

## Neonatal insufficient breast milk syndrome

*Inadequate milk intake is a predictable and preventable problem that may affect newborn infants; undiagnosed, it can be fatal.*

Verity Livingstone

### *This article will help you to:*

- recognize the Neonatal Insufficient Milk Syndrome
- perform a prenatal lactation assessment
- detect the syndrome early
- identify maternal and infant contributing factors
- increase the rate of milk synthesis

### *Practice Point*

- Direct observation is required in order to assess breastfeeding.
- Neonates should breastfeed every two to three hours.
- Check serum electrolytes if there is serious weight loss in the baby, since signs of dehydration may be absent.
- Irregular bowel movements stretching over days and few wet diapers indicate inadequate breastmilk.
- A bottle with a wide-based nipple does not usually cause so-called "nipple confusion."

“**T**here have been infant deaths due to dehydration and hypernatremia. The cause is ignorance. Young, inexperienced mothers are advised to breastfeed, but are not being taught how to judge whether the baby is receiving enough fluid, nor are they being taught the proper techniques of breastfeeding. This problem is made worse by early discharge from hospital, for there is not enough time to be sure that the new mother is successfully breastfeeding. This problem, which results in severely ill or dead infants, is preventable. If you have a patient who fits the profile, be sure to see the mother and baby within a day of so of discharge. Be sure the appropriate home support is being given.”

(Taken from, *Comments from the Coroner*, College of Physicians and Surgeons of British Columbia, Spring 1995).

Neonatal insufficient milk syndrome (NIMS) may be due to:

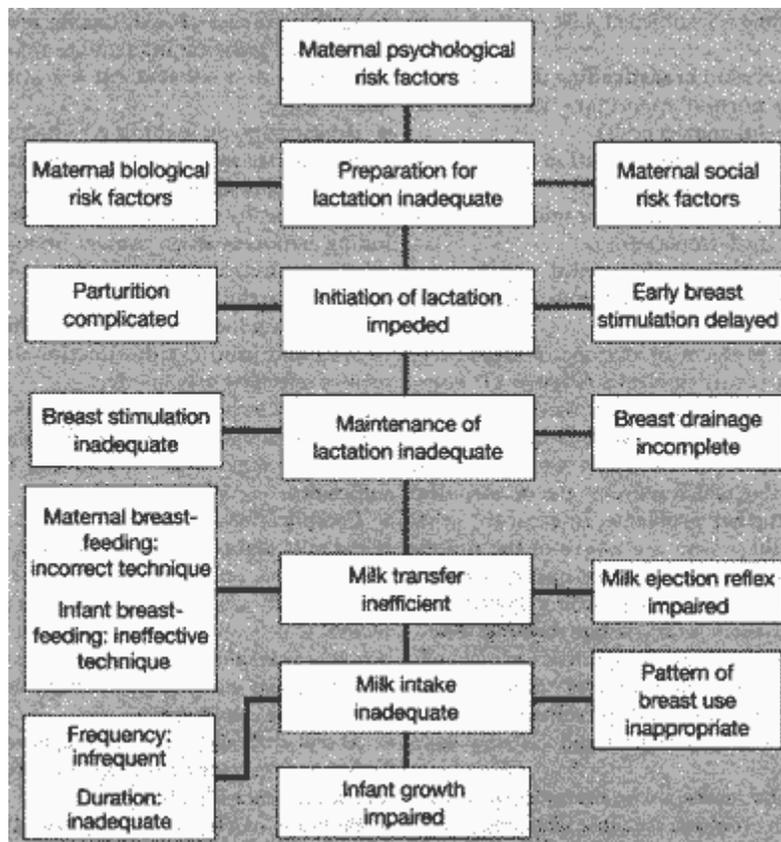
- inadequate maternal milk synthesis
- ineffective milk removal
- inadequate daily milk intake by the infant.

Most mothers across Canada initially choose to breastfeed but less than 10% continue to follow the recommended infant feeding guidelines. The most common reason given for abandoning breastfeeding is insufficient milk.

*Successful breastfeeding depends on:*

- normal mammary development (mammogenesis)
- unimpeded initiation of milk synthesis (lactogenesis)
- adequate on-going milk production (galactopoiesis)
- effective milk removal
- appropriate daily milk intake by the neonate.

A problem in any one of these areas can result in NIMS (Figure 1). Some mothers, realizing that their milk supply is inadequate or that their baby is failing to thrive, immediately resort to bottle feeding which prevents the development of further problems. In contrast, other mothers who are aware of the unique characteristics of breast milk may persist with exclusive breastfeeding despite signs that their infant is not thriving. These babies may be at high risk for malnutrition and hypernatremic dehydration, with the potential for seizures and permanent neurological and vascular damage.



The mothers who are most at risk for such problems are those who are:

- discharged from hospital early before lactation is established
- have little breastfeeding knowledge and skills
- have inadequate support at home
- have sleepy, non-demanding babies.

## Factors that interfere with milk synthesis

During the prenatal period, and in hospital, physicians have an opportunity to screen women and neonates for certain biological, psychological, and social risk factors that might interfere with successful lactation or breastfeeding.

### *Maternal factors*

- Lack of breast growth during pregnancy may indicate inadequate mammogenesis and subsequent lactation insufficiency.
- Breast surgery including reduction mammoplasty may interfere with glandular or lactiferous duct function.
- Anatomically abnormal breasts, including hypoplastic or conical breasts, may never lactate adequately due to insufficient glandular development.
- Certain endocrinopathies including thyroid and pituitary dysfunction and relative infertility may interfere.
- Pituitary ischemia due to obstetrical hemorrhage or severe hypotension (Sheehan's syndrome) may result in lactation insufficiency.
- Complications of pregnancy such as gestational diabetes, pregnancy-induced hypertension, and preterm labour may result in early separation of the baby and mother which can delay the initiation of breastfeeding (more than 12-24 hours).
- Infrequent early breast stimulation and drainage can interfere.
- Absence of colostrum or postpartum breast enlargement/engorgement may indicate absence of milk production.
- Previous or chronic psychiatric disorders including depression may recur in the postpartum period and interfere with maternal parenting abilities.

The full maturation of the mammary glands does not occur until a woman becomes pregnant. Lactogenic hormones including estrogen, progesterone, prolactin, insulin, thyroid and growth hormones trigger the development of the mammary epithelial cells, acinar glands, and lactiferous ducts. Successful mammogenesis is clinically indicated by an increase in breast size of at least one or two bra sizes. Following expulsion of the placenta, the breast becomes receptive to prolactin surges which trigger the onset of lactation. Breast fullness and leaking are signs that lactation has begun. No colostrum or postpartum breast changes can signify inadequate milk production.

**Breast exam:** After reviewing the woman's history, a careful breast examination should be performed. Variations in breast appearance or symmetry may indicate mammary gland disorder and subsequent hypolactation. Scars give clues to potential glandular, ductal or nerve disruption.

### *Infant factors*

- Prematurity
- Intra-uterine growth retardation
- Congenital facial anomalies including cleft palate, cleft lip, micro-gnathia, ankyloglossia
- Neurological problems associated with dysfunctional sucking, swallowing or breathing
- Respiratory distress
- Cardiovascular disorders
- Multiple births

- Admission to special care nursery

Infant illnesses that require early infant/mother separation and factors that interfere with sucking, swallowing or breathing pose a risk to establishing lactation.

**Factors that interfere with milk removal include:**

- maternal technical difficulties with positioning and latch due to lack of skill, perineal or abdominal pain, or sedation
- infant technical difficulties due to suckling/swallowing or breathing disorders such as prematurity, micrognathia, cleft palate, or cardiac or respiratory complications.

Breastfeeding is a technical process where by the infant suckles at the breast and strips out milk. Breastfeeding may be ineffective if the mother does not understand the basic principles of positioning and latching or if the infant has difficulty grasping the nipple and breast tissue, or has an uncoordinated suck pattern. Direct breastfeeding observation is needed to assess the sucking dynamics.

**Factors that interfere with 24-hour milk intake include:**

- infrequent feeds and long sleep periods (more than four hours)
- passive, nondemanding infants
- restricted access to breast (for example, one breast per feed or abrupt removal from breast)
- maternal depression or lack of support.

The amount of milk the baby takes in each day depends on how often and how long the infant feeds. Neonates should breastfeed every two to three hours; long periods of sleep and missed feeds can result in inadequate intake. Frequent bowel movements and many wet diapers indicate adequate fluid and caloric intake; irregular bowel movements stretching over days and a lack of wet diapers are sensitive markers for inadequate feeds. Hungry babies are often fussy and irritable while most well-fed babies wake when hungry and remain content between feeds.

*Psychological risk factors*

Many women have anxieties about their ability to breastfeed. They are more likely to succeed if they have support from their family and friends. Physicians should find out about the woman's beliefs, attitudes and knowledge regarding breastfeeding, as well as her plans for returning to work and related issues.

**How to avoid problems**

After completing a careful history and physical examination and having elucidated potential factors that might interfere with breastfeeding, the following guidance should be offered.

- Avoid medicated or interventional labour. Soon after natural childbirth, infants exhibit an instinctive rooting behaviour to locate and latch on to the breast. Medications and complications of childbirth may interfere with this.
- Initiate breastfeeding or pumping following complete delivery of the placenta; it is this early breast stimulation that triggers the initiation of lactation.
- Breastfeed or pump on demand, every two to three hours, because regular breast drainage and stimulation facilitates lactogenesis.
- Practice rooming/bedding in (24 hours/day). Maternal/infant separation impedes breast drainage and stimulation.
- Combined mother and infant nursing care enables patient-centred teaching.
- Relieve engorgement early to prevent involutinal atrophy of acinar cells.

- Avoid routine supplementation. Bottle-feeding causes “breast confusion” by removing an infant’s hunger drive, reducing breast stimulation and drainage.
- Avoid rubber nipples and pacifiers. If an infant is demonstrating hunger cues by sucking, he is hungry. Offering a pacifier is not an appropriate maternal response to the infant’s cues. The infant should suckle on the breast frequently.
- Exclusive breastfeeding ensures that the infant receives adequate colostrum, including secretory IgA and other unique hormonal factors.
- Review the “signs that your baby is breastfeeding well” in Table 1.
- Remember to schedule the first postpartum medical appointment for mother and baby within the first week.
- Discuss the availability of community resources for the new mother.

### **Signs that your baby is breastfeeding well (first three weeks)**

#### **By three or four days of age, your baby:**

- has wet diapers: at least 4 to 5 noticeable times (looks or feels wet) in 24 hours (pale and odourless urine)
- has at least 2 to 3 bowel movements in 24 hours (colour progressing from brownish to seedy mustard yellow and at least the size of a loonie)
- breastfeeds at least eight times in 24 hours
- is content after most feedings.

#### **Other signs that your baby is breastfeeding well are:**

- you can hear your baby swallowing during the feeding
- your breasts are full before feedings and soft after
- your baby is only drinking breast milk.

*Table 1 Questionnaire for new mothers*

## **Early detection of NIMS**

Newborns often lose weight in the first few days due to normal physiological fluid losses. Within the first week, however, the baby should gain until it reaches its birth weight at 10 to 14 days. Neonates gain approximately 20 to 30 gms per day after the first week. If breastfeeding is successfully established, weight loss should be no greater than 7%. All mothers and infants should be screened at one week to ensure adequate weight gain.

### *How the physician monitors progress*

Following hospital discharge, keep in close contact with breastfeeding mothers and infants because of the high incidence of early difficulties. Follow those with breastfeeding difficulties and known risk factors carefully. At the first postpartum visit, review with the mother the signs that her baby is breastfeeding well (Table 1), obtain a naked infant weight, and assess the mother’s emotional well-being and social support. If the mother is having difficulties breastfeeding or if the infant’s weight is continuing to fall or is more than 10% below birth weight, conduct a clinical breastfeeding assessment.

### *Clinical breastfeeding assessment*

In order to identify the etiology of NIMS, take a detailed maternal and infant history, including breastfeeding history; follow with a careful maternal and infant examination. Observe breastfeeding and

assess positioning, latching, suckling, and swallowing. Infant milk intake is measured by performing an accurate test feed. Maternal milk yield is assessed by combining the test feed with residual pumped milk. Fairly sensitive electronic scales are necessary; standard office scales are unreliable for such small volumes. Since the clinical signs of neonatal dehydration may be absent, obtain serum electrolytes if there is significant weight loss to rule out hypernatremic dehydration. Other causes of infant failure to thrive should be considered, including congenital anomalies, sepsis, metabolic or endocrine disorders.

## **Management of NIMS**

This depends on the degree of infant starvation and dehydration, and includes:

- increasing milk production by increasing breast stimulation and drainage
- increasing milk transfer by correcting the breastfeeding technique
- increasing intake by increasing the frequency and duration of breastfeeding.

These can be achieved by 20 to 30 minutes of effective breastfeeding, followed by 10 minutes of breast pumping to enhance breast stimulation and drainage, repeated about eight times a day. Short term complementary feeds, using expressed breast milk, donor milk or a non-iron fortified formula may be needed. A bottle is the most familiar feeding utensil and a wide-based nipple does not usually cause so-called "nipple confusion." Close observation and follow-up with naked infant weights monitored should be continued until the rate of maternal milk synthesis and infant weight gain is satisfactory. Galactogues including phenothiazines and domperidone are dopamine antagonists; they may be used with care as adjunct therapy in mothers with a low rate of milk synthesis. Domperidone (10 — 20 mg t.i.d.) is effective and well tolerated. The drug excretion in breast milk is minimal. A few neonates will still need complementary feeds, and mothers may need reassurance that partial breastfeeding or mixed feeding is still beneficial.

By providing continuous and comprehensive care to families throughout the perinatal period and by incorporating breastfeeding advice into routine office visits, physicians can share in the promotion, protection, and support of breastfeeding.

## ***Further reading***

Livingstone, V., Medical Alert. Insufficient Breast Milk Intake and Hypernatremic Dehydration. British Columbia Medical Journal, May 1995.

Livingstone, V., Breastfeeding Kinetics. A Problem Solving Approach to Breastfeeding Difficulties.

In: Behavioural and Metabolic Aspects of Breastfeeding, World Rev Nutri Diet (A.P.

Sirnopoulos, J.E. Dutra de Oliveira, and I.D.

Desai, eds.), Karger Basal, Vol.78:28-54.

The Art of Successful Breastfeeding- A Guide for

Health Professionals. Video available: 690 West

11th Avenue, Vancouver. V5Z 1M1. Canada.

Fascimile 604-875 5017.

Corrigendum

In the first article of this Breastfeeding series (January 1997) captions to Figures 2 and 3 were reversed.

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