Abstract:
Concerns about low milk supply and excessive early infant weight loss are among the most frequently cited reasons women abandon exclusive breastfeeding. While lack of information about normal breastfeeding sometimes contributes to the perception of low supply, in many cases the problem is real. A number of well-documented factors may cause a delayed onset of milk production and contribute to low milk production. These include long, stressful labor, cesarean delivery, maternal overweight or obesity, metabolic or hormonal disorders (diabetes, hypertension, polycystic ovarian syndrome), maternal blood loss, maternal infection, and poor early stimulation by a preterm, small, injured or ill infant. What are the best practices to protect the option to breastfeed in such cases? New research provides interventions that can help mothers maximize their milk production, and emphasize the critical nature of the timing of these interventions.

Objectives:
Identify causes of delayed onset of milk production and acquired low milk supply.
Identify early infant weight loss as a predictor of early supplementation and early weaning.
Describe new research about the calibration of milk production.
Discuss the time-sensitive nature of interventions to protect milk production.

Outline:
I Causes of delayed onset of milk production and acquired low milk supply
   A. Birth complications
   B. Medical problems of the mother and/or baby
   C. Management issues
II Infant cues, stooling patterns, and excessive early weight loss
   A. How the mother interprets the signals
   B. Implications for exclusive breastfeeding
   C. Implications for the risk of weaning
   D.
III  Best practices to protect the milk supply

   A.  New research: a review
   B.  Counseling the mother

References:


Why Women Lose their Milk: The time sensitive nature of early milk production

Presented by: Barbara Wilson-Clay, BS, IBCLC
bwc@lactnews.com
Advantages of Breastfeeding:

- Prevention of death in children younger than age 5
- Protection against a range of child infections and illnesses
- Optimal development of infant gut biome
- Promotion of optimal oral development
- Increases in IQ
- Protection against overweight and obesity
- Protection against breast and ovarian cancer in mothers
- Improved birth spacing

Fear of Low milk supply: #1 reason women abandon exclusive breastfeeding

- Misinformation about what normal breastfeeding looks like may contribute to what is called “perception of low milk supply” rather than a real problem.
- But! Delays in the onset of copious lactation are common – especially following cesarean birth and in obese women.
- Low early milk supply contributes to excess infant weight loss.
- Low infant birth weight, poor early management of breastfeeding, and infrequent feeding may cause poor initial calibration of milk production.
- Maternal dietary deficiencies, metabolic, environmental, or genetic issues may contribute to poor milk production in some mothers.
Objectives:

- Identify causes of delayed onset of milk production and acquired low milk supply
- Identify early excess infant weight loss as a predictor of both early formula supplementation and early weaning
- Describe new research about the calibration of milk production
- Discuss the time-sensitive nature of interventions to protect milk production
Let’s start with a case

- Mom is a smoker, very stressed with a husband recently returned from combat
- Delivers on her due date by emergency c-section with general anesthesia
- Baby is Small for Gestational Age (SGA) and weighs only 5 lbs owing to placental abnormalities – 2 large blood clots
- Mother has larger than average nipples
What *should* happen following normal birth?

- After normal delivery, term infants left skin-to-skin locate and begin to stimulate the nipple.
- Delivery of the placenta triggers what is called “secretory activation” – a complex hormonal interaction that normally results in the onset of copious lactation *30-40 hours* after birth (engorgement).
During the first 2 days colostrum is available in small amounts (30 ml/day) – the primary purpose of colostrum is now being recognized as immunological rather than nutritional.

Colostrum comes in many colors

The colostrum must be removed as if the birth were normal, and it must be fed immediately to the newborn for immunological protection, for laxative effect, and to prevent excess infant weight loss.
Delayed onset of copious milk production (the milk “coming in”) occurs after 72 hours. Our c-section case mom and her tiny baby are at risk.

- **Delayed onset is COMMON.** Dewey et al, reported that 22 percent of mothers experienced delays (Risk factors for suboptimal infrat breastfeeding behavior, delayed onset of lactation, and excess neonatal weight loss. *Pediatrics* 2003; 112:607-619)

- **Nommsen-Rivers et al found 44 percent of women experienced delayed onset of lactation** (Delayed onset of lactogenesis among first-time mothers is related to maternal obesity and factors associated with ineffective breastfeeding. *Am J of Clin Nutr* 2010; 92(3):574-584.)
What are some causes of delayed onset?

- Long, stressful labor
- Primiparity, multiple birth
- Inadequate or delayed breast stimulation
- Instrument assisted delivery, cesarean birth
- Retained placenta
- Hypo-androgenism, hypertension
- Excessive maternal blood loss, other types of maternal illness
- Maternal insulin resistance and maternal diabetes

(Chapman 1999, Dewey 2003, Hall 2002, and many others)
Relationship of delayed onset to weaning:

- Brownell (2012) reported an association between delayed lactogenesis and cessation of both any and exclusive breastfeeding.
- Delays are also significant because they are associated with suboptimal infant breastfeeding behavior (the baby gives up hoping and starts sleeping with the nipple in their mouth – they appear to be feeding but are not).
Retained colostrum contributes to down-regulation of milk production

- The big driver of production is effective milk removal
Does the research support this?

- Parker (*Breastfeeding Medicine* 2015) demonstrated that mothers of preterms who began milk expression within the first hour after birth made significantly more milk than when expression was delayed.

- Morton (*J Perinatology* 2009, 2013) demonstrated that a combination of both hand expression and electric breast pumping produced significantly more milk and milk with higher fat content (Hands on Pumping or HOP).
Is hand expression alone adequate stimulation?

- A study by Lussier, et al (Breastfeeding Medicine 2015) compared milk volumes of mothers of very low birthweight babies using only hand expression versus electric breast pump expression.
- This was a randomized, controlled trial and was not funded by a pump company.
- At the end of 1 week, the mothers randomly assigned to use electric pumping were producing twice as much milk as the hand expressing mothers.
- The trend of reduced milk production in the hand expression mothers persisted even after the end of the 7 day trial when they, too, began electric pumping.
What are the implications of the Lussier findings?

- They add to a body of evidence going back decades that suggests that the milk supply is calibrated within the first few days to a few weeks following birth.
- Milk volumes achieved during that time are likely to be maintained over the course of lactation.
- If you set the thermostat too low, the mother is always trying to play catch up to increase supply – mostly unsuccesssfully.
So what **might** happen to our case mother and baby?

- In many hospitals, an SGA baby is managed like a term baby of normal weight.
- SGA babies have special issues and needs. If feeding is not well-managed, growth faltering persists post-natally (resulting in both stunting and intellectual deficits – especially if the baby is female and is supplemented with formula) (Morley R, et al. Neurodevelopment in children born small for gestational age: a randomized trial of nutrient-enriched versus standard formula and comparison with a reference breastfed group. *Pediatrics* 2004; 113(3):515-521.)
- Often disparities between small mouth and large nipples are not assessed and managed
- Typically an appearance of feeding without confirmation of intake results in delayed interventions to remove colostrum and to stimulate the breasts.
- This results in low milk supply and a baby who doesn’t grow well.
What **did** actually happen?

- Born in a Baby Friendly Hospital. An IBCLC at bedside as the mother came out of anesthesia assisted in immediate hand-expression of colostrum.
- The colostrum was taken to the nursery and immediately fed to the infant.
- Electric breast pumping initiated within 6 hours; first breastfeed at 8 hrs.
- Test weights allowed targeted supplementation with normal, reference volumes for each day postpartum. *(Don’t overfeed!)*
- Baby was also supplemented with high cal donor milk until mother’s milk came in on Day 4.
- Baby lost only 3.5% of birth weight
- She was exclusively breastfed until 6 months, partially for 2 years.
Infant stooling in the first week:

- Absence of daily stooling in the first week and delayed transition from dark meconium to light-color stools: *Important clinical signs that an infant needs more evaluation for feeding!*
- They are indications that the baby is at risk for inadequate milk intake, a sign of delayed lactogenesis II, increased risk of hyperbilirubinemia, and more rarely, bowel blockage.
Here’s what normal looks like:

- **Meconium**—Day 1
- **Transitional stool**—Day 2
- **Yellow stool once milk comes in**—Day 3

24 hr stool count of exclusively breastfed baby at the beginning of Day 3

When reporting stools use size comparisons—don’t count the small ones!

After solids
Urination patterns

- Less useful to predict adequate calorie intake
- Is important to assess from the standpoint of ruling out blockages and to document hydration status.
- Red crystals in the urine (brick dust urine) may be normal on Day 1 and 2, but after Day 3 they may indicate dehydration.
Weight loss/weight gain in newborns:

- Ideally newborns don’t lose more than 7% of birth weight (Academy of Breastfeeding Medicine 2009)
- Excessive weight loss impacts stamina for effective feeding
- Impact of maternal IV fluids during labor as a cause of infant weight loss: Increased *diuresis* (urination) of extra fluids by the infant appears to occur only during the first 24 hours. Continued infant weight loss Day 2 and beyond should prompt careful evaluation of milk intake.

More about weights

- Babies smaller than 7 lbs are at increased risk for poor breastfeeding.
- Babies who lose > 7% of birth weight are at increased risk for poor breastfeeding. (Academy of Breastfeeding Med 2009)
- By the end of 7-10 days birth weight is normally regained.
- Infants who lose a lot of weight early on typically receive more formula. Tracking weight loss trajectory prior to discharge might alert staff to better assist those dyads and preserve exclusive breastfeeding. (Flaherman VJ, et al. Newborn weight loss during birth hospitalization and breastfeeding outcomes through age 1 month. *J Human Lactation* 2017; 33(1):225-230.)
More about weight:

- For the next 3-4 months, weight gain is typically 1 oz/day for girls and 1.5 oz/day for boys.
- Weight gain typically doubles (and may triple) by 6 months, after which rate of growth typically slows unless over-feeding takes place. (WHO growth charts for breastfed infants)

Case baby at 6 months: 17.5 lbs
Test Weighing: Why guess when you can know?

- “The most widely accepted method for measuring milk production is test-weighing, in which the infant is weighed before and after feeding using an electronic scale.” (Lee S, Kelleher SL. 2016)
- This requires a sensitive scale (accurate to within 2 grams).
Take home messages from the new research on calibration of milk supply and factors increasing risk of weaning:

- **Intervention** is not a bad word when it prevents bad outcomes. (How long would you wait to feed a starving older person?)
- If you carefully assess a situation and see that the mother is at risk for a low milk supply or the baby is likely unable to stimulate a full milk supply – ACT!
- Give the mother full information in a calm manner so she knows that you have an evidence-based plan to manage her situation to protect her breastfeeding goals.
At risk dyads are best served by immediate steps to protect the milk supply.

- Early initiation of expression
- Skin-to-skin holding (to calm mother & baby and facilitate breastfeeding)
- Hands-on-Pumping (combine hand and pump expression)
- Appropriate frequency of milk expression: 8-10 times/24 hours (at least 8 times/24 hours.)
- Use own mother’s milk to supplement infants losing weight, donor human milk from a safe source, formula
Best Practices

- Newborn assessment should carefully identify small, injured, preterm, ill, jaundiced babies and those with congenital malformations.
- Maternal breast assessment should carefully identify women with surgical scars indicating previous breast surgery, abnormal breast and nipple anatomy, and health history should screen for hormonal conditions, obesity, nutrition.
Q/A:

bwc@lactnews.com