INTRODUCTION
This operating procedure is based on a combination of best available evidence and the clinical experience of the senior clinicians of the unit. It is designed to improve patient care but does not replace the central role of clinical expertise and judgement in determining appropriate patient care.

1. AIM
   - To ensure infants receive the best possible feeding management
   - To promote consistency in feeding management
   - To reduce/minimise the risk of necrotising enterocolitis (NEC)

2. PATIENT
   - Newborns

3. STAFF
   - Medical and nursing staff

4. CLINICAL PRACTICE
   - Infants ≥34 weeks and >1800 grams
     - Review the readiness of infant for feeding at least every 24 hours.
     - Precautions/Contraindications: Perinatal asphyxia, PDA, indomethacin, inotropes, post-surgery, major congenital anomaly, major congenital heart disease, severe IUGR. Always discuss with a senior clinician for feeding management of these babies.
     - Respiratory support is not a contraindication to feeding, provided the infant is clinically stable on the respiratory support.
     - The presence of umbilical lines is not a contraindication to feeding.
     - Surgical Infants: Feeding plan is to be done in consultation with surgical team.
     - Feeding method:
       - Otherwise well but poor sucking effort: Intermittent 3 hourly gavage feeding at 60 ml/kg/day. Increase by 20-30 ml/kg/day until 150 ml/kg/day. Some infants don’t tolerate 60 ml/kg feed straight away and one can consider giving 30 ml/kg/day aliquots for the first 2-3 feeds before increasing to 60 ml/kg/day (but remember to closely monitor BSLs in such cases).
       - Infant with illnesses of short duration and resolved or no respiratory distress e.g. TTN: Can go straight onto 3 hourly breast feeds. If the infant’s mother is on the postnatal wards, infant can be transferred to postnatal wards after 1 to 2 code 5 or 6 breastfeeds.
       - Infants on stable respiratory support and not suitable for sucking feeds: Start 5 ml EBM/term formula 3 hourly and increase by 5 ml every 2nd feed until full feeds (150ml/kg/day). Establish sucking feeds when the infant is ready.

   - Infants <34 weeks or < 1800 grams
     - Precautions/Contraindications: Perinatal asphyxia, PDA, indomethacin, inotropes, post-surgery, major congenital anomaly, major congenital heart disease, severe IUGR. Always discuss with a senior clinician for feeding management of these babies.
ENTERAL NUTRITION IN NEONATES  cont’d

- Surgical Infants: Feeding plan is to be done in consultation with surgical team.
- Infants on non-steroidal anti-inflammatories (NSAIDs) for PDA: Trophic feeds can be given and nutritional feeds can be considered after discussing with senior clinician.
- Inotropes: keep nil by mouth.

Table. Feeding recommendations for infants <34 weeks or < 1800 grams.

<table>
<thead>
<tr>
<th>Birth weight</th>
<th>≤750 g</th>
<th>751-1000 g</th>
<th>1001-1500 g</th>
<th>1501-1800 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiation of feeding</td>
<td>As soon as possible</td>
<td>As soon as possible</td>
<td>As soon as possible</td>
<td>As soon as possible</td>
</tr>
<tr>
<td>Method of feeding</td>
<td>Intermittent bolus gavage</td>
<td>Intermittent bolus gavage</td>
<td>Intermittent bolus gavage</td>
<td>Intermittent bolus gavage</td>
</tr>
<tr>
<td>Minimal enteric feeding (MEF) as initial feeding regime</td>
<td>Yes</td>
<td>Yes</td>
<td>Only in special circumstances</td>
<td>Usually not necessary</td>
</tr>
<tr>
<td>Amount of MEF</td>
<td>1 ml q4 hourly</td>
<td>1 ml q4 hourly</td>
<td>1 ml q2 hourly</td>
<td>N/A</td>
</tr>
<tr>
<td>Duration of MEF</td>
<td>48-72 hours but variable</td>
<td>48-72 hours but variable</td>
<td>Variable</td>
<td>N/A</td>
</tr>
<tr>
<td>Type of MEF</td>
<td>EBM</td>
<td>EBM</td>
<td>EBM or formula</td>
<td>N/A</td>
</tr>
<tr>
<td>Nutritional feeds</td>
<td>1 ml q2 hourly</td>
<td>1 ml q2 hourly</td>
<td>1 ml q2 hourly</td>
<td>2 ml q2 hourly</td>
</tr>
<tr>
<td>Feed advancement</td>
<td>1 ml q2 hourly for 24 hours, then 1 ml q1 hourly for 24 hours, then increase by 0.5 ml per feed every 24 hours until 160-170 ml/kg/day</td>
<td>1 ml q2 hourly for 24 hours, then 1 ml q1 hourly for 24 hours, then increase by 1 ml per feed every 24 hours until 160-170 ml/kg/day</td>
<td>1 ml q2 hourly for 24 hours, then increase by 1 ml per feed every 12 hours for 48 hours, then increase by 1 ml per feed every 8 hours until 160-170 ml/kg/day</td>
<td>Increase by 1-2 ml twice daily for 24 hours, then increase by 1 ml every 6-8 hrs for 24 hours, then increase by 1 ml every 6 hours (or 2 ml every 8 hours in bigger infants) until 160-170 ml/kg/day</td>
</tr>
<tr>
<td>Type of nutrition</td>
<td>EBM or term formula</td>
<td>EBM or term formula</td>
<td>EBM or term formula</td>
<td>EBM or term formula</td>
</tr>
<tr>
<td>HMF or preterm formula (24cal/oz)</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
</tr>
<tr>
<td>Pentavite</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
<td>After 24 hours of 160-170 ml/kg/day of EBM or term formula</td>
</tr>
</tbody>
</table>

Gastric aspirates
- Check for gastric aspirates before every second feed, but not more than once every 6 hours.
- If aspirate is <3ml/kg body weight or <30% of the volume of the last feed, return the aspirate and give the full volume of milk scheduled.
ENTERAL NUTRITION IN NEONATES  cont’d

- If aspirate is 3 – 5 ml/kg body weight and/or between 30-50% of the volume of the last feed, return the aspirate and give the volume of milk scheduled minus the volume of the aspirate returned.
- Consult a senior clinician to determine management in the following circumstances:
  o If aspirate is >5 ml/kg body weight and >50% of the volume of the last feed
  o If aspirate volumes are markedly increased at one feed, or steadily increasing over several feeds
  o If 2 consecutive aspirates are ≥3 ml/kg body weight and between 30-50% of the volume of the last feed

  Recommendation: Cease feeds and recommence after 6 hours if clinically otherwise satisfied.
- If the aspirate is light green with no other sign of feed intolerance e.g. vomiting, large aspirates and abdominal distension or systemic symptoms like temperature instability, apnoeas or bradycardias, feeds can continue. Check the feeding tube position to make sure it has not migrated through pylorus.
- If aspirates are lightly stained with blood and no other suspected underlying pathology, no need to stop feeds. If aspirates are heavily blood-stained, consult a senior clinician to determine management.

Vomits
- Effortless milky vomits (called possets) are innocuous. Continue feeds unless other signs of feed intolerance.
- Persistent or worsening effortless vomiting, with other symptoms suggestive of significant gastro-oesophageal reflux, such as bradycardia or desaturation events: Consult a senior clinician.
- Blood stained vomit: If occasional vomits that are finely streaked with blood and no other symptoms of underlying pathology, continue feeds but observe closely.
- Bile stained vomit: Bile-stained vomit is potentially very serious and may suggest bowel obstruction. Stop enteral feeds and consult a senior clinician.
- Persistent, projectile vomits: Potentially serious and may suggest hypertrophic pyloric stenosis. Stop enteral feeds and consult a senior clinician.

Abdominal Distension
- Normal Finding: Normal Preterm abdomen can be distended but soft, non-tender and may have visible bowel loops.
- Routine abdominal girths are not necessary.
- Any increasing abdominal distension, any firm and/or tender abdomen: Consult senior clinician.

Feed Intolerance with HMF or preterm 24 cal per 30 ml formula
- Some VLBW infants may develop signs of feed intolerance after adding HMF to EBM or changing over to preterm formula. In these circumstances, stop HMF/preterm formula and continue plain EBM/term formula and reassess after 48 hours.

Feed Intolerance and continuous feeds
- In those infants with persistent feed intolerance even after the above measures, we may consider continuous feeds.

Oral medications
- Keep in mind that oral sodium chloride increases the osmolality of feeds.
ENTERAL NUTRITION IN NEONATES  cont’d

How to re-introduce feeds after feed intolerance/NEC
• This is complex and beyond the scope of the guidelines. Always discuss with senior clinician.

Assessing readiness to sucking feed
• Suck, swallow, and breathing coordination, is usually not fully developed until 35-36 weeks (and sometimes not until term) although some babies can safely take all their feeds by mouth 35 weeks. There is some evidence that oral feeds can be initiated earlier than was originally thought. Most babies will be 34-35 weeks before bottle feeding can be started, but many babies seem able to ‘go to the breast’ and try and establish feeds as early as 32 weeks. The decision to initiate and increase oral feeds is best taken by an experienced nurse familiar with assessment of preterm babies.

5. DOCUMENTATION
• eMR
• Daily Care Plan
• Neonatal Observation Chart
• NICUS database

6. RELATED POLICIES/PROCEDURES/CLINICAL PRACTICE LOP
• Royal Hospital for Women NCC LOP – Parenteral Nutrition in Newborns

7. RISK RATING
• Medium

8. NATIONAL STANDARD
• Standard 1 Governance for Safety and quality in Health Service Organisation
• Standard 9 Recognising and Responding to Clinical Deterioration in Acute Health Care

9. ABBREVIATIONS AND DEFINITIONS OF TERMS

<table>
<thead>
<tr>
<th>NCC</th>
<th>Newborn Care Centre</th>
<th>EBM</th>
<th>Expressed Breast Milk</th>
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<tbody>
<tr>
<td>NEC</td>
<td>Necrotising Enterocolitis</td>
<td>NSAIDs</td>
<td>Non-Steroidal Anti-Inflammatories</td>
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<tr>
<td>PDA</td>
<td>Patent Ductus Arteriosus</td>
<td>MEF</td>
<td>Minimal Enteric Feeds</td>
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<tr>
<td>IUGR</td>
<td>Intrauterine Growth Restriction</td>
<td>HMF</td>
<td>Human Milk Fortifier</td>
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<tr>
<td>BSL</td>
<td>Blood Sugar Level</td>
<td>VLBW</td>
<td>Very Low Birth Weight</td>
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<tr>
<td>TTN</td>
<td>Transient Tachypnoea of the Newborn</td>
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10. REFERENCES
ENTERAL NUTRITION IN NEONATES  cont’d


11. AUTHOR
Primary Nov 2010 S Bolisetty (Staff Specialist)

REVISION & APPROVAL HISTORY
August 2018 Reviewed and Approved NCC LOPs Committee
November 2010 Primary Approved Newborn Care Management Committee and RHW Quality & Patient Safety

FOR REVIEW: 2021