Ins and Outs: Getting Calories into the Inappetant Cat
Managing Feline Constipation

Margie Scherk, DVM, DABVP
Cats Only Veterinary Clinic
Vancouver, B.C., Canada

In! Getting calories into the inappetant cat

Inappetence and anorexia are common problems in feline patients. Inadequate nutrient intake is, at best, detrimental and interferes with healing. At worst, it is life-threatening. Cats have only a limited ability to conserve body protein; this can result in negative nitrogen balance, protein: calorie malnutrition and deterioration of protective mechanisms impacting immunity, red cell hemoglobin content, muscle mass as well as the ability to repair tissues. Additionally, cats have limited storage of many other nutrients as well as a restricted ability to down-regulate numerous metabolic processes. Their design is best suited to eating multiple small meals per day, high in protein, and moderate in fat. Inappetence and anorexia should be dealt with promptly and adequately.

Meeting the patient's nutritional needs is not a substitute for localizing the cause for this inappetence. It is, however, necessary and allows time to identify the cause. Providing nutrients may be the most challenging part of any therapeutic regimen, and recovery or attaining the best possible QOL in cats may depend on our ability to ensure optimal nutrition.

The first question that must be answered is: why has this cat stopped eating? Is it because of a loss in appetite or some other reason? Nausea may be of neurologic origin (e.g., vestibular disease or irritation of the chemoreceptor trigger zone or the vomiting center by inflammation, neoplasia or chemicals including metabolites or drugs). It may be a result of dehydration or may originate with GI inflammation for any reason (e.g., ileus, colitis, upper intestinal or gastric disease). However, decreased food intake may be due to other factors, such as dysphagia, pain (e.g., oral, dental, GI, multisystemic, etc.), dislike of the diet (e.g., boredom, altered palatability, spoilage), aversion, fear (e.g., environmental changes including those in the social demographics).

Nutritional support should be considered for the severely malnourished cat (20% weight loss, body condition score 1-2/9) or moderately malnourished (a 10% weight loss, BCS 3-4/9) who also have catabolic disease. Some cats will benefit from early intervention even at normal weight and condition if they suffer from advanced renal disease, hepatopathy, protein losing GI or glomerular disease, pancreatitis or bile duct obstruction.

Inappetent cats, and those not ingesting adequate protein, shift into a catabolic state. They are at risk for hepatic lipidosis, especially if ill and possibly at a greater risk if previously obese. Lipidosis is a disease of dysfunctional lipoprotein metabolism; it is important to calculate the daily caloric and protein requirements as part of the therapeutic plan. [Calories: 50 kcal/kg ideal BW/day; 4.5 g protein/kg ideal BW/day]. The diet needs to be balanced for energy (protein, fat, +/- carbohydrates), vitamins and minerals. It needs to be palatable taking the following four factors into account: texture, aroma, taste, and consistency. Bowls should be wide and flat to avoid interfering with whiskers. The environment should be non-threatening, so a hospital setting is especially off-putting. Feline facial pheromone may be beneficial to reduce stress.

Rehydration and correction of electrolyte imbalances are important but oft overlooked goals in the correction of inappetence and anorexia. Anti-emetics have a place if the cat is vomiting. In gastric-origin nausea, agents such as H2 antagonists, gastroprotectants, proton pump inhibitors or prostaglandin E agonists may be beneficial depending on the cause of the gastric upset.

Appetite stimulants including cyproheptadine (1 mg/cat PO BID), mirtazapine (2-3 mg/cat PO q72h) may help jump-start a cat's appetite, but keep track of total calories consumed. If a cat is eating but not enough, supportive feeding (assisted syringe feeding or tube feeding) must be considered. A cat eating small amounts of baby food will not meet his caloric needs until he eats 2-3 jars/day. Meat baby food is not balanced, but is sufficient for several weeks. There are several diets specifically designed for the assisted feeding of cats (Royal Canin Recovery, Hill's a/d, Eukanuba Maximum Calorie), liquid balanced enteral diets for cats (Clinicare, Rebound) Additionally, we can make a slurry from any canned food; blend with a liquid feline diet rather than water to minimize loss of calories.

There are several options for assisted feeding each with advantages and disadvantages. In general, the author starts with syringe assisted feeding until the cat is stable enough to allow the brief anaesthetic required for the placement of an esophageal tube. With concurrent liver disease, give three doses of Vitamin K1 (1.0 mg/kg q12h SC) prior to tube placement, biopsies or any other procedure that might result in bleeding. Placement of esophageal tubes is discussed elsewhere. The instrumentation for this procedure is very basic requiring only the following: 14-16 Fr red rubber feeding tube/urinary catheter, Carmalt or other long curved forceps, a scalpel blade, suture and bandaging materials and a multiple use injection port (prn adaptor).

Calculating how much to feed requires that you know the patient's current weight as well as their healthy weight and the caloric densities (kcal/ml) of the diet you are intending to use (see Table 1). Use 50 kcal/kg as a rough guide to determine calories needed. Start by feeding 1/3-1/2 of the calories needed for the current, inappetant weight. On day two, feed 2/3-3/4 of this number and on day three, feed the full calories needed for the current weight. For weight gain, gradually increase to the calories needed for the cat's healthy weight.

Example

- 3.4 kg sick cat BCS 3/9, healthy weight 4.0 kg BCS 5/9
- 3.4 kg X 50 kcal/kg/day = 170 kcal by day 3
- 170 kcal = 81 ml Eukanuba Maximum Calorie
- OR 131 ml of Hill's a/d or Royal Canin Recovery or PVD CV mixed with equal volumes Clinicare or Rebound.
- Day 1 feed 30-40 ml of Max Cal or 44-65 ml of the other diets
- Day 2 feed 54-61 ml of Max Cal or 87-98 ml of the other diets
- Day 3 feed 81 ml Max Cal or 131 ml of the other diets.
    - Once stable, gradually increase to meet caloric requirements for 4 kg healthy weight.
    - 4 kg X 50 kcal/kg/day = 200 kcal (95 ml Max Cal vs.154 ml of the other diets).

With surgically placed tubes there is a delay in how quickly one can start to use them; with an esophageal tube only a 2-3 hour delay is required to ensure full recovery from anaesthesia whereas gastrostomy and jejunostomy tubes require a longer wait of 10-12 hours. Cats can eat with any of these tubes in place. It is recommended to avoid offering food for a week to reduce the likelihood of them developing aversion to the food offered. Once a cat is eating well with tube in place the question becomes when one can remove the tube. Weigh the cat and, as long as he/she is eating well, avoid using the tube (for nutrients) for a week then reweigh the kitty. If the weight is stable (or increased), then it is safe to remove the tube. Because of stoma formation (except nasoesophageal tubes), removal does not require anaesthesia. Remove the suture (purse-string or stay sutures) and pull the tube out. In the case of a gastrostomy tube, its bulb must be straightened out the bulb/balloon by inserting a straight probe through the tube while concurrently pulling the tube out. Suturing is not required for any of the skin openings. Cleanse minimal serous discharge that may occur for 2-3 days.

Feeding frequency: the number of feedings per day, (and hence intervals), is determined based on the volume of food tolerated per feeding. Start with 6 ml and increase by 6 ml increments to about 36-48 for most cats. In the uncommon case of the patient who cannot tolerate even 6 ml boluses despite antiemetic therapy (see Pancreatitis notes in these Proceedings), trickle feeding may be instituted. Trickle feeding is a technique in which liquefied food is syringed into an empty fluid bag and administered gravitationally or by pump assistance via an intravenous line attached to the large bore feeding tube or by use of a large syringe filled with food and syringe pump. Renew food and delivery tubing and syringe at 12-hour intervals to avoid bacterial contamination. A promotility agent may be warranted as well. A good client reference is the Animal Medical Center of Canberra's website: www.animalmedicalcentre.com.au => Pet Health => Articles => Cats => Tube feeding.

The success of assisted feeding is measured objectively by weight gain. Subjective measures will include improved coat quality, increased energy, muscle recovery and innumerable other effects that the client will appreciate. An improved quality of life is the goal whether recovery form the underlying problem is possible or not.

Table 1: Caloric densities of convalescent diets, for calculating feeding volumes

ReboundTM: 1 kcal/ml
ClinicareTM: 1 kcal/ml
Royal Canin/MediCal RecoveryTM: 1.23 kcal/ml
Hill's a/dTM: 1.3 kcal/ml
Eukanuba Maximum CalorieTM: 2.1 kcal/ml
Purina PVD CVTM: 1.3 kcal/ml if blended with 170 ml (1 CV can) ReboundTM/ClinicareTM
Blended with H2O => 0.7 kcal/ml

Out! Managing feline constipation

Constipation is defined as the infrequent or difficult evacuation of stool. It is a common problem in cats that may be acute or chronic and does not inherently imply a loss of colonic function. Often the underlying cause is dehydration and is readily managed by supportive hydration, by oral, nutritional or parenteral means. When a cat has intractable constipation that is unresponsive to therapy or cure, this is referred to as obstipation. Obstipation implies permanent loss of function. When obstipation results in dilatation of the colon or hypertrophy of the colon, then the condition is described as megacolon.

Constipation is more prevalent than we may recognize. Clients may perceive firm pellets as being "normal" and report them as such when queried by the veterinary team. If their cat defecates in the garden or if the litter pan is not cleaned on a daily basis, they may be unaware that their cat has excessively dry stool. Cats are presented because of a client's observation of reduced, absent or painful, elimination of hard stool. Cats may pass stool outside the box as well as in it, may posture and attempt to defecate for prolonged periods or may return to the box to try repeatedly to pass stool, unsuccessfully. There may be mucus or blood passed associated with irritative effects of impacted stool, and even, intermittently, diarrhea. Vomiting is frequently associated with straining. Inappetence, weight loss, lethargy and dehydration become features of this condition if unresolved. Dilated megacolon is preceded by

repeated episodes of recurrent constipation and obstipation. In the cat with hypertrophic megacolon, there may be a known history of trauma resulting in pelvic fracture.

Constipation is a sign of cellular water deficit. When cells are dehydrated and the water intake (from drinking and eating) of the cat is maximized, the kidneys have reclaimed as much water as they are capable of, then colonic contents are the last source of water to try to maintain hydration. Determining the actual character of a cat's feces is helpful in assessing their overall condition. Asking the client if there has been a change in stool character may not elicit the information; if a cat has had hard stool for months, even if the client is aware that the stool is pelleted, the question will not produce this information. Asking the client to tell you if the stool is hard pieces, moist logs, semi-formed (cow patties) or coloured water will elicit the desired information.

Clinical presentation and diagnosis

Constipation, obstipation and megacolon may be seen in cats of any age, breed and gender, however middle aged (mean 5.8 years), male (70%) DSH (46%) cats appear to be at risk for megacolon. Cats with dysautonomia (rare) have signs referable to other autonomic defects, such as urinary incontinence, regurgitation, mydriasis, prolapse of the nictating membrane and bradycardia. Digital rectal examination under sedation or anaesthesia should be performed in all cats to rule-out pelvic fracture, malunion, rectal diverticulum, perineal hernia, anorectal stricture, foreign body, neoplasia or polyps. A neurological examination should be performed to detect any neurological causes of constipation, including pelvic nerve trauma, spinal cord injury, or sacral spinal cord deformities of Manx cats.

Serum biochemistries and a complete blood count are generally normal; they should be performed in order to detect cats with electrolyte abnormalities (hypokalemia, hypercalcemia, dehydration). A serum T4 should be checked in obstipated kittens suspected of being hypothyroid.

Abdominal radiography should be performed to characterize the mass and verify that it is, indeed, colonic impaction rather than neoplasia. They will also help to identify predisposing factors such as pelvic fracture, extra-luminal mass, foreign body, and spinal cord abnormalities. Barium enemas, or colonoscopy and ultrasound may be additional tools required to help define the problem. CSF evaluation is indicated in cats with neurological involvement.

Therapy

There are five components of medical management of the cat with recurrent constipation, obstipation or megacolon: 1. achieve and maintain optimal hydration; 2.remove impacted feces; 3. dietary fiber; 4. laxative therapy; 5. colonic prokinetic agents.

1. As long as cellular dehydration is present, the need will exist to resorb water from renal and gastrointestinal systems. Systemic hydration may be attained through parenteral fluid therapy, including regular subcutaneous fluids in the home, feeding canned foods, adding water or broth to the food, feeding meat broths, or the use of running water fountains in the home. Addition of fiber to the diet should be avoided until the patient is adequately hydrated.
2. Removal of impacted feces helps to reduce the toxic and inflammatory stress on the bowel wall. Pediatric rectal suppositories may be used to help with mild constipation. They include dioctyl sodium sulfosuccinate (e.g.,DSS, Colace™), glycerin or bisacodyl (e.g.,Dulcolax™). Enema solutions that may be used include warm tap water, DSS (5-10 ml/cat), mineral oil (5-10 ml/cat) or lactulose (5-10 ml/cat). They should be administered slowly through a well-lubricated 10-12 Fr. rubber catheter. Mineral oil and DSS should not be given together as DSS promotes mucosal absorption of the mineral oil. Sodium phosphate containing enemas (e.g., Fleet™) are contraindicated because they predispose to life-threatening electrolyte imbalances (hypernatremia, hyperphosphatemia and hypocalcemia) in cats. Hexachlorophene-containing soaps should be avoided because of potential neurotoxicity. Enemas given too rapidly may cause vomiting, pose a risk for colonic perforation and may be passed too rapidly for the fecal mass to be softened by them.
    a. Manual extraction may be required in recalcitrant cases. Infusion of water into the colon, manual massage and reduction of the mass by abdominal palpation and gentle use of fingers to break down the fecal mass may be helpful. Caution must be used to reduce the risk of perforation. Anytime a cat is anaesthetized for manipulations of the colon, a cuffed endotracheal tube should be in place, in case the cat vomits.
3. Dietary fiber acts as a bulk-forming laxative. The benefits of *insoluble* (poorly fermentable) fiber, (e.g., wheat bran, cereal grains), are to improve or normalize colonic motility by distending the colonic lumen, increase colonic water content, dilute luminal toxins (such as bile acids, ammonia and ingested toxins) and increase the rate of passage of ingested materials thereby reducing the exposure of the colonocyte to toxins, while increasing the frequency of defecation. Suggested doses are: psyllium (Metamucil™, 1-4 tsp mixed with food PO q12-24h), canned pumpkin (1-4 tbsp mixed with food PO q24h), coarse wheat bran (1-2 tbsp mixed with food PO q24h). *Soluble* (highly fermentable) fibers (e.g., oat bran, pectin, beet pulp, vegetable gums) are readily digested by bacteria and provide large quantities of short chain fatty acids, which are beneficial in many ways for colonic health, but they are not suitable as laxatives, because they have little ability to increase fecal bulk or dilute luminal toxins. They gel intestinal contents. In nature,

most fibers are not strictly insoluble or soluble, but can be considered to have a greater or lesser percentage of soluble fiber. Pectin and guar gum are 100% soluble fiber, psyllium is 79% soluble and 21% insoluble fiber.

   a. Recently a psyllium-enriched dry extruded diet (Royal Canin Fiber Response) has been studied in France and in Canada. It was shown to be beneficial in the treatment of cats with recurrent constipation attributed to dilated or hypertrophic megacolon. While some of the 54 cats required fluid therapy and enemas initially, oral laxatives and other medications were discontinued.

4. Laxatives may be categorized as emollient, lubricant, hyperosmotic and stimulant, based on method of action. *Emollient* laxatives are anionic detergents that increase the miscibility of water and lipid in ingesta, enhancing lipid absorption and impairing water absorption. DSS (Colace^{TM}, 50 mg PO q24h) and dioctyl calcium sulfosuccinate (Surfax^{TM}, 50 mg PO q12-24h) have been used in cats.
   a. Lubricant laxatives impede water absorption as well as enabling easier passage of stool. Mineral oil (10-25 ml PO q24h) or petrolatum (hairball remedies, 1-5 ml PO q24h) are best suited to mild cases of constipation. Additionally, mineral oil is better administered by enema rather than orally, because of the risk of aspiration pneumonia. Chronic use may interfere with absorption of fat-soluble vitamins.
   b. Hyperosmotic laxatives stimulate colonic fluid secretion and propulsive motility. While there are three types (poorly absorbed polysaccharides [lactulose, lactose], magnesium salts [magnesium citrate, magnesium sulfate, magnesium hydroxide] and polyethylene glycols [GoLYTELYTM, ColyteTM]), lactulose (0.5 ml/kg PO q8-12h, prn) is the safest and most consistently effective agent in this group. Kristalose consists of lactulose crystals for reconstitution that cats may accept sprinkled on their food or suspended in water. Mg salts are contraindicated in cats with renal insufficiency. Miralax, polyethylene glycol (PG3350) may be used in cats at a dose of 1/8 - 1/4 tsp twice daily in food; polyethylene glycols are contraindicated in functional or mechanical bowel obstruction.
   c. The stimulant laxatives enhance propulsive motility by a variety of actions. One example, which has been used in cats, is bisacodyl (DulcolaxTM, 5 mg PO q24h), which acts by stimulating nitric oxide-mediated epithelial call secretion and myenteric neuronal depolarization.

5. Colonic prokinetic agents stimulate motility from the esophagus aborally. Older motility agents have been unsuccessful, either because of significant side-effects (bethanechol) or the inability to enhance motility in the distal gastrointestinal tract (metaclopromide, domperidone). Cisapride (Propulsid^{TM}, Prepulsid^{TM}) is a benzamide prokinetic drug and helps in mild to moderate constipation. Cats with longstanding obstipation or megacolon are not likely to be helped much by cisapride. Published dose recommendations are 2.5 mg PO q8-12h; this author routinely uses 5 mg/cat PO q8-12h without noted side effects. Newer promotility drugs have not yet received wide use in veterinary medicine. Dr. Washabau stated: “Cats treated with prucalopride at a dose of 0.64 mg/kg experience increased defecation within the first hour of administration. Fecal consistency is not altered at this dose. The therapeutically effective dose for tegaserod in cats is 0.1-0.3 mg/kg PO BID.”

Cats with chronic obstipation or megacolon are candidates for colectomy. Chronic fecal impaction results in mucosal ulceration and inflammation and risk of perforation. Surgery should be done before bowel wall and patient health are compromised and debilitated. At the time of resection, small intestinal biopsies are advised, as concurrent, underlying disease (e.g. lymphoma, FIP) may be identified. Post-operatively, diarrhea may be present for 4-6 weeks. As anal tone isn’t compromised, house soiling shouldn’t occur. The prognosis for recovery is good.

References/suggested reading available upon request