Continuous vs. Intermittent NG Feeding for Patients on Mechanical Ventilation: Impacts on Gastric Emptying and Pulmonary Aspiration: A Comprehensive Systematic Review

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Significance of Mechanical Ventilation

- A commonly used mode of support in the intensive care unit
  - 8 to 28% of patients receiving mechanical ventilation (MV)
- Primary risk factor for nosocomial pneumonias
  - risk 6 to 21 times the rate for nonventilated patients
  - 86% of nosocomial pneumonias are associated with mechanical ventilation
Ventilator-Associated Pneumonia

- pneumonia occurring more than 48 h after patients have been intubated and received mechanical ventilation
Significance of VAP

- Account for 15% of all hospital associated infections
- Account for 27% of all MICU acquired infections
- Affects 10–20% of mechanically ventilated patients
Increased morbidity and mortality
- ranges from 24 to 50% and can reach 76% in some specific settings
- have a 2- to 10-fold higher risk of death compared with patients without pneumonia
Significance of VAP

- Increases ventilatory support requirements and ICU stay by 4.3 days
- Increases hospital LOS by 4 to 9 days
- Increases cost - $11,000 per episode
Role of Enteral Feeding

- Necessary nutritional support
- A well known risk factor for developing VAP (VAP)
Step 1: Ask An Answerable Question

P • Patient/Problem
  • Patients on ventilator

I • Intervention
  • Intermittent NG Feeding

C • Comparator
  • Continuous NG Feeding

O • Outcome
  • Gastric Emptying
  • Indicators of Pulmonary Aspiration
Criteria for considering studies for this review

Step 2: Tracking down the best evidence with which to answer that question
Types Of Studies

- Randomized Controlled Trials (RCTs)
- Controlled Clinical Trials (CCTs)
- Non-randomized controlled trials and before and after studies will be considered in the absence of RCTs
The quantitative component of this review will consider studies that include adult patients on mechanical ventilation and receiving NG feeding.
Only trials comparing the effects of continuous or intermittent NG feeding were selected.
Types of Outcome Measures

- Gastric emptying
- Pulmonary Aspiration
A three-step search strategy was utilized in each component of this review.

- An initial limited search of MEDLINE and CINAHL was undertaken followed by analysis of the text words contained in the title and abstract, and of the index terms used to describe article.

- A second search using all identified keywords and index terms will then be undertaken across all included databases.

- Thirdly, the reference list of all identified reports and articles will be searched for additional studies.
Search Methods For Identification Of Studies

- Electronic searches
  - MEDLINE
  - CINAHL databases
  - EMBASE
  - The Cochrane Central Register of Controlled Trials
  - Chinese Electronic Publication Service (CEPS)
  - Chinese Electronic Theses and Dissertations Service (CETD)
Keywords Used

- enteral feeding
  - nasogastric feeding
- mechanically ventilated
- gastric emptying
- ventilator-associated pneumonia
- aspiration pneumonias
- gastric aspiration
Data Collection & Analysis
Selection Of Studies

- One review author screened the title, abstract and descriptors of identified studies for possible inclusion.
- From the full text, two authors independently assessed potentially eligible trials for inclusion.
- Differences were resolved by consensus, or 3dr third party adjudication.
- 7 studies were included in the final data analysis.
Data Collection

- Data extracted from the publications included
  - Study
  - Intervention
  - Participants’ characteristics
  - methodological quality
  - outcome measures

- Data were extracted using a pre-tested extraction form by two independent reviewers
Step 3: Critically appraising that evidence for its validity, impact, and applicability
Research rigor of these studies was evaluated using the Quality Index, developed by Downs and Black (1998).

- It consists of five subscales, including (a) reporting (10 items), (b) external validity (3 items), (c) bias (7 items), (d) confounding (6 items), and (e) power (1 item).
- The highest possible score was 32.
## Methodological Quality of Included Studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Total</th>
<th>Report</th>
<th>External Validity</th>
<th>Bias</th>
<th>Confounding</th>
<th>Power</th>
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<td>5</td>
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<tr>
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<td>.776</td>
<td>.618</td>
<td>.859</td>
<td>.854</td>
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</tbody>
</table>
Step 4: Synthesize the available evidence
Comprehensive Meta Analysis version 2.2 (Biostate, 2006) was used to analysis statistical data extracted from retrieved articles and to conduct meta-analysis.

- i.e., sample size, mean, change score, SD, $t$, $p$ values

- Odds ratio, standard difference in mean, 95% confidence intervals (CI) and $p$-values were calculated for each of studies as well as combined effects.
No difference in gastric emptying between two modes of NG feedings
Result

No difference in pulmonary aspiration between two modes of NG feedings
**Result**

Patients receiving intermittent NG Feeding had better outcome in Neutrophil cell concentration in sputum.

### Meta Analysis

<table>
<thead>
<tr>
<th>Study name</th>
<th>Outcome</th>
<th>Std diff in means</th>
<th>Standard error</th>
<th>Variance</th>
<th>Lower limit</th>
<th>Upper limit</th>
<th>Z-Value</th>
<th>p-Value</th>
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<tbody>
<tr>
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</tbody>
</table>

**Std diff in means and 95% CI**

```
-1.00  -0.50  0.00  0.50  1.00
```

**Favours A**  **Favours B**
No difference in lipid-laden macrophage cell concentration in sputum between two modes of NG feedings.
Limitations of the study

- Publication bias
- Study quality
  - Non-RCT
  - Small sample size
- Confounding factors
  - Homogeneity in population?
Conclusion

- No definitive studies showing either intermittent or continuous NG feeding is better in the outcomes of gastric emptying or the amount of lipid-laden macrophage presented in sputum.
- Intermittent NG feeding is better than continuous NG feeding in terms of less neutrophils present in sputum.
The current strength of evidence is weak and well-designed studies are strongly recommended.

Clinical application should take individuals’ differences into consideration.