Feeding Tube Placement
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Key Points
• feeding tubes should not pass the LES
• “if the gut works, use it”
• learn how to do a Chinese finger trap friction suture
• keep a column of water in the tube between feedings

As a general rule, the closer one comes to the oral route of food intake and digestion, the more efficient is the assimilation and digestion of nutrients and the greater the flexibility in formula composition. Conversely, the further aboral one gets, the less efficient is the assimilation and digestion of nutrients and greater care must be taken when choosing formula composition. Route of administration also dictates feeding tube diameter; tube diameter in turn dictates usable feeding formulas due to varying formula viscosity and particulate matter size. The most common routes of administration for enteral hyperalimentation include oral, nasoesophageal/ nasogastric, pharyngostomy, esophagostomy, gastrostomy, gastroduodenostomy, and jejunostomy. Each route has its indications, contraindications, advantages, disadvantages, and complications.

Nasoesophageal/nasogastric
Nasoesophageal/nasogastric intubation is an easy, effective, and efficient means of providing enteral nutritional support. The availability of small bore, soft polyvinyl and silastic feeding tubes (i.e., 3 - 5 French 36 inch, Argyl or National Catheter Company) and low viscosity, nutritionally complete liquid diet formulations, and patient tolerance of tube placement has made nasoesophageal/nasogastric tube placement a popular avenue for feeding malnourished patients. Nasoesophageal/nasogastric tube placement is indicated in any patient with protein-calorie malnutrition that will not undergo oral, pharyngeal, esophageal, gastric, or biliary tract surgery.

techique: Local nasal anesthesia, sedation, or light general anesthesia may be necessary for placement of a nasoesophageal/nasogastric tube in dogs and cats. In the majority of cases, topical anesthetic or light sedation is all that is necessary for proper tube placement.

anesthesia – cat: Place 0.5-1 ml of 0.5% proparacaine hydrochloride (topical local anesthetic) into the nasal cavity. Tilt the head up to encourage the local anesthetic to coat the nasal mucosa. Repeat application of local anesthetic to ensure adequate anesthesia of the nasal mucous membrane. If the patient will not tolerate nasal intubation (i.e., if excess stress is required to place the nasoesophageal/nasogastric tube; particularly with debilitated cats), administer 1 to 2 mg/kg of ketamine intravenously to obtain light general anesthesia.

anesthesia – dog Place 1 to 2 ml of 2% lidocaine into the nasal cavity and tilt the head upwards for several seconds. Repeat application of local anesthetic before attempting to pass the nasoesophageal/nasogastric tube. If the patient does not tolerate passage of the tube, sedation or light general anesthesia may be required.

tube placement Select an appropriate size feeding tube

| Cats  | any weight | 5 French X 91 cm |
| Dogs | 2 to 15 kg | 5 French X 91 cm |
| Dogs | >15 kg | 8 French X 91 cm |

Estimate the length of tube to be placed in the esophagus or stomach by placing the tube from the nasal planum along the side of the patient to the 7 or 8 th intercostal space (i.e., nasoesophageal) or last rib (i.e., nasogastric). It is the authors recommendation that the feeding tube not pass through the lower esophageal sphincter, as this may result in sphincter incompetence and esophageal reflux of hydrochloric acid, causing esophagitis. Place a tape marker on the tube once the appropriate measurement has been taken. Lubricate the tip of the tube with 5% lidocaine viscous prior to passage. Hold the patients head in a normal functional position (i.e., avoid hyperflexion or hyperextension).

tube placement – cat Place the tube in the ventrolateral aspect of the external nares and pass it in a caudoventral medial direction into the nasal cavity. The tube will generally “drop” into the oropharynx and stimulate a swallowing reflex. Pass the tube to the predetermined distance.

tube placement – dog Identify the prominent alar fold, and direct the tube from a ventrolateral location in the external nares, to a caudoventral and medial direction as it enters the nasal cavity. When the tube is introduced 2 to 3 cm inside the nostril, feel it contact the median septum at the floor of the nasal cavity. At this moment, push the external nares dorsally to facilitate opening the ventral
meatus, elevate the proximal end of the tube, and continue to advance the tube into the oropharynx and esophagus.

**confirming esophageal placement** Confirm esophageal placement by injecting 3 to 5 ml of sterile saline through the tube and eliciting a cough or placing 6 - 12 ml of air and auscultating for borborygmus at the xiphoid. Placement can also be confirmed by taking an x-ray of the chest. If the patient requires general anesthesia, visually confirm tube placement in the esophagus.

**securing the tube to the patient – cat** Once the clinician is satisfied that the tube is properly placed, it should be sutured to the nose and head to ensure it will not be removed by the patient. In the cat, it is important that the tube not exit laterally and come in contact with the whiskers. Place the tube directly over the dorsal aspect of the nose and forehead and secure it with an encircling suture and Chinese finger trap. An Elizabethan collar is placed postoperatively to prevent iatrogenic tube removal.

**securing the tube to the patient – dog** In the dog, the tube is secured to the lateral aspect of the nose and dorsal nasal midline with an encircling suture and Chinese finger trap, or cyanoacrylate glue. An Elizabethan collar should be used immediately postoperatively and until it is determined if the patient will tolerate the presence of the tube.

**tube management** Place a column of water in the tube and cap it when not in use; this prevents intake of air, reflux of esophageal contents, and occlusion of the tube by diet. Three and 5 French feeding tubes come with appropriate size caps. Nasoesophageal/nasogastric tubes can be left in place for several weeks, are well tolerated, easily removed, the patient can drink and swallow around the tube, and repeated oro gastric intubation is prevented.

**Esophagostomy**

**indications:** Esophagostomy tube feeding is indicated in anorexic patients with disorders of the oral cavity or pharynx, or anorexic patients with a functional gastrointestinal tract distal to the esophagus.

**contraindications:** Esophagostomy tube placement is contraindicated in patients with a primary or secondary esophageal disorder (e.g., esophageal stricture, after esophageal foreign body removal or esophageal surgery, esophagitis, megaesophagus).

**advantages:** Advantages of esophagostomy tube feeding include ease of tube placement, tubes are well tolerated by the patient, large bore feeding tubes can be used allowing use of blenderized diets, tube care and feeding is easily performed by the client, patients can eat and drink around the tube, and tube removal can be performed anytime after placement. Esophageal tube placement eliminates coughing, laryngospasm, or aspiration occasionally associated with pharyngostomy tubes.

**disadvantage:** The major disadvantage of esophagostomy tube is the need for general anesthesia during placement.

**placement:** Provide general anesthesia. Place the patient in right lateral recumbency with the left side uppermost. The tube can be placed on either the right or left side of the mid cervical region, however the esophagus lies slightly left of midline making left sided placement more desirable. Aseptically prepare the lateral mid cervical area from the angle of the mandible to the thoracic inlet. Slightly extend the neck and hold the mouth open with a mouth speculum. Premeasure and mark a 20 to 24 French polyvinyl chloride feeding tube from the level of the mid cervical region (i.e., exit point of feeding tube) to the level of the seventh or eighth intercostal space; ensuring mid- to caudal esophageal placement. Enlarge the two lateral openings of the feeding tube to encourage smoother flow of blended diets. This technique requires the use of an Eld feeding tube placement device. Place the oblique tip of the instrument shaft through the oral cavity and into the esophagus to the level of the mid cervical region (i.e., equal distance between the angle of the mandible and thoracic inlet) and palpate the tip as it bulges the cervical skin. Make a small skin incision over the device tip. Activate the spring loaded instrument blade until it penetrates esophageal wall, cervical musculature, subcutaneous tissue and is visible through the skin incision. Carefully enlarge the incision in the subcutaneous tissue, cervical musculature and esophageal wall with the tip of a #15 scalpel blade to allow penetration of the instrument shaft. Place a 2-0 Nylon suture through the side holes of the feeding tube and through the hole in the instrument blade. Tighten the suture until the tip of the instrument blade and feeding tube tip are in close apposition. Retract the instrument blade into the instrument shaft so the feeding tube tip just enters the instrument shaft (i.e., deactivating the instrument blade. Place sterile water-soluble lubricant on the tube and instrument shaft. Retract the instrument and pull the feeding tube into the oral cavity to its predetermined measurement. Remove the 2-0 Nylon suture to free the feeding tube from the instrument. Place a stylet through one of the side holes of the feeding tube and against its tip. Lubricate the feeding tube and advance it into the esophagus until the entire oral portion of the tube disappears. Gently retract the stylet from the oral
cavity being careful to ensure its release from the feeding tube. Secure the tube to the cervical skin with a Chinese finger-trap suture of #1 Novafil. The exit point of the tube can be left exposed or bandaged. A column of water is placed in the tube and the exposed end capped with a 3 cc syringe; this prevents intake of air, reflux of esophageal contents, and occlusion of the tube by diet. Most patients tolerate the tube without the need of an Elizabethan collar. Esophagostomy tubes can be removed immediately after placement or left in place for several weeks to months. Care of the tube exit site may require periodic cleansing with an antiseptic solution. Tube removal is performed by cutting the finger-trap suture and gently pulling the tube. No further exit wound care is necessary; the hole seals in one or two days and heals by 7 - 10 days.

**Complications:** Complications associated with esophagostomy tube placement include early removal by the patient or vomiting the tube No significant long-term complications have been reported (e.g., esophagitis, esophageal stricture, esophageal diverticulum, or subcutaneous cervical cellulitis). Reflux esophagitis can occur from improper tube placement (i.e., through the lower esophageal sphincter) or esophageal irritation from the tube itself. Mid-esophageal placement of silicone rubber tubes greatly reduces the incidence of esophageal injury and eliminates reflux esophagitis.

**Gastrostomy indications:** Tube gastrostomy is indicated in anorexic patients with a functional gastrointestinal tract distal to the esophagus or patients undergoing operations of the oral cavity, larynx, pharynx, or esophagus.

**Contraindications:** Gastrostomy tube placement is contraindicated in patients with primary gastric disease (e.g., gastritis, gastric ulceration, gastric neoplasia) or disorders causing vomiting.

**Advantages:** Advantages of gastrostomy tube feeding include ease of tube placement, patient tolerance, use of large bore feeding tubes, ease of tube care and feeding by the client, and oral feeding can commence while the tube is in place.

**Disadvantages:** Disadvantages include specialized equipment may be necessary (i.e., endoscope, special tube placement instruments), general anesthesia is required, feeding cannot be initiated the first 24 hours after tube placement, and depending upon placement technique tubes must remain in place for a minimum of 10 - 14 days before removal (i.e., to encourage adhesion formation between stomach and abdominal wall).

**Technique: • percutaneous surgical placement with gastropexy**

General anesthesia and standard skin preparation of the left paralumbar fossa is performed. Instruct an unsterile assistant to pass a large bore stiff plastic stomach tube (e.g., as for decompressing patients with GDV) into the stomach. Palpate the left flank area until the bulging end of the stomach tube can be palpated and grasped. The tube should be grasped at a point 1 - 2 cm caudal to the last rib and 3 - 4 cm ventral to the transverse processes of lumbar vertebrae 2, 3, and 4. Hold the stomach tube in this position and make a 2 cm skin incision over the end of the tube. Bluntly dissect subcutaneous tissues and abdominal muscles to expose the wall of the stomach over the tube; take care not to enter the lumen of the stomach. Place a purse string suture full thickness in the stomach wall around the tube using 2-0 Maxon suture. Use a #11 scalpel blade to enter the stomach through the lumen of the stomach tube. Place a 20-24 French Foley catheter 3 - 4 cm into the lumen of the stomach tube. Place moderate traction on the purse string suture as the assistant slowly withdraws the stomach tube. Once the Foley catheter is out of the lumen of the stomach tube, inflate the bulb and place gentle traction on the catheter to bring it against the stomach wall. Tie the purse string suture snugly around the Foley catheter. Place three to four simple interrupted sutures of 2-0 Maxon from the stomach wall to the body wall to firmly pexy the stomach in place. Close subcutaneous tissues and skin around the exiting Foley catheter and secure the catheter to the skin with a Chinese finger trap suture of #1 Novafil.

**Advantages:** Advantages of this technique include ease of tube placement, ease of finding the stomach in an anorectic patient, tube placement is quick, no special equipment (i.e., endoscope or feeding tube placement device) is needed to place the tube, surgical gastropexy ensures an immediate seal between the stomach wall and body wall, and confirmation of proper tube placement is performed during placement. Feeding tubes can be safely removed at any time after placement. This technique is the authors choice for placement of a gastrostomy feeding tube.

**Jejunostomy indications:** Jejunostomy feeding is indicated in any patient undergoing oral, pharyngeal, esophageal, gastric, pancreatic, duodenal, or biliary tract surgery in which the intestinal tract distal to the surgical site is functional. Surgical patients with a neurologic status that may prevent postoperative feeding may also be considered. Immediate feeding of a highly digestible, low bulk
diet in patients undergoing colonic surgery can be accomplished using a jejunostomy tube. Patients with preexisting protein-calorie malnutrition that must undergo major abdominal surgery are considered candidates for early enteral hyperalimentation via jejunostomy.

**Preferred technique placement:** A celiotomy incision is required for placement of a jejunostomy feeding tube. A 5 French diameter, 91 cm (36 inch) infant feeding tube is recommended. Bring the distal tip of the feeding tube into the abdominal cavity through a 2-3 mm stab incision on the right or left body wall using a #11 scalpel blade. Select a segment of proximal jejunum, identify the normal direction of flow of ingesta (i.e. oral to aboral), and insure the selected segment can easily be mobilized to the feeding tube entrance location on the body wall. Make a 1-1.5 cm linear incision through the seromuscular layers of the antimesenteric border of the selected jejunal segment. Use a 10 gauge hypodermic needle or the point of a #11 scalpel blade and enter the lumen of the jejunum at the most aboral end of the incision. Place the distal end of the feeding tube through the incision and pass 25 - 30 cm (10 to 12 inches) of the tube aborally in the lumen of the jejunum. Lay the exiting portion of the tube in the 1 - 1.5 cm seromuscular incision and suture the tube in this “tunnel” by inverting the seromuscular layer over the tube with three or four interrupted Cushing sutures of 4-0 Maxon. Pexy the tube exit site of the jejunum to the exit site at the body wall with four to five simple interrupted sutures of 4-0 Maxon. Omentum may be interposed between the jejunum and body wall. Insertion of an enterostomy feeding tube requires 10-15 minutes to perform. Secure the exiting feeding tube to abdominal skin using a Chinese finger-trap of 2-0 Novafil. The feeding tube exit point should be incorporated into a body bandage to prevent premature removal by the patient, technical staff, or client. Patients with enterostomy feeding tubes can be fed immediately postoperatively. A column of water should be kept in the tube between feedings.

**Complications**

Complications include premature removal, tube induced jejunal perforation, peritoneal leakage, and subcutaneous leakage. Tube induced jejunal perforation is prevented by using soft rubber tubes designed for enterostomy feeding; not high density polyethylene plastic tubes. Peritoneal leakage is prevented by paying close attention to include a 360° jejunal-abdominal wall pexy. Subcutaneous leakage is prevented by securely fixing the tube to skin.