The INCUBATOR
Journal Club Notes

Title: *Epidemiology of Apnea and Bradycardia Resolution in Premature Infants*
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Journal: *Pediatrics, August 2011*
Location: *CHOP*

Background

- ***What's the question?***
  How many infants have additional events (apneas or bradycardias) after being deemed "ready for discharge"? (A child was classified as being ready for discharge when the following criteria were met: No feeds administered via a naso- or orogastric tube, stable thermoregulation off supplemental heat, receipt of nasal cannula oxygen or room air, Discontinuation of methylxanthines)

- ***Is it a valid question?***
  Prior to the study, NICUs were using various discharge observation periods from 1–21 days.

Methods:

- ***Study design:***
  Retrospective cohort study of data collected within the Kaiser Permanente Medical Care Program between 1998 and 2001. This was data collected for the Infant Functional Status Study, which was intended to assess discharge decision making for premature infants.

- ***Inclusion criteria:***
  Eligible infants 34 weeks of less, born at 5 KPMCP hospitals.

- ***Exclusion criteria:***
  Major congenital anomalies, home mechanical ventilation, VP shunt placement, lost to follow up at 1 year.

- ***Primary Outcome:***

Success rate and event identification rate (EIR) of various apnea- and bradycardia-free intervals., ie: determining the last apnea or bradycardia event occurring before "ready-for-discharge day" and evaluating if apneas or bradycardias occurred after this point.

- ***Secondary Outcomes:***
  To evaluate each apnea- or bradycardia-free interval after stratifying by the gestational age of the infant or the PMA of the last apnea or bradycardia event. The third aim of the study, was to calculate the success rate and EIR of each apnea- or bradycardia-free interval using only severe apnea or bradycardia events. Then, the team reran all analyses after requiring that methylxanthines be discontinued for 3 and 5 days, on the basis of the half-life of these medications.

Results:

- ***Baseline characteristics:***
  N=*1403 infants, the average gestational age was 31.1 ± 2.6 weeks, and the average PMA at discharge was 35.6 ± 1.8 weeks. there was a 7.2% recurrence rate for any apnea episode, a 8.3% recurrence rate for any bradycardia episode, a 3.8% recurrence rate for severe apnea, and 4.3% recurrence rate for severe bradycardia. After discharge from the NICU, 2 infants had an apnea or bradycardia event unrelated to a viral infection within 21 days of the last apnea or bradycardia event, and 7 infants had apnea related to viral symptoms.*

- ***Primary Outcomes:***
  Once the infants were otherwise ready for discharge, 84.2% did not have an apnea event and 78.5% did not have a bradycardia event. 94% did not have a serious apnea event and 93% did not have a serious bradycardia event. These infants tended to be larger and less likely to have complications of premature birth compared with infants with a future event (as GA increased infants were less likely to have future events). Babies were more likely to have future events if discharged on oxygen or had BPD.

- ***Secondary outcomes:***

They looked at each length interval from 1 day to 14 days. A 95% success rate apnea threshold was not reached until 13 days for infants with a gestational age of less than 26 weeks, 9 days for infants with a gestational age of 27 to 28 weeks. In contrast, infants of a gestational age of 30 weeks or more reached this threshold between 1 and 3 days after the last apnea event. Bradycardia showed similar trends. Beginning the observation time after a PMA of 36 weeks reduced the success rate by 5% to 10% regardless of the gestational age of the infant, compared with a PMA of 36 weeks or less. Infants of younger gestational age had, on average, an older PMA for their last event than older–gestational age infants.

They did find differences between study centers.

Finally, the team accounted for discontinuation of methylxanthines in the sensitivity analysis.
If methylxanthines had been discontinued for 3-days discontinuation period, infants reached the 95% success rate threshold with a 3-day apnea observation period and a 4-day bradycardia observation period. If they. Had been discontinued for 5 days, infants reached a 95% success rate threshold with a 2 day observation period and a 3-day bradycardia observation period.

Study takeaways: *The longer a child has been off of caffeine when ready for discharge, the less likely they are to have subsequent events, however infants need to be monitored after caffeine clearance. Infants with older GA, older PMA and less medical comorbidities were less likely to have apnea or bradycardia events after discharge ready date.*

Strength/limitations:
Retrospective, differences between centers