

Is gastric residual volume monitoring in critically ill patients receiving mechanical ventilation an evidence-based practice?

Sir,

Nutritional support in intensive care units (ICUs) is widely accepted as an integral part of patient care, when oral food intake is inadequate or not possible; however, feeding often receives lower priority compared with other ICU treatments such as hemodynamic and ventilation control.^[1] Nutritional status is an important factor in health maintenance and disease recovery, particularly in critically ill patients during the mechanical ventilation (MV).^[2] Many critically ill patients, especially those who require MV, are unable to eat normally; hence, "artificial nutrition" is provided through enteral or parenteral route.^[3] Underfeeding and malnutrition are prevalent in critically ill patients receiving invasive MV. It is estimated that the overall incidence of malnutrition in ICU could be as high as 50%.^[4] Moreover, more than 35% of ICU patients are reported to be malnourished upon admission to the ICU.^[5] Underfeeding in patients receiving MV can decrease regeneration of respiratory epithelium, respiratory muscles strength and therefore, prolong MV.^[2] Furthermore, underfeeding and malnutrition in these patients have an adverse effect on all physiological processes. It increases the risk for infection and pulmonary edema, decreases phosphorus levels needed for cellular energy (adenosine triphosphate) production, reduces ventilatory drive and impairs production of surfactant.^[6]

Although, enteral nutrition (EN) is the preferred method for nutritional support in ICU patients, patients with enteral feeding are at great risk of malnutrition due to insufficient nutritional intake, primarily due to frequent interruptions in enteral feedings.^[7] One of the most important factors for frequent interruptions in enteral feeding in these patients is an increased gastric residual volume (GRV).^[6] It is believed that in critically ill patients receiving EN, high GRVs may result in aspiration of gastric contents and increase the risk of ventilator-associated pneumonia (VAP).^[8]

The practice of monitoring GRVs to assess the safety of enteral tube feeding has been a routine part of enteral feeding protocols in the ICUs. However, little scientific evidence indicates that their use, improves patient outcomes.^[9] A study done by Reignier *et al.* found that the absence of GRV monitoring was not inferior to routine performance of this practice in terms of development of VAP or new infections, lengths of ICU and hospital stay, organ failure scores, or mortality rates in mechanically ventilated patients.^[10] Furthermore, the result of another study by Poulard *et al.*, have shown that early EN without GRV measuring in mechanically ventilated patients improves the delivery of enteral feeding, without increasing the rate of vomiting or VAP in these patients.^[11] They concluded that the routine GRV monitoring of mechanically ventilated patients during EN may be discontinued in most patients.^[10,11] Eliminating GRV monitoring from routine part of enteral feeding protocols in the ICUs may have beneficial effects such as improved EN delivery, prevent underfeeding and consequently can decrease the morbidity and mortality rates in critically ill patients. Also, considering that there are several pathogenetic mechanisms associated with VAP removing interventions such as GRV monitoring with no proven beneficial effects, would allow critical care nurses to focus on interventions of proven value.^[11]

It should be noted that although the importance of adequate nutritional support in critically ill patients is well-established, in recent years, there has been increasing interest in the concept of 'permissive underfeeding' that may be associated with clinical benefit in these patients.^[12] A study by Krishnan *et al.* found that a therapeutic window for caloric intake in medical ICU patients (33-65% of caloric intake requirements calculated using the American College of Chest Physicians (ACCP); approximately 16-18 kcal/kg/day) was associated with better outcome compared to highest (>65%) and lowest (0-32%) tertiles of caloric intake in these patients.^[13] Moreover, the results of a study by Casaer *et al.* have been shown that in critically ill patients, high caloric intake by early initiation of parenteral nutrition to supplement EN during the 1st week after ICU admission is associated with worse prognosis.^[14]

In sum, in the current climate of evidence-based practice, there is a paucity of scientific information to support GRV monitoring as a routine part of enteral feeding protocols in critically ill patients receiving MV. The use of GRVs monitoring is often based on tradition rather than best evidence, which often guides critical care nurses in the managing enteral feeding with unnecessary interruptions of EN delivery. Therefore, it seems that this practice can be removed from the usual care of

these patients. Future research in this regard is strongly recommended.

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