

2018 NRP Current Issues Seminar

Friday, November 2 – Orlando, Florida

Unanswered NRP Live Questions

- Q. Students are often frustrated by the e-Sims and grading. NRP is a team-based program and the students are asked to resuscitate a complex infant alone during the e-sim. How do you respond to this? All these infants would have at least 2 people present due to risk factors.**
- A. Yes, neonatal resuscitation includes cognitive, technical and teamwork skills. Different components of the NRP curriculum emphasize each of these skills. The eSim cases are intended to reinforce the learner’s basic knowledge and mastery of the NRP flow diagram using a self-directed, interactive simulation environment with “virtual” team members. The cases are not meant to evaluate teamwork or technical skills. Students can be frustrated with eSim if they expect to get a high score without practicing a few times. Some students need to use the “Pause Scenario” tab at the top of the screen until they gain speed and skill using the electronic simulation’s features. The score enables the student to assess their own improvement (eSims are not a graded component and learners do not need to achieve a “passing” score). You might find it helpful to view the NRP Live webinar of January 2018 (located in the Instructor Toolkit under “Archived Webinars”) titled “Tips and Strategies for Destressing your eSim Experience.”
- Q. I feel as though we are losing the "basics" on initial assessment. Meaning too focused on O2 saturations and not looking at the overall patient response. Also, with ventilation w/visually seeing good chest rise and good breath sounds.**
- A. The initial assessment “basics” should not be influenced by the baby’s oxygen saturation and the NRP does not recommend the use of pulse oximetry during the initial assessment. The NRP Flow Diagram emphasizes continuous assessment throughout resuscitation. Beginning with the rapid initial evaluation after birth and continuing through the initial steps, health providers must perform basic physical assessments of tone, breathing and heart rate. Throughout the flow diagram, the NRP emphasizes the assessment of heart rate rather than oxygen saturation as the primary indicator of improvement. If the baby does not respond to the initial steps, the NRP does recommend using additional technologies to complement your physical examination because studies have demonstrated that assessments of color, chest movement and heart rate may be unreliable. Pulse oximetry should be used to guide oxygen administration if central cyanosis persists or positive pressure ventilation begins.
- Q. Are there sentinel or terminal events that should trigger the decision to discontinue resuscitation? Thank you for the opportunity to ask the experts.**
- A. The *Textbook of Neonatal Resuscitation*, 7th edition, discusses your question on page 192. There is no single event or duration of attempted resuscitation that can predict with certainty that further attempts at resuscitation will be unsuccessful. If there is a confirmed absence of heart rate after 10 minutes of resuscitation, it is reasonable to stop resuscitative efforts; however, the decision to continue or discontinue should be individualized. Decision making will include considerations about whether resuscitation interventions have been optimized, uncertainty about the duration of asystole, the availability of advanced therapies, the etiology and timing of the events leading to cardiac arrest and

any previous discussions with the family. See pages 268-269 in the textbook for more information regarding cases where gestational age is uncertain, and cases of certain severe congenital malformations and chromosomal anomalies.

Q. At what corrected GA (gestational age) one should switch from NRP to PALS for cardiopulmonary resuscitation in NICU setting?

A. During the first weeks after birth, respiratory failure is the cause of nearly all cardiopulmonary arrests. In general, we recommend applying the NRP recommendations during the immediate newborn period and during the time the baby is an inpatient following birth unless there is a reason to suspect a primary cardiac etiology for the infant's cardiopulmonary arrest. Go to the Instructor Toolkit (under archived webinars) and view the January 2018 NRP Live that discusses things to consider when deciding to use NRP and PALS. In addition, the Fall/Winter 2017 edition of the NRP Instructor Update includes an article about this topic (<https://www.aap.org/en-us/Documents/NRP-FallWinter2017.pdf>).

Q. Any idea how frequently intraosseous drugs are administered in resuscitation situation?

A. At present, there is no national registry that can reliably answer your question. We believe that the UVC is the most common route for epinephrine/volume administration during newborn resuscitation in the hospital delivery room. Emergency Department physicians and emergency medical service providers may be more likely to use the intraosseous route, but we are unaware of any literature describing how frequently resuscitation drugs are administered using the intraosseous route for newborns either inside or outside the delivery room.

Q. How much of an increase in pressure do you use for the "P" in MR. SOPA and after you place an alternative airway, when do you decrease the pressure?

A. NRP 7th edition recommends starting face-mask PPV with a PIP (peak inspiratory pressure) of 20-25 cm H₂O (page 78). When incrementally increasing pressure during the "P" of MR. SOPA, it is recommended that you increase the PIP by approximately 5 cm H₂O at a time, delivering several breaths with each change to assess for perceptible chest movement, to a maximum of 40 cm H₂O for term newborns (page 83) or 30 cm H₂O for preterm newborns (page 232). After placing an alternative airway, re-evaluate the baby's chest movement and breath sounds because you may be able to rapidly decrease the pressure required to achieve adequate ventilation. The baby should not appear to be taking a big breath with each ventilation. Use only as much pressure as necessary to inflate and aerate the lungs so that the heart rate and oxygen saturation increase.

Q. Any studies in Epi administration through a laryngeal mask?

A. According to a recent review, there are no randomized controlled trials in human newborns comparing epinephrine administration using the intraosseous, umbilical catheter, peripheral IV, endotracheal tube or laryngeal mask routes (Wagner M. *Pediatr Crit Care Med.* 2018;19(4):332-338). Animal studies have assessed the feasibility of epinephrine administration using the laryngeal mask (Chen KT. *Resuscitation.* 2006;69(3):503, Chen KT, *Emerg Med J.* 2008;25(11):722).

Q. Are meconium aspirators now intended to aspirate an indwelling ETT? If tube is plugged with meconium should tube be used as a suction device or remain in place as pulmonary toilet?

A. The meconium aspirator is intended for use as a suction device, not only for meconium that obstructs the airway but for any viscous material that could block the airway, including mucus, blood, etc. It is not intended to stay in place for intermittent suctioning. If an endotracheal tube is plugged with meconium,

it should be removed and replaced with a clean endotracheal tube. Refer to pages 139-140 (Lesson 5) and pages 250-251 (Lesson 10) for additional details on the use of suction devices the management of a suspected airway obstruction.

Q. How does delayed cord clamping change the timing of the NRP flow diagram? Any work on starting NRP while the baby is still attached to the placenta?

A. At this time, delayed cord clamping does not change the timing of the NRP Flow Diagram, and positive-pressure ventilation does not begin until after the cord is clamped and cut. If the newborn is vigorous, initial steps may be performed during the “delay” in cord clamping and the newborn is usually positioned on the maternal chest or abdomen. If the newborn is not vigorous but has no other contraindications for delayed cord clamping, it is reasonable for the OB provider to briefly dry/stimulate the newborn and suction the mouth and nose. If the newborn does not immediately respond by breathing, the cord should be clamped and cut so that the baby can be quickly moved to the radiant warmer. Positive-pressure ventilation should begin within 1 minute of birth. The time of birth is defined as the moment the last fetal part emerges from the mother’s body (page 36, Lesson 3). Regarding your question about beginning resuscitation with the cord intact: research is ongoing but at this time, we do not have enough evidence to make a recommendation for beginning PPV with the cord intact. For more information, go to the Instructor Toolkit, click on “Archived NRP Live Webinars” and review the June 2018 NRP Live for a presentation on Delayed Cord Clamping.

Q. If a Mag infant comes out after 30 seconds of dry/stim has cried...Now with intermittent apneic episodes do we PPV or Stim to breathe?

A. In this case, it would depend on the frequency and severity of the apnea. If apneic episodes are frequent, involve desaturation or bradycardia, or require more than mild stimulation, mechanical support and continuous cardiorespiratory monitoring should be considered until the infant can successfully maintain spontaneous ventilation. Regardless of the etiology, positive pressure ventilation is indicated if an apneic newborn does not respond to brief stimulation.

Q. We have had trouble with depth of insertion for 22 wk infants - the 6+ wt in kg does not result in correct depth for these infants. Will NRP be addressing adjusting and adding new recommendations for these smaller and more fragile infants?

A. The NRP 7th edition textbook does not recommend using the 6+ weight method. The current NRP textbook recommends 2 ways to estimate the ET tube depth of insertion: the nasal-tragus length or Table 5-4 in the *Textbook of Neonatal Resuscitation* (page 135) which includes gestational age down to 23-24 weeks. As we attempt to resuscitate babies of younger gestational age and additional research evidence becomes available, we will consider including additional measurements on the table.

Q. What should one do with babies who go skin-to-skin and subsequently develop pulmonary hemorrhages? New phenomenon since WHO issued recommendations for stable infants to go skin-to-skin.

A. We don’t know of any correlation between skin-to-skin care of healthy newborns and pulmonary hemorrhage. This would be extremely rare. Could you be referring to Sudden Unexpected Postnatal Collapse? If yes, SUPC in an apparently healthy term newborn is usually related to failure to monitor respiratory status and head positioning in the first few hours following birth. Here is one article you may want to read for more information: [https://nwhjournal.org/article/S1751-4851\(16\)30083-6/pdf](https://nwhjournal.org/article/S1751-4851(16)30083-6/pdf)

Q. Now that we are treating newborns 500-700g, what do you think of using ET #2?

A. The NRP 7th edition textbook does not address the routine use of size 2.0 ET tubes. The decision whether to include 2.0 ET tubes with resuscitation supplies should be made by individual hospitals in consultation with neonatologists in their region. Questions to consider when making this decision include whether you have a suction catheter that can safely clear an obstruction from a size 2.0 ET tube and whether the high resistance caused by its small diameter will result in safe ventilation and gas exchange (Dibiasi RM. *Respiratory Care*. 2008;53(11):1450-1560).

Q. On MR. SOPA, when you have a baby with meconium, will you suction endotracheal as first option?

A. The AAP/AHA Guidelines for neonatal resuscitation (reprinted at the back of the textbook) and NRP 7th edition no longer recommend routine intubation and suction for non-vigorous babies with meconium-stained amniotic fluid. These babies may be resuscitated in the same manner as babies with clear amniotic fluid. See page 53 of the *Textbook of Neonatal Resuscitation*, 7th edition. Endotracheal suction is advised if the airway is obstructed by meconium. If an endotracheal tube has been placed into the trachea as the "A" step in MR. SOPA and ventilation is not successful through the tube (e.g. no chest rise, no breath sounds, no rise in heart rate) then tracheal obstruction with meconium should be considered. In such cases, tracheal suctioning with a suction catheter or meconium aspirator is indicated.

Although routine intubation and suction are no longer recommended, adequate preparation and resources are still important. Meconium stained fluid is still considered a risk factor that increases the likelihood that the newborn will require resuscitation. At least 2 qualified people should be present at the time of birth solely to manage the baby with meconium stained fluid and a provider with intubation skills should be immediately available. If additional risk factors are present, a fully qualified team should be present at the time of birth in case extensive resuscitation is required.