GASTROINTESTINAL INTERVENTIONAL RADIOLOGY (IR)
Matthew W. Beal, DVM, DACVECC
College of Veterinary Medicine, Michigan State University, East Lansing, MI

Key Points:
- Fluoroscopic placement of devices for enteral nutritional support are common gastrointestinal IR procedures in veterinary medicine. Feeding devices include, but are not limited to nasojejunal tubes (NJ), esophagojejunal tubes (EJ), gastrostomy (G) and gastrojejunal tubes (GJ).
- Colonic stents may be utilized for the palliation of malignant colonic obstruction.
- Additional gastrointestinal IR procedures include, but are not limited to esophageal stent placement, and placement of stents across other stenotic areas of the gastrointestinal system. In humans, palliation of life threatening gastrointestinal bleeding is also well established.

Image-Guided Post-Pyloric Nutritional Support Techniques

Enteral nutritional support is associated with decreased length of stay, fewer infective complications, and significant cost savings when compared to parenteral nutritional support in people with critical illness. Nasogastric and nasoesophageal tube placement is quick and the procedure is generally well-tolerated in small animal patients. However, many critically-ill patients demonstrate nausea and vomiting associated with feeding into the stomach. Feeding post-pyloric allows for the provision of enteral nutritional support in this patient population. Traditional surgical jejunostomy is invasive (requires surgery or laparoscopy) and is associated with significant complications including ostomy complications and septic peritonitis. Fluoroscopic, minimally invasive, post-pyloric nutritional support techniques minimize the risk of serious complications while maximizing the benefits of enteral nutritional support in the patient population with intolerance of, or contraindications to gastric feeding. These techniques include the placement of nasojejunal (NJ), esophagojejunal (EJ), and the percutaneous gastrojejunal (GJ) tubes.

Nasojejunal Tube Placement: The technique for fluoroscopic wire-guided NJ tube placement has been previously described by the author. With the aid of general anesthesia and local anesthesia (local anesthetic infusion into the nostril), a well-lubricated 8-Fr red rubber feeding tube with the tip removed to create an end-hole is passed ventrally and medially through the ventral nasal meatus and into the proximal esophagus. Intermittent fluoroscopy confirms tube location. Through this catheter, a moistened 260cm, 0.035in straight-tip, standard stiffness (or stiff), hydrophilic guide wire (HGW) is advanced down the esophagus and into the stomach. The red rubber feeding tube is removed and a 4- or 5-Fr 100cm Berenstein (angled) catheter was advanced over the HGW and into the stomach. Left lateral positioning facilitates the accumulation of air in the pylorus and illustrates its location. If the pylorus is not easily visualized, 10-20mL of room air is instilled into the stomach. The Berenstein catheter is used to direct the HGW towards and eventually across the pylorus. The HGW should always lead the Berenstein catheter to prevent trauma to the walls of the gastrointestinal tract. The Berenstein catheter is advanced over the HGW and into the duodenum and the HGW is then advanced well into the jejunum. The Berenstein catheter is then removed over the HGW and a well lubricated, end-hole-modified (bolus tip removed, tip thermally smoothed, and side holes created), 8-Fr
137.5cm feeding tube is advanced over the HGW and into the jejunum. The HGW is removed and the feeding tube is sutured in place adjacent to the alar fold using a finger trap pattern.

Esophagojejunal Tube Placement: The technique for fluoroscopic wire-guided EJ is very similar to that of NJ tube placement but simply begins with a routine esophagostomy tube placement followed by advancement of the HGW through the esophagostomy tube. The esophagostomy tube is removed and substituted for a peel away sheath introducer. EJ tube placement proceeds as described above for NJ tube placement. The EJ method facilitates easier placement of the tip of the tube further into the proximal jejunum (Figure 1) in larger dogs.

Figure 1: Left lateral abdominal radiograph illustrating EJ tube placement in a dog. The asterix (*) illustrates the tube in the descending duodenum. The (#) represents the termination of the tube in the jejunum.

Gastrojejunal Tube Placement: The technique for fluoroscopic wire-guided GJ placement has been previously described. The patient is positioned in right lateral recumbency and an orogastric tube facilitates gastric insufflation. Fluoroscopy is utilized to identify a location caudal to the left, 13th rib for placement of 3 gastrointestinal suture anchors (GSA) into the stomach in a triangular pattern, creating a gastropexy. An 18g puncture needle is advanced through the center of the triangle created by the GSA. A 0.035in, 150cm, standard stiffness, hydrophilic guide wire with a straight, flexible tip (HGW) is passed through the puncture needle and into the stomach and a 5F angled guiding catheter is then passed over the HGW and used to direct the HGW across the pylorus and duodenum, and into the jejunum. Serial over-the-wire dilation of the body wall facilitates placement of an 18F peel-away introducer through which an 18F/8F 58cm dual-lumen gastrojejunal feeding tube (GJT) is advanced over the HGW and into the jejunum (Figure 2). Percutaneous gastrostomy tubes can be placed using identical technique.
Figure 2: Right lateral abdominal radiograph illustrating gastrojejunal tube placement in a dog. The asterix (*) illustrates the tube in the descending duodenum. The (#) represents the termination of the tube in the jejunum.

Colonic Stent Placement

Colonic stent placement for the palliation of malignant partial colonic obstruction has been previously described in the cat. Briefly, the location of the obstruction is identified using a positive contrast colonogram. With the patient under general anesthesia, a HGW is advanced via the rectum past the obstruction. The diameter of the colon oral and aboral to the obstruction is determined utilizing a catheter with standardized radiopaque markings (5F Marker Catheter, Infiniti Medical LLC, Malibu, CA) advanced over the HGW. The standardized markings allow the operator to account for the effects of magnification. The diameter of the chosen stent must be significantly larger than the adjacent (normal) colonic diameter. A woven self-expanding stainless steel or nitinol stent is then centered on and deployed across the obstruction.

References and Selected Reading