Nutrition is an often-overlooked area of veterinary critical care but it is of vital importance in the healing process of our sickest patients. While it is true that calories and nutrients can be supplied parenterally with nutritionally balanced solutions, most general veterinary practitioners are not equipped to provide total parenteral nutrition. The old adage “if the gut works, use it” applies to all of our patients. Enteral nutrition is more economical, more cost-effective, and – in most cases – better for our patients. Providing nutrition to the gut directly improves the health of the intestinal mucosa, helping to maintain its viability and decrease the chance of gastrointestinal dysfunction.

Most sources state that anorexia of more than three days’ duration warrants immediate and aggressive nutritional intervention and support. Many of our patients have already been anorexic, or have been eating less than their nutritional needs for a period of time prior to presentation to the veterinary clinic and inappetance can be expected to continue during the course of hospitalization, either because of the inciting disease process or the stress of hospitalization. For many years practitioners relied on syringe feeding to either supplement or satisfy patients’ caloric needs. Recent studies have shown, however, that syringe feeding – especially of feline patients – is very stressful and may lead to more occurrences of food aversion so the current recommendation is to avoid syringe feeding most veterinary patients. Also, many patients cannot tolerate oral feeding due to reasons including trauma, uremic ulcers, and oral surgery, among others. Other indications for instituting nutritional support include actual or anticipated loss of more than 10% body weight, burns, large losses due to vomiting or diarrhea, and trauma – particularly involving draining wounds as large albumin losses can be expected.

Once the decision has been made to place a feeding tube, the practitioner has several options available. One of the first considerations is whether the tube will be maintained outside of the hospital setting. Next, the practitioner must decide where in the GI tract the nutrition will be best utilized. Finally, the patient’s ability to tolerate an anesthetic procedure must be considered and weighed against the benefit of providing enteral nutrition. In general, tube feeding should be started slowly and increased over time to provide the nutrition the patient requires.

Nasogastric / Nasoesophageal Tubes

Indications and Advantages: Nasogastric (NG) and nasoesophageal (NE) tubes are ideally suited for short-term, in-hospital feeding. The biggest advantage to using these tubes is that, in general, little to no sedation or anesthesia is required for placement and veterinary technicians can place them easily. Additionally, the tubes themselves are relatively inexpensive. Placement can be confirmed via lateral thoracic radiograph: in the case of an NE tube, the tip of the tube should be visualized past the heart in the distal third of the esophagus; and, in the case of an NG tube, the tip of the tube should be visualized in the fundus of the stomach. If properly placed, there are few complications and, if the patient removes or chews the tube, it will generally pass through the digestive tract without further complications. The biggest risk involved in the use of NG/NE tubes is improper placement into the trachea rather than the esophagus, which can lead to pneumonia if the tube is used for feeding.

Disadvantages: Because the tubes are generally smaller in diameter (3 – 8 Fr), only liquid diets can be used. These tubes are only used for short-term feeding (between three and ten days) because of the risk of them becoming dislodged by sneezing or vomiting or by the patient pawing the tube out of the nose.

Contraindications: Because the tube is placed through the nasal cavity, patients with thrombocytopenia are not candidates for NE / NG tubes due to the risk of potentially uncontrollable epistaxis. These tubes should not be placed in patients with respiratory compromise, as the tube may occlude the nasal passage, increasing respiratory distress.

Required Supplies:
- Proparacaine drops
- Water-soluble lubricant or lidocaine gel
- Red rubber tube, or commercial feeding tube
- Tape
- Skin stapler or suture
- E-collar

Placement:
- Place 1-2 drops of proparacaine in each eye and each naris. This will numb the rostral area of the muzzle, allowing for a more comfortable placement procedure.
- Measure the tube to the last rib if placing an NG tube. For NE tubes, measure to the 8th or 9th rib space. Make note of the distance the tube is to be inserted.
- Lubricate the tube and feed it rapidly into the naris in a ventromedial direction, inserting it to the measured distance. Some technicians find it easier to feed the tube if the nose is pushed dorsocaudally (“pug-nosed”) during insertion.
- Take a lateral thoracic radiograph to confirm proper placement. Once placement is confirmed, secure the tube and record in the record the distance of insertion.
- A test dose of sterile water or saline (10-15ml) may be instilled if the technician is unsure about placement location. If coughing is elicited, remove the tube and replace.
- Secure the tube with either suture, staples, or skin glue.
- The use of an e-collar is recommended to prevent the patient from pawing the tube out. Be aware that the e-collar may discourage some patients from eating on their own.

Using the tube: The tube can be used for feeding immediately upon placement, if no sedation was used for the procedure. One advantage to NG placement is that it allows aspiration of any residual gastric contents prior to feeding, leading to greater patient comfort. NG / NE tubes can be used for either bolus or CRI feeding, depending on clinician’s preference. Flush the tube with 3-10ml of water prior to using it for feeding to ensure patency. If feeding via CRI, no flushing should be necessary, unless it becomes occluded. If flushing is unsuccessful, the tube should be replaced. Removal of the tube is very simple: the tube is simply pulled from the naris. It is recommended that the tube be clamped during the removal process to prevent aspiration of any contents remaining within it.

Esophagostomy Tubes

Indications, Advantages, and Disadvantages: Esophagostomy tubes are ideal for long-term feeding, including maintaining nutritional intake after hospital discharge. These tubes can remain in place from weeks to months, they are tolerated well by patients, and most owners can easily manage feeding via the tube. Esophagostomy tubes are larger in diameter than NE / NG tubes so blenderized diets can be used. While placement requires anesthesia, the procedure is generally very short (10-15 minutes) and is appropriate for all but the most critical patients.

Contraindications: Patients with protracted and/or profuse vomiting are likely to vomit up – and possibly chew – the tube. Esophagostomy tubes should not be placed in patients with esophageal dysfunction such as megaesophagus, esophageal stricture, or pre-existing esophagitis.

Using the tube: The tube can be used as soon as the patient has regained the swallowing reflex. The tube should be flushed with several milliliters of water prior to using for feeding to ensure patency. Most patients tolerate warmed fluids and food better than cold or room temperature materials. Bolus feedings several times a day are also well tolerated, rather than large volumes less frequently. When the patient is eating well on their own (defined as consuming at least 85% of their nutritional requirements), the tube may be removed. Removal can be performed without anesthesia and the stoma allowed to close via granulation.

Gastrostomy Tubes

Indications and Advantages: Gastrostomy tubes (G-tubes or PEG tubes) are ideal for patients with pre-existing esophageal dysfunction or disease, or when the esophagus must be bypassed for any reason.
The tubes can remain in place for weeks to months, or even years, are very well tolerated by patients, and easy for owners to use. These tubes have the largest bores of all feeding tubes available, so a wider diversity of diets may be used.

**Disadvantages:** Placement of G-tubes requires general anesthesia, though the procedure is usually of short duration. The tube cannot be used for at least 12 hours after placement to allow for stoma formation between the stomach and body wall. If the tube is used before complete stoma formation, peritonitis is a potentially serious complication. Additionally, these tubes must remain in place for a minimum of seven to fourteen days (depending on source) before they can be safely removed – premature removal may result in gastric perforation. Potential complications during placement include splenic laceration, gastric hemorrhage, and pneumoperitoneum. Complications that may arise after placement include protracted vomiting, peritonitis, tube migration, or displacement.

**Contraindications:** G-tube placement is contraindicated in those patients with conditions in which the stomach cannot be apposed to the abdominal wall such as ascites or space-occupying masses. Patients with pre-existing gastric disease or neoplasia are also not candidates for G-tube placement.

**Using the tube:** Once stoma formation and adhesion has been confirmed, food and medications can be provided via the tube using procedures similar to those used for esophagostomy tubes. Patients can eat on their own with the tube in place and indications for removal are the same as those for esophagostomy tubes. Removal can be accomplished without anesthesia (though some patients will benefit from light sedation). It is generally recommended that patients be fasted for twelve hours prior to tube removal to minimize leakage of stomach contents during tube removal. The patient is placed in lateral recumbency and the tube is pulled firmly and steadily out of the stomach through the stoma on the body wall and the stoma is allowed to heal by second intention. Alternatively, G-tubes can be removed endoscopically via the oral cavity.

**Jejunostomy Tubes**

**Indications and Advantages:** Jejunostomy tubes (J-tubes) are used when the esophagus, stomach, proximal duodenum, and pancreas must be bypassed. Patients with protracted and uncontrollable vomiting, severe pancreatitis, or gastric disease or dysfunction can benefit from J-tube placement.

**Disadvantages:** J-tube placement requires general anesthesia and laparotomy, though they may also be placed via a G-tube. J-tubes are small in diameter and can only accommodate liquid diets, and feeding must be provided via CRI, meaning these tubes must be maintained in a hospital setting. Due to the small size of the tubes, and the propensity of the tubes to reflux into the duodenum, clogging and kinking are common problems.

**Using the tube:** J-tubes require CRI feeding, due to the limited reservoir capacity of the small intestine. Frequent flushing may reduce the incidences of clogging and kinking. J-tubes are removed by pulling them through the skin and the stoma site is allowed to heal via second intention. It is advised to leave J-tubes in place at least seven to ten days before removal to allow for some adhesion around the entry site, which may minimize leakage of intestinal contents into the abdominal cavity at tube removal.

**References**

*Available on request*