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Dispelling Myths and Unfounded Practices About Enteral Nutrition

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Abstract

Many protocols and steps in the process of enteral nutrition (EN) use are not overly supported with strong research and have been done the same way over many years without questioning the use of best-practices evidence. This article reports many of the myths and unfounded practices surrounding EN and attempts to refute those myths with current evidence. These practices include those about enteral access devices, formulas, enteral administration, and complications. (*Nutr Clin Pract.* 2020;35:196–204)

Keywords

enteral nutrition; evidence-based practice; myth; nutrition support; patient safety; tube feeding

Introduction

Enteral nutrition (EN) refers to the system of providing nutrition directly into the gastrointestinal (GI) tract, bypassing the oral cavity and, at times, bypassing the stomach.[1] Each year in the United States, this nutrition support modality is used in about 250,000 hospital stays from infants to older adults.[2] EN is also widely used in subacute, rehabilitation, long-term care, and home settings.[3,4] In 2013, an estimated 437,882 patients were receiving home EN.[4] Many processes in EN have limited evidence and need further research.[5] This leads to many myths in tube-feeding practice, some of which may not be safe. Evidence-based therapy findings that prevent morbidity or mortality are often not translated into clinical practice. One reason is that research often neglects how to instruct on delivering therapies to patients.[6] To help integrate evidence into clinical care and dispel myths

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and unfounded practices of EN, the American Society for Parenteral and Enteral Nutrition (ASPEN) EN Task Force identified practices that are commonly circulated in the acute-care setting through home care and that are not evidence-based. This article reports existing myths along with facts and evidence refuting these inappropriate procedures to provide safer and more accurate care. The purpose is also to teach early-career clinicians, students, and trainees, along with many seasoned clinicians who may still be operating using many of these unsubstantiated practices. Myths will be dispelled in the areas of EN access devices, formulas, administration, and complications. These recommendations do not constitute medical or other professional advice and should not be taken as such. To the extent that the information published herein may be used to assist in the care of patients, this is the result of the sole professional judgment of the attending healthcare professional whose judgment is the primary component of quality medical care. The information presented in this document is not a substitute for the exercise of such judgment by the healthcare professional. Circumstances in clinical settings and patient indications may require actions different from those recommended in this document, and in those cases, the judgment of the treating professional should prevail. ASPEN does not endorse any particular brand of products mentioned herein.

Myths/Unfounded Practices and Evidence for Appropriate Practice

Enteral Access Devices

Myth/unfounded practice #1: It is appropriate to use auscultation or visualization of gastric fluids only to verify nasogastric tube (NGT) tip placement.

Background: In the past, after NGT placement, auscultation or visualization of aspirate gastric fluids alone has been used for verification of tube tip placement. Now with increasing reports of tube misplacement and fatal events in both pediatric and adult patients, along with the increased radiation risk for pediatric and neonatal patients with x-ray following tube placement, alternative methods have been recommended. A 2017 Pennsylvania Patient Safety Authority report describes 166 enteral tube misplacements documented from 2011 to 2016.[7] In this report, 10.2% of the misplacements occurred in pediatric patients, with many of these misplacements associated with adverse events.[7]

Evidence: Safety and practice alerts warn against the use of auscultation and visual inspection of gastric aspirate as the means of NGT location verification because neither method is confirmatory and may result in false affirmation of correct NGT placement.[8,9] Despite these warnings and practice alerts, recent studies found that these methods are still widely used by nurses caring for both pediatric and adult patients.[10,11] The American Association of Critical-Care Nurses (AACN) in an AACN Practice Alert recommends the following: Do not use the auscultatory (air bolus) method to determine tube location and do not use the water bubbling method (holding tube under water) to determine tube location. Instead, use observation of visual characteristics of aspirate from the tube with at least 1 other measure such as use of pH, capnography, or observation of signs of respiratory distress.[9]

Summary/Recommendations: New ASPEN recommendations were developed by the NOVEL Project for pediatric patients.[12] Based on the available evidence, the following are recommendations for best-practice standards to verify NGT location in pediatric patients:

1. Provide education to all staff who place or confirm placement of an NGT.
2. Use appropriate NGT placement and securing methods, such as using the Nose→Earlobe→Xiphoid process→Midline of the Umbilicus (NEMU) tube-measurement method in children.
3. Measure gastric pH (a gastric pH value of 1–5.5 without a change in the patient's clinical status is indicative of gastric placement).
4. Consider a radiograph for any patient in whom there is any concern for correct NGT placement, such as:
   a Difficulty placing the NGT
   b NGT placement in any patient at high risk of misplacement. This includes those with known history of facial fractures, neurologic injury/insult/baseline abnormality, respiratory concerns, or decreased or absent gag reflex and those who are critically ill.
   c Any patient whose condition deteriorates shortly after NGT placement
5. Improve interpretation and communication about the radiograph.

The Patient Safety Movement Foundation also recommends for adult and pediatric patients to include use of pH for all and to x-ray as appropriate for age.[13]

Myth/unfounded practice #2: Use of ISO 80369-3–compliant enteral connectors on EN devices is not necessary.

Background: ISO 80369-3 is a global standard published in 2016 to guide the manufacturing of enteral connectors to prevent misconnections.[14]

Evidence: In September 2018, the US Food and Drug Administration (FDA) sent a letter to the healthcare community stating, "The U.S. Food and Drug Administration (FDA) is concerned by continued reports of misconnections with enteral devices. To reduce the risk of misconnections and patient injury, the FDA

recommends hospitals and clinicians use enteral devices with connectors that meet the International Organization for Standardization (ISO) 80369-1 or ISO 80369-3 standard, or that are otherwise designed to reduce the risk of misconnections. There are currently marketed enteral connectors that meet the 80369-3 standards, these are marketed under the tradenames of ENFit, and Nutrifit."[15]

Summary/Recommendations: Although these recommendations are not mandatory, having a safer system for patients is highly encouraged, and all healthcare institutions and agencies should convert to enteral devices that have such connectors as soon as possible. Assistance with adoption can be found at www.stayconnected.org.

Myth/unfounded practice #3: Low-profile enteral access devices (EADs) are for children only.

Background: There is no specific patient population indication or restriction on patient use of low-profile EADs. The myth stems from the fact that the devices are small and often used in children or infants. When the extension set is removed, it is difficult to pull these devices out, and young children may try to pull out a traditional feeding tube.

Evidence: Low-profile, skin-level, or button-type tubes are used frequently, especially in children, although many adults also appreciate the advantages to these types of EADs. They are less bulky, especially when not accessed by an adaptor for feeding; are less visible under clothing; contain antireflux valves; and do not require tape to secure them to the abdomen.[5]

Summary/Recommendations: Many patients, especially active individuals, could benefit from a low-profile device.

Myth/unfounded practice #4: Jejunal tubes such as nasojejunal or jejunostomies are associated with frequent complications.

Background: Jejunal tubes are often longer and thinner than gastrostomy tubes or NGTs, which can lead to complications, such as tube displacement, tube clogging, intussusception, or obstruction.

Evidence/Recommendations: With correct and verified placement, adequate and frequent flushing, and proper medication administration, many of these complications can be avoided.[16-18]

Myth/unfounded practice #5: It is acceptable to have a nasogastric drainage tube serve as a nasogastric feeding tube for an extended period of time.

Background: Large-bore nasal tubes used for drainage or sump tubes do not have indications for feeding in their product literature; rather, these tubes are to be used for nasogastric suctioning, lavage, and/or decompression. Despite specific indications for these uses, sometimes a large-bore tube has been used to deliver EN.[19]

Evidence: Primarily, a large-bore nasogastric access allows for the ability to assess tolerance to enteral feeding prior to placement of a smaller-bore feeding tube. A drainage tube can be placed at the bedside by clinicians at all levels of training. It provides a temporary delivery route that can be immediately used for enteral feeding following confirmation of placement.[18] The presence of an NGT can be associated with sinusitis and pressure-related skin breakdown. Tubes with an indication for nasal enteral feeding (enteric tubes) are often small bore (8–12F) for gastric and small-intestinal feeding. These tubes are made of silicone, polyurethane, or a mixture of both components. They are softer, more pliable, and more comfortable for the patient but may be prone to clogging and are more difficult to use for aspiration of gastric contents because of their smaller diameter.[20]

Summary/Recommendations: The large-bore NGT, when used for tube-feeding, should be replaced with a more pliable tube with a smaller diameter tube within 5–7 days to help reduce morbidity and improve patient comfort.[19]

Myth/unfounded practice #6: Patients cannot swallow with a nasogastric feeding tube in place.

Evidence: Patients may still be able to eat and drink while they have an NGT in place, as long as it is safe for them to take food and fluid by mouth. A speech pathologist can assess swallowing function to determine whether oral intake is safe. In a study by Want and colleagues, the placement of an NGT did not affect temporal and nontemporal measurement of swallowing in stroke patients with dysphagia with or without minor aspiration.[21] A more recent trial in older healthy subjects concluded that the presence of an NGT increases airway penetration-aspiration and pharyngeal residue and prolongs transit through the pharynx in older healthy individuals. Consideration of the impact of an NGT on swallowing during concurrent oral and enteral feeding is recommended, with further systematic investigation required in elderly patients recovering from critical illness.[22] In a recently published study, in similar patients with dysphagia post-stroke, it was found that the NGT has a negative effect on swallowing function, and it was recommended that once the patient is able to swallow, the tube should be removed.[23] This is also dependent on the amount the patient is able to ingest.

Summary/Recommendations: Patients with a nasogastric feeding tube who are able to safely swallow and meet nutrition needs orally should do so as a transition to having the NGT removed.

Formulas

Myth/unfounded practice #7: You can only bolus feed commercially available blenderized formulas and always need a larger feeding tube.

Background: There are increasingly more commercially available blenderized formulas on the market, and each manufacturer may have different recommendations.

Evidence: It is important to check with each specific manufacturer for their recommendations on administration, tube size, and pumping capabilities.[20] As an example, Real Food Blends recommends a 14F or larger gastrostomy tube and bolus feeding unless diluted with additional water, which would then allow for gravity or pump feed.[24] The manufacturer of Liquid Hope by Functional Formularies states, "The formula is pretty thin and does not require straining. These formulas should have little problem flowing through gastrostomy tubes. If using gastrojejunostomy and jejunostomy systems, some dilution may be required; please check with your healthcare provider. If using a smaller tube and need the formula thinner, place the unopened pouch under running hot water for about 3 minutes, which will thin considerably. Remember, if cool at all, even in an air-conditioned room, Liquid Hope will thicken and become more viscous, since it is real food. You may add a bit of liquid in order to achieve desired consistency."[25] Other commercially available blenderized formulas to check on include Abbott's PediaSure Harvest and Nestlé's Compleat Organic Blends.

Summary/Recommendations: Administer blended formulas through feeding tubes as suggested by manufacturer recommendations.

Myth/unfounded practice #8: Homemade blenderized formulas clog feeding tubes.

Background: In practice, it is generally believed that medications more often clog feeding tubes.

Evidence: Viscosity of blenderized tube-feeding formulas tends to be greater than that in commercial formulas.[26] This increased viscosity does raise the concern of tube occlusion if the feeding-tube bore size is not adequate. It is important to use a commercial blender and blend well. If a commercial blender is not used, strain the blended formula to avoid clogs or increase blending time. In a recent study by the FDA, clogging rates, correlated blenders, and blending times were reviewed and suggested increasing blending time using an existing blender. If that is not preventing clogging, a higher-quality blender and increased blending time may be needed.[26]

Summary/Recommendations: Care must be taken in preparation and delivery of homemade blenderized formulas.

Myth/unfounded practice #9: Homemade blenderized formula is not sanitary and increases food-borne bacteria.

Background: There are many points in the process of preparing homemade blenderized tube-feeding formula preparation when the formula may become contaminated, similar to food that is prepared to eat by mouth. The food may be contaminated or not cooked properly, or proper hygiene was not employed.[26]

Evidence: Recommendations are to use the same guidelines for blending feeding formulas as are used for cooking or food preparation. Abide by expiration dates and cook the foods that should be cooked to proper temperatures. When cooking and storing foods, be sure to keep foods out of temperature danger zones and consider how long foods are safe to consume while stored in the refrigerator. The temperature danger zone is between 40°F and 140°F, and proper cooking temperature/storage times for foods can be found at www.foodsafety.gov. Wash and sanitize the kitchen counters and utensils, and thoroughly wash your blender. It is important to keep perishable formulas cool once they are blended. Blends need to be refrigerated and kept cool with heavy-duty ice packs for formula transport or overnight feedings. Discard any unused portion after 24 hours. The suggested hang time at room temperature is 2 hours.[5] Bacteria are present in homemade blenderized diets but are not always necessarily associated with GI infections.[26]

Summary/Recommendations: Use safe food-handling practices when preparing and administering blenderized diets.

Myth/unfounded practice #10: It is impossible to track calories and other nutrients when using blenderized formula.

Evidence: When a patient first goes on home EN, calculations are required to ensure a balanced and nutritious blended tube-feeding formula is created, but it is not impossible. The patient and family should work with a dietitian to obtain guidelines on basic recipes. This is particularly important for pediatric patients to promote adequate growth and development.[26] There are educational materials to help track how many calories are in different recipes for blended formulas.[28] A homemade formula may not always provide enough micronutrients, depending on the ingredients, but like an oral diet, it can be supplemented with a vitamin/mineral supplement.

Summary/Recommendations: It is possible to calculate nutrients in a blenderized formula and monitor intake.

Myth/unfounded practice #11: Elemental and semielemental formulas are the preferred formula choice for administration through jejunal tubes.

Background: Traditionally, semielemental formula was used through a jejunal tube because of tube size and the concern about digestive and absorptive capacity with the tube tip farther down in the GI tract.

Evidence: There is no concrete recommendation based on the limited data and research available. Data suggest using a polymeric, less viscous formula and to consider an elemental or semielemental formula if individuals have symptomatic malabsorption disorders.

Summary/Recommendations: Formula choice is based on the patient's GI conditions/tolerance and not the type of feeding tube.[29]

Administration

Myth/unfounded practice #12: Patients need to wait to be fed the next day or 24 hours after placement of a percutaneous endoscopic gastrostomy (PEG) tube.

Background: For many years, holding feedings until the next day or 24 hours after placement of a PEG tube was common. This practice was based on old surgical dogma when performing surgeries on the GI tract.

Evidence: Recent literature shows that this practice may be obsolete. Multiple randomized controlled trials (RCTs) have evaluated feeding within 4 hours after PEG tube placement, ranging from <1 to 4 hours. In 2008, a meta-analysis on RCTs was performed, showing no difference in complications or mortality within 72 hours between feeding within 4 hours and delayed feedings for >4 hours.[30] In 2011, a similar meta-analysis on RCTs showed the same results when feeding was initiated within 3 hours of PEG tube placement.[31] In 2014, a large retrospective experience study over 5 years was published, showing no differences between feeding within 4 hours and delayed feeding (>4 hours) for overall complications and mortality within 30 days.[32] Based on the literature, a consensus recommendation was published in 2017 by ASPEN stating that PEG tube feedings may be initiated within several hours (≤4 hours) after placement.[5]

Summary/Recommendations: Feeding after PEG tube placement may be initiated within 4 hours after placement to avoid delays in feedings.

Myth/unfounded practice #13: ENFit enteral connectors will not allow for blenderized diet flow.

Background: Concerns about the new small-bore enteral connectors have led to this assumption.

Evidence: Mayo Clinic Rochester and the FDA's Center for Devices and Radiological Health investigators conducted studies comparing the performance of the legacy feeding-tube systems as compared with ENFit connector systems.[33] The 2 sites used similar protocols to measure flow rates and delivery force of products with the legacy funnel-style connecting system as compared with products equipped with the ENFit connection. Both the Mayo Clinic and the FDA found similar results in the flow testing. In general, the flow rates and gravity flow rates of the legacy system and the ENFit system were largely similar. The Mayo Clinic study showed that the most critical factors affecting flow rates in homemade blenderized tube-feeding were the size of the particulate in the formula, the type of blender used, and the duration of blending time. When comparing products with the legacy funnel connecting systems with those with ENFit connectors, it was shown that levels of syringe-plunger force for both systems were similar at both sites. Statistical analysis by researchers at the Mayo Clinic showed that tube diameter, blender type, and blending time had a greater impact on force levels than the change in the connector system. The US FDA concluded that products with ENFit connectors required the same or less force than products with legacy connectors. In a separate study, the FDA tested patient blenderized diets, under gravity and push-mode feeding, through 5 legacy G-tube brands and 3 corresponding ENFit brands (sized between 14 and 24F). The results concluded that patients using push mode "will largely be impacted after the transition to ENFit. For a gravity mode of feeding, some ENFit users may need higher-powered blenders and should expect increased feeding times."[27]

Summary/Recommendations: In most cases, blenderized diets can flow through the new enteral connectors.

Myth/unfounded practice #14: Enterally delivered medications can be combined with other medications or added to enteral formula and do not require flush between medications.

Background: Several surveys found that medication delivery included combining medications with each other and not flushing appropriately.[34,35]

Evidence: Do not add medication directly to an enteral feeding formula and do not mix medications before administering them.[34] Prior to administering medication, stop the feeding and flush the tube with at least 15-mL water.[5,34] After administration, flush the tube again with at least 15-mL water, taking into account the patient's volume status.[34] Dilution/flush should be less for pediatric doses (minimum 50:50 volume) and at least 5 mL when fluid is not restricted.[5,35] Repeat with the next medication, if appropriate. Flush the tube 1 final time with at least 15-mL water.[35,36] Purified water is the preferred fluid for diluting and flushing medications for enteral administration.[5]

Prepare approved immediate-release solid dosage forms of medication for enteral administration according to pharmacist instructions.[5] Techniques may include crushing simple compressed tablets to a fine powder and mixing with purified water, opening hard gelatin capsules and mixing powder containing the immediate-release medication with purified water, and using only clean enteral syringes (≥20 mL with ENFit device) to administer medication through an EAD. Restart the feeding in a timely manner to avoid compromising nutrition status. If the medication requires holding feeds to avoid altered drug bioavailability, then holding feedings for 30 minutes or more is suggested.[5]

Summary/Recommendations: Medications delivered into a feeding device need to be administered using appropriate techniques to prevent tube clogging.[36]

Myth/unfounded practice #15: It is appropriate to add modular components directly to the enteral formula.

Background: It has been observed/reported that health professionals and family members often add modular

directly to enteral formula. Modular components provide additional macronutrients to the enteral regimen but should not be added directly to the formula, as they are sometimes hyperosmolar and may cause diarrhea.[20]

Evidence: The first step to using modular components is to follow manufacturer instructions. Do not mix modular components directly with formula; rather, administer as a medication. If dilution of a modular component is required, typically 1 scoop or 1 packet of the product is mixed with 2–4 oz of water until well dissolved. Feeding tube is flushed with 30–60 mL of water before and after infusing the mixture. See specific package instructions or refer to manufacturer's website, as directions may vary depending on product.[20]

Summary/Recommendations: Modular components should be administered appropriately, similar to medications.

Myth/unfounded practice #16: Continuous feedings through the jejunum do not need to be flushed with water.

Background: Many clinicians believe that since formula is continuously moving through the feeding tube, there is no need for additional water flushing.

Evidence: Jejunal feeding tubes are often longer and thinner and have narrower lumens than NGTs or gastrostomy tubes and are more susceptible to clogging if not flushed regularly.[16-18] Recommendations are to flush the tube before and after medication administration, before and after feeding sessions, every 4–6 hours if the feeding tube is not used, and every 4–6 hours during continuous feedings.[16,17,29] Proper flushing of the tube at regular intervals during the day is recommended.[18] The length of jejunal tube can be 15, 22, 30, or 45 cm; therefore, the amount of water needed to flush the tube, typically 10–20 mL, will vary depending on the length of the tube.[16] The lowest volume necessary to clear the tube is recommended for neonatal and pediatric patients, which is 1–3 and 3–5 mL, respectively, and upward of 5–10 mL depending on the child's fluid balance and size.[17]

Summary/Recommendations: Periodically flush jejunal feeding tubes with water.

Myth/unfounded Practice #17: EN should be held in adult critically patients when gastric residual volume (GRV) is >200 mL.

Background: Long-held beliefs that aspiration risk increases with GRV volumes of >100 mL led to this myth.

Evidence: Recent guidelines from ASPEN/Society of Critical Care Medicine and Canadian Critical Care Nutrition suggest that for critically ill patients, GRVs should not be used as part of routine care when receiving EN. Should GRVs be used, EN should not be held for GRV < 500 mL when there are no other signs of intolerance.[37] A recent systematic review supported that GRVs of 500 mL vs 250 mL had no effect on mortality, infections, intensive care unit (ICU) or hospital length of stay (LOS), or ventilator-associated pneumonia.[38] In addition, using a GRV threshold of 500 mL vs 250 mL was significantly associated with better nutrition delivery. Not checking GRVs vs checking GRVs at a >250-mL threshold is associated with better caloric delivery.[38,39]

Summary/Recommendations: GRVs should not be routinely measured; however, when GRVs are measured, use a higher volume than 200 mL to trigger the clinicians to consider holding enteral feeding.

Myth/unfounded practice #18: Turn off enteral feedings when the patient lies flat for repositioning.

Background: It was believed that patients lying flat for repositioning needed to have their tube-feeding shut off during that time.

Evidence: Although there is evidence to support a semirecumbent head-of-bed position for patients receiving EN, this is not necessarily true for intermittent flat positioning. Semirecumbent position with the head of bed up 30–45° may be associated with a reduction in pneumonia in critically ill patients. Semirecumbent position has no effect on mortality, ICU LOS, or duration of mechanical ventilation.[38] Only 1 research study has been published on intermittent head-of-bed flat positioning—that is, putting the head down to pull the patient up in bed while in the hospital. Historically, nurses stop the feeding for this procedure to decrease risk of aspiration from enteral feedings. However, DiLibero and colleagues showed no difference in aspiration when the head of bed is flat for positioning.[40] Unfortunately, the research consisted of a small sample size (n = 23, 46 samples, patient used as own control). With this study in mind, the nurse should not have to turn feedings off when the bed is going to be flat for a few minutes during repositioning. If the patient has enteral feeds infusing at 60 mL/h and the bed is flat for 5 minutes, only 5 mL will infuse during this time. Alternatively, there may be 40–240 mL already in the stomach, depending on the hourly rate and stomach emptying; therefore, the 5 mL will likely not increase risk of aspiration. If feedings are turned off, there is a potential to forget to turn the pump back on, thus decreasing the amount of nutrition provided to the patient.

Summary/Recommendations: EN feedings do not need to be turned off for temporary patient repositioning.

Myth/unfounded practice #19: When patients are going to be placed in the prone position, enteral feedings must be turned off during the procedure and/or while prone.

Background: Similar to the flat position, it was believed that patients lying in a prone position needed to have their tube-feeding shut off.

Evidence: Linn and colleagues reviewed 4 studies and found there is limited evidence proving the safety and tolerability of EN administered to patients in the prone position.[41] However, prone positioning does not substantially increase the rate of complications when compared with EN administered in the supine position. The

most recent study in 2016 found supine vs prone also had no significant difference in GRV or vomiting.[42] EN in mechanically ventilated patients in the prone position is feasible, safe, and not associated with an increased risk of GI complications.[42] Earlier studies found no difference in GRV from supine to prone, yet others found increased complications of vomiting and aspiration with prone positioning.[43,44] Recommendations based on these studies for EN with prone positioning is the use of 25° elevation, prokinetic agents, or transpyloric feeding tubes.[44,45]

Summary: EN feeding may be well tolerated in patients in a prone position.

Myth/unfounded practice #20: Sterile technique is critical for EN care.

Evidence: Clean technique is adequate for care of the EAD site and for handling devices and equipment. Keeping a long-term enteral device site healthy and clean requires the patient to wash the area daily with mild soap and water and dry thoroughly.[20] Prior to any care, it is important to correctly wash your hands. The steps to this process are as follows:

1. Wet the hands with clean running water (warm or cold) and apply soap.
2. Lather the hands by rubbing them together with the soap.
3. Scrub all surfaces of the hands, including the palms, backs, fingers, between the fingers, and under the nails. Keep scrubbing for at least 20 seconds. Need a timer? Hum the "Happy Birthday" song twice.
4. Rinse your hands under clean, running water.
5. Dry your hands using a clean towel or air-dry them.[46]

Summary/Recommendations: Use clean technique for most EN care.

Complications

Myth/unfounded practice #21: Use cola soda, meat tenderizers, pineapple or cranberry juices, etc, to prevent clogging and unclog the feeding tube.

Background: It was believed that alternative liquids could prevent and treat feeding-tube clogs.

Evidence: Using measures to prevent clogs is the best strategy. Flush feeding tubes with a minimum of 30 mL of water every 4 hours during continuous feeding or before and after intermittent feedings in an adult patient to prevent clogging.[5,47] Flush the feeding tube with 30 mL of water after residual volume measurements in an adult patient.[5,47] Flushing of feeding tubes in neonatal and pediatric patients should be accomplished with the lowest volume necessary to clear the tube. For an NGT in a neonatal patient, flush with 1–3 mL of water, and for a pediatric patient, flush with 3–5 mL of water.[47] If the water flush does not resolve the clog, use an uncoated pancreatic enzyme solution by crushing 1 uncoated pancreatic enzyme tablet and 1 325-mg sodium bicarbonate tablet mixed in 5 mL of water. The solution should be introduced to the clog and the feeding tube clamped for at least 30 minutes. If the clog is not cleared within 30 minutes, the solution should be removed from the tube and replaced with a fresh mixture. Cranberry juice and carbonated beverages may worsen occlusions because of the acidic pH of these fluids.[5,48,49]

In home care, patients do not have ready access to pancreatic enzymes. The first strategy to unclog a feeding tube usually involves attaching a 60-mL syringe of warm water to the tube, using the syringe plunger to push the water into the tubing, massaging the tubing to loosen the clog, and then pulling back on the plunger to dislodge the clog. If this technique is ineffective, water penetration may be tried. Remove all fluid from the tube, instill the tube with warm water, and clamp the tube for 20–60 minutes, periodically moving the plunger back and forth to help loosen the clog.[5050]

Summary/Recommendations: For prevention and treatment of a feeding-tube clog, using water is best.

Myth/unfounded practice #22: With a peritubular leak at the enterostomy tube site, replacing the tube with a tube that has a larger French size will fix the leak.

Background: It was believed that as the enteral device stoma or site gets larger, a larger tube is needed to decrease that leakage.

Evidence: A small amount of leakage at the enterostomy tube site can be expected to last for a few days after tube insertion, but this should not be excessive (eg, not requiring a dressing change more than twice a day), and it should stop by itself. A small amount of leakage may always be present. If the leakage is continuous and there are large volumes along with pain or problems using the tube, medical advice should be sought. Leakage may be caused by tube movement, granulation tissue, a cracked tube, infection, and conditions that increase pressure in the stomach. It is not always due to the size of the tube.[20,51,52]

Summary/Recommendations:

- If the tube has a balloon on the end, make sure the balloon has enough water in it and is filled properly.
- Prevent leakage by limiting movement of the tube in and out of the stoma/exit site. If there is an external bumper, make sure it is fitting well at the skin level and is not too loose or too tight.
- Do not switch to a larger size tube, as this may make the stoma/exit site bigger and cause more leakage.

Myth/unfounded practice #23: EN-associated diarrhea is almost always caused by the formula.

Background: Often, healthcare professionals and family members request formula changes when patients experience diarrhea.

Evidence: There is no standard definition for diarrhea. However, ASPEN defines diarrhea as >500 mL of stool output every 24 hours or >3 stools per day for 2 or more consecutive days. Diarrhea may be caused by medications, GI disease, postsurgery, infection, and (less likely) tube-feeding formula (characteristic or specific components).[53-55] Common causes of diarrhea should be ruled out before considering changing formula. Those causes may include the following:

- Medications that contain magnesium or sorbitol (frequently in liquid medications)
- Medications that can cause GI side effects (antibiotics, proton pump inhibitors, prokinetic medications, etc)[56]
- GI diseases or infections such as fat malabsorption, Crohn's disease, bacterial overgrowth, short-bowel syndrome, or enterotoxic organisms such as *Clostridium difficile.*[5]

A systematic approach recommended by ASPEN to manage diarrhea includes the following:[5]

- Rule out above causes (infectious or inflammatory causes, fecal impaction, medications, etc).
- Once *C. difficile* is ruled out or is being treated, consider an antidiarrhea agent.
- If the above are completed and symptoms continue, consider changing formula or feeding method.

Summary/Recommendations: EN-related diarrhea is multifactorial and is not often related to the enteral formula.

Conclusion

It is of great importance that EN-related myths be refuted with facts and evidence-based scientific findings to make this therapy safe and effective. This is particularly true in teaching new practitioners and students about EN—not only the correct findings but also the idea that each step in the process of EN use is supported with evidence and that myths are not be passed along like lore.

Statement of Authorship

S. Zoeller, M. L. Bechtold, B. Burns, T. Cattell, B. Grenda, L. Haffke, C. Larimer, J. Powers, F. Reuning, L. Tweel, and P. Guenter equally contributed to the conception and design of the research; S. Zoeller, M. L. Bechtold, B. Burns, T. Cattell, B. Grenda, L. Haffke, C. Larimer, J. Powers, F. Reuning, L. Tweel, and P. Guenter contributed to the design of the research; S. Zoeller, M. L. Bechtold, B. Burns, T. Cattell, B. Grenda, L. Haffke, C. Larimer, J. Powers, F. Reuning, L. Tweel, and P. Guenter contributed to the acquisition and analysis of the data; S. Zoeller, M. L. Bechtold, B. Burns, T. Cattell, B. Grenda, L. Haffke, C. Larimer, J. Powers, F. Reuning, L. Tweel, and P. Guenter contributed to the interpretation of the data; and S. Zoeller, M. L. Bechtold, B. Burns, T. Cattell, B. Grenda, L. Haffke, C. Larimer, J. Powers, F. Reuning, L. Tweel, and P. Guenter drafted the manuscript. S. Zoeller, M. L. Bechtold, B. Burns, T. Cattell, B. Grenda, L. Haffke, C. Larimer, J. Powers, F. Reuning, L. Tweel, and P. Guenter critically revised the manuscript, agree to be fully accountable for ensuring the integrity and accuracy of the work, and read and approved the final manuscript.

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