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Will ultrasound be able to bring back the lost glory of gastric residual volume?

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Since many critically ill patients cannot eat on their own, they often need nutritional support. However, gastric intolerance during enteral nutrition (EN), such as vomiting, aspiration, diarrhea, and abdominal distension and firmness, can occur due to gastrointestinal dysfunction. To prevent this, gastric residual volume (GRV) has traditionally been monitored [1]. Gastric contents can be manually aspirated with a syringe through a gastric tube at regular intervals of 4 to 8 hours to measure GRV, and if GRV exceeds a certain threshold, EN can be delayed to prevent complications [2].

However, GRV monitoring presents several challenges. First, GRV is not always a reliable indicator of gastric intolerance. Depending on the patient's condition, comorbidities, size and type of tube, position of the tip of feeding tube, and GRV measurement technique, the accuracy can vary. In addition, GRV measurement frequently interrupts EN and causes underfeeding [2]. Moreover, the results of the REGANE [3] and NUTRIREA 1 trials [4] called the clinical relevance of GRV measurement itself into question, and the Society of Critical Care Medicine (SCCM)/American Society for Parenteral and Enteral Nutrition (ASPEN) guidelines in 2016 recommended that GRV monitoring not be included in routine care protocols [5].

Ultrasonographically-measured anterior cross-sectional area has been used to assess gastric emptying time and to estimate gastric contents and volume for assessment of aspiration risk in the perioperative period [6]. Recently, ultrasound has become widely available in intensive care units (ICUs). In this issue of *Acute and Critical Care*, Sharma et al. [7] demonstrates that GRV measurement by ultrasound has a significant correlation with manually aspirated GRV. This was a small single-center study, so caution must be used when interpreting the results. However, most of the study subjects were high-risk neurosurgical patients with mechanical ventilation, opioid sedation, and vasopressor infusion. Although routine monitoring of GRV in the ICU is not recommended in the SCCM/ASPEN guidelines owing to the REGANE [3] and NUTRIREA 1 trials [4], they rarely include surgical and high-risk patients and cannot be generalized. Therefore, GRV measurement is still a method that should be considered in high-risk patients, and even in the recent ESPEN guidelines, it is recommended to delay EN at a GRV of 500 mL/6 hours [8].

A few years ago, a *Journal of the American Medical Association* (JAMA) editorial described the "end of an era" for GRV; however, it seems premature to generalize this to all ICU patients [9]. GRV measurement by ultrasound is non-invasive, can be easily performed

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bedside, and has the advantage of not being affected by the size or type of tube, and has low EN interference [10]. While studies to date suggest that ultrasound can be an important tool for GRV measurement, further large-scale studies are needed to restore the lost glory of GRV, showing that it has a positive impact on clinical outcomes in critically ill patients.

CONFLICT OF INTEREST

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AUTHOR CONTRIBUTIONS

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