Nutrition and Fluids in the NICU

Nutrition for babies in the NICU

Feeding babies in the neonatal intensive care unit (NICU) is quite different from feeding healthy babies. When babies are sick or born too early (premature), they're often not well enough to breastfeed or take a bottle. Premature babies may not be able to suck effectively. Or their gastrointestinal (GI) tracts may not be mature enough to digest feedings. Babies who have unstable health are often unable to take regular feedings. Babies with umbilical catheters and those who need help breathing, such as with a mechanical ventilator, may not be able to be fed. This is because of the risk of problems, such as breathing food into the lungs (aspiration).

IV fluids and parenteral nutrition

Many babies in the NICU receive vital fluids and electrolytes through an IV (intravenous) tube in a vein. Some babies may need a special fluid called parenteral nutrition (PN) or hyperalimentation. This has nutrients they need until they're able to take milk feedings.

The contents of IV fluids and PN are carefully tailored for each baby. The fluids have calories, protein, and fats. They also have electrolytes. These include sodium, potassium, chloride, magnesium, and calcium. Babies need calories, protein, and fats for healthy growth and development. Fluids, electrolytes, and vitamins are needed for the body's systems to work well.

Blood tests help show how much of each item a baby needs. The amount of each nutrient can be increased or decreased as needed. Your baby’s weight and urine amount is tracked daily. This also helps to assess fluid needs.

Watching your baby's electrolyte and blood levels

Some babies have too much or too little of certain electrolytes or other substances in the blood. As a result, some common problems include:

- **Hypernatremia.** This is high amounts of salt (sodium) in the blood.
- **Hyperkalemia.** This is high amounts of potassium in the blood. It can be diagnosed by blood test. Or it can be diagnosed by changes in the baby's heart rate pattern.
- **Hyperglycemia.** This is high amounts of sugar (glucose) in the blood. It's diagnosed by blood tests, often done by heel stick. Some babies may need insulin to control high glucose levels.
- **Hypoglycemia.** This is low blood sugar. It's usually treated with IV fluids that have dextrose. This is a type of sugar.
- **Hypocalcemia.** This is low calcium levels in the blood. It's usually treated with calcium in IV fluids.

Is your baby ready for milk feedings?

Even babies born before 28 weeks can benefit from milk feedings. These very early preterm infants are given feedings in very small amounts. This is done by tube feeding. These are called trophic feedings. Trophic means that these feedings help the digestive tract mature and grow. The amount of milk is very slowly increased over days or weeks. Once your baby is able to have large enough amounts of milk feedings, IV fluids and PN can be slowly decreased.

Sick babies may not be strong enough to suck well. Premature babies may not be physically mature enough to coordinate sucking, swallowing, and breathing. Or they may be too weak to suck for long periods of time. Sucking is the earliest sign that a baby is getting ready to practice feeding by mouth. It also has a calming effect. The best place for the baby to practice sucking and learn to feed is at the breastfeeding parent’s breast. But small pacifiers for premature babies may be used for comfort and practice when breastfeeding

parents aren't available. It may help premature babies to have drops of their parent's colostrum by mouth even if they aren't able to feed by mouth yet.

Feeding your baby in the NICU

These are some ways babies may be fed in the NICU:

- **Gavage or tube feedings.** Premature babies, most often those born before 32 to 36 weeks, often can't be fed from the breast or bottle. Gavage or tube feedings may be needed until the baby learns to suck well. For gavage feedings, a small flexible tube is placed into a baby's nostril or mouth. It is then passed down into the stomach. The tube is usually left in place until the baby is able to feed by mouth ongoing. At first, tiny amounts of breastmilk or formula are given through the feeding tube. Because of their small stomach size, very tiny babies may be fed using a pump that slowly gives the milk in small amounts. As the babies grow, they're able to slowly take larger amounts at each feeding. Before each tube feeding, a baby may be checked for residual. This is the amount of milk in the stomach left over from the last feeding. If the amount of residual is more than expected, it may mean the baby isn't digesting milk well.

- **Cup or spoon feedings.** Some NICUs use soft flexible feeding cups or shallow feeding spoons instead of bottles for babies who are learning to breastfeed.

- **Nipple feedings.** Feeding practice from breast or bottle can begin as soon as babies are stable and are able to suck well. Your baby will likely begin to practice feeding by mouth while still being tube fed. Even if a baby shows interest and participates in a feeding, it can be tiring. You'll need to pay attention to your baby's cues that show they're tired. If you're using a bottle, it's important to help your baby pace the feeding. Learning to feed by mouth is a gradual developmental process. It can take several weeks for premature babies. So it's normal to take only occasional small amounts by bottle or at the breast. To find out how much milk a baby is getting at the breast, they can be weighed before and after the feed using a special scale. As your baby increases the amount they can safely and comfortably take by nipple, the amount in the tube feedings can be decreased.

Why breastmilk is important and how lactation consultants can help

Breastmilk is the preferred milk for all babies, especially the most premature babies. Breastmilk has all the nutrients needed for growth and development. Baby formulas you can buy are designed to be close to human milk. But most of these are based on cow's milk protein. This is different from human protein. The proteins and fats in breastmilk are more easily digested. Because of these differences, formula may not be as well tolerated by a baby. Also, breastmilk has antibodies and other immune factors from the breastfeeding parent. These are to help protect babies from infection. This is something that baby formulas you can buy don't have. This protection is extra important when babies are sick or premature and have a higher risk of an infection. Necrotizing enterocolitis is a very dangerous intestinal condition in very premature infants. It's more common in babies who don't get breastmilk. More breastmilk feedings also seem to lead to more brain growth for premature babies.

Very premature babies may need supplements added to breastmilk. This is done to meet their increased needs for protein, calcium, and phosphorus. Even if your baby can't breastfeed, you can pump your breastmilk and store it for gavage or nipple feedings. Depending on the amount of milk needed for feedings, donor milk or formula may need to be given for a short time in addition to a baby's own parent's milk. Donor milk is pasteurized before it's given. Because of this, it may lose some nutritional value. But it's more helpful for premature infants than formula. It's an important choice when the breastfeeding parent's breastmilk isn't available.

Certified lactation consultants are nurses or other healthcare providers who are specially trained and certified to help you with breastfeeding. In the NICU, these providers can help you and your baby with breastfeeding. They can also teach you about pumping and storing your breastmilk for your baby. Learning to feed by mouth is a process that can take babies a few weeks. Because of this, you'll likely need to keep expressing milk even after leaving the NICU.