GI Endoscopy in Cats: What Can We Learn?

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Gastrointestinal endoscopy is commonly performed in cats and is useful in the diagnosis of many (GI) gastrointestinal disorders. Many GI diseases require mucosal biopsy for diagnosis and endoscopy is a minimally invasive technique, with less morbidity when compared to surgical exploratory and full-thickness biopsy. Gastrointestinal endoscopy also has therapeutic value as foreign bodies can be removed, esophageal strictures dilated, and percutaneous endoscopic gastrostomy tubes placed. Endoscopic skills can easily be developed by practitioners who 1) acquire knowledge of the normal endoscopic anatomy, 2) become familiar with the appearance of common lesions, 3) receive appropriate hands-on instruction, and 4) devote the time and effort required to learn proper technique.

Although rigid endoscopic equipment can be useful in diagnosing some esophageal and colonic disorders, the author routinely performs flexible endoscopy in cats. Flexible endoscopes provide better mucosal visualization and allow the tip to be advanced around flexures and through many sphincters of the gastrointestinal tract. Endoscopes to be used in cats should have four-way tip deflection, automatic air-water insufflation, a large biopsy channel, a diameter less than 10mm and a working length of at least 100 cm. Available accessories should include biopsy forceps, cytology brushes, and a variety of foreign-body retrieval forceps.

It is the author's opinion that endoscopic capability should be available to the average private practice. Endoscopy encourages the practice of high quality medicine by providing a minimally invasive, highly useful, diagnostic and therapeutic procedure.

Indications
There are numerous indications to perform gastrointestinal endoscopy in cats (Table 1). Some of the disorders that can be diagnosed via endoscopy are included in Table 2. Endoscopic examination of the esophagus will provide valuable diagnostic information in cats examined for regurgitation. Esophagoscopy should be performed if barium contrast radiographs demonstrate an intraluminal mass, mucosal irregularity or ulcer, a narrowed lumen or a motility disorder associated with normal luminal diameter. Esophagoscopy is also indicated if survey thoracic and barium contrast radiographic examinations are normal. Foreign bodies (string, fish hooks, pins, needles, bones, and hair balls) observed on radiographs can be removed endoscopically with less morbidity than thoracotomy. Strictures can be dilated via balloon catheters passed through the endoscope biopsy channel.

Gastroduodenoscopy is a very important diagnostic procedure in cats that chronically vomit. The author performs endoscopy, rather than upper GI barium studies, because endoscopy offers the following advantages: 1) direct mucosal inspection; 2) directed mucosal biopsy; 3) ability to remove foreign bodies; 4) ability to visualize subtle mucosal lesions; 5) assessment of respectability of neoplastic masses; and, 6) is rapid to perform. Some potential disadvantages of endoscopy include: 1) necessity of general anesthesia; 2) inability to examine the entire small intestine; 3) inability to detect lesions in the muscularis and serosa; and, 4) inability to evaluate gastric motility and emptying. Gastric and small intestinal mucosal samples can be collected via endoscopy with less morbidity than exploratory celiotomy with gastrotomy and enterotomy.

Therapeutically, gastroduodenoscopy is indicated if foreign bodies are visualized on radiographs or if an owner has observed or suspects foreign-body ingestion. In cases of suspected foreign body ingestion radiographic studies should always confirm the presence of a foreign body prior to endoscopy. Endoscopic retrieval of gastric foreign bodies is readily accomplished in most cases. Foreign bodies in the small intestine are very difficult to remove endoscopically and exploratory surgery is indicated in most cases.

A final indication for gastroduodenoscopy is placement of percutaneous endoscopic gastrostomy tubes (PEG). This rapid and simple procedure provides a convenient avenue for nonstressful enteral nutritional support in cats with prolonged anorexia or oral, pharyngeal, or esophageal disorders.

Duodenoscopy is a valuable diagnostic procedure in cats with chronic small intestinal diarrhea. If laboratory evaluation does not establish a diagnosis, small intestinal biopsy is indicated. Endoscopy can provide small intestinal mucosal samples for histopathologic evaluation. In most cats, samples can be obtained from the duodenum and sometimes the jejunum. It is difficult and often dangerous to enter the ileum in cats via colonoscopy. However, biopsy forceps can be gently passed through the ileocolic sphincter and tissue samples obtained. After instillation of saline, a fluid aspirate can also be collected from the small bowel which can aid in the diagnosis of Giardia. Because the common histologic causes of chronic small bowel diarrhea usually diffusely involve the small intestine, a diagnosis can often be reached with endoscopic biopsy.

The major indication for performing colonoscopy is obtaining mucosal biopsy samples in cats with chronic large-bowel diarrhea. Some cats with acute, large-bowel diarrhea associated with moderate-to-severe hematochezia rapidly require a definitive diagnosis. Colonoscopy can often provide an answer in a minimally invasive fashion.
Unique characteristics of endoscopy in cats

The principles and techniques of performing fiberoptic endoscopy in cats are very similar to those employed in dogs. However, there are some important differences encountered when performing endoscopy in cats (Table 3). The most important species difference is the small diameter and length of cats’ gastrointestinal tracts. This is most critical in the antrum, pylorus, duodenum, and ileum where the diameter limits endoscopic maneuverability, making mucosal examination and advancement of the endoscope more difficult. However, this difficulty can be overcome by patience, proper technique, and endoscopic experience.

Small diameter (pediatric) endoscopes (7.8mm) can be maneuvered through these difficult areas in cats easier than larger endoscopes (9.8mm). However, the major disadvantage of pediatric endoscopes is that they have smaller biopsy channels (2.0 vs 2.8mm) which result in smaller biopsy samples that may be more difficult for the pathologist to interpret. In addition, the variety and size of foreign-body retrieval forceps is limited for pediatric endoscopes. With experience, larger endoscopes (9.8mm) can be successfully maneuvered through a cat's gastrointestinal tract. However, an all-feline practice might benefit from purchasing and using a smaller pediatric endoscope.

The feline esophagus differs anatomically from the canine esophagus, which is composed of striated muscle. The caudal one-third of the esophagus in cats contains smooth muscle which results in a series of transverse folds. Additionally, submucosal blood vessels can be commonly seen.

The relatively small feline stomach can easily and quickly become over-distended by insufflation of air during gastroscopy. Gastric distention can cause respiratory compromise and may activate vagal reflexes that produce bradycardia. The endoscopist should constantly monitor the amount of air within the stomach and apply suction when necessary to maintain a minimally distended stomach.

The antral portion of the stomach is small and is attached at a more acute angle to the gastric body than in dogs. Endoscopic manipulation in this area is limited by the small luminal diameter, and the endoscopist may have difficulty advancing the endoscope into the antrum. Often the endoscope will retroflex into the gastric body instead of entering the antrum. The small antrum also makes it difficult to obtain a direct frontal view of the angularis incisura, an important endoscopic landmark, which is easily visualized in dogs. The pyloric sphincter is often open in cats.

Cats have a single duodenal papilla, that transports bile and pancreatic secretions, that is located in close proximity to the pylorus and can be difficult to visualize in many cats. The relatively short esophagus and stomach is an advantage in cats because more endoscope length is available for advancement into the small intestine. In many cats it is possible to advance the endoscope through the duodenum into the jejunum, allowing a greater area of mucosa to be observed and sampled.

The feline colon also differs from the canine colon in several respects. The rectal area of cats usually has less mucosal folding than dogs, resulting in easier and quicker endoscope passage through the descending colon. The feline cecum is extremely short (approximately 1cm in length) and it can be entirely viewed from the ascending colon. The cecocolic sphincter is often open.

Patient preparation

Proper preparation for esophagogastroduodenoscopy requires withholding food for 12 hours prior to the procedure. Endoscopy is performed with the cat under general anesthesia and positioned in left lateral recumbency. This will position the antrum “away” from the table-top and will help facilitate endoscopic intubation of the duodenum. Various pre-anesthetic agents have been shown to not affect the endoscopist’s ability to pass through the gastrosophageal and pyloric sphincters.

Colonoscopy requires a feces-free colon and a clear ileal effluent. Food should be withheld for 24 hours prior to the procedure. The author routinely uses an iso-osmotic GI lavage solution of polyethylene glycol and electrolytes, that is not absorbed as it moves through the gastrointestinal tract, GoLYTELY®, to prepare cats for colonoscopy. Antiemetics should be administered 15-30 minutes prior to GI lavage solutions to minimize vomiting due to gastric distention. Metoclopramide 0.2-0.4 mg/kg SC or maropitant 1 mg/kg SC can be utilized. Using nasogastric installation, two doses (30ml/kg) of GoLYTELY® two hours apart, the afternoon prior to endoscopy, are administered. This large volume of fluid flushes feces from the colon. Sedation is not used during GI lavage solution administration as aspiration of these solutions can be fatal. Warm water enemas (20ml/kg) are given after each dose and prior to anesthesia induction. Sodium phosphate enemas should never be used to prepare cats for colonoscopy because they can lead to fatal hyperphosphatemia. Some experts do not use GI lavage solutions, administering multiples enemas instead. To perform colonoscopy, the cat should be placed under general anesthesia and positioned in left lateral recumbency. This will position the ascending colon “away” from the table and facilitate advancement of the endoscope into the orad colon.

This seminar has reviewed the indications for performing GI endoscopy in cats, listed the common diseases encountered, and has emphasized the unique features of performing endoscopy in cats. It is the author's hope that practitioners without endoscopic capability will seriously consider purchasing equipment and receiving endoscopic instruction. The practice of feline medicine can be improved by frequently using this minimally invasive procedure to obtain diagnostic biopsy samples, remove foreign bodies, or place a percutaneous endoscopic gastrostomy tube.
Table 1 - Indications for gastrointestinal endoscopy

**Esophagoscopy**
- Foreign Body Retrieval
- Intraluminal Mass
- Irregular Mucosa or Ulcer
- Stricture Dilation
  - Regurgitation with Normal Survey and Barium Radiographs
- Motility Disorder with Normal Luminal Diameter

**Gastroduodenoscopy**
- Chronic Vomiting
- Foreign Body Retrieval
- Placement of Percutaneous Gastrostomy Tube
- Acute Vomiting with Hematemesis
- Chronic Small Bowel Diarrhea

**Colonoscopy**
- Chronic Large Bowel Diarrhea
- Acute Large Bowel Diarrhea with Hematochezia
- Ileal Biopsy with Chronic Small Bowel Diarrhea
- Demonstrated on Survey or Barium Contrast Radiographs

Table 2 - Disorders diagnosed by endoscopy

**Esophagus**
- Foreign Body
- Esophagitis
- Stricture
- Neoplasia

**Stomach**
- Gastritis
- Gastric Ulcer
- Foreign Body
- Neoplasia

**Small intestine**
- Inflammatory Bowel Disease
- Neoplasia
- Foreign Body
- Duodenal Ulcer

**Large intestine**
- Inflammatory Bowel Disease
- Neoplasia

Table 3 - Unique features of endoscopy in cats vs dogs

- Small diameter of gastrointestinal tract
- Short length of GI tract
- Transverse folds in caudal esophagus
- Visible submucosal esophageal blood vessels
- Ease of achieving gastric over-distention
- Acute angle of gastric antrum
- Single duodenal papilla
- Jejunum often accessible
- Fewer rectal mucosal folds
- Short cecum with cecocolic sphincter usually open

References