Abstract:
Successful transition from the intrauterine to extrauterine environment is dependent on several significant physiologic changes that must occur within minutes of birth. Most infants effectively transition at delivery without requiring any special assistance. However, about 10% of infants will require some level of intervention, and 1% will require extensive resuscitative measures at birth. The focus of this article is on the preparation for and management of an unexpected delivery in the emergency department. We will highlight the unique aspects of newborn resuscitation, as well as recent changes to the Neonatal Resuscitation Program from the 2015 American Heart Association Guidelines.

Keywords:
neonatal; neonatal resuscitation; newborn; unexpected delivery; precipitous delivery; delivery; emergency department

*Department of Pediatrics, Division of Neonatology, Feinberg School of Medicine, Northwestern University, Chicago, IL; †Department of Pediatrics, Division of Emergency Medicine, Feinberg School of Medicine, Northwestern University, Chicago, IL.
Reprint requests and correspondence: Arika G. Gupta, MD, 225 East Chicago Ave., Box 45, Chicago, IL, 60611.
arika.gupta@northwestern.edu

1522-8401

Management of an Unexpected Delivery in the Emergency Department

Arika G. Gupta, MD*, Mark D. Adler, MD†

For those who do not routinely care for newborn infants in the immediate postdelivery period, facing a sudden unexpected need to fill the role can be anxiety provoking, particularly if the infant requires care beyond the routine. Successful transition from the intrauterine to extrauterine environment is dependent on several significant physiologic changes that must occur at the time of birth. Most (approximately 90%) infants successfully transition at delivery without requiring any special assistance from medical providers. However, the remainder of infants will require some level of intervention, and less than 1% will require extensive resuscitative measures at birth.[1,2] In this article, we will focus on the preparation for and management of a newborn who unexpectedly delivers in the emergency department (ED) and has approximately a 1 in 10 chance of requiring intervention.

CASE PRESENTATION

A 15-year-old patient is brought to the ED by her parents for a complaint of severe abdominal pain at home. She has received care at your institution before for orthopedic issues and thus chose to come to your hospital for this issue as well. She has had episodic abdominal pain that has been recurring every 3 minutes, nausea, and a report of recent weight gain. She cannot tell you her last menstrual period. Your examination quickly reveals what the history strongly suggested: she is pregnant and in active labor. You have staff with ultrasound training on the unit and their examination reveals an intrauterine fetus. On pelvic examination, the patient is fully

dilated, and the fetus is crowning. You immediately begin preparing for a precipitous delivery in the ED and make arrangements for the appropriate teams to be notified.

Some of the most important considerations in this situation include the following:

1. What are the key questions to ask to prepare for the impending delivery of a neonate?
2. What needs to be prepared for the resuscitation of this infant?
3. What are the principles and steps behind resuscitation of a newborn infant?

PREPARING FOR AN UNEXPECTED DELIVERY

First, take a deep breath and remember that 90% of babies require no assistance at birth and transition to the extrauterine environment appropriately all on their own.[1,2] However, given that the remaining 10% of neonates require some intervention at birth, we must ensure we are prepared to support any newborn that requires assistance. In some instances, there may be time to discuss an impending delivery with a neonatologist; however, in other cases, the ED team must respond rapidly and rely exclusively on their own expertise.

To prepare efficiently and effectively, it is helpful to know what questions you must ask the patient before the delivery. These questions include the following:

1. Did the patient receive prenatal care? Was the pregnancy known to the patient?
2. How many babies are expected to be delivered?
3. Approximate gestational age in weeks or date of last menstrual period?
4. Any major complications during the pregnancy or labor (eg, gestational diabetes, gestational hypertension, concerns about fetal growth, maternal infection or fever, prolonged rupture of membranes)?

On the basis of this information (or lack thereof), you can begin preparing the appropriate number of team members and resuscitation supplies. If time permits, it is helpful to prebrief with the team to review the plan for resuscitation, assign roles, and delegate tasks. In addition, obtaining further history can be valuable, such as finding out if there were any known anatomic abnormalities on prenatal ultrasound. There are certain prenatal abnormalities, such as congenital diaphragmatic hernia, congenital heart disease, anterior abdominal wall defects, or lumbosacral defects, to name a few, which would affect your immediate evaluation and resuscitation of the infant and prompt more immediate consultation with a neonatologist.

It is critical to have separate teams with predesignated roles, with one team to manage the mother and the other team for the newborn. The focus of this article is on preparing for and managing the neonate; the care of the mother, including maternal labor or delivery complications, will not be discussed. Given the low-frequency, high-stakes nature of an unexpected delivery in the ED, a standardized checklist of supplies and equipment for a newborn resuscitation is helpful to ensure that all necessary items are prepared and checked before delivery. Table 1 provides a list of recommended supplies and equipment for an impending delivery.[3] Because of the rarity of such events, the supplies and equipment may be more difficult to find or may be missing, unlike frequently used ED equipment. It is useful to identify where these supplies are kept and have a process to ensure they are checked and stocked on a regular basis. Unplanned deliveries are sufficiently challenging without this additional distractor.

PRINCIPLES AND STEPS OF NEWBORN RESUSCITATION

The American Heart Association (AHA) published updated guidelines on neonatal resuscitation in November 2015.[4] These guidelines are meant to apply to newly born infants who require assistance

TABLE 1. List of equipment needed for neonatal resuscitation.

Radiant warmer
Warm blankets/towels
Hat
Plastic wrap (such as NeoWrap)
Thermal mattress
Bulb suction, suction catheter, and suction tubing
Neonatal face mask (all sizes)
Endotracheal tubes (all neonatal sizes: 2.5, 3.0, 3.5, and 4.0), stylet (optional)
Laryngoscope blades (all neonatal sizes: 00, 0, 1 Miller)
Bag valve mask device (ideally flow-inflating bag; however, self-inflating bag would be adequate)
Laryngeal mask airways (size 1 neonatal)
Oxygen source and blender
O_2 saturation probe and monitor
Cardiac leads and monitor
CO_2 detector
Tape
Umbilical line kit
Stethoscope