What Is a NICU? Material I Have Learned from Rounding

By Cleo Pappas

A NICU is a hospital department devoted to seriously ill newborns. The acronym NICU represents neonatal intensive care unit. NICU babies may be full term, premature, or what is now considered a special category, late pre-term. The NICU at the Children’s Hospital of the University of Illinois (CHUI) is located on the fourth floor. There are several units on that floor, but the NICU is a locked unit. The nurse at the desk has to buzz visitors into the unit. Visitors entering the unit identify themselves to the nurse. Parents show the identification bracelet they wear that matches the bracelet on their child. Siblings are allowed on the unit, depending on the condition of the newborn. Visitors are reminded not to enter if they are ill. Staff on the unit may not wear sleeves that reach below their elbows and must scrub in by using antiseptic soap.

The usual census on the NICU is around 30 infants. One of the most unsettling characteristics of the NICU is the silence. The expectation of a nursery is that there will be the sound of babies crying and cooing. Babies on the NICU are rarely heard, and, when they are perceived, the sound is similar to a soft, feline mewing. As one resident said, and not inaccurately, “They sound like cats.”

Typical equipment in a NICU includes radiant warmers. Because small babies have little body fat, they cannot stabilize their own body temperature. A radiant warmer assists the child to maintain its body temperature. Babies are in incubators or isolettes. These protect the baby from drafts and provide moistened air. The word incubator hails from their original use to hatch poultry.

Every baby is weighed daily, and the weight recorded needs to be accurate within five grams. The child’s weight is an extraordinarily important measurement, for all interventions - feeding, medication, and IV’s - are calculated according to weight. Every NICU baby is unique in its particular constellation of needs; therefore, pharmaceutical dosages are extrapolated from pediatric dosages. Pediatric pharmacists are crucial in this process and round daily with the attendings, fellows, residents, and medical students.

Other equipment in a NICU includes a cardiorespiratory monitor, pulse oximeter, respirator, infusion pump (IV), phototherapy lights, and naso-gastric tubes. The monitor is attached to the baby’s head and gives a constant read-out of vital signs such as heart rate, respiratory rate, and blood pressure. The monitor has alarms that signal when any one of these readings changes. The pulse oximeter measures how much oxygen is in
the blood. The respirator helps babies who are too weak to breathe on their own. Because of the delicacy of premature baby lungs, the type of machine used is crucial to the child’s survival. NICU IV’s have to be very precise. Measurement of infused medications can be as small as 0.1 cc per hour (about 1/30 of a teaspoon per hour). Phototherapy lights convert bilirubin in the baby’s blood to a harmless form. “Bili lights”, as they are frequently called, are common in newborn nurseries. In the NICU, though, they are crucial, for bilirubin can cause brain damage in a sick baby. Naso-gastric tubes are bi-directional and may be used to remove secretions from the stomach or to feed. There are many other instruments commonplace in the NICU such as drainage pumps, blood-gas machines, a light box to read x-rays the old fashioned way as well as computers to read digital films, transport incubator, and defibrillator, just to name a few.

Because of CHUI’s highly skilled staff, babies are often transported to its NICU from other hospitals. Ill infants are never allowed to travel unaccompanied by medical personnel, so often one of our NICU fellows will travel by ambulance, sirens screaming, to the transferring location in order to ride back with the baby.

NICU nurses are highly trained. The ratio of patient to nurse is usually one to one, or, at the most, two babies to one nurse.

The role of the clinical librarian in the NICU is challenging. As one of the attendings from the pediatric floor once told me, “It’s a whole ‘nother world there!” No one can become complacent, because any baby’s condition can change with lightning speed. Parents and caretakers are extremely anxious and emotional, and it takes a gifted physician to move from being all business relaying blood and gas chemistries one minute to displaying extraordinary sympathy and compassion when a parent enters the scene. I have witnessed this instantaneous transformation, and it never fails to move me. The librarian’s job on the NICU is more often responding to a directed question. Because what is being relayed regarding each child is relayed quickly and in metric terms, it is difficult to parse what additional, if any, information, is necessary. The content matter is very complex, too, so, when a question arises, I generally work with the fellows to determine if the literature I am pulling is on point. They often have to ask the attending. If a resident or medical student has a difficult time answering a question, I will send research on the issue to them after rounds. I have worked closely with the Infectious Disease nurse on topics she has assigned me, and I have co-authored a paper with the Division of Neonatology Program Director and his assistant director on the topic of short-bowel syndrome in the NICU. One of the more experienced pharmacists who also works on the pediatrics floor explained to me that there are fewer major issues on the NICU but they are more serious and complicated.

Some of the topics encountered on the NICU and which I have researched include retinopathy of prematurity (ROP), necrotizing enterocolitis (NEC), methicillin-resistant Staphylococcus aureus (MRSA), drug addiction, and Human immunodeficiency virus (HIV). ROP refers to the abnormal development of blood vessels in the eye of a premature baby. The disease is staged, may cause blindness, and all babies under thirty weeks gestation are screened. NEC is of unknown etiology (cause) and has a
death rate of almost 25%. It is triggered either by bacteria or a loss of blood flow to the intestinal tissue. The result is the death of that tissue. Sometimes surgery and resulting loss of bowel is the treatment; hence, the development of short gut syndrome in the NICU. Weak newborns are particularly susceptible to the problems that MRSA initiates. Although staff are always very careful regarding hand hygiene, when a case erupts, it is easily transmitted. MRSA infected infants need to be sequestered, and extra precautions implemented. New admissions are always screened, and the Department of Public Health monitors outbreaks wherever and whenever they occur. Mother to child transmission of HIV can be prevented by dosing with antiretroviral drugs (ARVs). Babies born to HIV positive mothers do not breast-feed, and moms are reminded not to pre-chew their child’s food when table foods are fed. Finally, babies born to moms who use drugs sometimes endure neo-natal abstinence syndrome. The baby becomes used to the drug while in the mother’s uterus and then suddenly is withdrawn from the drug upon birth. It is a multisystem disorder that frequently involves the central nervous system (CNS), gastro-intestinal (GI) system, autonomic system, and respiratory system. It is serious. Listening to the screams of a child going through this is heart wrenching, and I admire the professionalism and “even keel” that the doctors and nurses maintain when dealing with the mother of such a child.

Rounding on the NICU is much different from rounding on the pediatric floor. The patients are severely ill, everything is fast paced, and emergencies are either just over, emerging, or around the corner. Because of the pace, I find that my literature contributions tend to be after rounds rather than during. Rounding on the NICU is intense but deeply gratifying.

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