

Apnea of Prematurity- Epidemiology

Dr. Julie Weiner and Dr. Joti Sharma discuss what apnea of prematurity is, what causes apnea prematurity, and how long it lasts.



Featured Speaker:

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Transcription:

Dr. Julie Weiner: Hello everyone and welcome to the very first edition of Neonatal Review: Isolette to Crib. The purpose of this podcast is to review high-yield common topics in neonatology. While our focus is geared towards the neonatal perinatal boards, anyone learning or studying neonatology will find this podcast helpful.

I will be one of your hosts for this podcast. I'm Dr. Weiner, one of the neonatologists and current Medical Director for the NICU at Children's Mercy Hospital in Kansas City, Missouri. We're located here in the Heartland and thank you for joining us. To help prepare for boards, we have a collection of neonatologists to help us along the way. All have either passed boards, been there, done that, or are currently studying for boards, same boat as you. We are joined today by Dr. Joti Sharma, the other host for this podcast. She is the Fellowship Director here at Children's Mercy Hospital. Say hi, Dr. Sharma.

Dr. Joti Sharma: Hello.

Dr. Julie Weiner: She is joining us to talk about apnea of prematurity and what we need to know. So take a sip of your caffeine, keep breathing, and we will all get through this together. Okay, Dr. Sharma, what do we need to know about apnea? To start, I think it's important to first define apnea of prematurity. Don't you think so?

Dr. Joti Sharma: Hey, Dr. Weiner, you are correct. Definition of apnea of prematurity is important, especially with apnea in newborns as we will see later. So apnea of prematurity is actually a developmental disorder due to the immaturity of the respiratory control in preterm infants. Apnea is actually defined as cessation of the respiratory airflow. Apnea of prematurity is defined as cessation of breathing for more than or equal to 20 seconds or are shorter respiratory pause that is associated with bradycardia, heart rate less than a hundred beats per minute with or without oxygen desaturation, cyanosis and pallor in infants less than 37 weeks gestation. This is actually the widely accepted definition of apnea of prematurity.

Dr. Julie Weiner: Dr. Sharma, clinically don't we commonly see infants with apneic events less than 20 seconds?

Dr. Joti Sharma: Dr. Weiner, you are true. In practice, many apneic events in preterm infants are less than 20 seconds because briefer pauses of five to 10 seconds occur frequently in preterm infants and are normal unless they result in bradycardia and hypoxemia.

Dr. Julie Weiner: So if apnea of prematurity is in preterm infants, what is different if a 40 week newborn infant has apnea?

Dr. Joti Sharma: So there is another entity called apnea of infancy, which distinguishes apnea in infants who are greater than or equal to 37 weeks gestation at the onset of apnea. What is important to realize is that if a 40-week-old infant has apnea, it is important to think about a pathological cause as opposed to just being due to prematurity.

Dr. Julie Weiner: While apnea in term infants is uncommon, pathologic causes should be considered. Do you want to talk more about this?

Dr. Joti Sharma: As I mentioned earlier, if an infant has first-time onset of apnea greater than 37 weeks gestation, it is important to think about pathological causes. And some of the differential diagnosis that we should consider are seizure disorder, infections, birth asphyxia, or hypoxic-ischemic encephalopathy, intracranial hemorrhage or stroke. Exposure to drugs can also lead to respiratory depression. And of course, anatomical abnormalities like micrognathia with obstruction of the airway.

Dr. Julie Weiner: How does the apnea of prematurity and apnea of infancy differ from just periodic breathing?

Dr. Joti Sharma: Good question because it can get confusing. Therefore, it is important to distinguish them in clinical practice. In periodic breathing, episodes are characterized by a pattern of repetitive cycles of breathing and respiratory pauses that are approximately five to 10 seconds in duration. The typical description is short respiratory pause with a few rapid breaths followed by slower breaths, then another pause and the cycle repeats,

It is also important to note that these pauses may be accompanied by modest oxygen desaturation and bradycardia, but they do not usually require clinical intervention. Periodic breathing is common in preterm infants, but needs to be differentiated from apnea of prematurity. And as mentioned earlier, typically periodic breathing does not require intervention.

Dr. Julie Weiner: So moving back to apnea of prematurity, how is the frequency of apnea related to gestational age?

Dr. Joti Sharma: The frequency of symptoms is inversely proportional to gestational age. In other words, the incidence of apnea increases with decreasing gestational age. So the more premature the infant, the higher rate of apnea of prematurity.

Dr. Julie Weiner: So Dr. Sharma, since you mentioned incidence, what is the incidence of apnea of prematurity?

Dr. Joti Sharma: Dr. Weiner, as I mentioned earlier, the incidence is dependent on gestational age and

degree of prematurity. So in very preterm infants, that is infants who are less than or equal to 28 weeks gestation, virtually all infants will develop apnea. And this is based on the review of cardiorespiratory recordings from pneumography and cardiac and pulse oximetry monitoring. The good news is 92% of apneic spells will be resolved by 37 weeks postmenstrual age in these infants. And actually, 98% will have resolved by 40 weeks postmenstrual age.

I do want to mention that there is a group of infants born between 24 to 28 weeks gestation who may continue to have apneic spells beyond 38 weeks postmenstrual age, which may prolong their hospitalization. And most of these infants actually do have bronchopulmonary dysplasia. But again, the good news is that even in this group of infants, the majority of cases of apnea will resolve by postmenstrual age 43 to 44 weeks of gestation.

Dr. Julie Weiner: So Dr. Sharma, you mentioned virtually all infants less than 28 weeks develop apnea of prematurity. How about those that are greater than 28 weeks?

Dr. Joti Sharma: So for infants more than 28 weeks gestation, the proportion of infants with apnea decreases. At 30 weeks gestation, the incidence of apnea is 85%. And at 34 weeks, it decreases to 20%.

Dr. Julie Weiner: So now that we know how common apnea of prematurity is, how does it affect hospital stay for these infants?

Dr. Joti Sharma: Infants who have persistent apnea do have a longer hospitalization. So there is an association with persistent apnea and longer hospitalization. It is also important to note that there is a wide distribution in the rate of apnea amongst NICUs, because of the criteria for diagnosis of apnea is very variable. Generally and most infants, apnea of prematurity follows a common natural history. The more severe events that require intervention are the first ones to resolve. Last to resolve are the isolated, spontaneously resolving bradycardic events of uncertain clinical significance.

Dr. Julie Weiner: So let's shift a little bit and discuss some of the causes of the apnea. Dr. Sharma, do you mind doing that?

Dr. Joti Sharma: Dr. Weiner, that's actually a great segue. But before we discuss the causes of apnea, it is important to classify apnea first. And we will discuss the cause of apnea in our next podcast when we cover apnea of prematurity pathogenesis.

Dr. Julie Weiner: So how do you classify apnea in newborns?

Dr. Joti Sharma: Apnea is classified as central, obstructive or mixed.

Dr. Julie Weiner: What is the classification based on or due to?

Dr. Joti Sharma: The classification is actually based on respiratory effort in airflow. So in central apnea, the inspiratory efforts are absent and they result in cessation of breathing effort. In obstructive apnea, the inspiratory efforts persist, but are ineffective in the presence of upper airway obstruction. And this upper airway obstruction usually is active pharyngeal level. With mixed apnea, the upper airway

obstruction with inspiratory efforts either proceeds or follows central apnea.

Dr. Julie Weiner: So how common are all these three types of apnea in preterm infants?

Dr. Joti Sharma: Most apneic spells in preterm infants are of the mixed type. In a study of physiologic recordings of 2000 apneic episodes in 47 infants, it was shown 50% of these episodes were of the mixed type. 40% was central and 11% obstructive. Interestingly, the longer the episode of apnea, the more likely it is the mixed type, as opposed to short respiratory pauses, which are primarily classified as central apnea.

Dr. Julie Weiner: In summary, we're going to just review the definition, incidence and classification of apnea of prematurity. Dr. Sharma, do you mind summarizing these areas for us?

Dr. Joti Sharma: Sure. I'll do a quick summary. So apnea of prematurity is defined as cessation of breathing for more than or equal to 20 seconds or a shorter respiratory pause, which is associated with oxygen desaturation with or without bradycardia in infants less than 37 weeks gestation. Apnea of prematurity is a developmental disorder that reflects physiologic immaturity rather than a pathologic process. Apnea of infancy refers to infants who are more than or equal to 37 weeks gestation at onset of apnea and a pathologic cause should be considered.

Periodic breathing is defined as repetitive cycles of breathing and respiratory pauses that are approximately five to 10 seconds in duration and clinically asymptomatic. Apnea is classified as central, obstructive or mixed. Most apneic spells in preterm infants are the mixed type. The incidence of apnea increases with decreasing gestational age.

Dr. Julie Weiner: So as we're wrapping up this very first podcast, let's review a few questions that will hopefully help to increase and show our knowledge in this topic. Dr. Sharma, can you help us with that?

Dr. Joti Sharma: I guess so. Yeah, I do have I think two questions. The first question is: Apnea in neonates is defined as cessation of respiration for more than or equal to 20 seconds with accompanied desaturation and bradycardia. Which of the following statements is incorrect regarding apnea of prematurity? The choices are A, the incidence of apnea of prematurity is inversely proportional to gestational age; B, the incidence of apnea is a hundred percent in infants less than or equal to 28 weeks gestation; choice C, central apnea is the most common type of neonatal apnea; choice D, patients with bronchopulmonary dysplasia may experience persistent apnea.

Dr. Julie Weiner: Okay, Dr. Sharma. Which one is it? Which one's the answer?

Dr. Joti Sharma: So if we review that, we just went over A, right? We talked about the more premature the baby, the higher the rates of apnea. And B is also correct, because we did mention that almost all babies less than 28 weeks gestation will develop apnea. D is correct, patients with bronchopulmonary dysplasia are the ones that are more likely to experience persistent apnea. C, the choice is central apnea is the most common type of neonatal apnea. As we reviewed, it is actually the mixed type. So the answer is C.

Dr. Julie Weiner: Okay, Dr. Sharma. What's the next question?

Dr. Joti Sharma: The following statements are correct about apnea of infancy, except... so basically, which of the statements is incorrect? Choices are A, apnea of infancy refers to infants who are more than equal to 37 weeks gestation at onset of apnea; B, a seizure disorder could be considered as a differential diagnosis for apnea of infancy; choice C is episodes are characterized by a repetitive cycles of breathing and respiratory pauses of five to 10 seconds in duration; and choice D is the incidence of apnea in term infants is low.

Dr. Julie Weiner: Okay, I'm going to take a stab at this one and try to answer the question. I think the answer is C that that is an incorrect statement, that episodes are characterized by repetitive cycles of breathing and respiratory pauses of five to 10 seconds in duration, I think it's longer. Dr. Sharma, you want to kind of explain or tell me if I'm right?

Dr. Joti Sharma: Yes, Dr. Weiner. You are correct. And actually C is the definition of periodic breathing and all the other choices, A, B and D are correct about apnea of infancy.

Dr. Julie Weiner: Okay. Thank you, Dr. Sharma. This will wrap up our very first podcast. Hopefully, this information will give you a better understanding of apnea of prematurity. This is Neonatology Review: Isolette to Crib. I'm Dr. Julie Weiner, and thank you for listening. Please join us for our next podcast where we will discuss the pathogenesis of apnea of prematurity and the causes.

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