**Rapid Enteral Feed Volume Advancement’s Effect on Necrotizing Enterocolitis in Very Low Birthweight Preterm Infants**

April Dwane, BS, RN, PHN

**PICO Question:** Does rapid enteral feed volume advancement in stable preterm infants with a birthweight of less than or equal to 1500 grams impact the incidence of Necrotizing Enterocolitis (NEC) when compared to slow enteral feed volume advancement?

**Background**

Necrotizing Enterocolitis (NEC) is a gut infection related to immaturity, portions of bowel become necrotic with risk for sepsis and death. Treatment is bowel rest for suspected cases and surgical resection for necrotic bowel.

Enteral Feed (EF) feeding via nasogastric or orogastric tube common in the NICU due to poor oral feeding coordination from neural immaturity.

**Methods: Literature Search**

- **Databases:** CINAHL, PubMed, Web of Science
- **Key Terms:** "enteral feed," "rapid," "slow," "NEC," "NICU," "preterm," & "VLBW"
- **Refinement:** English, published within 10 years, experimental or quasi-experimental design
- **Selection:** 3 Randomized Control Trials & 1 Retrospective Case Control Study

**Selected Studies**

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Birthweight Class</th>
<th>Setting</th>
<th>Interventions (Rapid Rate)</th>
<th>Control (Slow Rate)</th>
<th>Sample Size</th>
<th>Time to Regain Birthweight</th>
<th>Incidence of NEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raban et al. (2016)</td>
<td>Randomized Control Trial</td>
<td>ELBW</td>
<td>Single Center, South Africa</td>
<td>+36ml/kg/day, starting with 4ml/kg (low) or 24ml/kg (high)</td>
<td>+20ml/kg/day</td>
<td>200</td>
<td>Not Significant (p=0.99)</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Karagol et al. (2013)</td>
<td>Randomized Control Trial</td>
<td>ELBW + VLBW</td>
<td>Single Center, Turkey</td>
<td>+30ml/kg/day</td>
<td>+20ml/kg/day</td>
<td>92</td>
<td>Significantly Decreased 1.77, 95% CI 1.03–3.03, p=0.004</td>
<td>Significantly Decreased 19.1 days vs 22.3 days, p&lt;0.0001</td>
</tr>
<tr>
<td>Krishnamurthy et al. (2010)</td>
<td>Randomized Control Trial</td>
<td>VLBW</td>
<td>Single Center, India</td>
<td>+30ml/kg/day</td>
<td>+20ml/kg/day</td>
<td>100</td>
<td>Not Significant (p=0.01)</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Maas et al. (2013)</td>
<td>Retrospective Case Control Study</td>
<td>ELBW + VLBW</td>
<td>Single Center, Germany</td>
<td>+30ml/kg/day, starting with 4ml/kg (low) or 24ml/kg (high)</td>
<td>+15-20ml/kg/day</td>
<td>224</td>
<td>Not Significant (p=0.01)</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>

**Results**

<table>
<thead>
<tr>
<th>Study</th>
<th>Time to Reach Full Enteral Feed</th>
<th>Time to Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raban et al. (2016)</td>
<td>(Did Not Measure)</td>
<td>(Did Not Measure)</td>
</tr>
<tr>
<td>Karagol et al. (2013)</td>
<td>Significantly Decreased 181 days vs 22.3 days, p=0.001</td>
<td>Significantly Decreased 232 days vs 351 days, p=0.001</td>
</tr>
<tr>
<td>Krishnamurthy et al. (2010)</td>
<td>Significantly Decreased 7 days vs 9 days, p=0.0001</td>
<td>Significantly Decreased 9.5 days vs 11 days, p=0.10</td>
</tr>
<tr>
<td>Maas et al. (2013)</td>
<td>Significantly Decreased 6 days vs 8 days, p=0.0001</td>
<td>Not Significant (4 days vs 2 days, p=0.72)</td>
</tr>
</tbody>
</table>

**Strengths**

- Practical and adaptable with easy integration and expansion
- Generalizable to VLBW and ELBW
- Supported by randomized control trials
- Comparable rates for intervention and control
- Heavy reliance on objective data, subjective data (NEC diagnosis) standardized via Bell’s Staging Criteria for Diagnosis of NEC
- Nurses as interventionists

**Weaknesses**

- International populations may not represent US population
- Only single center studies
- NEC incidence studied as secondary outcome, studies not powered to detect clinical significance

**Implications**

**Feeding Policy Changes**

- Applicable to resource limited settings in large and small scale
- Cost effective; no additional equipment, training, personnel; shorter length of stay reduces overall cost

**Future Research**

- US study to confirm international populations are representative of US population
- Multi-center studies
- Studies sufficiently powered to detect clinical significance of NEC incidence

**Conclusion**

Patient advocacy for rapid enteral feed volume advancement led by nursing staff based on observation of patient feed tolerance reduces time to regain birthweight, time to full enteral feeds, and time to discharge without increasing risk for Necrotizing Enterocolitis.