The Yorkshire and Humber Neonatal Operational Delivery Network

Title: Feeding the Preterm Infant - Guidance for LNUs and SCBUs

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This clinical guideline has been developed to ensure appropriate evidence based standards of care throughout the Yorkshire and Humber Neonatal ODN. The appropriate use and interpretation of this guideline in providing clinical care remains the responsibility of the individual clinician. If there is any doubt discuss with a senior colleague.

Summary page

Key recommendations:

- Enteral feeds with Mother's Own Milk (MOM) can be considered in all infants irrespective of gestation or birth weight
- Volumes and choice of milk vary depending on 'Risk Groups' based on gestation and birth weight - See Summary Table
- It is highly recommended to consider Donor Breast Milk (DBM) for infants with lower birth weights and gestations within the Medium and High Risk Groups
- Colostrum should be given as mouth care/buccal administration to all infants as soon as it is available
- The use of formula is strongly advised against in the High Risk Group
- DBM should receive fortification as per MOM according to local unit policy
- DBM can be transitioned to preterm formula at 25% per day commencing at 3 weeks of age or 2 weeks tolerating full enteral feeds, whichever is later

Summary Table:

For babies receiving BREAST MILK– either MOM or DBM

Risk Group	Low	Medium	High
Gestation/Birth weight criteria	**>1500g** AND Gestation >**31+6** AND Clinically well	**1000-1500g** AND Gestation **>29+6**	**800g-999g** OR Gestation **27+0 - 29+6**
When to start?	Day 1	Day 1	Day 1
How much to start?	Full feeds	30ml/kg/day	15ml/kg/day
How to increment	As fast as tolerated	30ml/kg/day	30mls/kg/day
Feed frequency	2-3 hourly, consider responsive feeding from birth	1-2 hourly	1-2 hourly

For babies receiving FORMULA because there is no MOM and no consent for DBM (see guidance below - 'Choice of Milk'):

Risk Group	Low	Low Intermediate	High Intermediate
Gestation/Birth weight criteria	**>1500g** AND Gestation >**31+6** AND Clinically well	**1250-1500g** AND Gestation **>31+6**	**1000-1249g** OR Gestation **30+0 - 31+6**
When to start?	Day 1	Day 1	Day 3
How much to start?	Full feeds	20ml/kg/day	20ml/kg/day
How to increment	As fast as tolerated	20ml/kg/day	20ml/kg/day
Feed frequency	2-3 hourly, consider responsive feeding from birth	1-2 hourly	1-2 hourly

1. Background

This preterm feeding guideline has been developed using published evidence and in co-ordination with hospitals around the Yorkshire and Humber Neonatal ODN. Whilst we acknowledge that there will be differences in practice between different Trusts we believe that following a standardised method of initiating and advancing enteral feeds in preterm neonates reduces variation and may subsequently reduce the risks associated with feeding preterm infants such as Necrotising Enterocolitis (NEC).

Neonatal nutrition can partly be provided by parenteral nutrition (PN), however this has its own risk profile including cholestasis and line related infection. These can be reduced by early commencement of enteral feeds, which brings with it other important immunological and microbiological benefits. The main concerns surrounding commencement and progression of enteral feeding are feed tolerance and the development of necrotising enterocolitis (NEC).

2. Aim

- Provide guidance for enteral feeding in preterm infants being cared LNU and SCBUs.
- Provide evidence-based standards of care across the Network
- Assist clinicians in making decisions regarding commencement and subsequent advance of milk feeding in preterm neonates
- Provide guidance on choice of milk and transitioning from DBM

- **Areas outside remit:**
  - Feeding of infants with surgical and cardiac problems
  - Feeding infants <27 weeks gestation or birth weight <800g
  - Commencement and monitoring of babies receiving parenteral nutrition
  - Use of breast milk fortifier
  - Prevention and management of metabolic bone disease

3. Feeding the preterm infant

3.1 Choice of milk

There are two tables, depending on whether babies are fed with breast milk (either MOM (mother's own milk) or DBM (donor breast milk)) or formula. This is due to milk choice being the largest contributor to the risk of developing NEC in premature or ELBW babies, with the use of MOM showing a significant reduction in this risk along with benefits in terms of milk tolerance, time to full feeds and rates of late onset sepsis. It is therefore the first choice of milk for infants of any weight or gestation.

The literature also suggests DBM is less causative of NEC in comparison to preterm formula. However, it is likely to be nutritionally inadequate and therefore its duration needs to be under review (see section 'Donor Breast Milk').

Preterm formula can be considered if there is no MOM available for infants in the Low Risk group. It can also be considered for larger infants with a more advanced gestation within the Medium Risk Group. Use of formula in the High Risk should be avoided, and parents should be counselled regarding the risks associated with its use in this population and consent sought for DBM if MOM is not available.
If consent for DBM is not provided, preterm formula can be commenced in this group but with extreme caution and close monitoring.

3.2 Risk Groups

Risk groups are defined according to the risk of development of NEC, which increases according to lower gestation and lower birth weight. The risk groups assume the baby is well. Critically unwell neonates, such as those with escalating ventilatory or cardiovascular support, HIE or requiring exchange transfusion, require individual assessment.

Low Risk Group:
Birth weight **>1500g** AND Gestation **>31+6** AND clinically well.
Can feed from birth at full feeds.
Increment feeds as fast as tolerated.
MOM > Formula > IV fluids
Consider 2-3 hourly feeds from birth, consider "responsive feeding" from birth

Medium Risk Group:
Birth Weight **1000-1500g** AND Gestation **>29+6** Gestation
Can feed from birth – Don't delay.
IF feeding with breast milk (MOM/DBM):
Initiate feeds at 30ml/kg/day or as available
Increment at 30ml/kg/day, can go faster at consultant discretion.
1st choice = MOM>DBM

If feeding with formula:
Birth weight **1000- 1249g** OR gestation **30+0 - 31+6**
Initiate feeds at 20ml/kg/day on Day 3
Increment at 20ml/kg/day

Birth weight **1250-1500g** AND gestation **32+0** or greater
Initiate feeds at 20ml/kg/day on Day 1
Increment at 20ml/kg/day

High Risk Group
Birth weight **800g - 999g** OR Gestation **27+0 - 29+6**
Can feed from birth – Don't delay.
This should be up to 15ml/kg/day, as available
After 24 hours of these introductory feeds, start nutritive feeds, increasing by 30mls/kg/day
1st choice = MOM > DBM
Formula should be avoided, if possible, in this Risk Group, and parents counselled regarding the use of DBM (See section 'Choice of Milk').

3.3 Feeding Babies close to risk group weight margins

This guidance should be implemented in the knowledge that the risk of NEC escalates with lower birthweight and gestation. However, where a baby's weight falls at the upper end of a risk group category, a faster rate of increment can be considered based upon careful assessment of the clinical condition.

3.4 Colostrum

The first milk to be expressed is known as colostrum and is rich in immunoglobulins. This is often in very small volumes and is therefore difficult to give via an NGT. This colostrum can be given as buccal colostrum or mouth care to all infants as soon as it is available via an enteral syringe. Swabs should be avoided as the colostrum can soak into these. This can be continued until volumes are sufficient to commence enteral feeding as per the table.

Recommendations:

- **Colostrum should be given as mouth care/buccal to all infants as soon as it is available**
- **DBM should be considered for infants in the High Risk Group and should be considered for those with lower gestations and birth weights in the Medium Risk Group**

- **The use of formula is strongly advised against in the High Risk Group**

3.5 Donor Breast Milk (DBM)

DBM can be used as an alternative to MOM for infants in the High and Medium Risk groups. Parents should be approached at 48 hours if volumes of MEBM are insufficient to advance feeds, and commenced by 72 hours.

However, DBM may be nutritionally inadequate and often contains much lower quantities of protein, carbohydrates and fat in comparison to MOM. To maintain adequate nutritional intake and promote satisfactory growth it is important to review the duration of this of there is a continued poor or absent supply of MOM. It is recommended that DMB be fortified as per MOM according to local unit policy.

Babies who continue on fortified DBM due to lack of MOM supply can be transitioned to preterm formula, either at 3 weeks of age or after tolerating full enteral feeds for 2 weeks, whichever is later. This should be done gradually in order to reduce sudden alterations in milk composition and reduce the rate of change to the gut microbiome. Transition to preterm formula should therefore be done in a controlled manner as there are case reports of fulminant NEC presenting in this period. The recommended transition is by 25% every 24 hours.

Recommendations:

- **DBM should receive fortification as per MOM according to local unit policy**

- **DBM can be transitioned to preterm formula at 25% per day commencing at 3 weeks of age or after 2 weeks of tolerating full enteral feeds, whichever is later**

3.6 Parenteral Nutrition

The use of parenteral nutrition (PN) is outside the scope of this guideline. There is national guidance from both BAPM and NICE regarding the provision and monitoring or PN within the preterm population, though each have different criteria regarding gestation and weight thresholds for commencement. At this time there is no current ODN guidance on the use of parenteral nutrition, though it is strongly encouraged that all units are clear regarding their local criteria for commencement of PN to avoid any delay in nutrition delivery.

3.7 Feed tolerance

There is variation throughout the ODN as to how to determine feed intolerance, with some units using gastric aspirates and others monitoring for clinical signs. There is currently not enough evidence to promote one approach over the other, and as such the group was not able to come to a consensus on the measurement of gastric residuals.

All babies should be monitored for feed intolerance in line with local guidelines and any baby showing signs of feed intolerance must be assessed.

Signs of feed intolerance include:

- cardiovascular compromise – especially episodes of desaturation/bradycardia post feed
- vomiting after feeds – make note of colour and quantity of vomiting
- abdominal distension and tenderness
- Loose stool

3.8 Feeding and Blood transfusions

There is currently inadequate evidence to support either feeding or not feeding during blood transfusions. Clinical trials (eg. WHEAT) are ongoing.

3.9 Restarting feeds

If feeds have been discontinued, following a clinical deterioration, clinical judgement should be used with regards to re-commencement of feed. For babies with no evidence of gastro-intestinal pathology re-commencement at the previous feed volume, or close to, may be appropriate.

4. Audit criteria:

- Use of DBM, fortification of DBM
- Increments for gestation/birth weight

5. References

The guideline has been adapted from the Bradford, Hull & East Yorkshire, Leeds Teaching Hospital and Jessop Wing guidelines.

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