

ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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Update on Endoscopic Approaches to Nutritional Support

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G&H Could you discuss the current use of percutaneous endoscopic gastrostomy tubes for enteral nutrition?

MHD Percutaneous endoscopic gastrostomy (PEG) tubes have been used for approximately 30 years. They were originally designed for use in children and have become a fairly standard part of gastroenterology and surgical endoscopy. The various kits that have been developed for placement of PEG tubes have similar components: a PEG tube and instrumentation for making an incision to obtain access to the stomach, an external bolster for stabilizing the position of the tube, and an adapter on the end of the tube for feeding. Placement of these tubes requires 2 individuals (usually a physician and a nurse). The procedure has increased in volume over the years, most likely because the general population is becoming older, and older patients are typically the ones who develop chronic diseases that require feeding tubes.

Percutaneous endoscopic gastrojejunostomy (PEG-J) is performed in patients who cannot receive food into the stomach and, thus, have to be fed via the small intestine. In this procedure, a standard PEG tube is placed, and then a smaller tube (a jejunal tube) is placed through the PEG tube and positioned down into the small intestine. The inner tube (the jejunal tube) is used for nutritional support, whereas the outer tube (the PEG tube) can be used to administer medications into the stomach or to decompress the stomach, if necessary.

PEG-J systems, particularly the jejunal tubes, are more cumbersome and difficult to place than PEG tubes. Although PEG-J tubes have been shown to provide benefits, many gastroenterologists struggle with positioning this tube system and, thus, avoid doing so by referring this job to radiologists. I do not agree with this tendency; I think that the procedure can be learned quite easily with practice.

The disadvantage of PEG-J systems is that the jejunal tube may migrate backward into the stomach; thus, it may appear that patients are being fed via the small intestine, but, in fact, the jejunal tube has actually migrated back into the stomach, so patients are being fed via the stomach, which is what gastroenterologists were trying to avoid in the first place. PEG-J is not the appropriate tube system for patients who will require jejunal feeding for the rest of their lives; this system is most effective as a bridge for patients who might need small bowel feeding only for several months.

Another technique, which has grown in prominence over the past 10 years, is direct percutaneous jejunostomy. This procedure involves the placement of a feeding tube directly into the small bowel (rather than into the stomach via a PEG tube). As with any procedure, there is a learning curve; however, this procedure appears to be safe. Ultimately, direct percutaneous jejunostomy should become part of endoscopists' armamentarium for therapeutic nutritional interventions.

G&H Could you expand on how the use of these feeding tubes has changed over time?

MHD Originally, PEG tubes were used only in children and patients with terminal diseases (eg, patients who were unable to swallow, perhaps due to esophageal cancer, end-stage Parkinson disease, or a major neuro-

logic problem). Over the years, PEG tubes have shown efficacy in certain patient populations, although they have had questionable utility in other patient populations. For example, PEG tubes have been very effective in patients with head-and-neck cancer, patients with esophageal cancer, and patients who have had a major stroke but are otherwise functional. However, there have been questions regarding the use of PEG tubes in patients with end-stage dementia who have lost the ability to swallow. Endoscopists are sometimes criticized for placing tubes in these patients, who are near death and perhaps should not undergo this procedure. However, as all dementia patients are not the same, I think that the decision of whether to place feeding tubes should be determined on a case-by-case basis. Nevertheless, we have to remember that inserting a feeding tube will not save the life of a terminal patient, although it may help improve the patient's quality of life.

PEG-J has answered the question of how endoscopists can place a feeding tube into the small bowel without the help of a surgeon or a radiologist and without creating a puncture site in the small intestine. PEG-J enables access to the small bowel by placing a jejunal tube through a preexisting PEG tube. Over the years, we have seen that endoscopists can become quite competent at performing this procedure. However, the procedure is not permanent; the jejunal feeding tube is small in diameter and light in weight, which results in occlusion and migration. Efforts are currently underway to redesign the PEG-J system, so that the jejunal tube is larger and less likely to clog or migrate out of position.

G&H Do you anticipate any other major changes in the technology of these tubes or in their applications in the near future?

MHD Over the next 5–10 years, I foresee changes that will improve patient and clinician safety and reduce complications associated with PEG tube placement. For example, the most common complications associated with PEG tube placement are bleeding, infection around the tube, or peritubular leakage of gastric contents around the tube and onto the patient's skin. The materials and construction of the tubes are currently being redesigned to address some of these complications by making the tubes less irritating to tissue—which would improve a patient's ability to tolerate the tube long term and improve wound healing.

In addition, we are starting to look more carefully at the placement procedure and are questioning whether it is truly sterile or near sterile. Although the endoscopist uses a sterile gown and gloves, the procedure is not as sterile as one performed in an operating room because

the PEG tube can become contaminated during placement. Over the next several years, I foresee redesign of the tube to minimize this problem.

Interestingly, PEG tubes in the United States tend to be larger in size than those used in the rest of the world. There has been much debate regarding this difference. I predict that there will be a shift to a middle-of-the-road approach: tubes that are not too big but that are not too small in size.

With regard to the PEG-J procedure, I foresee innovation aimed at aiding the endoscopist in positioning the jejunal tube by simplifying the procedure; instead of an hour-long struggle, the goal should be to place the jejunal tube in 10–15 minutes. Design changes will likely address complications associated with the procedure, such as tube obstruction (by developing larger jejunal tubes) and migration (perhaps by changing the shape of the tubes or how they rest or attach to the small bowel).

G&H Have there been any recent developments in feeding solutions?

MHD Over the years, the development of feeding solutions has waxed and waned. As feeding solutions fall under the category of food substances, the approval process by the US Food and Drug Administration (FDA) differs from the approval process associated with drug development. Recently, we have seen a move toward more specialized tube feeding solutions (ie, solutions with pharmacological properties). For example, some solutions are now being made with fish oil, glutamine, or arginine. Other types of modified lipids are being placed into solutions as well. These new solutions are using nutrients as mechanisms for changing patients' outcomes by improving factors such as immune response and oxidative stress, particularly in critically ill patients.

G&H Is nutritional support needed in patients with gastrointestinal diseases?

MHD There are several gastrointestinal (GI) diseases that are particularly affected by nutrition. In the past, all patients with pancreatitis were considered nil per os; if they needed nutrition, it was administered intravenously (via parenteral nutrition). However, over the past 10 years, we have learned that many of these patients can be fed via the gut, usually the small bowel (via enteral nutrition). In fact, studies have shown that patient outcomes improve with the use of enteral nutrition compared to parenteral nutrition. Pancreatitis patients receiving enteral nutrition experience fewer complications, shorter hospital stays, and improved healthcare economic benefits.

Nutrition also plays a role in inflammatory bowel disease, particularly Crohn's disease, where macronutrient

deficiencies can occur. These deficiencies can be found in children, where they can lead to growth failure, or in adults, where gastroenterologists may be more focused on bowel movements or rectal bleeding than on the patient's nutritional status; in this case, an aggressive approach is needed for nutritional maintenance: either a change in diet, initiation of supplemental enteral nutrition, or possibly even initiation of parenteral nutrition.

Another area of nutritional importance involves patients with GI cancers, including esophageal cancers, gastric cancers, pancreatic cancers, and small bowel cancers. These patients tend to be anorectic from their cancer; they are also usually hypermetabolic and have a GI tract dysfunction that prevents them from eating normally. Over the years, we have seen that treating a patient's tumor, but not their nutritional status, results in very poor outcomes. It is common for cancer patients to be malnourished; it is less common for physicians to institute aggressive nutritional support simultaneously with tumor treatment.

Nutritional support is also important in patients with terminal cancer, such as peritoneal metastasis from a tumor and resultant small bowel obstruction. Although these patients may have only 4–6 months to live, their quality of life may dramatically improve with the use of aggressive nutritional support.

G&H What is your perspective on current and evolving endoscopic techniques for weight loss?

MHD The development of an endoscopic obesity device in the United States has been a long and difficult journey. There were high hopes for the Garron-Edward gastric bubble, but, unfortunately, it was associated with complications. At that time, it was thought that the procedure could be performed and the patient could be sent home and would lose weight. Later, we

realized that other medical professionals need to be involved, such as a dietician and behavioral therapist.

Recently, the difficulties in this journey have involved the FDA, which has declared that endoscopic approaches to obesity treatment must be as effective as surgical treatments for obesity. However, it is not realistic to expect the same outcomes from a major surgical procedure and from placement of a device in the stomach or sewing the inside of the stomach. Currently, we are trying to make the FDA understand that there should be a treatment option between diet/exercise and surgery. A patient with a high body mass index (BMI; eg, 40 kg/m²) may do better with a surgical intervention for obesity, whereas endoscopic treatment may be more appropriate in patients with a BMI of approximately 30 kg/m² who have been unsuccessful with diet, education, and exercise.

Over the next 5 years, I anticipate more success in this area. Several devices currently being used internationally are having some success. In the United States, I think we will have to compromise with the FDA, but we will have at least one therapeutic endoscopic device available for placement in obese patients in the near future.

Suggested Reading

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