

### Question:

Is the practice of measuring Gastric Residual Volume (GRV) in mechanically ventilated critically ill patients who are tube fed into the stomach reliable for predicting tolerance, regurgitation and aspiration? What is considered an acceptable GRV?

### Key Practice Point

1. GRV has been used clinically as a surrogate marker for tube feed tolerance/gastric emptying and potential formula aspiration. The practice of measuring GRV is considered unreliable for predicting feeding tolerance, regurgitation and aspiration.

### Evidence

1. There is no consensus regarding the level of GRV to be used to determine feeding failure or what the normal GRV is in a critically ill patient. The value for the designated cut off varies in the literature from 120 – 500 ml. (1)

2. GRV can vary with patient position (supine vs. upright), tube position (antrum vs. fundus), tube type (small bore vs. large bore), size of the aspirating syringe, and method of feeding (bolus vs. continuous). (2,3)

3. GRV should be considered in the context of patient's disease, medications and electrolyte abnormalities which may lead to an ileus or delayed gastric emptying. Prokinetic agents may be useful in some patients. (2,3)

4. Endogenous secretions should also be considered. Physiologically it has been estimated that a daily contribution of 1500 ml of salivary output and 3000ml of gastric secretions would generate an average of 188ml/hour of endogenous secretions alone in the normally fed adult. In addition tube feeds may infuse at rates of 25-125 ml/hr. Assuming gastric emptying of 35-50% per hour, GRV may vary 279 – 464 ml in 4 to 6 hours (1,4). This should be considered in the decision to hold tube feeds based on GRV. Stopping at low arbitrarily selected volumes may not be clinically appropriate or physiologically sound.(1,4)

5. Low GRV do not guarantee tolerance to feeding and a single high GRV does not necessarily predict intolerance because subsequent value may decrease. A trend may be more valuable than the use of a cut off value. (1,2) In critically ill patients receiving nasogastric feeding a wide range of GRV (even up to 400ml) may be seen with no obvious intolerance. High GRV may be expected with greater infusion rates. (2)

6. No difference was found in regurgitation/aspiration, and pneumonia in patients with GRV<200ml or GRV>400ml. (1). GRVs have a low sensitivity as a marker for aspiration. Tube feeds should not be stopped for GRV below 400-500 ml in the absence of other signs of intolerance. (1)

7. As per Society of Critical Care medicine (SCCM) and American society for Parenteral and Enteral Nutrition (A.S.P.E.N) Guidelines for Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient – holding enteral nutrition for gastric residual volumes < 500ml in the absence of other signs of intolerance should be avoided. (6)

**8. Recommendation:** Based on the literature review as noted above, it is recommended that GRV up to 500 ml be accepted in adult critically ill patients who are fed into the stomach, in the absence of other signs of intolerance.

## References

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3. Murphy LM, Bickford V. Gastric Residuals in Tube Feeding: How Much Is Too Much? *Nutrition in Clinical Practice.*1999;14(6):304-306.
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5. Burd RS, Lentz CW. The Limitations of Using Gastric Residual Volumes to Monitor Enteral Feedings: A Mathematical model. *Nutrition in Clinical Practice.*2001;16(6):349-354.
6. McClave SA, Martindale RG, Vanek VW, McCarthy M, Roberts P, Taylor B, Ochoa JB, Napolitano L, Cresci G, the A.S.P.E.N Board of Directors, and the American College of Critical Care Medicine. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N). *JPEN.*2009;33(3):277-316.