PedsCases Podcast Scripts

This is a text version of a podcast from Pedscases.com on "**INFANT NUTRITION (BIRTH TO 6 MONTHS).**" These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedcases.com/podcasts.

INFANT NUTRITION (BIRTH TO 6 MONTHS)

Developed by KEON MA and Dr. MELANIE LEWIS for PedsCases.com.
May 8, 2017

INTRODUCTION:

Hi everyone, my name is Keon Ma. A huge thank you to Dr. Mel Lewis for helping to develop this podcast. Today's podcast will discuss infant nutrition from birth to 6 months of age, with two cases as examples to highlight the guidelines developed by Health Canada, the Canadian Pediatric Society, Dietitians of Canada, and the Breastfeeding Committee for Canada.

By the end of this podcast, the listener should be able to:

1. Describe the benefits of breastfeeding
2. Discuss the guidelines for Vitamin D supplementation
3. List the few contraindications for breastfeeding
4. Discuss proper preparation of infant formula
5. Discuss common conditions mothers often mistakenly attribute to breastfeeding
6. Discuss ways to encourage breastfeeding initiation and duration

CASE 1:

A single mother of a 3-month old boy, Ted, comes into your clinic and notes that her breast milk production has been declining. She wonders if she should supplement with commercial infant formula, or add other foods or supplements into Ted's diet to ensure he is getting all the nutrition he needs. However, she explains that she has been on financial assistance for a while and wants to explore low-cost options. She asks what recommendations you have for her.

It is important to note that this mother's concern about adequate breast milk supply is a very common situation, but decreased breast milk production is often perceived rather than real. Mothers may even stop feeding if they feel that breast milk production is reduced. Infants should generally be breastfed even if jaundiced, which may occur in up to 15% of infants during the second and third week of life.

Exclusively breastfeeding is the recommendation for the first 6 months. Breast milk is easily digestible for infants and supports optimal growth. It also contains immunoglobulins and white blood cells. There is an association of breastfeeding with protection against gastrointestinal infections, acute otitis media, respiratory tract infection and sudden infant death syndrome.

A balanced diet for mom should be encouraged and extreme dieting should be discouraged to maintain her health while breast feeding. Avoiding common allergenic foods has not been shown to reduce food allergies in infants.

The only supplement recommended for breastfed infants is vitamin D3. Vitamin D3 is essential for calcium and phosphorus absorption to build strong bones and teeth. The recommended dose is 400 IU. A liquid drop format of vitamin D3 is recommended, and vitamin D2 or multivitamins should be avoided. Infant reserves are quickly used up if not given a supplement, and can lead to rickets. Rickets is a condition characterized by inadequate mineralization and subsequent bone deformation. An exception to supplemental vitamin D3 is if the infant is only consuming infant formula, as that already contains the recommended amount of vitamin D3.

Although vitamin D may be synthesized by sun exposure, the CPS guidelines assume little sun exposure because there is a risk for skin cancer in infants from direct sunlight.

Around 6 months of age, mothers can begin to explore complementary foods for their infants.
Iron is important for cognitive, motor and behavioral development, but iron stores are usually depleted by 6 months of age.

You can look for 4 signs in infants that demonstrate readiness for complementary foods:

1. They have better control of their head
2. They can sit up and lean forward
3. They can let their caregiver know that they are full, like turning their head away
4. They can pick up food and try to put it in their mouth

Meat, meat alternatives and iron-fortified cereal should be the infant's first complementary foods. Meats are just as tolerated as cereals, and these complementary foods should be offered based on cues given by the infant, at least 2 or more times a day. Semi-solid textures should be introduced first, such as beef, lamb, poultry, fish, eggs, tofu and legumes cooked until tender and mashed. More detail will be discussed in a second podcast, infant nutrition from 6 to 24 months of age.

It is also important to address Ted's mother's concerns about her financial situation. Thankfully in Canada, low and middle income families are eligible for the Canada child benefit, which is a tax-free monthly payment. If a child is eligible, there may be additional child disability benefits too.

Developed by KEON MA and DR. MELANIE LEWIS for PedsCases.com.
May 8, 2017.

In summary, you could recommend to Ted's mother that she continue to breastfeed until 6 months with 400 IU of vitamin D3 supplementation, and to explore complementary foods that are iron-rich like meats and iron-fortified cereal once Ted is past 6 months old. You can *refer and complete the paperwork* for her to receive the Canada Child Benefit.

CASE 2:

Jessica is a 2 month old who has been breastfed since birth, and her mother is wondering about alternatives to breast milk because she herself has been struggling with cold symptoms for about 2 weeks. Now Jessica seems to have caught this cold and has been "spitting up" frequently.

First of all, there are very few contraindications to breastfeeding.
Most medications are compatible with breastfeeding, including antibiotics, as well as most diabetes medications and over-the-counter medications like acetaminophen. However, with some drugs like chemotherapy agents or radioactive isotopes, mothers may need to temporarily stop breastfeeding. However, they should continue to express their milk to maintain supply. Illicit drug use is strongly discouraged, as it can harm the infant and hinder the mother from fully caring for her infant.

There is no "safe" amount of alcohol in breast milk, but breastfeeding should continue with moderate alcohol intake. Mothers who are struggling with alcohol abuse or dependency should be counselled and supported. Smoking can also affect milk production, but it is important to maintain breastfeeding.

Mothers who are:
- HIV infected
- Infected with herpes lesions on both breasts
- Infected with untreated infectious tuberculosis
- Severely ill

Should explore breast milk alternatives.

Babies diagnosed with the rare metabolic condition galactosemia are also unable to tolerate breast milk.

Breast milk alternatives and substitutes should be explored in the following order, except for infants with galactosemia, who should be given soy-based commercial infant formulas.
1. Expressed breast milk from the mother
2. Pasteurized human milk from donors. Note that it is not recommended that unprocessed human milk be used even though there is a shortage of human milk banks due to the risk of containing various bacteria like *Salmonella, E. coli, Campylobacter and Listeria*.

3. Commercial infant formula (cow milk-based). Soy is only indicated if infants have galactosemia, have cow's milk allergy or for religious reasons.

Here are some more specific details about various infant formulas:

- Cow milk-based infant formulas generally contain iron. Omega-6, omega-3, nucleotides and live microorganisms are other ingredients often included but the data supporting their benefit is unclear.
- There is no evidence supporting a benefit of using lactose-free formulas in healthy infants, and they should not be used for infants with galactosemia, as there are still trace amounts of lactose.
- Thickened formulas may be marketed to reduce "spitting up", but this is normal and does not help in gastroesophageal reflux disease.
- Infant formulas with soy are shown to nurture normal growth and nutrition in the first year. There is little concern that phytoestrogens in soy formulas are causing adverse effects.
- Extensively hydrolyzed protein infant formulas are used for infants with confirmed food allergies, malabsorption syndromes or infants who cannot tolerate milk or soy protein formulas.

Infants should not be fed evaporated milk, cow milk, goat milk, soy or rice beverages for 4 reasons:

1. Low in iron
2. Low in essential fatty acids and nutrients
3. Less-digestible form of protein
4. High renal solute load

Additionally, ingesting cow milk when under 6 months can lead to blood loss in stool and subsequent iron deficiency anemia.

Proper formula preparation, storage and technique is vital to prevent the spread of microbes. Several points should be noted:

1. All food surfaces should be cleaned, and all equipment should be sterilized by boiling in a pot of water for 2 minutes, and air dried.
2. Liquid formula is already sterile, but powdered formula is not.
3. Powdered formula should be mixed with previously boiled water cooled to room temperature if immediately fed.
4. Otherwise, the powdered formula should be mixed with water at least 70°C and can be refrigerated for up to 24 hours.
5. Water should be obtained from the cold tap, as hot water may contain metals. It should be brought to a boil for at least 2 minutes, then cooled.

Lastly, infants should not be left alone when feeding on breastmilk substitutes. Bottle propping can increase their risk for choking, ear infections and early childhood caries, otherwise known as tooth decay.

Developed by KEON MA and DR. MELANIE LEWIS for PedsCases.com.
May 8, 2017.

Discontinuing breast feeding is usually unnecessary for most common health conditions in infants. There are 4 conditions that parents are often concerned about and associate with breastfeeding. These are constipation, reflux, acute gastroenteritis, or infantile colic.

Infants have wide variation in their bowel function, although true constipation should be noted. Infants often appear to be in discomfort when having a bowel movement, which is easily mistaken for constipation. Bowel movements may occur as infrequent as once every 3-4 days or longer when they are several weeks old.

Reflux and regurgitation are also common and can occur several times a day. Approximately half of 3-4 month old infants regurgitate at least once a day and require no treatment. Breastfeeding should generally continue even with regurgitation.

Breastfeeding reduces the risk of viral gastrointestinal infection, which usually presents with diarrhea. Dehydration is the main concern, so breastfeeding should continue, and oral rehydration therapy can be added. The standard oral rehydration solution contains 90 mmol/L of sodium, 20 mmol/L of potassium, 80 mmol/L of chloride, 30 mmol/L of bicarbonate and 111 mmol/L of glucose.

Infantile colic starts at 3-4 weeks of age and resolves by 4 months. The babies present with episodes of three or more hours a day of irritability, fussiness or crying with no obvious cause or failure to thrive. This can be obviously distressing for a caregiver. However, they should be counselled and educated that feeding changes do not make a huge difference. Rather, cuddling, rocking, stroking or massaging are better strategies to calm an infant.

We have now examined 2 common concerns from parents, and explored several conditions often mistakenly attributed to breastfeeding. But how else can physicians support new mothers?

You can encourage new mothers to have regular check-up appointments, usually at 10 -14 days of age, 6 weeks, 3 months, 6 months and 12 months of age. **Growth charts should be used to monitor nutrition status**. Weight, length and head circumference *should* be routinely measured at all office and immunization visits. Be sure to consider gestational age at birth, growth velocity, birth weight, problems with lactation or illnesses before suggesting changes to diet.

Newborns commonly experience weight decline in the first 2 weeks, but should steadily gain weight afterwards, about 150-350 grams/week for the first 3 months, then 75-200 grams/week from months 3 to 6.

The World Health Organization (WHO) supports what's known as the Baby Friendly Initiative. These are some clinical pearls you can take away for your practice, which have been shown to encourage breastfeeding initiation and duration:

Developed by KEON MA and DR. MELANIE LEWIS for PedsCases.com.
May 8, 2017.

1. Inform all pregnant women about the benefits and management of breastfeeding, that exclusive breastfeeding is recommended for the first 6 months with vitamin D3 supplementation, and there are few contraindications to breastfeeding.
2. Put babies in skin to skin contact with their mothers immediately following birth for at least an hour, and encouraging mothers to breastfeed when they feel the infant is ready.
3. Teach mothers how to breastfeed and lactate even when separate from their infants. They should express their milk manually or with a pump at least every 4-6 hours, 6-8 times a day, even if they need to stop breastfeeding for medical treatment, to maintain milk supply.
4. Encourage breastfeeding based on cues given by the infant, so that the mother can recognize and respond to the infant's appetite and hunger. It also avoids overfeeding.
5. Avoid the use of artificial pacifiers or dummies, which may hinder the establishment of breastfeeding habits. Bottle propping should also be avoided.
6. Refer new moms to support groups.

Thanks for listening to PedsCases, and be sure to listen to part 2 of infant nutrition, recommendations for infants from 6-24 months.

REFERENCES:

Alberta Government. Alberta Child Benefit (ACB). Available from: https://www.alberta.ca/alberta-child-benefit.aspx

Government of Canada. Canada Child Benefit. Available from: https://www.canada.ca/en/employment-social-development/campaigns/canada-child-benefit.html#story

Critch, J. (2013). Nutrition for healthy term infants, birth to six months: An overview [Canadian Paediatric Society Practice Point]. Paediatr Child Health; 18(4):206-7.

Forgie, S., Zhanel, G., & Robinson J. (2009). Management of acute otitis media. *Paediatr Child Health*, 14(7): 457-60.

Grueger, B. (2013). Weaning from the breast [Canadian Paediatric Society Position Statement]. Paediatr Child Health;18(4):210.

Health Canada. (2012). Nutrition for Healthy Term Infants: Recommendations from Six to 24 Months. Available from: http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php

Leung, A. & Prince T. (2006*).* Oral rehydration therapy and early refeeding in the management of childhood gastroenteritis [Canadian Paediatric Society Position Statement]. Paediatr Child Health;11(8):527-31

Developed by KEON MA and DR. MELANIE LEWIS for PedsCases.com.

May 8, 2017.