Enteral nutrition

1. Q: How do you code for percutaneous endoscopic jejunostomy (PEJ)?
A: For direct (D) PEJ, I use code 44372, with a Relative Value Unit (RVU) of 6.72.

2. Q: In the severely ill patient, is there any role for amino acid supplementation?
A: Arginine and glutamine are two very important amino acids for the critically ill patient, who is often in the intensive care unit (ICU) on a ventilator. Arginine is a conditionally essential amino acid, meaning that in critical situations, it should be supplemented. Multiple studies have determined that arginine is an immuno-enhancing supplement that has been shown to improve rates of morbidity and mortality and days on a ventilator in an ICU in some very ill patients. There have been concerns about the use of arginine in septic patients, because arginine is metabolized to nitrous oxide – a vasodilator. However, these concerns are unfounded.

Glutamine is an immune-stimulating amino acid that is also trophic for the small bowel mucosa. Although oral or enteral administration of glutamine has not been shown to improve clinical outcomes in critically ill patients, intravenous administration of glutamine has been shown to be beneficial. Intravenous glutamine is currently available internationally but not in the United States. Therefore, oral arginine supplementation or use of an arginine-fortified enteral formula should be considered in critically ill patients.

3. Q: In what specific clinical circumstances would you recommend post-pyloric feeding (i.e., placement of a feeding tube so that the tip is beyond the pylorus)? For post-pyloric feeding, are there any real differences between duodenal and jejunal feeding?
A: Post-pyloric feeding is necessary in patients with gastroparesis, a partial gastrectomy when there is not enough stomach for gastric access, partial or complete gastric outlet obstruction, pancreatitis or for patients with intolerance to gastric feeding. (Recent national guidelines do not recommend holding gastric tube feeding unless the gastric residual volume is greater than 500 mL. This rule has markedly reduced the number of patients diagnosed with gastric feeding intolerance.)

A benefit of jejunal feeding in reducing the risk of aspiration, as compared with the risk associated with gastric feeding in patients (even critically ill patients) without gastric intolerance, has not been shown. It is important to place the tube beyond the duodenum in at-risk patients. Studies have shown that the degree of small bowel to stomach regurgitation declines as the top of a feeding tube is placed more distally. Deep jejunal feeding has also been shown to cause less pancreatic stimulation as compared with duodenal feeding.

4. Q: What is the best route of nutrition in patients with acute pancreatitis? Are there any relevant published randomized controlled trials on this?
A: Most studies that have evaluated the use of jejunal feeding in patients with acute pancreatitis have evaluated patients with severe pancreatitis, who are often on a ventilator and in whom their preference of feeding route is not a concern. Recent studies have shown that gastric feeding is as useful as small bowel feeding in this setting. Still, these studies are small in number, and the premise has yet to be fully accepted.

Clearly, the use of parenteral nutrition (PN) in a patient with a functional gastrointestinal tract makes no sense because of the high risk of infectious complications. In patients with mild to moderate pancreatitis, who are awake and alert, it may be reasonable to try oral nutrition. For those who cannot tolerate oral nutrition because of nausea, vomiting or pain, jejunal feeding should be the next step. For patients who refuse to have a nasal tube, the use of percutaneous endoscopic gastrostomy (PEG) or percutaneous endoscopic jejunostomy (PEJ) should be considered.
5. Q: Is there a cost difference between insertion of a PEG or PEJ under fluoroscopic guidance or endoscopic guidance?

A: The costs of radiologic or endoscopic insertion of a gastric or jejunal feeding tube are similar and certainly less expensive than an operative placement of a feeding tube. However, in most facilities, the gastroenterologist is available to manage tube complications and enteral feeding issues, whereas the radiologist is usually not.

6. Q: Are there guidelines on how long a patient can be kept NPO (nothing by mouth) without food? Can bowel rest be prolonged by use of peripheral parenteral nutrition?

A: How long a patient can be without nutrition is directly related to the patient’s nutritional status. A healthy adult can live about 60 days without food. In the hospitalized setting, the well-nourished patient who is not traumatically injured can be NPO for five to seven days before negative nitrogen balance starts to affect disease recovery outcomes. For moderately malnourished patients, the duration decreases to three to five days, and in the severely malnourished patient, to zero days.

There are scoring systems that allow physicians to determine a patient’s nutritional status. One of the more useful tools for determining the degree of malnutrition is called the subjective global assessment (SGA). The use of peripheral parenteral nutrition allows some, but not all, of a patient’s calorie and protein needs to be met. Although this approach may be perfectly reasonable in the short-term, to truly meet an at-risk patient’s calorie and protein goals, total parenteral nutrition is required.

7. Q: Should a PEG not be placed for feeding unless the physician thinks that the patient is going to require PEG feeding for more than 30 days?

A: This question has not been examined effectively in the literature. From a practical standpoint, we know that the average nasoenteric tube lasts about seven to nine days before dysfunction occurs. This has to be considered against the potential complications of a percutaneously placed tube (infection, peritoneal leak, colo-cutaneous fistula). Many enteral nutrition specialists now recommend that percutaneous enteral access be undertaken if the patient requires enteral nutrition for greater than two weeks.

8. Q: Do you check residual gastric volumes, and at what volume do you stop PEG tube feedings? When would you use prokinetic medications to increase gastric emptying? When would you consider gastric feeding a failure?

A: The literature is quite clear that we should not be holding gastric tube feedings for an amount less than 500 mL. New guidelines published by the Society of Critical Care Medicine and the American Society of Parenteral and Enteral Nutrition have set the threshold at 500 mL. Pro-motility agents have been shown to enhance gastric emptying and should be prescribed to patients who exhibit gastric feeding intolerance prior to consideration of an alternative feeding route (jejunal or parenteral nutrition).

9. Q: If jejunal feeding is needed, are there any real clinical outcome differences between placing a PEG with J tube extension or placing a direct-PEJ (DPEJ)?

A: Few studies have been published, but all have shown the same results: PEG/J tubes are easier to place than DPEJ tubes. However, the J-arm of the PEG/J system has a significantly higher rate of dysfunction (clogging, kinking, migration) than the DPEJ tube, leading to a higher rate of endoscopic re-interventions and interruptions in feeding.

10. Q: There is much ethical controversy in PEG tube feeding: Many consider it over-used. What are your thoughts on this?

A: The most contentious part of this controversy concerns patients who are near death or have little potential for rehabilitation. We clearly do not know the benefit of PEG placement in patients with dementia who have a swallowing disorder. Most retrospective studies would suggest there is no benefit, although a true prospective, randomized trial has yet to be conducted.

Consideration of PEG-tube placement should take into account the family’s wishes, ethical and cultural sensitivity, the patient’s wishes and the potential for improving a patient’s disease state and quality of life. One also has to consider other uses of a PEG tube besides feeding. These include gastric venting, medication delivery and hydration without an intravenous catheter. These aspects need to be taken into account in the final determination as to whether a patient would benefit from PEG placement.

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11. Q: The Feed or Ordinary Diet (FOOD) Trial suggested that early PEG feeding in patients with dysphagia from an acute stroke may actually increase overall patient mortality or increase the likelihood of a poor outcome (Lancet 2005;365:764-772). At my institution, the neurologists seem to ask for early PEG placement within the first week of an acute stroke. I would appreciate your thoughts on early PEG compared with nasogastric feeding in dysphagic stroke patients.

A: This area is confusing, as studies looking at early PEG placement generally have not considered the degree of disability of the patient from the stroke. The FOOD Trial taught us that early PEG placement may not be the right answer for all post-stroke patients. In the majority of such patients, swallowing function will recover.

The most appropriate intervention is nasogastric tube placement in the first five to seven days, with conversion to a PEG in patients in whom swallowing function does not improve. The recommendation for early PEG placement can be made in the patient who cannot tolerate a nasogastric tube or in a patient with a significant degree of disability in whom recovery of swallowing function is unlikely.

12. Q: What is the best approach to nutrition in hospitalized patients with:
   a. Severe acute pancreatitis, with and without ileus

A: In a patient without ileus, I would recommend jejunal feedings, usually via a nasojejunal (NJ) tube. In a patient with an ileus, I would still attempt an NJ feed, because our ability to detect an ileus is poor. There is no need for a specialized enteral formula to be used; a general polymeric enteral formula will suffice. In patients who do not tolerate NJ feeds or with conclusive evidence of an ileus, I would recommend parenteral nutrition.

   b. Severe ulcerative colitis (UC)

A: It is uncommon for patients with UC to require nutritional support except in the very severe cases, which often require colectomy. I would first attempt oral or enteral nutrition in the patient with severe UC. If the patient does not tolerate oral or enteral nutrition, I would recommend peripheral parenteral nutrition. Recent data suggest that omega-3 fatty acid supplementation or use of an omega-3-fortified enteral formula is beneficial to blunt the inflammatory cascade seen in patients with UC.

   c. Liver failure with hepatic encephalopathy

A: There is no convincing data that the use of a branched-chain fortified enteral formulation improves the treatment of hepatic encephalopathy. In contrast to older recommendations, protein restriction should be avoided because these patients are already malnourished.

   d. Severe sepsis, with and without multisystem organ failure

A: Every effort should be made to provide these patients enteral nutrition as soon as possible and to achieve at least 50 percent of their anticipated caloric needs within 72 hours of admission to maximize the effect of enteral nutrition on their immune systems. An immune-enhancing enteral formula should be used.

13. Q: In patients with dysphagia from advanced Alzheimer's dementia, should a trial of hand feeding be attempted before resorting to PEG feeding?

A: This question is nearly impossible to answer because of a lack of relevant clinical trials. This decision requires an in-depth conversation with the family. The patient's wishes, if known, should be followed. We need to understand the family's goals, and they need to understand the reality of the situation. Feeding is not going to improve Alzheimer's disease and may not improve mortality. Quality of life and pain associated with not being fed are more difficult to predict. Also, feeding by hand takes a big commitment from the family or nursing home staff. (Most nursing homes do not have the resources to allow prolonged hand feeding).

14. Q: What specific measures can be taken to prevent liver disease and gallbladder disease in patients on parenteral nutrition?

A: To reduce the risk of liver or gallbladder disease in a patient on PN, three steps should be taken: 1) avoid overfeeding; 2) avoid overfeeding with carbohydrates; and 3) provide some enteral feeding (to stimulate the gut), if possible. Recent data in children suggest that the use of a fish-oil (omega-3) supplemented fat source (lipid) prevents and improves the cholestasis associated with PN. Unfortunately, fish-oil supplemented PN is currently not available in the USA and can only be obtained through a specialized institutional review board process with approval from the U.S. Federal Drug Administration. There is no insurance reimbursement for this product in most cases.
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15. Q: Could a PEG tube be placed in a patient with a ventriculoperitoneal (VP) shunt? How about in patients with ascites (nonmalignant or malignant; small or large volume)?

A: PEG placement in patients with a VP shunt is safe and acceptable. Placement of a PEG tube for gastric decompression in patients with malignant ascites and vomiting (usually due to ovarian cancer) is also a well accepted practice. PEG placement in patients with cirrhotic ascites has not been well studied. In general, a small amount of ascites should not prevent PEG placement. A moderate or large amount of ascites requires that the abdomen be drained dry prior to PEG placement and that repeated paracenteses be performed to keep the peritoneal cavity dry until the PEG tube tract has healed. Antibiotics should also be prescribed during this time to prevent seeding of the peritoneal fluid. PEG placement in patients with massive ascites is futile.

16. Q: What are your thoughts on PEG feeding in patients who cannot swallow in the setting of:
   a. Advanced Alzheimer's dementia
   A: Appropriate if the family desires and the expectations are reasonable (i.e., for hydration and medication). Inappropriate if the goal is to improve the patient's outcome or reverse the underlying disease state.
   b. Terminal cancer
   A: Appropriate for the delivery of medications or for hydration. Not appropriate for attempting to preserve life or improve clinical outcomes. It is perfectly reasonable if the patient or family requests not to have a PEG tube placed.
   c. Advanced Acquired Immune Deficiency Syndrome (AIDS)
   A: Appropriate for medication delivery or hydration. Inappropriate for improving clinical outcomes. It is perfectly reasonable if the patient or family requests not to have a PEG tube placed.
   d. Persistent vegetative state
   A: Appropriate if deemed desirable by the family or according to the patient's healthcare directive. Inappropriate for improving clinical outcomes. It is perfectly reasonable if the family or patient requests not to have a PEG tube placed.
   e. Prolonged coma
   A: Appropriate if deemed desirable by the family or patient. Also appropriate if there is a chance of recovery. It is perfectly reasonable if the family or patient requests not to have a PEG tube placed.

17. Q: The oncologists at my institution often recommend prophylactic PEG tube placement in patients with head and neck cancer, who are starting chemoradiation therapy. They cite the risk of subsequent dysphagia and odynophagia from chemoradiation. Are there published studies to support prophylactic PEG placement in these patients? Otherwise, why not wait and place a PEG tube only in those patients who really need it?

A: For the most part, the data on this issue are clear. Prophylactic PEG tube placement is the correct approach. Waiting for the patient to develop severe swallowing issues can result in malnutrition, poor quality of life, interruptions in treatment (chemotherapy/radiation/surgery) and increased PEG procedure-related complications.

18. Q: How do the various liquid formulations for enteral feeding differ?

A: Most enteral formulas are polymeric, meaning that the protein, carbohydrate and fat in the formulation need to be digested into smaller components to be absorbed by the intestine. They are also relatively inexpensive. The concentration of a formulation is 1 calorie/mL unless otherwise indicated. A product marked as HN has a higher nitrogen content. Products are available in partially digested forms (small peptides) and completely digested forms (elemental).

Elemental products, because of the small particle sizes, tend to be more hyperosmolar than polymeric products. Specialty formulations are available for certain disease states. The two most commonly used today are immune enhancing (arginine, glutamine, fish oil, nucleotides) formulations and diabetes-specific formulations (low sugar content).

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19. Q: In what clinical situations would you recommend total parenteral nutrition with PEG or PEJ feeding as the primary route of nutrition?

A: I would recommend total parenteral nutrition for a patient who cannot tolerate enteral feeding and has gastrointestinal tract dysfunction such as obstruction, a distal small bowel or colonic fistula, a severe intestinal motility disorder, severe malabsorption or short bowel syndrome. PEG tubes should be used in patients with intact gastric function, enough stomach to place the PEG tube and a likelihood of benefiting, clinically and in terms of quality of life, from PEG tube placement. A DPEJ tube should be used for patients with gastric feeding intolerance, lack of enough stomach for PEG placement, gastric outlet obstruction or pancreatitis.

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