

Nutritional needs of ill Pets

Assisted feeding can enhance healing in anorectic, hospitalized Pets.



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Nutrition is an important aspect in the recovery from any disease process. Almost every disease increases nutrient requirements over the basal metabolic needs of the patient due to the production of inflammatory mediators and tissue destruction and repair. Vomiting and diarrhea contribute to increased nutrient losses. Proper healing of surgical wounds, traumatic injuries and burns also increase nutrient requirements. If nutritional needs are not met, the disease will be more difficult to resolve and the Pet will suffer for a longer period of time. The benefits of meeting nutritional needs include enhanced immune function, wound repair and response to therapy, decreased recovery time and increased overall survival rate.

Encouraging sick Pets to eat

Before embarking on nutritional support for the Pet, the doctor must ensure that the Pet has been stabilized and rehydration, electrolyte replacement and normalization of acid-base status have been achieved. This can be accomplished with appropriate

intravenous fluid therapy and pharmaceutical intervention if needed. The subject of stabilization is beyond the scope of this article and has been covered elsewhere.¹ The goal of nutritional support is to stimulate Pets to eat their regular or prescribed food as quickly as possible so they can go home. Unless there is a medical contraindication (e.g., pancreatitis in the dog), the Pet should be encouraged to eat as soon as possible. Attempts should be made to feed the Pet its regular diet so dietary changes do not contribute to the existing illness by causing vomiting and diarrhea. Some Pets will accept a novel diet if it is more appealing than their regular diet. It is generally not recommended to feed cats the chosen therapeutic diet long-term while they are in the hospital setting. Ill cats are very stressed and may associate the food with the hospital and develop an aversion to the food.

Hand or “coax” feeding should be attempted before proceeding to more invasive methods. This can be done by a caring and patient PetNurse. Warm the food to body temperature to improve the aroma, remove the Pet from the kennel and vocally reassure the Pet in a calming voice.

Esophagostomy Tube Placement

Figure 1



After clipping and aseptically preparing the left lateral neck, place a curved forceps in the mouth and then into the esophagus.

Figure 2



After identifying the jugular vein, push the tip of the forceps laterally so the esophagus is isolated against the lateral neck. Make a small stab incision, just large enough for the tube, over the tip of the forceps.

Figure 3



Open the jaws of the forceps, grasp the distal end of the tube and withdraw the forceps and the tube through the mouth.

Figure 4



Hold the end of the feeding tube so it does not slide through the incision.

Figure 5



Using the forceps or your fingers redirect the distal end of the feeding tube back through the mouth and into the esophagus. You may need to pull on the external end of the feeding tube to avoid kinking the tube.

Figure 6



Once the distal end has been placed into the esophagus, line up your pre-measured mark with the skin and secure the tube to the neck with the tip pointed dorsally. A tape butterfly or Chinese finger trap friction suture can be used to secure the tube. Cap the tube to avoid air or particles entering the tube. A soft bandage should be applied over the tube.

Illustrations by Christian Hammer

Force-feeding by manually placing food in the Pet's mouth can be attempted or moist food can be placed on the muzzle area and the Pet will reflexively lick it off. It is difficult to provide adequate caloric intake with assisted feeding in severely anorectic patients. Some cats with mild anorexia may be stimulated to eat by administration of cyproheptadine (2 to 4 mg/cat orally once or twice daily).¹ Cyproheptadine is rarely successful with severe anorexia, such as that induced by hepatic lipidosis.

Nutritional needs

Daily maintenance nutritional requirements should be calculated to avoid underfeeding. Nutritional needs are based on basal energy needs plus adjustments for activity or disease. In Pets weighing between 2 and 50 kg,

basal energy requirements are $(30 \text{ times body weight in kg}) + 70 = \text{kcal per day}$.² Adjustment factors of 1.1 to 2 are made for the maintenance kcal requirement. Approximately 60 kcal/kg/day is a reasonable rule of thumb to use for maintenance caloric intake in mature dogs and cats.¹ More accurate calculations are recommended if the Pet is less than 2 kg or greater than 50 kg, has severe disease or is losing significant protein or energy.

The sick Pet should be fed a commercially prepared diet that contains adequate calories and protein in a dense, palatable formulation to achieve the highest energy input with the smallest possible volume. Hill's Prescription Diet a/d[®] fits these requirements well.³ Each 5.5 ounce (156 gram) can contains 180 kcal, 10.4 percent

protein and 7.1 percent fat, with optimal digestibility in most anorectic Pets. The food is easily diluted and given by syringe to the Pet either by mouth or through a feeding tube.

Selecting alternative feeding methods

If the Pet is too debilitated or doesn't eat after one to two days of illness, alternative feeding methods must be employed to ensure adequate caloric intake.

Intermittent orogastric tube feeding is only useful in Pets that need short-term nutritional support for one to two days. Most ill anorectic Pets require feeding tubes that bypass the mouth, most commonly nasoesophageal, esophagostomy and percutaneous gastrostomy tubes.

Nasoesophageal feeding tubes

Nasoesophageal tubes are easy to place and require no special equipment, only local anesthesia. Place a few drops of topical anesthetic, such as proparacaine, in the nostril. Choose an appropriately sized soft rubber or Silastic feeding tube and place the distal end at the level of the ninth rib. Make a line with indelible marker on the tube even with the end of the nose. Place some lubricant on the tip, insert the tube in the ventromedial meatus of the nostril and gently slide the tube towards the pharynx. Massaging the throat will often induce swallowing and assist in passing the tube into the esophagus. Secure the tube at the lateral meatus of the nostril using surgical glue or tension sutures and then run it along the bridge of the nose in cats or along the lateral aspect of the muzzle in dogs. Before administering food, check tube placement by injecting air and listening for borborygmus, aspirating and obtaining neg-

ative pressure or radiographing the Pet.

These tubes have several disadvantages, which include having small bore diameters and necessitating very liquified food. This requires dilution with water or electrolyte solutions and thus larger volumes must be instilled. The tubes are relatively annoying for the Pet, are easily vomited and chewed and preclude voluntary eating in most cases. In my experience as a practitioner, I prefer using an esophagostomy tube for assisted feeding of ill and anorectic Pets.

Esophagostomy feeding tubes

The placement of an esophageal feeding tube is relatively simple and straightforward.

Guide to Feeding Tube Selection

Nasoesophageal tube

Advantages

- General anesthesia not needed
- Well tolerated, but Elizabethan collar is suggested
- Can be placed while stabilizing patient for anesthesia and longer-term tube placement (use 3.5 to 5 French in cats, 5 French in dogs)

Disadvantages

- Liquid diets only, large volume required
- GI tract needs to be functioning normally
- Can only be used for less than one week
- Vomiting can cause tube displacement
- Prone to blockage due to small diameter (3.5 to 5 French)

Food suggestions

- CliniCare® Liquid Diet (1 kcal/ml)

ward. Larger bore tubes can be used, the Pet can be fed immediately after recovery from anesthesia, and Pets tolerate them very well and can eat and drink on their own if they desire. No special equipment is needed and the tube can be removed at any time following placement. The entry wound will rapidly heal by second intention after removal. Esophagostomy tubes can remain in place for weeks to months.

The only disadvantage of esophageal tubes is the need for general anesthesia. The Pet is anesthetized following stabilization. An appropriate anesthetic protocol is used and anesthesia is maintained with inhaled gas via an endotracheal tube. The Pet is

positioned in right lateral recumbency. The skin over the left lateral cervical region is shaved and aseptically prepared caudal to the ramus of the mandible extending to the thoracic inlet.

A 12 French or larger red rubber feeding tube is recommended and should be pre-measured and marked to ensure that when the tube is in place, the tip resides in the distal esophagus and does not cross the lower esophageal sphincter. To premeasure the tube, lay the tube next to the Pet with the distal tip at the level of the eighth rib. Mark the tube where it crosses the area of insertion into the esophagus.

A mouth gag is placed and a long,

Esophagostomy tube

Advantages

- Useful in patients with facial or oral trauma
- Larger bore than nasoesophageal-12 French or larger in cats and small dogs, up to 24 French in large dogs
- Can use gruel-type diet; more calorie dense and causes less diarrhea than high water content nasoesophageal diets
- Well tolerated by Pets
- Easily managed by clients
- Can be removed immediately after placement or left in place for several weeks
- Elizabethan collar not normally needed, but bandage needs to be changed daily

Disadvantages

- Requires general anesthesia
- Cannot be used in patients with esophageal disorders

Food suggestions

- Eukanuba MaxCal (2.11 kcal/ml); Prescription Diet a/d (1.2 kcal/ml) or any appropriate diet blenderized
- Administer a total of 60 to 65 ml per feeding in cats

Gastrostomy tube

Advantages

- Good choice for long-term nutritional support
- Well-tolerated by Pets
- Larger bore (18 to 22 French in cats; 20 to 30 French in dogs)
- Patients can eat and drink on their own if they desire

Disadvantages

- Requires general anesthesia
- Not recommended in patients with gastric or pancreatic disease or ascites
- Special equipment is necessary
- Cannot initiate feeding until 24 hours after placement
- Must remain in place for at least 7 to 10 days before removal
- Malnourished or protein deficient patients may not heal as well

Food suggestions

- Eukanuba MaxCal (2.11 kcal/ml); Prescription Diet a/d (1.2 kcal/ml) or any appropriate diet blenderized

curved Kelly or Carmalt forceps is then inserted into the mouth and into the esophagus through the cricopharyngeal sphincter. The tip is pointed laterally to tent the esophagus in the area where the incision will be made dorsal to the jugular vein (*Figure 1*, page 40). The skin incision for tube placement within the esophagus should be made at a point midway between the ramus of the mandible and the shoulder (thoracic inlet).

The skin incision is made with a #15 blade over the tip of the forceps while the forceps are pushed laterally, causing the esophagus to contact the skin. Being careful to avoid the jugular vein, make a stab incision through the skin and into the esophageal lumen (*Figure 2*, page 40). The tips of the hemostats are advanced through the incision, the jaws opened and the distal end of the premeasured feeding tube grasped. The tube is pulled through the skin and esophageal incision out of the mouth to the premeasured, marked spot and the forceps are removed (*Figures 3 and 4*, page 40). Then redirect the distal tip of the tube through the pharynx and down the esophagus using your thumb and forefinger until the tube is beyond your reach. This passage can be facilitated by lubricating the tube with sterile lubricating jelly and gently withdrawing the tube as it exits the neck and twisting, to straighten and unkink the tube (*Figure 5*, page 40).

The tube should move easily back and forth in the esophagus if correctly placed. Position the distal end in the esophagus so the premarked line on the tube corresponds with the point of skin entry. To ensure proper placement in the esophagus versus the trachea, the tube should be palpated through the neck and negative pressure should be found during aspiration.

Coughing or water dripping from the nose after a test injection of 3 to 5 cc of saline through the tube indicates improper placement. Adhesive tape should be attached to the tube in “butterfly” fashion and the tube sutured to the left side of the neck with a gentle curve so the injection port is dorsal to the insertion site (*Figure 6*, page 40). A Chinese finger-trap friction suture can be used instead of the tape if desired. The skin incision is left open, lubricated with antibiotic ointment and covered with a loose, light-weight bandage that allows access to the tube. When not in use, the end of the tube should be occluded with a cap to prevent air entry.

Recently, Banfield has made an esophageal feeding tube introducer available to their doctors. The procedure for the feeding tube placement is similar as described above, except the adapter has a rounded bulb in the center over which the skin incision is made. The introducer is then rotated to expose a canal into which the tube is directed. This piece of equipment makes it unnecessary to pull the tube from the mouth and redirect it into the esophagus.

If desired, the Pet may be fed immediately after recovery from anesthesia. Calculate the caloric requirements of the Pet and divide the amount needed into four to six equal feedings throughout the day, diluted to a consistency easily administered by syringe. The food should be warmed to room or body temperature. Gradually increasing the amount fed will decrease vomiting. Prophylactic administration of an antiemetic may also be helpful to counteract nausea. The first day, you should strive to meet a third of the caloric intake.

The second day should provide two

thirds of needed intake and on the third day the entire caloric intake is offered. Always check for correct placement before every feeding by aspirating through the tube and ensuring only negative pressure is felt. If any fluid or food is aspirated, postpone the feeding for one to two hours. The volume of each feeding should not exceed 60 ml in the cat and should occur over 10 minutes. Flush the tube with approximately 6 ml of warm water after each meal to prevent clogging of the tube. If the tube does clog, 15 ml of carbonated beverage can be instilled in the tube and allowed to sit for 20 minutes before flushing with warm water.

Once the tube is no longer needed, it can be gently withdrawn from the esophagus after the sutures are removed. The esophagus and skin should be allowed to heal by second intention over the next four to five days. Long-term complications such as esophageal stricture, esophagitis and subcutaneous cervical cellulitis have not been reported.⁴

Gastrostomy feeding tubes

Gastrostomy tubes are another available option for feeding ill and anorectic Pets. These tubes have the advantages of being large enough for thick gruel administration and are often tolerated by Pets for weeks to months. These tubes are especially useful in cats with chronic hepatic lipidosis that require prolonged supportive care or do not tolerate esophagos-


tomy tube or refuse to eat with the esophagostomy tubes in place. The disadvantage is the tube must be inserted percutaneously directly into the stomach, either via endoscopy or surgery using an ELD device or other assistive devices. Feeding must be delayed 24 hours until the serosal and parietal peritoneum have formed a seal. Gastrostomy tubes must also be maintained for at least seven to 10 days before removal to ensure adhesion between the body wall and stomach wall has occurred so that stomach contents do not leak into the abdominal cavity. Instruction for placement and after care of gastrostomy tubes can be found in other references.

Antiemetics

Antiemetics are indicated if there is vomiting, because it contributes to morbidity and prevents adequate caloric intake. Centrally acting agents are more effective and should be parenterally administered for maximal effect. Prochlorperazine (0.1 to 0.5 mg/kg intramuscularly every 6 to 8 hours) is very effective due to inhibition of the chemoreceptor trigger zone and medullary vomiting center. It should be used cautiously in dehydrated or hypotensive patients.

Another valuable antiemetic is metoclopramide. It increases lower esophageal sphincter pressure, gastric tone and peristalsis locally. It also works centrally to block dopamine in the chemoreceptor trigger zone. It is most effective when given as a constant rate infusion intravenously at a rate of 1 to 2 mg/kg/day but can also be given at a dose of 0.2 to 0.5 mg/kg intramuscularly, subcutaneously or orally every 8 hours. On rare occasions, the drug can cause unusual behavior or disorientation due to its extrapyramidal effects. Vomiting

can occasionally worsen due to the increased gastric contractions. Metoclopramide given orally is poorly tolerated in cats and the drug should never be used if gastric or intestinal obstruction is suspected due to the risk of intestinal rupture.

Sick Pets will benefit from any form of assisted feeding. The type selected is based on the length of time feeding will be necessary, presence of any concurrent gastrointestinal disease, equipment available, skill level of the clinician, and whether the Pet can tolerate general anesthesia. Feeding tubes can become an integral part of treating a wide variety of illnesses. The faster Pets meet their caloric needs, the faster they will recover. Veterinarians, team members and clients will be pleased with the results and your patients will get healthier quicker. 

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