus which is observed 24 hours after surgery. In a study by Guthbertson et al. (as cited by Bebchuk, 2002), four out of

five of the dogs had 85% of the small intestine resected but they had no complications for 11 to 24 months after that. However, the exact small intestinal length that can be removed in cats before causing the short bowel syndrome in cats is not known (Bebchuk, 2002).

3.0 Materials and Methods

3.1 Data Collection

A restrospective study was performed on the records available in University Veterinary Hospital (UVH) of University Putra Malaysia, Malaysia for a period of 5 years starting January 2012 to December 2016. The ward case lists in the Small Animal Wards in UVH were screened for records of gastrointestinal foreign body obstruction in dogs and cats. The case numbers for the cases found were obtained for reviewing of the radiographs from an online database. The radiographs were reviewed for foreign bodies in the gastrointestinal tract. Case numbers of respective cases were recorded to obtain medical and surgical records of the patients. The logbooks at the Main Surgery Unit was also reviewed for patients with FB that had underwent surgery. The case numbers were also obtained.

Data on patient signalment that were retrieved included patient ID, age, breed, gender and body weight, date of presentation and date of surgery performed.

Historical data on these patients were also reviewed for any past history of sickness and respective treatment done. The diagnostic reports such as radiography examination, contrast study and ultrasonography examination were also recorded. The

location of the FB was also determined through the radiograph and ultrasonography as well as the radiological and ultrasonography findings.

Medical and surgical data were obtained which included pharmaceutical drugs used and GIT surgery performed to remove the FB. The conservative management is defined as treatment using non-invasive methods such as medications and laxatives to allow the FB to pass out by itself. The endoscopic management uses an endoscope to retrieve the FB. The surgical treatment is more invasive which includes gastrotomy, enterotomy and intestinal anastomosis to remove the FB. Postoperative complications and outcome that occurred after the surgery were reviewed. The type of FB found in the animal was also noted and classified into NLFB and LFB. NLFB was classified as discrete objects found at one location the GIT and may cause clinical signs of vomiting, diarrhea and/or abdominal pain. LFB was classified as objects that are long and inducing plication or clumping through one or more sites of the GIT.

3.2 Data Tabulation

All data were tabulated in the Microsoft Excel spreadsheet and transferred to SPSS (statistical Program for Social Science) spreadsheet for further analysis. All statistical analyses were conducted using IBM SPSS software 22.0. Additional tests for association using Chi-square (Fischer's Exact Test) were performed on selected data. Statistical significance was recorded at $p<0.05$ whereby the level of significance was set at 5%. Selected factors that were used to determine association were species, breed, age, duration of clinical signs, FB location, types of management and outcome of the management.

4.0 Results

The total number of cases that were warded due to suspected FB was 94 cases from January 2012 till December 2016. After a series of diagnostic workouts (radiographs and ultrasonography) and surgical management, the number reduced to 20 cases (12 dogs and 8 cats) of confirmed FB cases (Figure I). Due to missing and incomplete medical records, the total case reported in this study was 17 cases (10 dogs and 7 cats). Records were available for the remaining 17 patients which comprised of 10 dogs and 7 cats that were diagnosed with FB during the study period from January 2012 until December 2016. The number of cases each year ranged from one to four cases.

The presenting clinical signs includes: vomiting (47.1%), inappetance (23.5%), and acute weight loss (5.9%). However, some of the patients did not show any clinical signs (29.4%). Only 4 out of 17 cases (23.5%) the owner knew that their pet had ingested the foreign body. All patients did radiograph at least once to aid in the diagnosis. Three out of ten dogs did contrast study (30%) using barium meal. Furthermore, ultrasonography was performed in three (30%) of the ten dogs presented. In cats, only one cat (14.3%) did both contrast study and ultrasonography as part of the diagnostic workout.

There was no significant association between the location of FB and the species ($p = 0.580$) and age ($p = 0.515$). There was also no significant association between outcome and species ($p = 0.485$), age ($p = 1.000$), location of FB ($p = 0.515$)

and management method used (p = 1.000). However, these values should be interpreted carefully as the sample size is too small for this study.

4.1 Dogs

Breeds represented in the canine group were one each of Mastiff cross, Fila, Labrador Retriever, German Shepherd, English Mastiff, Shih Tzu, Jack Russel cross and Maltese and two Poodle (Table I). The mean age in this group was 3.3 (ranging from 7 months to 6 years) (Table II). Patients aged less than one year old were categorised as young dogs (5.9%) while patients aged one year or more were categorised as adult dogs (52.9%).

Overall, 15 objects were retrieved from 10 cases. The patients diagnosed with FB had either endoscopic (20%) or surgical (80%) treatment which was summarised in Table VI and Figure IV. For the surgical treatment, gastrotomy (30%), enterotomy only (30%), enterotomy with colostomy (10%) and enterotomy with intestinal anastomosis (10%) were done. None of the cases had conservative treatment to remove the foreign body. NLFB was found in eight out of ten cases (80%) whereas LFB was found in one case only (10%) (Table III). One case did not state the foreign body found. The location of the foreign body were divided into three categories which were the stomach only (50%), small intestines only (30%), small and large intestines (20%) (Table III and Figure II). There was no significant association between the breed of dogs presented and the location of FB (p = 1.000). Based on radiographic findings, the degree of obstruction was categorised into no obstruction (20%), partial obstruction (40%), complete obstruction (0%) and unknown (40%). (Table V)

The outcome of the management method is mostly no complications (70%) (Table VII and Figure V). However, some of the dogs had mild haemorrhage post-endoscopic examination due to manipulation of FB (10%) and swelling at suture site (10%) and bruises at suture site (10%) after surgical intervention. The dogs with mild haemorrhage and the swelling at the suture site had resolved the next day. The dog with bruises at the suture site had been observed to have resolved at day 13 post-operation. There was no significant association between the outcome of the management method on breed ($p = 1.000$) and duration of clinical signs observed ($p = 0.429$).

4.2 Cats

Breeds represented in the feline group were Domestic Short Hair (5 cats), Maine Coon (1 cat) and American Short Hair (1 cat) (Table I). The mean age in the feline group was 4.1 years (ranging from 4 months to 14 years) (Table II). Patients aged less than one year old were categorised as young cats (11.8%) whereas patients aged one year or more were categorised as adult cats (29.4%).

Overall, eight objects were retrieved from seven cases. The patients diagnosed with FB had conservative only (14.3%), endoscopic only (14.3%), surgical only (57.1%) and conservative and surgical treatments (14.3%) (Table VI and Figure IV). One out of seven cats had surgical treatment followed by conservative treatment. The four out of seven cats that went for surgery only had enterotomy done. NLFB was found in four out of seven cases (57.2%) whereas LFB was found in the remaining three out of seven cases (42.8%) (Table III). The FB location were in the stomach

(14.3%), small intestines (14.3%), large intestines (28.6%) and abdomen and omentum (14.3%), jejunum to ascending colon (14.3%) and from base of tongue to before ileocecal junction(14.3%) (Table IV and Figure II). There was no significant association between the cat breeds and FB location ($p = 1.000$). Based on radiographic findings, the degree of obstruction was categorised into no obstruction (42.9%), partial obstruction (14.3%), complete obstruction (0%) and unknown (42.9%) (TableV).

All seven cats had good outcomes and no complications after the management methods done (Table VII and Figure V).

5.0 Discussion

In this study, FB was relatively more common in dogs (58.8%) as compared to cats (41.2%). The reason for this is due to the more indiscriminate eating behaviour in dogs as compared to cats (Slatter, 2002). However, this study reported on a small

number of cats and dogs as there were missing medical and surgical records such as radiographs, type of foreign body and history from referral clinics.

Both breeds of dogs appear to be equally predisposed to having FB in this study. There appears to be more DSH affected by FB as compared to other breeds of cat. Banfield Pet Hospital in the United States collected data for FB in 2014 and the data showed that dogs below one year old has the highest prevalence of GIT FB whereas cats aged between one to less than three years had the highest prevalence of GIT FB. The results in this study proved different as 90% of dogs in this study was over one year old and 57.1% of the cats presented were 3 years old and above. The variation of the result from other studies may be due to the small sample size obtained making it less accurate.

In addition, this study revealed that the pylorus is the most common site of FB in dogs (30%) whereas colon was the most common site for FB in cats (57.1%). However, in a study by Hayes (2009), the most common site for FB was the jejunum in both cats and dogs for discrete FB. It is possible that the FB could have moved towards the distal section of the GIT when presented with increasing duration of clinical signs (Hayes, 2009).

The most common foreign body ingested in dogs was the durian seed (3 cases) whereas in cats was the string or thread (2 cases). The ingestion of durian seed in dogs was not commonly reported in journal papers but one case report had a case of durian seed ingestion in one dog (Thilagar et al., 2007) due to the availability of durian in Malaysia. Cats more commonly ingest string or thread which supports findings in a

study by Hayes (2009) which also reported the most common foreign body found in cats to be single strands of thread or string (63%).

The use of radiographs in combination with the history and clinical signs that may be present in the animal were fairly good tools to diagnose FB in cats and dogs. Seven out of ten dogs (70%) were presented to UVH with complaint of clinical signs observed by the owner whereas the rest of the dogs had shown no clinical signs. The three dogs were all referral cases whereby some of the referral veterinarians failed to provide the complete history of the patient. Two of the three cases were diagnosed at the referral veterinarian and referred to UVH for second opinion.

The management performed for each case were based on the location, clinical signs, time since ingestion of item, size, shape and nature of foreign body (Webb, 2014). Surgical management was the most done to remove FB in GIT (76.5%) in dogs (47%) and cats (29.5%). Two dogs and one cat undergone endoscopic management to remove FB in the pylorus (two dogs) and gastric inlet (one cat). Conservative management was only performed in one cat since the foreign body was moving towards the anus after repeated radiographs. The reason for the highest number of cases going for surgical management was because the FB were in the intestines and there were multiple FBs along the GIT.

The outcomes of the management were based on whether the patient had complications or not complications. In my study, seven out of ten dogs did not suffer any complications post-management for a follow-up period between 12 days to 1.3 years. Only three out of ten dogs had minor complications (17.6%) which were one each for mild haemorrhage, bruises at suture site and swelling at suture site. One of

the case which suffered from mild haemorrhage was due to FB removal through endoscope. The cause of the mild haemorrhage was due to the experience and expertise of the endoscopist since the instrument is still new to the hospital. The complications that occurred for all cases resolved after one day. In another study Gianella et al. (2009), all the three dogs with FB in the stomach had gastric perforations and pneumoperitoneum after surgical treatment which is not seen in my study. This could be due to the difference in type of FB reported and also the expertise and experience of the surgeon. On the other hand, removal of FB in cats had no complications in my study within a follow-up period of 2 months to 1.5 years. Management of FB in cats even with more invasive methods such as surgery can still have a good prognosis with successful management (Bebchuk, 2002) which is seen in my study.

6.0 Conclusion

In conclusion, a total of 17 FB cases were reported in UVH over 5 years (2012 to 2016) which included 10 canine cases and 7 feline cases. There were three main sites for GIT FB which were the stomach, small intestines and large intestines. This study revealed that the most common FB location in dogs were the stomach (50%)

and small intestines (50%) whereas the most common FB location in cats was the large intestines (57.1%). Most of the FB can be diagnosed using abdominal radiographs with the aid of contrast study. Among all the complications presented after treatment, the most complications occurred in dogs (30%) which were due to mild haemorrhage (10%), bruises at suture site (10%) and swelling at suture site (10%). This showed that the management based on the location of the foreign body have good outcome.

7.0 Recommendation

As for my recommendation, I would like to suggest a better record keeping system and management to be practiced in UVH as some of the records or data regarding the sample were missing and so the information required could not be retrieved. This can also be achieved using a computerised database for record keeping and management so that patient records can be accessed even from many years back. This would help retrospective studies to be done more easily and effectively. A

logbook on cases studied should include the final diagnosis of the patients presented at the front office and the wards. The logbook at the Radiology Unit in UVH should also include a radiological diagnosis. This would enable future retrospective study to be more accurate and convenient.

Furthermore, I would also like to suggest that the small animal clinicians in UVH complete the daily progress form and surgical protocol for the surgeries done so that people reviewing the patient medical records can obtain more accurate information.

Finally, I would like to recommend future retrospective study regarding ype of foreign bodies ingested and effect on haematological parameters in dogs and cats. The prevalence of metal toxicity due to foreign body ingestion in dogs and cats can also be studied.

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9.0 Appendices

Table I: Breeds of dogs and cats with foreign body presented to UVH, UPM from 2012 to 2016 (n = 17)

Breeds	**Number**
Dogs (n = 10)	
Large	
Mastiff X	1

Fila	1
Labrador Retriever	1
GSD	1
English Mastiff	1
Small	
Poodle	2
Shih Tzu	1
Jack Russel X	1
Maltese	1
Cats (n = 7)	
DSH	5
Maine Coon	1
ASH	1

Table II: Patient details at presentation to UVH, UPM from 2012 to 2016 (n = 17)

	Dogs (n =10)	**Cats (n = 7)**
Age (years)		
Mean (sd)	3.26 (2.0)	4.6 (5.0)
Range	0.6 – 6.0	0.3 – 14.0
Bodyweight (kg)		
Mean (sd)	18.1 (13.9)	2.8 (1.1)
Range	3.8 – 40.2	1.2 – 4.3
Duration of clinical signs		
Mean (sd)	10.0 (10.3)	3.2 (2.39)
Range	2.0 – 30.0	1.0 – 7.0

Table III: Foreign bodies recovered from the gastrointestinal tract of dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 17)

Appearance on Radiograph	**Type of Foreign Body**	***Dog**	**$^{+}$Cat**
Nonlinear Foreign Body			
Cannot be determined	Hard faeces	1	0
Radiolucent	Durian seed	3	0

Radiopaque	Metal ball	1	0
Cannot be determined	Rubber mat	1	0
Cannot be determined	Wool	2	0
Cannot be determined	Plastic pieces	2	0
Radiopaque	Beads	0	1
Radiopaque	Metal nut	0	1
Radiopaque	Stapler	0	1
Cannot be determined	Rubber band	1	0
Raqiopaque outline, radiolucent inside	Chewed off tube	0	1
Radiopaque	Wire	2	0
Radiopaque	Sewing needle	0	1
Cannot be determined	Cloth	1	0
Radiopaque	Fish Hook and line	0	1
Linear Foreign Body			
Cannot be determined	String/thread	0	2
Cannot be determined	Not stated	1	0

* 15 foreign objects from 10 dogs (two dogs had three types of objects and one dog had two types of objects)

+8 foreign objects from 7 cats (one cat had two types of foreign objects)

Table IV: The location of foreign bodies in the gastrointestinal tract of dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 17)

Foreign Body Location	**Dogs (n = 10)**	**Cats (n = 7)**
Single site		
Pylorus	3	0
Stomach	2	0

Gastric inlet	0	1
Jejunum	2	0
Large intestines	0	1
Colon	0	2
Multiple sites		
Duodemum-jejunum junction	1	0
Duodenum, caecum, colon	1	0
Jejunum to ascending colon	0	1
Small intestines and colon	1	0
From base of tongue to before ileocaecal junction	0	1
Abdomen and omentum	0	1

Table V: Degree of obstruction of foreign bodies in the gastrointestinal tract of dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 17)

Degree of Obstruction	**Dogs (n = 10)**	**Cats (n = 7)**
None	2 (20%)	3 (42.9%)
Partial	4 (40%)	1 (14.3%)
Complete	0 (0%)	0 (0%)
Unknown	4 (40%)	3 (42.9%)

Table VI: Choice of treatment for foreign body removal in the gastrointestinal tract of dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 17)

Choice of Treatment	**Dogs (n = 10)**	**Cats (n = 7)**
Conservative	**0%**	**14.3%**
Lactulose 1.2 ml PO BID D1-D3	0	1
Endoscopic	**20%**	**14.3%**
Endoscope	2	1

Surgical	**70%**	**57.1%**
Gastrotomy	3	0
Enterotomy	3	1
Ex-lap: Enterotomy and Colotomy	1	0
Ex-lap: Enterotomy + intestinal anastomosis	1	0
Ex-lap -> milked tube out from rectum	0	1
Multiple enterotomy (21 site) from jejunum to ascending colon	0	1
Multiple enterotomy + instestinal anastomosis	0	1
Surgical and Conservative	**0%**	**14.3%**
Laparotomy + retention enema	0	1

Table VII: Complications after foreign body removal in dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 17)

	Dogs (n = 10)	**Cats (n = 7)**
No complications	7 (70%)	7 (100%)
Mild haemorrhage	1 (10%)	0
Swelling at suture site	1 (10%)	0
Bruises at suture site	1 (10%)	0

Figure I: Number of foreign body cases in UVH, UPM from 2012 to 2016 (n = 17)

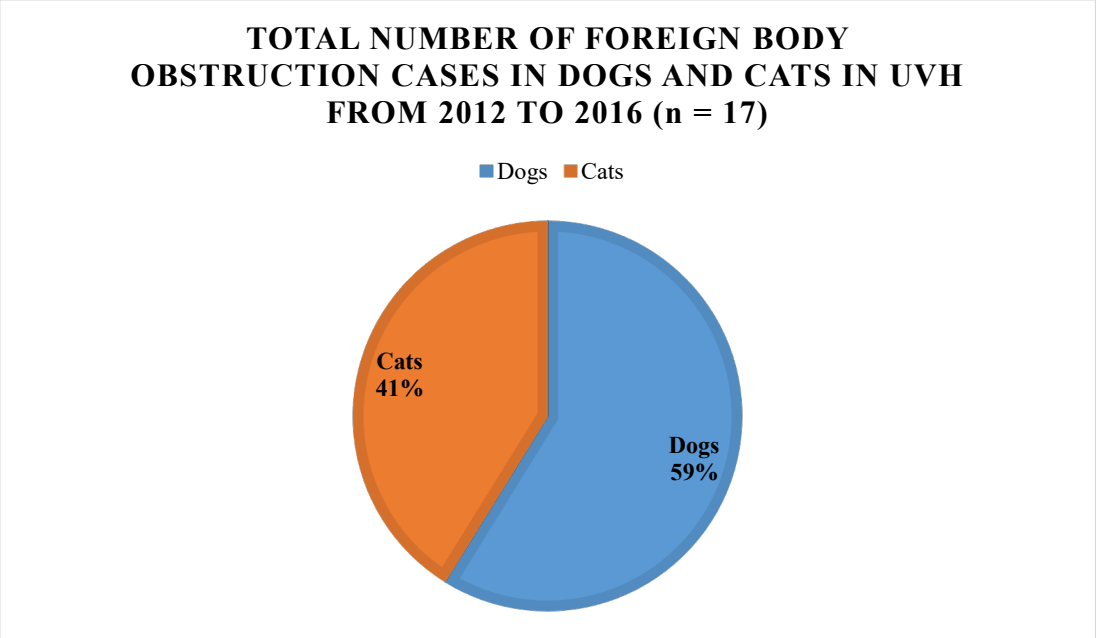

Figure II: Location of foreign body in dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 21)

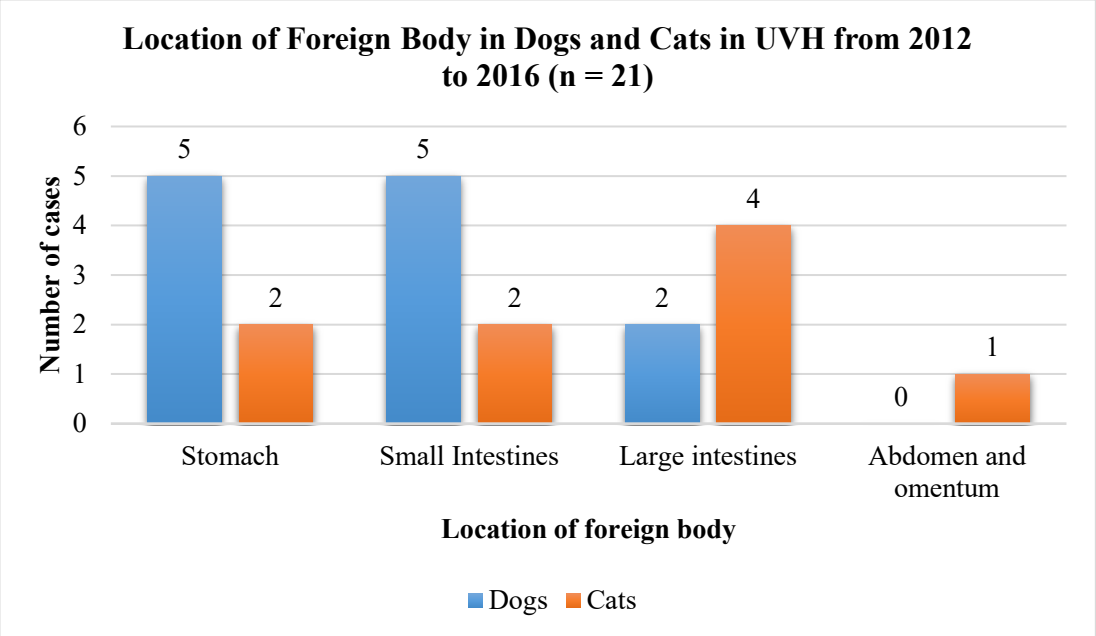

Figure III: Degree of obstruction of foreign bodies in dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 17)

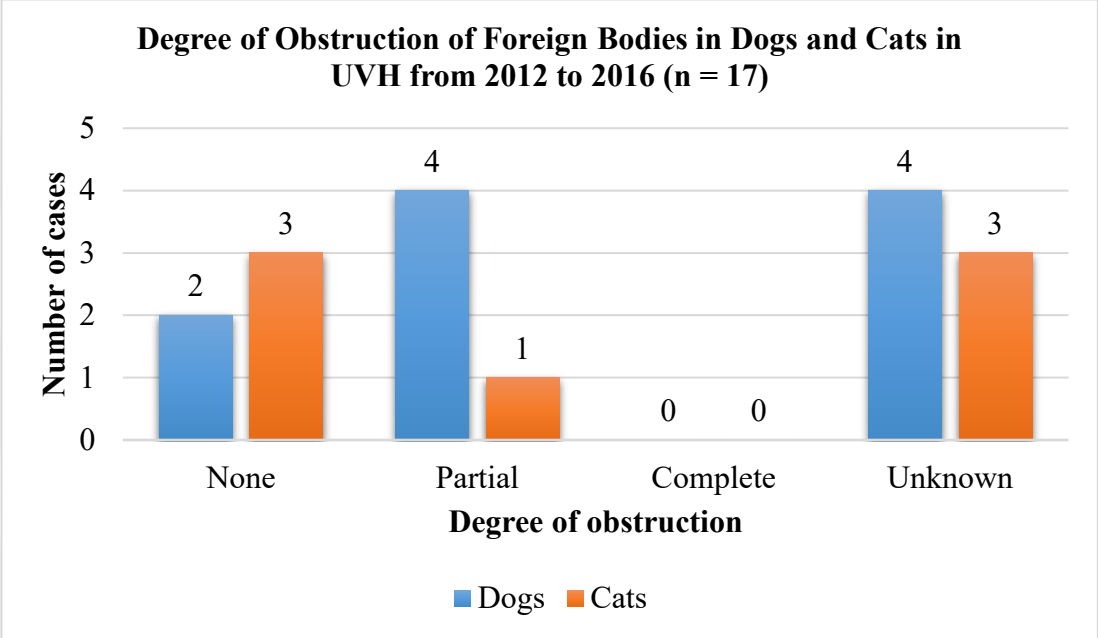

Figure IV: Choice of treatment to remove foreign body in dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 18)

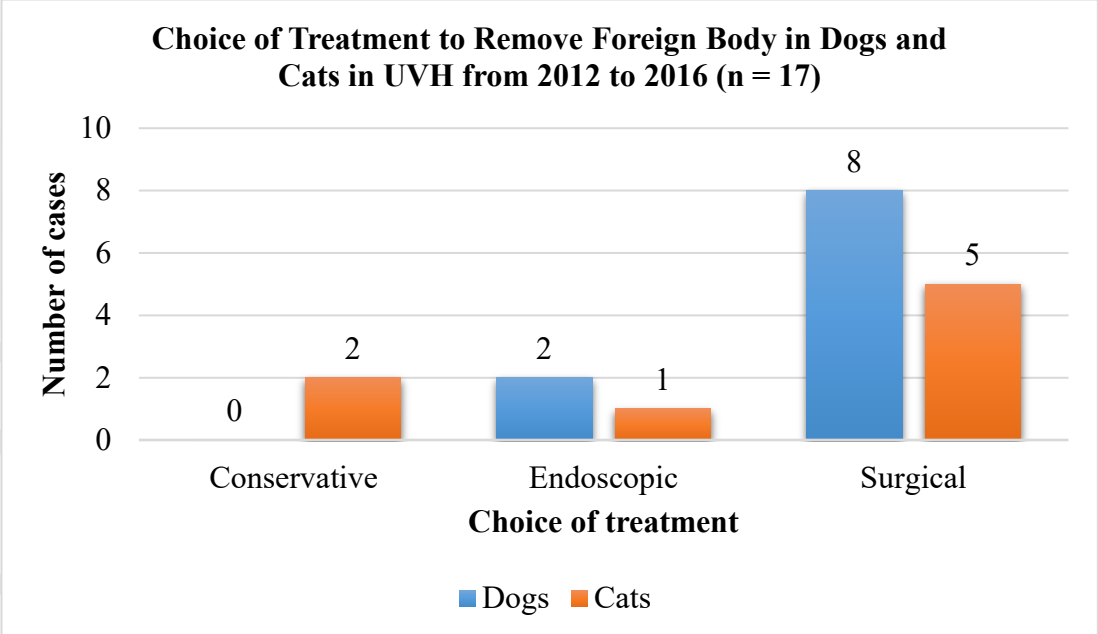

Figure V: Complications after foreign body removal in dogs and cats presented to UVH, UPM from 2012 to 2016 (n = 17)

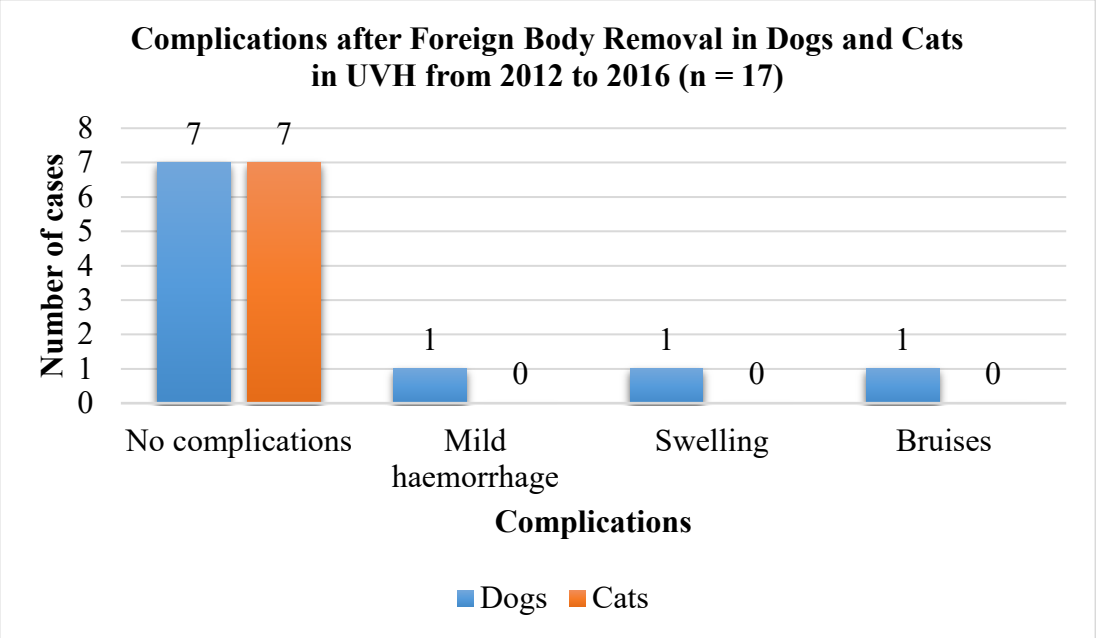

Figure VI: Positive contrast study using barium meal in a dog which ingested a piece of cloth.

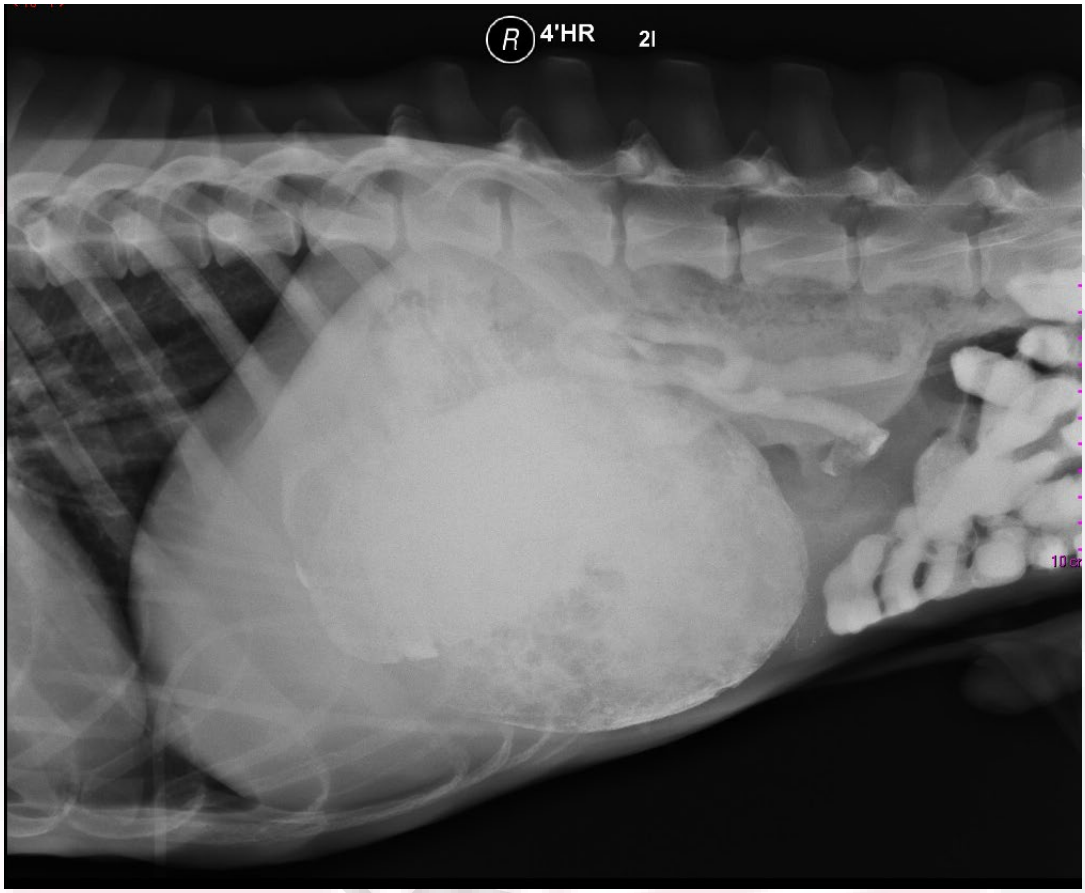

Figure VII: Abdominal radiograph of a cat which swallowed a chewed off tube.