Medicine University of South Carolina
Center for Evidence-Based Practice
Evidence-Based Practice Summary

Post-Pyloric Feeding to Reduce the Risk of Aspiration Pneumonia

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Ask the Question

Question 1: Does post-pyloric feeding decrease the risk of aspiration pneumonia in ventilated patients compared to gastric feeding?

Objective:

- In ICU patients, adequate nutrition is essential, but there is a risk when doing this
- There is decreased GI mobility in many patients related to medications and being sedentary while hospitalized
- There is a higher risk of aspiration pneumonia in patients whom are being fed via NG/OG tubes which increases hospital stay, cost, and could cause death
- The use of post-pyloric feeding tubes is becoming more popular in ICU patients on ventilators.

Background: To critically appraise the evidence surrounding post-pyloric feeding in vented ICU patients to determine if it helps reduce the risk of aspiration pneumonia.

Search for Evidence

Search strategies included: English language, within past 10 years, adult population, medical journals, nutrition journals

Databases included: PubMed, CINHAL, Google Scholar

Key words/terms included: ventilator, ICU patients, vented patients, aspiration pneumonia, post-pyloric, gastric, stomach, duodenal, dobbhoff, small-bore feeding tube
CRITICALLY ANALYZE THE EVIDENCE

Pico Question: Does post-pyloric feeding decrease the risk of aspiration pneumonia in ventilated patients compared to gastric feeding?

Practice Recommendation: Based on the evidence found, a post-pyloric feeding tube should be placed when a patient will be on a ventilator for > 72 hours. Strong recommendation, moderate quality of evidence.

Of the five studies that were found, they all seemed to provide a good amount of evidence supporting the PICO question provided. The evidence can be considered of moderate quality due the majority of the articles of either a meta-analysis or randomized control trials.

One meta-analysis was done to review the impact of gastric vs. post-pyloric feeding and the incidence of pneumonia. There were 563 studies which were searched, including 15 RCTs, and 966 participants were included. This meta-analysis found that there was a decrease in the incidence of pneumonia when a post-pyloric feeding tube was placed compared to a gastric feeding tube. (Jiyong et. al, 2013)

A randomized control trial was conducted to look at the incidence of microaspiration related to gastroesophageal regurgitation, but focused on post-pyloric feeding. This article provided good information, but the sample size was small with only 39 patients participating. The results did show, however, that there was a decrease in microaspiration when patients had a post-pyloric feeding tube present, rather than a gastric feeding tube. (Heyland et al, 2001)

A prospective, randomized clinical study looked at nasoduodenal feeding tubes and tried to determine if patient outcomes were better with these tubes compared to gastric feeding tubes. The study looked at 121 patients and resulted in a decrease in ventilator associated pneumonia related to aspiration when patients had a nasoduodenal tube rather than a gastric feeding tube. (Hsu et al, 2009)

A prospective, descriptive study was performed over a 2 year period and looked at 560 ICU patients in 5 ICUs. The purpose of this study was to evaluate pepsin-positive tracheal secretions and their presence in ICU ventilated patients. The results of this study showed there was a decrease in pepsin-positive tracheal secretions in ICU patients which were fed with post-pyloric feeding tubes compared to gastric fed patients. (Metheny et al, 2006)

The last article, a retrospective analysis, looked at which feeding site was associated with the greatest risk of aspiration pneumonia. 474 patients were eligible for the study, but 42 patients were excluded due to tube displacement. This study determined that tube
placement is important in the incidence of aspiration pneumonia and that the farther the tube is placed (i.e. the 1st/2nd/or 3rd portion of the duodenum) or jejunum there was less risk of aspiration than associated with tubes placed in the stomach. (Metheny et al, 2011)

Due to the small sample sizes in two of the studies, lack of blinding, some selective reporting, these articles collectively would be considered of moderate quality. Overall, however, there does seem to be consistency in the decreasing instance of pneumonia in ICU patients who were fed with post-pyloric feeding tubes rather than gastric feeding tubes.

<table>
<thead>
<tr>
<th>PICO Question: Does post-pyloric feeding decrease the risk of aspiration pneumonia in ventilated patients compared to gastric feeding?</th>
<th>Lower Quality Rating if:</th>
<th>Level of evidence for studies as a</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author/Date /Journal</strong></td>
<td><strong>Purpose of Study</strong></td>
<td><strong>Study Design</strong></td>
</tr>
<tr>
<td>Jiyong et al., 2013, <em>Clinical Nutrition</em></td>
<td>To review the impact of gastric versus post-pyloric feeding on the incidence of pneumonia</td>
<td>Meta-analysis</td>
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<tr>
<td>Heyland et al., 2001, <em>Critical Care Medicine</em></td>
<td>To determine if post-pyloric feeding reduces the risk of gastroesophageal regurgitation and microaspiration in critically-ill patients.</td>
<td>Randomized trial</td>
</tr>
<tr>
<td>Hsu et al., 2009, <em>Critical Care Medicine</em></td>
<td>To determine if patients with nasoduodenal feeding tubes had better clinical outcomes than those with nasogastric</td>
<td>Prospective, randomized, clinical study</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Study Title</th>
<th>Study Type</th>
<th>Population</th>
<th>Methods</th>
<th>Findings</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metheny et al., 2006, Critical Care Medicine</td>
<td>Prospective descriptive study over a 2 year period</td>
<td>360 adult patients from 5 ICU in a university-affiliated medical center with Level I trauma status. Patients were on ventilators and had either orally or nasally placed feeding tubes.</td>
<td>The mean percentage of pepsin-positive tracheal secretions was significantly higher in gastric fed patients than in small-bowel patients (35.6 ± 25.32 vs. 24.1 ± 20.01, respectively; p &lt; .001).</td>
<td>Study Limitations = None</td>
<td></td>
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<tr>
<td>Metheny et al., 2011, Journal of Parenteral and Enteral Nutrition</td>
<td>Retrospective Analysis</td>
<td>474 eligible patients at a university-based level I trauma center; 42 patients were excluded from the analysis due to tube displacement.</td>
<td>The percentage of pepsin-positive tracheal secretions was lower depending on the placement of the feeding tube. The percentage of pepsin-positive tracheal secretions was 13.6% lower if the feeding tube was placed in the 1st portion of the duodenum than in the stomach (p &lt; .001), 17.4% lower if in the 2nd/3rd portion of the duodenum (p &lt; .001), and 26.8% lower if placed in the 4th portion of duodenum or jejunum (p &lt; .001). There was no significant difference in the</td>
<td>Study Limitations = None</td>
<td></td>
</tr>
</tbody>
</table>

**Selective reporting of measures**

- Large losses to F/U

**Whole:**

- High
- Moderate
- Low
- Very Low
rate of pneumonia whether the feeding tube was placed in the stomach or D1, but there was a reduction in pneumonia if placed in D2 or lower.

**APPLY THE EVIDENCE**

- Post-pyloric feeding tubes should be considered in ICU ventilated patients in order to decrease the risk of aspiration pneumonia.
- Post-pyloric feeding tubes should be placed as soon as possible and should be placed for all patients receiving mechanical ventilation > 72 hours.

**EVALUATE THE EVIDENCE**

**Outcome & Process Measures:**

- Evaluate percentage of patients who become diagnosed with ventilator-associated pneumonia.
- Determine the average amount of time it takes to place a post-pyloric feeding tube.
- Evaluate the incidence of vomiting with post-pyloric feeding tubes.
- Evaluate pre-albumin levels with patients receiving both gastric and post-pyloric feedings to determine if there’s a difference from a nutritional standpoint.

**Implementation Plan:**

- Discuss findings with stakeholders.
- Discuss findings with MICU Quality team.
- Determine policy/procedure for post-pyloric feeding tube placement.
- Determine education plan for nurses/nutritionists on post-pyloric feeding.

**REFERENCES**


