Management of Gastric Residual Volumes: Evidence Based Practice
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Introduction
Early enteral feeding for mechanically ventilated patients is associated with positive effects on gut mucosa integrity, immune function, infection rates, glycemic control and overall survival. Not unlike other therapies, enteral nutrition has its risks. The most feared and talked about complication of enteral feeding is aspiration. Current practice utilizes gastric residual volumes (GRVs) as the main marker for risk of aspiration. This practice is neither standardized nor is it universal, with cutoffs ranging from 150ml to 500ml volumes.

Because of the positive effects of enteral feeding support, and unsure relationship of GRVs to aspiration, stopping enteral feedings when the GRVs reach an arbitrarily low set cutoff could be harming patients rather than benefiting them. The purpose of this literature review and critique of available studies is to determine the optimal GRV cutoff volume.

Current Policy at HMC
“Aspiration Precautions” policy number: A-5 CPNM:
*If receiving enteral nutrition: aspirate stomach contents before feedings or as ordered. For continuous tube feedings if gastric residual exceeds 250 ml, hold feeding and notify physician.

Methods
A non-restricted search of Cinahl, Pro Quest, Ovid, Pub Med, and Cochrane databases was conducted using combinations of the following terms:
*gastric residual volumes
*enteral nutrition
*tube feed residual
*aspiration

Literature Review

<table>
<thead>
<tr>
<th>STUDY</th>
<th>FINDINGS</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
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<tbody>
<tr>
<td>McClave et al. (2009)</td>
<td>Avoid holding feedings for RV &lt;500 without signs and symptoms of intolerance.</td>
<td>--Extensive lit. review.</td>
<td>--Grade B recommendation: only one level I study referenced</td>
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<tr>
<td>SCCM and ASPEN.</td>
<td></td>
<td>--Well defined methodology with specific leveling criteria</td>
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<td>Level I A</td>
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<tr>
<td>McClave, Snider (2002)</td>
<td>Don’t stop feedings for RV &lt;400-500. Abrupt cessation only with overt regurgitation</td>
<td>--Specific statistical findings from the studies reviewed were discussed</td>
<td>--No discussion of methods for article selection or leveling criteria</td>
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<td>North American Summit on Aspiration</td>
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<td>Level I C</td>
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<td>Montejo et al. (2010)</td>
<td>A limit of 500 ml is not associated with adverse effects and can be recommended as a normal limit for GRV</td>
<td>--Sample includes 329 patients from 28 ICUs</td>
<td>--No standardization of tube feeding rates or methods for measuring GRV</td>
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<td>REGANE study</td>
<td></td>
<td>--Blind statistical analysis with significance defined as P &lt;0.05</td>
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<td>Level I A</td>
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<tr>
<td>McClave et al. (2005)</td>
<td>No apparent relationship between residual volume and aspiration was found</td>
<td>--Well defined methods</td>
<td>--Small sample size of only 40 patients.</td>
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<tr>
<td>Level I B</td>
<td></td>
<td>--Extensive literature review comparing findings to that of other studies.</td>
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PICO Question
“For mechanically ventilated adult ICU patients receiving continuous enteral feedings (p), does holding the tube feeds for GRVs greater than 250ml (l), reduce the incidence of aspiration (o) as compared to not holding the tube feeds until residual volumes are greater than 500 ml (c)?”

Conclusions
According to the best evidence available, not withholding feeds until GRVs are > 500 ml does not increase the risk of aspiration as compared to holding tube feeds for residuals >250 ml. Patients aspirate with all levels of residual volumes. Attention must therefore shift away from GRV as an important marker of aspiration, to the need for careful assessments for other signs of gastric intolerance, and to the implementation of further methods to reduce aspiration.

Implications
Practice
Implementation of an evidence based protocol designed to accept GRVs up to 500 ml, with attention being added to the importance of assessing for signs of intolerance.

Research
Investigation into the following terms to determine their usefulness in the management of enteral feedings:
*refractometry testing
*use of prokinetic agents
*use of narcotic antagonists infused through the feeding tube

References

Normal Chest x-ray
Pneumonia Chest x-ray