Can we stomach gastric feeding in critically ill patients with gastrointestinal intolerance?

Observational data suggest that enteral nutrition is associated with better outcomes in critically ill patients (1–3). These studies also suggest that increased nutrient delivery is associated with improved outcomes, although these data are confounded by severity of illness and the fact that sicker patients are less likely to tolerate enteral nutrition and more likely to have worse outcomes. Gastrointestinal intolerances often limit delivery of enteral nutrition in critically ill patients. Two of the most common intolerances are elevated gastric residual volumes and vomiting. Postpyloric placement of the enteral feeding tube represents one method utilized in clinical practice in an attempt to overcome these intolerances, yet the benefit of postpyloric feeding tubes remains controversial. Early studies found that patients fed distal to the pyloris received a higher percentage of their goal calories than those fed into the stomach (4, 5). However, data collection in these studies began at the time of initiation of enteral feeds, regardless of any delay that may have occurred while placing a feeding tube into the postpyloric position. A meta-analysis of nine studies in a heterogeneous group of critically ill patients suggested that ignoring this delay may have confounded the results (6). Marik and Zaloga found that time to initiation of enteral feeding was, on average, 16 hrs shorter in patients randomized to receive enteral nutrition via the gastric compared to the postpyloric route. Overall caloric delivery was similar between the patients randomized to the two groups. Ho and colleagues (7) also found no difference in caloric delivery in a separate meta-analysis of 11 randomized studies.

*See also p. 2342.

Key Words: critically ill; enteral feeds; enteral nutrition adequacy; nasojejunal; postpyloric

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Other observational data suggest that the provision of enteral nutrition increases the risk of vomiting, aspiration, and ventilator-associated pneumonia (VAP) in mechanically ventilated patients (8). Many believe these risks arise from gastrointestinal intolerances, especially elevated gastric residual volumes and regurgitation of enteral food into the esophagus and above. Placement of the enteral feeding tube distal to the pyloris should logically reduce this risk. However, previous randomized trials have found conflicting results to this theory. Hsu and colleagues (9) found that postpyloric tubes increased the amount of enteral nutrition delivered and also reduced vomiting compared to gastrically delivered enteral feedings in critically ill medical patients. Using almost the exact same inclusion and exclusion criteria, White and colleagues (10) randomized 102 patients to either initial postpyloric or gastric enteral feedings and found no difference between the groups with regard to caloric delivery, gastrointestinal intolerances, or VAP. Likewise, two meta-analyses found that postpyloric placement of the enteral feeding tube did not reduce mortality, development of pneumonia, aspiration, or intensive care unit length of stay (5, 6).

These previous randomized studies compared gastric vs. postpyloric enteral feedings early in the course of all patients with critical illness and did not specifically investigate the effect of transitioning from gastric to postpyloric feedings in patients who demonstrate gastric dysmotility. Gastric enteral feeds are routinely initiated in many critically ill patients, with tolerance in the majority of those patients (11, 12). Although patients who are intolerant of gastric enteral feedings are the minority, many surmise that these are the patients at highest risk for elevated gastric residual volumes, esophageal regurgitation, aspiration, and VAP. Since the small bowel is less prone to impaired motility, these patients should be the most likely to benefit from placement of the feeding tube beyond the pyloris. In this issue of Critical Care Medicine, Davies and colleagues (13) report the results of a well-designed study that addresses this practice. They randomized 180 patients who were mechanically ventilated for <72 hrs, receiving narcotic infusions, and with gastric dysmotility, defined by either a single elevated gastric residual volume >150 mL or cumulative residual volumes over 12 hrs >500 mL. Almost a quarter of patients enrolled suffered from traumatic brain injury, a population previously shown to be at high risk for gastric immotility and potentially benefiting from postpyloric feeding (14). Patients were randomized to either a spontaneously migrating frictional nasojejunal tube or continuing nasogastric feedings. Prokinetics were permitted per usual practice in both groups, and, although allowed, only 10% of patients in the nasogastric group crossed over to postpyloric feedings for continued enteral intolerance. The study found no difference in the primary outcome of enteral energy delivery, whether analyzed over 28 days or the first 10 days. In addition, there were no differences in clinical outcomes, including VAP (which was determined by three blinded adjudicators), duration of mechanical ventilation, hospital stay, or hospital mortality. Somewhat surprisingly, the study also found no difference in rates of aspiration, vomiting, abdominal distention, or diarrhea between groups.

One limitation of this study is whether or not the population studied really represented patients with impaired gastric motility. Although no direct measurement of gastric emptying was employed to identify patients for inclusion, the criteria utilized for gastric dysmotility were pragmatic, defined at the outset, and able to be easily applied by the bedside clinician. This study reinforces that critically ill patients can be successfully and safely enterally fed in the stomach. Although higher than some nutrition studies (15, 16), the enteral energy delivery of 70% in both groups is comparable to full-calorie feeding groups of two recent studies that predominantly utilized gastric...
feeding (11, 12). Furthermore, both of those randomized studies failed to demonstrate improved clinical outcomes from increased adequacy of enteral nutrition, suggesting that even if postpyloric feeding did increase energy delivery, it is unlikely to result in better outcomes. Combined with previous trials, this study demonstrates that routine use of postpyloric feeding, even in patients who have demonstrated some intolerance to gastric feeding, does not improve outcomes or facilitate delivery of more nutrition. As such, the routine use of postpyloric feeding tubes is unnecessary, and our effort in caring for these critically ill patients is better focused on other aspects of critical care.

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REFERENCES


Generation of early warnings with smart monitors: The future is all about getting back to the basics!*

Observing the differences between what people have been taught, what they know they should do, and what they actually do is a fascinating study in human behavior. In addition to compelling clinical evidence, implementation of best practices in medicine is dependent upon social, political, cognitive, and interpersonal dynamics that we are only beginning to understand (1–4). We know that “failure to rescue” of patients on the regular wards whose course has changed for the worse is an important and potentially reversible source of morbidity and mortality (5–7). We also know that vital sign changes are an important predictor of subsequent cardiac arrest, intensive care unit (ICU) admission, mortality, and length of stay (8, 9). Yet rapid response systems—systems designed to care for this population—continue to receive some pushback and are underutilized even when they are implemented. Educational efforts, warning criteria, and hospital-wide policies that should facilitate greater use of the rapid response systems have fallen short of guaranteeing a call for all patients at risk (10–12). In fact, a “failure to call” rate of approximately 30% is rather common (11). Bringing at-risk patients to the attention of the rapid response system depends upon a successful completion of several tasks, and each has revealed itself as a point of failure. Vital signs must be collected at an interval sufficient to detect a significant change; they must also be obtained correctly and recorded and reported in a predictable manner.

*See also p. 2349.
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