Highlights of the New Neonatal Resuscitation Program Guidelines

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Abstract

In 2015, the neonatal guidelines for resuscitation were published with several new treatment guidelines. Many of these are highlighted in this review. They included changes in the algorithm, timing of cord clamping in the preterm infant, optimizing detection of heart rate after birth, maintaining the premature infant temperature in the delivery room, initiating oxygen use during resuscitation, and using sustained inflation to establish functional residual capacity. In the term infant, changes included management of the nonbreathing infant delivered in the presence of meconium-stained amniotic fluid and consideration for when to continue/discontinue resuscitation in infants with an Apgar score of 0 after 10 minutes of resuscitation.

Objectives  After completing this article, readers should be able to:

1. Understand the GRADE process for evaluating the science and significance of the recommendations.
2. Understand the rationale behind delayed cord clamping in the premature infant.
3. Understand the starting concentration of supplemental oxygen in the premature infant needing resuscitation.
4. Understand the importance of avoiding moderate hypothermia after birth and the methods of achieving this goal.
5. Understand the suggestive approach to managing the term depressed infant delivered in the presence of meconium-stained amniotic fluid.

Author Disclosure  Dr Perlman has disclosed no financial relationships relevant to this article. This commentary does contain a discussion of an unapproved/investigative use of a commercial product/device.
INTRODUCTION

The neonatal guidelines for resuscitation were recently published and reflected a summary of the evidence presented in the 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. (1)(2) This review of the guidelines will highlight some of the newer and potentially controversial issues brought about by new evidence. Importantly, some of the new recommendations are based on “Grading of Recommendations, Assessment, Development and Evaluation” (GRADE), a new system for evaluating the quality of evidence and strength of the recommendations (Table 1). (3)(4) In this review, the GRADE process will be briefly described, and the following new/controversial issues will be highlighted: the algorithm, timing of cord clamping in the preterm infant, optimizing detection of heart rate after birth, maintaining the temperature of the premature infant in the delivery room, initiating oxygen use during resuscitation, and using sustained inflation to establish functional residual capacity (FRC). This article also will include a discussion of the management approach to the nonbreathing term infant delivered in the presence of meconium-stained amniotic fluid (MSAF) and consideration for when to continue/discontinue

TABLE 1. Topics Reviewed for the 2015 ILCOR Process

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CPR=cardiopulmonary resuscitation; ILCOR=International Liaison Committee on Resuscitation; MSAF=meconium-stained amniotic fluid; PEEP=positive end-expiratory pressure.
resuscitation in infants with an Apgar score of 0 after 10 minutes of resuscitation.

**USING GRADE TO DEVELOP RECOMMENDATIONS**

GRADE is an emerging consensus process that rates quality of evidence and strength of recommendations along with values and preferences. In brief, GRADE classifies quality of evidence as: high quality (where one has high confidence in the estimate of effect as reported in a synthesis of the literature); moderate quality (moderate confidence, but there may be differences from a further elucidated truth); low quality (where one has low confidence in the estimate of the effect, which may be substantially different from the true effect); and very low quality (it is possible that the estimate of effect is substantially different from the true effect). The quality of a body of evidence involves consideration of 5 unique domains, including risk of bias for each outcome as reported across relevant studies (methodological quality), as well as the directness of evidence (such as, was the population studied the same as that for which the guideline will be used), heterogeneity of the results of individual studies, precision of effect estimates, and risk of publication bias. Randomized studies start off as high quality

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**Neonatal Resuscitation Algorithm**

- **Birth**
  - Term gestation? Breathing or crying? Good tone?
  - No: Warm, open airway, dry, stimulate
  - Yes: Maintain Temperature
  - 60 seconds

- **Temperature**
  - HR below 100/min? Gasping, or apnea?
  - No: PPV, SpO₂ monitoring, Consider ECG monitoring
  - Yes: Labored breathing or persistent cyanosis?
  - No: PPV, SpO₂ monitoring, Consider CPAP
  - Yes: Consider ET intubation

- **Adequate Ventilation**
  - Ensure adequate ventilation
  - Consider ET intubation
  - No: HR below 60/min?
  - Yes: Chest compressions, Coordinate with PPV

- **Resuscitation Care**
  - HR below 60/min?
  - Yes: IV epinephrine
but may be downgraded for methodological quality, whereas observational or cohort studies start off as low quality and can be further downgraded or upgraded depending on methodological quality or positive outcome effect.

Guideline users have to determine how much they can trust that a recommendation will produce more favorable rather than unfavorable consequences. The strength of a recommendation reflects a gradient in guidance, with a clearer expectation for adherence with strong recommendations and lesser insistence on weak recommendations. In addition, the effect may be in favor of or against the recommendation. According to GRADE, several factors may influence the strength of a recommendation, including the risk-benefit balance, quality of evidence, patient values and preferences, and finally, costs and resource utilization. If confidence in these values and preferences is high and variability is low, it is more likely that the recommendation will be strong (and vice versa). Recommendations, whether strong or weak, have different implications for patients, health care professionals, or health care management.

BACKGROUND

Approximately 85% of infants born at term will initiate spontaneous respirations within 10 to 30 seconds of birth, an additional 10% will respond during drying and stimulation, approximately 3% will initiate respirations after positive pressure ventilation (PPV), 2% will undergo intubation to support respiratory function, and 0.1% will require chest compressions and/or epinephrine to achieve this transition. (5)(6)(7) Although the vast majority of newborn infants do not require intervention to make these transitional changes, the large number of births worldwide means that many infants require some assistance to achieve cardiorespiratory stability each year.

NEONATAL ALGORITHM

There was considerable debate with regard to modifying the International Liaison Committee on Resuscitation (ILCOR) algorithm. First, the 30-second time rule was considered unreasonable, and not evidence-based; however, there was strong consensus that a reminder to assess and intervene if necessary, within 60 seconds after birth, should be retained to avoid critical delays in initiating resuscitation. This is based on the fact that more than 95% of newly born infants will start breathing spontaneously or in response to stimulation within approximately 30 seconds. (5) If apnea persists, PPV should be initiated within 60 seconds. Second, given the importance of moderate hypothermia (temperature <36°C) as a predictor of mortality, and evidence from multiple studies that it can be avoided (as described later in this article) with simple intervention strategies, the ILCOR algorithm contains a running line reminding providers to maintain thermoregulation throughout the immediate newborn period (Figure). The algorithm contained in the neonatal guidelines does not include this important reminder.

DELAYED CORD CLAMPING IN PRETERM INFANTS REQUIRING RESUSCITATION

For many years, the umbilical cord of the preterm neonate was generally cut soon after birth, so that the newborn can be transferred immediately to the neonatal team. However, there is evidence that a delay of clamping by 30 to 60 seconds after birth results in a smoother transition, particularly if the newborn begins breathing before the cord is cut. (2) The ILCOR scientific review indicates that delay is associated with increased placental transfusion, increased cardiac output, more stable and higher neonatal blood pressure, less intraventricular hemorrhage (IVH) of any grade, less need for transfusion after birth, and less necrotizing enterocolitis. (2) However, there was no evidence of decreased mortality or decreased incidence of severe IVH. The only negative consequence appears to be an increased level of bilirubin associated with more need for phototherapy. Despite drawing evidence from randomized controlled trials, the small sample size in most trials and the associated imprecision limit the quality of evidence for all outcomes of interest. Based on the latter, ILCOR suggests delaying umbilical cord clamping for preterm infants not requiring immediate resuscitation after birth (weak recommendation).

The neonatal guidelines translated this scientific statement as follows: “DCC [delayed cord clamping] for longer than 30 seconds is reasonable for both term and preterm infants who do not require resuscitation at birth. However, there is insufficient evidence to recommend an approach to cord clamping for preterm infants who do receive resuscitation immediately after birth.” Notably, both ILCOR and the neonatal guidelines do not specify a maximum time to delay in cord clamping. (1)(2)

DETERMINATION OF HEART RATE

Neonatal resuscitation success has typically been determined by detecting an increase in heart rate through auscultation. Heart rate also determines the need for changing interventions and escalating care. However, recent evidence
demonstrates that auscultation of heart rate is inaccurate, and pulse oximetry takes several minutes to achieve a signal and also may be inaccurate during the early minutes after birth. The ILCOR scientific review identified several non-randomized studies (deemed very-low-quality evidence) showing a benefit of electrocardiography (ECG) compared with oximetry for a fast and accurate measurement of heart rate in infants requiring resuscitation. (8)(9)(10) In addition, clinical assessment was found to be both unreliable and inaccurate. Among healthy newborns, providers frequently could not palpate the umbilical pulse and underestimated the newborn’s heart rate by auscultation or palpation. (11) Although the mean differences between the series of heart rates measured by ECG and pulse oximetry were small, pulse oximetry tended to underestimate the newborn’s heart rate and would have led to potentially unnecessary interventions. (8)(9)(10)(11) In particular, during the first 2 minutes after birth, pulse oximetry frequently displayed the newborn’s heart rate below either 60 or 100 beats per minute, whereas a simultaneous ECG showed the heart rate higher than 100 beats per minute. (10)

ILCOR suggests that an ECG can be used to provide a rapid and accurate estimation of heart rate (weak recommendation, very-low-quality evidence). Importantly, ECG should not replace the role of auscultation for the assessment of heart rate, as well as pulse oximetry to evaluate oxygenation. Moreover, each hospital will need to define the patient populations that may require ECG placement and develop methods for rapid application of the leads.

TEMPERATURE MAINTENANCE IN THE PREMATURE INFANT

It has been known for more than a century that preterm newborns who become hypothermic after birth have a higher mortality than those who remain normothermic. (12)(13)(14) The premature neonate is especially vulnerable and there appears to be a dose-related effect. Thus, in a large study involving more than 5,000 premature infants less than 1,500 g, there was an associated 28% increase in mortality for every 1 degree decrease in temperature below 36.5°C. (14) Hypothermia is also associated with serious morbidities, such as increased risk of IVH, respiratory issues, hypoglycemia, and late-onset sepsis. (2)

The ILCOR treatment recommendation states: “Admission temperature of newly born nonasphyxiated infants is a strong predictor of mortality and morbidity at all gestations. It should be recorded as a predictor of outcomes as well as a quality indicator” (this was a strong recommendation based on moderate-quality evidence). Hence, the running timeline was added to the algorithm to emphasize this point. It is recommended that the temperature of newly born nonasphyxiated infants be maintained between 36.5°C and 37.5°C after birth through admission and stabilization.

It is known for more than a century that preterm infant’s temperature; it is unknown which of these strategies is most effective. The scientific evidence indicates that the use of radiant warmers and plastic wrap with a cap has significantly improved but not eliminated the risk of hypothermia in preterm infants in the delivery room. (15)(16)(17) Other strategies have been introduced, including thermal mattresses, increased room temperature, and the use of warmed humidified resuscitation gases. (18)(19)(20)(21)(22) Various combinations of these strategies may be reasonable to prevent hypothermia in infants born at less than 32 weeks of gestation. (23)(24)(25)

The ILCOR treatment recommendation focuses on preterm infants of less than 32 weeks of gestation in the delivery room and suggests “using a combination of interventions, which may include environmental temperature 23°C to 25°C, warm blankets, plastic wrapping without drying, cap, and thermal mattress to reduce hypothermia (temperature <36.0°C) on admission to NICU.” This is a weak recommendation, based on very-low-quality evidence. In addition, it was pointed out that hyperthermia (>38.0°C) should be avoided because of potential associated risks. However no study showed any harm from hyperthermia.

Practical Considerations

Many of the studies used multiple strategies, so it is not possible to identify a specific intervention that is effective in maintaining infant temperature. Each unit should develop specific strategies to avoid moderate hyperthermia.
OXYGEN CONCENTRATION FOR PREMATURE NEWBORNS

The fact that high oxygen concentrations can be toxic to the newly born lungs has long been recognized by ILCOR. The original studies examined only air versus 100% oxygen and led to a recommendation that blended oxygen be used to titrate the concentration to achieve a targeted oxygen saturation. It is uncertain whether the preterm newborn should be started in a high (50%–100%) or low (21%–30%) oxygen concentration while a pulse oximeter is being attached. Review of the science revealed the following salient findings: initiating resuscitation of preterm newborns (<35 weeks of gestation) with high oxygen (≥65%) or low oxygen (21%–30%) showed no improvement in survival to hospital discharge with the use of high oxygen. (26)(27)(28)(29)(30) Similarly, in the subset of studies that evaluated these outcomes, no benefit was seen in preventing bronchopulmonary dysplasia, IVH, or retinopathy of prematurity. In all studies, irrespective of whether air or high oxygen (including 100%) was used to initiate resuscitation, most infants were receiving approximately 30% oxygen by the time of stabilization. (27)(29)(30) ILCOR recommends against initiating resuscitation of preterm newborns (<35 weeks of gestation) with high-supplemental oxygen concentrations (65%–100%). Rather, it recommends initiating with a low oxygen concentration (21%–30%) (strong recommendation, moderate-quality evidence). In making this recommendation, ILCOR places value on not exposing preterm newborns to additional oxygen without proven benefit for outcomes.

The neonatal guidelines state more clearly that resuscitation of preterm newborns of less than 35 weeks of gestation should be initiated with low oxygen (21%–30%), and the oxygen concentration should be titrated to achieve preductal oxygen saturation approximating the interquartile range measured in healthy term infants after vaginal birth at sea level.

Practical Considerations

There is much debate among physicians as to the appropriate saturation targets to follow in the first 5 to 10 minutes after birth. This issue is further complicated by the fact that the oximeter may underestimate heart rate during the first 2 minutes after birth, (10) raising serious questions regarding reliability of saturation values during this critical period.

RESPIRATORY SUPPORT IN THE PREMATURE INFANT

Establishing Functional Residual Capacity

The most effective method for establishing FRC in the fluid-filled lung of a newborn who does not breathe spontaneously has been debated for many decades. In the 1980s, Vyas et al (31) suggested a technique for administering a sustained inflation of up to 5 seconds in duration. Both standard PPV with or without positive end-expiratory pressure (PEEP) and inflation breaths up to 3 seconds in duration are the initial strategies currently advocated to initiate ventilation (Neonatal Resuscitation Program, European Resuscitation Council). (1) (32) Several recent animal studies have suggested that a longer sustained inflation (up to 30 seconds) may be beneficial for establishing FRC during transition from fluid-filled to air-filled lungs after birth. (33)(34) Three randomized studies demonstrated a benefit of sustained inflation (up to 15 seconds) for reducing the need for mechanical ventilation, but no benefit was found for reduction of mortality, bronchopulmonary dysplasia, or air leak (very-low-quality evidence, downgraded for variability of interventions). (35)(36)(37) Importantly, a recent randomized study showed an increase in pneumothorax and pulmonary interstitial emphysema (Table 2). (37) The ILCOR treatment recommendation is against the routine use of initial sustained inflation (>5 seconds’ duration) for preterm infants without spontaneous respirations immediately after birth. It is suggested that sustained inflation may be considered in individual clinical circumstances or research settings (weak recommendation, low-quality evidence). In making this recommendation and in the absence of long-term benefits, ILCOR places a higher value on the negative aspect involving lack of clarity as to how to administer sustained inflation and the duration of the breath compared with the positive findings of a reduced need for intubation at 72 hours. In addition, the methods used to deliver sustained inflation varied among studies. It was stressed that different devices varied in their ability to generate pharyngeal pressures. Moreover, recent experimental data suggest that an unintended glottis closure may be associated with sustained inflation.

Intubation and Tracheal Suctioning in Nonvigorous Infants Born Through Meconium-Stained Amniotic Fluid

For many years, it has been recommended that newborns with MSAS should receive tracheal suctioning using an endotracheal tube as a suction device. Approximately 15 years ago, as a result of a multicenter randomized clinical trial, the recommendation was restricted to infants who appeared to have respiratory compromise at birth (ie, were “nonvigorous”). ILCOR revisited this issue with regard to the risks/benefits of routine suctioning, and analyzed the data for the critical outcomes of mortality and/or meconium aspiration syndrome (MAS). Since the last ILCOR review (2010), 1 randomized study involving 122 infants showed no benefit to suctioning versus no suctioning in either
reducing mortality and/or MAS (low-quality evidence, downgraded for risk of bias and imprecision). (38) Older evidence was re-reviewed and the following findings were noted: three nonrandomized very-low-quality evidence studies showed a higher incidence of MAS in depressed infants who had tracheal intubation for suctioning (26%) compared with vigorous infants who did not undergo intubation (0.3%) (downgraded for indirectness). (39)(40)(41) Six very-low-quality observational studies demonstrated improved survival and lower incidence of MAS when infants (including depressed and/or vigorous infants) born through MSAF were intubated for tracheal suctioning (downgraded for indirectness and inconsistency). (42)(43)(44)(45)(46)(47) Six very-low-quality observational studies demonstrated no improvement in survival and/or incidence of MAS (including depressed and/or vigorous infants) when infants born through MSAF underwent intubation for tracheal suctioning (downgraded for indirectness). (48)(49)(50)(51)(52)(53)

Based on this re-review of the data, the ILCOR treatment recommendation stated the following: “There is insufficient published human evidence to suggest routine tracheal intubation for suctioning of meconium in nonvigorous infants born through MSAF as opposed to no tracheal intubation for suctioning.” In making this suggestion, ILCOR places a value on both harm avoidance (delays in providing bag-mask ventilation, potential harm of the procedure) and the unclear benefits of routine tracheal intubation and suctioning.

The neonatal guidelines state: “If an infant born through MSAF presents with poor tone and inadequate breathing efforts, the initial steps of resuscitation should be completed under the radiant warmer. PPV should be initiated if the infant is not breathing or the heart rate is less than 100 beats per minute. Routine suctioning of nonvigorous infants is more likely to result in delays in initiating ventilation, especially where the provider is unable to promptly intubate the infant or suction attempts are repeated.” In the absence of evidence of benefit for suctioning, the emphasis should be on initiating ventilation within the first minute after birth in nonbreathing or ineffectively breathing infants.

**Practical Considerations**

This change in the ILCOR treatment recommendation is based on 1 low-quality randomized study that showed no difference in outcomes (death and/or MAS), regardless of whether the infant underwent suctioning. In keeping with the low-quality evidence, it is important to restate that this is a suggestion and not a recommendation. It is also important to recognize that many cases of MAS described in the literature occur in the context of associated clinical events, chorioamnionitis, and/or fetal heart rate abnormalities. Clearly, under clinical circumstances that increase the potential for aspiration, the provider should anticipate and be prepared for the possibility that immediate intubation may be indicated, rather than waiting for signs of obstruction. The spirit of the ILCOR treatment recommendation recognized that a provider at delivery may not be skilled in intubation. Under such circumstances, delay in providing bag-mask ventilation versus potential harm of attempting intubation would favor the former approach while additional assistance is sought.

**APGAR SCORE OF 0 FOR 10 MINUTES OR LONGER**

Controversy exists as to how long after attempting resuscitation after birth, when a heart rate cannot be detected, should the provider continue or discontinue resuscitation efforts. The Apgar score of 0 has typically been the criterion used as the marker, because it indicates no detectable signs of life. The current recommendation for duration of resuscitative efforts is 10 minutes after birth. This guideline was revisited because the therapeutic hypothermia (TH) trials showed an increasing number of intact survivors with an
Apgar score of 0 after birth. The ILCOR science review indicates that of 129 infants of gestational age of greater than or equal to 36 weeks, and an Apgar score of 0 at 10 minutes after birth, either died or exhibited moderate to severe neurodevelopmental impairment at 22 months of age or later (very-low-quality evidence, downgraded for risk of bias, inconsistency, indirectness, and imprecision). (54)(55)(56)(57)(58)(59) Results from 3 of these studies, which included nested observational series in randomized clinical trials of TH and series of infants who received TH, showed that this adverse outcome occurred in 68 (76%) of 90 infants with an Apgar score of 0 at 10 minutes. Among the 56 cooled infants in these studies, 15 (27%) survived without major/moderate disabilities. (56)(57)(59) The current ILCOR treatment recommendation states that an Apgar score of 0 at 10 minutes is a strong predictor of mortality and morbidity in late-preterm and term infants. It is suggested that in infants with an Apgar score of 0 after 10 minutes of resuscitation, if the heart rate remains undetectable, it may be reasonable to stop resuscitation; however, the decision to continue or discontinue resuscitative efforts should be individualized. Variables to be considered may include whether the resuscitation was considered to be optimal, availability of advanced neonatal care such as TH, specific circumstances before delivery, and the family’s wishes (weak recommendation, very-low-quality evidence.) Importantly, the number of infants with no heart rate at 10 minutes who died in the delivery room is unknown.

Practical Considerations
There is a subtle but important distinction in the current recommendation. This refers to the Apgar score of 0 after 10 minutes of resuscitation, which is distinct from 0 at 10 minutes. In addition, it states that consideration should be given as to whether the resuscitation was optimal. Examples of optimization would include intubation before initiating chest compressions and administering intravenous rather than endotracheal epinephrine if indicated. (60)

CONCLUSIONS
This brief review highlights several of the new neonatal guideline recommendations that should enhance management options for the compromised infant immediately after delivery. There are many gaps in current management, which demands ongoing research to further optimize care.

American Board of Pediatrics
Neonatal–Perinatal Content Specifications

- Know the rationale, risks, and benefits of delayed cord clamping.
- Understand the significance, limitations, and causes of low Apgar scores, including the relationship between Apgar scores and later outcomes in preterm and full-term infants.
- Know the current recommendations regarding suctioning meconium from the airway during and following delivery.
- Know indications for and proper administration of supplemental oxygen immediately after birth.
- Know the causes, metabolic consequences, and treatment of infants with hypothermia.

References


1. Your hospital team is in the process of implementing the new Neonatal Resuscitation Program (NRP) guidelines. Which of the following statements correctly describes the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) process that informs guideline development?
   A. The GRADE process classifies articles as either “include” or “exclude” based on the merits of the study.
   B. Randomized studies start off as high-quality evidence, but may be downgraded due to methodological quality.
   C. The strength of studies considered for inclusion is determined by the study type and precision of effect, but does not take into account whether the population studied is the same as that for which the guideline will be used.
   D. Although assessing the strength of the studies is part of the GRADE process of review, the final recommendations do not have any language to indicate whether it is a strong or weak recommendation.
   E. Observational studies can only be included in the process if there are no randomized trials that are relevant to the question at hand.

2. You are at the delivery of a 31-week-gestational-age infant. You are discussing the management of cord clamping with the obstetric and pediatric teams. The plan is to clamp and cut the cord 60 seconds after delivery. Which of the following statements correctly describes the relationship of delayed cord clamping (DCC) and potential effects?
   A. Most of the literature on the subject suggests that DCC is most beneficial when the infant does not cry until after cord clamping.
   B. DCC is associated with increased placental transfusion, increased cardiac output, and increase in low-grade intraventricular hemorrhage, with decreased risk of high-grade intraventricular hemorrhage.
   C. The current recommendation from ILCOR is a strong recommendation to delay umbilical cord clamping for all preterm infants.
   D. The new guidelines state that DCC for longer than 30 seconds is reasonable for both term and preterm infants who do not require resuscitation at birth.
   E. The ILCOR and NRP recommendation for maximum time until cord clamping is 120 seconds.

3. You are at the delivery of a term male infant. The infant is apneic and is receiving warming, drying, and stimulation after being brought to the radiant warmer. Which of the following is an appropriate method to assess heart rate?
   A. In this case, there is no reason to assess heart rate until the apnea is resolved, because the resuscitation steps will be the same regardless of heart rate.
   B. Auscultation of the heart rate at the chest should be the main method of assessment unless the infant eventually undergoes intubation.
   C. Electrocardiography may provide a faster and more accurate measurement of heart rate than oximetry in infants requiring resuscitation.
   D. Pulse oximetry should only be applied to the infant 2 minutes after delivery or later.
   E. Palpation of the umbilical cord should be the main method of assessment unless it has been cut too short for this purpose.

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4. The resuscitation team is briefing before the cesarean delivery for a mother who is at 28 weeks' gestation. Which of the following plans for setting the initial oxygen concentration for starting resuscitation is consistent with the new NRP guidelines?
   A. 21%–30%.
   B. 30%–40%.
   C. 50%–60%.
   D. 70%–100%.
   E. The new guidelines do not specify a specific range, but recommend somewhere above 21% and below 100%.

5. The labor and delivery unit calls for a pediatrics team for meconium-stained amniotic fluid in a term infant with no other specified maternal risk factors. Which of the following regarding planning for this delivery is consistent with the new NRP guidelines regarding this issue?
   A. There is no need for a pediatrics team to attend this delivery.
   B. The decision for intubation versus no intubation for tracheal suctioning should be based on the thickness of the meconium-stained fluid.
   C. The decision for intubation versus no intubation for tracheal suctioning should be based on whether the infant is vigorous at birth or not.
   D. If the infant presents with poor tone and inadequate breathing efforts, the initial steps for resuscitation can be completed under the radiant warmer and positive pressure ventilation provided if the infant is not breathing or heart rate is less than 100 beats per minute.
   E. The infant should undergo intubation at least once for tracheal suctioning and further attempts determined by the consistency of the suctioned fluid.
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