Feline Idiopathic Megacolon

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**ABSTRACT:** Feline idiopathic megacolon is a relatively common colonic disorder characterized by severe distention of the colon. A thorough diagnostic investigation is needed to eliminate other potential causes from the list of diagnostic differentials. Medical management consisting of dietary modification and administration of laxatives, enemas, and/or promotility agents may be effective. Patients refractory to medical therapy should be further evaluated to determine whether they are candidates for subtotal colectomy.

Feline idiopathic megacolon is characterized by generalized colonic dysfunction manifesting as severe colonic dilation and fecal impaction. Clinical signs commonly include anorexia, weight loss, vomiting, and dyschezia; physical examination classically reveals a large amount of very firm feces palpable within the colon. Diagnostic investigation is aimed at ruling out underlying problems that could cause colonic stricture and/or obstruction (see box on page 659). Once this has been done, medical management with dietary modification and administration of laxatives, enemas, and/or promotility agents may be effective. Patients refractory to medical therapy may benefit from surgical intervention via subtotal colectomy.

**PATHOPHYSIOLOGY**

Feline idiopathic megacolon has traditionally been attributed to primary neurogenic and degenerative neuromuscular disorders. Previous investigations by Washabau et al.\(^1\)\(^2\) using in vitro isometric stress measurements of colonic smooth muscle segments revealed that cats with idiopathic dilated megacolon developed less isometric stress in circular and longitudinal smooth muscle in response to neurotransmitters, membrane depolarization, and electrical field stimulation compared with healthy controls. These findings were associated with decreased myosin light-chain phosphorylation, suggesting a disturbance of intracellular calcium mobilization\(^2\) and signifying that feline idiopathic megacolon is a general-\(ized\) dysfunction of colonic smooth muscle. Thus colonic motility may be augmented with therapeutic intervention designed to stimulate colonic smooth muscle.

**DIAGNOSIS**

**Constipation** is defined as “a condition in which bowel movements are infrequent or incomplete”; severe constipation is often referred to as **obstipation**.\(^3\) Obstipation implies permanent loss of colonic motility, and when obstipation results in dilation or hypertrophy of the colon, the condition is called **megacolon**.\(^3\)
Hypertrophic megacolon may result from pelvic fracture malunion, pelvic canal stenosis, or luminal obstruction. Conversely, dilated megacolon is considered the end stage of feline idiopathic megacolon.

Domestic cats of any pedigree, age, or sex may develop constipation or obstipation and/or megacolon. Most cases involve middle-aged male cats; Domestic Shorthair, Domestic Longhair, and Siamese cats are overrepresented. Owners often describe affected cats as having reduced, absent, and/or painful defecation for a variable period of time. Large, hardened, desiccated feces are commonly observed, but chronically constipated cats may have intermittent episodes of hematochezia or diarrhea from the irritant effect of fecal concretions on the colonic mucosa. Systemic signs, most notably vomiting, anorexia, and weight loss, may be observed in patients with prolonged difficulty defecating.

Profound colonic impaction is a consistent physical examination finding in cats with idiopathic megacolon. In addition, dehydration, abdominal pain, and mild to moderate mesenteric lymphadenomegaly may occur in severely affected cats. Cats with constipation due to dysautonomia may have other signs of autonomic nervous system failure, including mydriasis with depressed direct and consensual pupillary light reflexes, dysuria with a distended urinary bladder, dry mucous membranes, prolapsed nictitans, and/or dysphagia. In all cats with suspected idiopathic megacolon, clinicians should carefully perform a digital rectal examination with patients sedated or anesthetized. Rectal examination may identify less frequent causes of constipation, including foreign bodies, rectal diverticula, stricture(s), and/or rectal masses. Pelvic fracture malunion and/or pelvic canal stenosis may also be detected in cats with historical or current pelvic trauma. Furthermore, chronic tenesmus may be associated with perineal herniation. A complete neurologic examination should be performed to identify potential neurologic causes of constipation.

To diagnose feline idiopathic megacolon, the following must be eliminated from the list of diagnostic differentials: systemic disturbances, mechanical obstructions, and obvious functional abnormalities. Metabolic causes of constipation, including dehydration, hypokalemia, and hypercalcemia, may be detected in some cats. Therefore, a thorough evaluation should include a complete blood count, serum biochemical profile, and urinalysis. Because iatrogenic hypothyroidism may be associated with constipation, measurement of basal serum thyroxine concentration is recommended in cats with recurrent constipation after treatment of hyperthyroidism.

Abdominal radiography is essential to help characterize the severity of colonic impaction and to identify predisposing factors, including foreign object(s), mass lesions, pelvic fractures, colonic strictures, and spinal column abnormalities (Figure 1). However, in idiopathic cases, radiographic findings with colonic impaction can-
Abdominal ultrasonography may be used to more extensively evaluate extraluminal mass lesions, and ultrasound-guided biopsy may help obtain a definitive histopathologic diagnosis. Colonoscopy after evacuation of impacted feces may be indicated to inspect intraluminal structural abnormalities, and contrast radiography may be used if colonoscopy is not appropriate. Patients with evidence of neurologic impairment may benefit from cerebrospinal fluid analysis, myelography, and/or electrophysiologic studies to definitively characterize the malady.

**MEDICAL MANAGEMENT**

A first bout of constipation often resolves without therapy, but mild to moderate or recurrent episodes of constipation usually require some form of medical intervention. Often, a combination of dietary modification, laxatives, enemas, and/or colonic prokinetic agents is effective therapy. Studies have shown that dietary supplementation with short-chain fatty acids improves colonic smooth muscle constriction in both cats and dogs. Hospitalization for intravenous fluid therapy to correct dehydration and electrolyte derangements as well as to evacuate impacted feces is typically required in cases of obstipation and megacolon.

Rectal suppositories (see box above) are available to manage mild constipation, but their use requires an amenable pet and compliant pet owner. Suppositories may be used alone or in conjunction with oral laxative therapy. Mild to moderate or recurrent episodes of constipation may require administration of enemas and/or manual extraction of impacted feces. Several types of enema solutions (see box at top right) are available; these solutions should be administered slowly with a well-lubricated red rubber catheter. Because enema solutions containing sodium phosphate may cause severe electrolyte disturbances in cats, these solutions should never be used in this species.

Manual extraction of impacted feces is required in patients in which enemas and laxative therapy have not successfully facilitated defecation. Cats should be adequately rehydrated, and anesthesia should be maintained with an endotracheal tube in place to prevent aspiration in case colonic manipulation induces vomiting via stimulation of colonic stretch receptors. We recommend perianesthetic administration of metronidazole (Flagyl, Pharmacia and Searle; 7.5 to 15 mg IV bid) because of potential anaerobic bacterial translocation with colonic handling during digital extraction. Warm water or 0.9% saline mixed in a 50:50 combination with a water-based, sterile bacteriostatic surgical lubricant may be infused into the colon while the fecal mass is manually reduced via abdominal palpation. Laxative and/or prokinetic therapy may be instituted once the fecal mass has been adequately removed.

Lactulose is a hyperosmotic laxative and is perhaps the most frequently used medication in treating idiopathic megacolon (see box on page 661). The organic acids produced from lactulose fermentation stimulate colonic fluid secretion and propulsive motility. Another example of a hyperosmotic laxative is polyethylene glycol, and some researchers report anecdotal success with the use of this medication. Bulk-forming...
laxatives are typically minimally digestible polysaccharides and celluloses, and constipated cats may respond to dietary supplementation with one of these products. Dietary fiber is preferable because it is well tolerated, more effective, and more physiologic compared with other laxatives. Fiber induces vigorous colonic contraction via colonic stretching in large-bowel segments capable of effectively contracting; thus fiber supplementation may be effective in early stages of idiopathic megacolon when the colon may still have some ability to contract. In addition, fiber supplementation in late stages of idiopathic megacolon may exacerbate colonic distention and subsequent clinical signs; thus a low-residue diet may be more beneficial in affected patients. Emollient laxatives enhance lipid absorption and impair water absorption by altering the miscibility of water and lipid in ingesta. Animals should be well hydrated before receiving bulk-forming, hyperosmotic, and/or emollient laxatives. Lubricant laxatives impede colonic water absorption while facilitating ease of defecation and are typically beneficial with mild cases of constipation. White petrolatum and mineral oil are the most common examples of lubricant laxatives, but we do not recommend oral administration of mineral oil because of the risk for aspiration. Bisacodyl is a laxative that stimulates colonic propulsive motility. This stimulant laxative may be given individually or in combination with fiber supplementation, but daily administration should be avoided because of potential injury to myenteric neurons with long-term use.

Serotonergic 5-hydroxytryptamine (5-HT)–receptor activation may cause colonic contraction, and 5-HT₄ agonists may stimulate both colonic and cardiac 5-HT₄ receptors. Cisapride (from compounding pharmacies) is a substituted piperidinyl benzamide serotonin receptor agonist, and in vitro studies showed that this medication stimulates feline colonic smooth muscle 5-HT receptors to promote propulsive motility. This medication has also been shown to cause prolongation of the QT interval and slowing of cardiac repolarization via blockade of the rapid component of the delayed rectifier potassium channel in humans, and these changes may cause the fatal dysrhythmia torsades de pointes. Similar in vitro effects have been characterized in canine cardiac Purkinje fibers, but in vivo effects have not been reported in dogs and cats. Although cisapride has been removed from most pharmaceutical markets, this medication may still be purchased from many compounding pharmacies. The histamine (H₂) antagonists ranitidine (Zantac, GlaxoSmithKline) and nizatidine (Axid, Eli Lilly) stimulate in vitro feline colonic smooth muscle contraction via inhibition of tissue acetylcholinesterase, but in vivo studies still need to be conducted to determine whether these medications should be considered a standard component of therapy for idiopathic megacolon.

Tegaserod (Zelnorm, Novartis) is a partial non-benzamide agonist at 5-HT₄ receptors and a weak pure ago-

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**Recommended Laxatives**

- **Hyperosmotic**
  - Lactulose
- **Bulk-forming**
  - Canned pumpkin
  - Psyllium
- **Emollient**
  - Dioctyl sodium sulfosuccinate (Colace, Mead Johnson)
  - Dioctyl calcium sulfosuccinate (Surfax, Hoechst)
- **Lubricating**
  - White petrolatum
  - Mineral oil
- **Stimulating**
  - Bisacodyl

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**Clinicians should carefully perform a digital rectal examination using sedation or anesthesia in all cats with suspected idiopathic megacolon.**
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Prucalopride stimulates giant migrating contractions in dogs, frequently causing defecation within the first hour after administration. This medication also increased defecation within a similar time period in healthy cats with no alteration of fecal consistency. To date, prucalopride has not been approved for use in the United States.

Misoprostol (Cytotec, Searle) is a prostaglandin E₁ analogue shown to reduce the incidence of NSAID-induced gastric injury. An in vitro study revealed that misoprostol stimulates feline colonic smooth muscle contraction. However, to our knowledge, in vivo studies have not been conducted. Erythromycin has been shown to decrease in vitro canine colonic transit time; however, this medication has no effect on feline colonic smooth muscle and thus is not indicated to treat feline constipation or obstipation and/or megacolon.

Metoclopramide HCl (Reglan, Wyeth-Ayerst) and domperidone (Motilium, Janssen, LP) are dopaminergic (D) antagonists with peripheral prokinetic effects and central antiemetic effects at D₂ receptors. Although these medications enhance gastric motility, they have a negligible effect on colonic transit time, which minimalizes their use in treating constipation or obstipation and/or megacolon.

Surgical Management

Cats with a history of chronic constipation refractory to appropriate medical therapies may require surgical intervention. Many surgical techniques for the management of feline idiopathic megacolon have been described, including coloplasty and partial or subtotal colectomy. Partial colectomy involves removal of only the dilated and atonic segment of colon at the time of surgical exploration; grossly normal tissue is not resected. Partial colectomy has fallen out of favor because differentiation between normal and abnormal tissue based on gross appearance at the time of surgery is impossible. A study demonstrated that the entire colon is likely histologically affected and any amount of colon remaining following subtotal colectomy may continue to dilate, potentially resulting in recurrence of clinical signs. Thus failure to resect a significant length of grossly normal-appearing colon may result in therapeutic failure.

**Procedure for Subtotal Colectomy**

- Position the patient in dorsal recumbency.
- In a routine manner, shave and drape the ventral abdomen for aseptic surgery.
- Monitor the patient’s cardiovascular status (i.e., temperature, heart rate and rhythm, respiratory rate, blood pressure, end-tidal carbon dioxide) continuously during the entire anesthetic period.
- Provide appropriate intraoperative fluids (typically, isotonic crystalloid administered at 5–10 ml/kg/hr).
- Create a ventral midline celiotomy from cranial to the umbilicus to the pubis.
- Thoroughly explore the abdomen.
- Harvest appropriate samples (tissue biopsy specimens, fluids) from other abdominal organs before incising the gastrointestinal tract.
- Isolate and pack off the colon with laparotomy pads moistened with sterile 0.9% sodium chloride.
- From the surgical site, digitally manipulate fecal material within the colonic lumen.
- Occlude the colonic lumen using noncrushing clamps (Doyen forceps).
- Double-ligate only the short vasa recta vessels supplying the segment to be resected, helping to ensure that the caudal mesenteric, cranial rectal, left, middle, and right colic vessels are intact to maximize blood supply to the anastomosis site.
- Transect the distal colon 2–4 cm cranial to the pubis.
- 3-0 or 4-0 absorbable suture is preferred for colectomy; however, if the patient is immunocompromised and/or hypoalbuminemic, a nonabsorbable suture should be used.

**Surgical area on a cat before subtotal colectomy.**

Note the profound colonic distention.
The current gold-standard surgical treatment of feline idiopathic megacolon is subtotal colectomy (see box on page 662 and Figure 2). This procedure involves removal of 90% to 95% of the colon regardless of gross appearance; only a short distal colonic segment is spared to allow anastomosis. Controversy still exists as to whether to preserve the ileocolic junction during the colectomy procedure because the ileocolic valve allows passage of the small intestinal contents into the colon and prevents reflux of colonic contents into the ileum. The removal of the ileocolic valve is thought to cause reflux of colonic microorganisms into the small intestine, resulting in small intestinal bacterial overgrowth and diarrhea. In a study by Sweet et al, the ileocolic junction was preserved in 14 cats and resected in eight cats during subtotal colectomy. There was no difference in the overall recurrence of constipation in either group. However, patients that underwent ileocolic junction resection had significantly looser feces than those in which the ileocolic junction was preserved.

The use of cleansing enemas is not recommended before colonic surgery in veterinary medicine because preoperative enemas may change firm, dry feces into a bacteria-rich liquid capable of contaminating the surgical field. The patient should be fed a low-residue diet until 12 hours before induction of general anesthesia, at which time food should be withheld. Free access to water should be allowed until anesthetic induction. Perioperative, broad-spectrum parenteral antimicrobial therapy is recommended to reduce the risk for postoperative infection. We prefer ampicillin–sulbactam sodium (Unasyn, Pfizer) at a dose of 22 mg/kg IV administered at induction; a second dose should be administered if surgery lasts longer than 2 hours.

Potential postoperative complications include colonic leakage, colotomy and/or ventral abdominal incisional dehiscence, peritonitis, ischemic necrosis, stricture, and/or abscess formation. Hydration should be maintained using intravenous fluids for 1 to 3 days after surgery. Appropriate analgesics should be used as necessary during the perioperative period. The patient may be fed within 24 hours following surgery, although it is not uncommon for the patient to initially have a poor appetite. Appetite stimulants such as cyproheptadine (Periactin, Corepharma, Inc.; 2 mg/cat PO bid) or diazepam (Valium, Hospira, Inc.; 0.5 mg/cat IV) may be necessary. The long-term prognosis for cats with idiopathic megacolon that undergo subtotal colectomy is fair to good.

Figure 2. Intraoperative image of the descending colon of a cat with idiopathic megacolon.

CONCLUSION

Feline idiopathic megacolon is a relatively common disease characterized by generalized colonic dysfunction. Common clinical signs include dyschezia, anorexia, weight loss, and/or vomiting, and physical examination typically identifies profoundly firm fecal material within the colonic lumen. A thorough diagnostic investigation must be conducted to rule out predisposing problems before establishing a diagnosis of idiopathic disease. Medical management with dietary modification and administration of laxatives, enemas, and/or promotility agents may be successful. However, subtotal colectomy should be considered for patients refractory to medical therapy.

REFERENCES


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**ARTICLE #3 CE TEST**

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1. Which pedigree is not overrepresented for having feline idiopathic megacolon?
   a. Domestic Shorthair
   b. Maine coon
   c. Domestic Longhair
   d. Siamese

2. Which condition does not cause hypertrophic megacolon?
   a. pelvic fracture malunion
   b. hypokalemia
   c. pelvic canal stenosis
   d. luminal obstruction

3. _______ laxatives enhance lipid absorption and impair colonic water absorption by altering miscibility of water and lipid in ingesta.
   a. Hyperosmotic
   b. Bulk-forming
   c. Emollient
   d. Lubricant

4. _______ is a potentially adverse cardiac side effect of cisapride.
   a. Ventricular tachycardia
   b. Prolongation of the QT interval
   c. Atrial standstill
   d. Left anterior fascicular block
5. H₂ antagonists stimulate in vitro feline colonic muscle stimulation via
   a. suppression of parietal cell activity.
   b. inhibition of tissue acetylcholinesterase.
   c. stimulation of enterochromaffin cells.
   d. direct stimulation of myenteric plexi.

6. The preferred surgical treatment of idiopathic megacolon is
   a. coloplasty.
   b. subtotal colectomy.
   c. partial colectomy.
   d. total colectomy.

7. Which is not a reported metabolic cause of colonic dysfunction?
   a. hyperphosphatemia
   b. hypokalemia
   c. hypercalcemia
   d. dehydration

8. Which may not be used as an enema?
   a. a 50:50 ratio of water or saline plus a water-based lubricant
   b. dioctyl sodium sulfosuccinate
   c. glycerin
   d. lactulose

9. During deobstipation, stimulation of the colonic afferent nerves may stimulate
   a. extensor rigidity.
   b. vomiting.
   c. dysuria.
   d. panniculus reflex.

10. The preferred administration route for lubricant laxatives is
    a. oral.
    b. intravenous.
    c. per rectum.
    d. subcutaneous.