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Who Codes in the NICU: An Analysis of Demographics and Factors that Place Neonates at Higher/Lower Risk of a Serious Code Event and Prognosis Post-Code

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Who Codes in the NICU: An analysis of demographics and factors that place neonates at higher/lower risk of a serious code event and prognosis post-code

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Background

- Neonatal code events are relatively rare in the NICU
 - 10-21% of VLBW admissions¹⁻²
 - 29-59 code events per year from 2010-2012 in our NICU; 3-7% of all patients admitted
- Most studies have stated poorer outcomes for extremely low birth weight (ELBW) infants with lower birth weight³⁻⁶, use of vasopressors^{4,9}, decreasing gestational age⁷, renal failure⁸, sepsis⁸, and longer duration of CPR^{10,11}. Little prognostic or outcomes literature exists for more diverse NICU populations serving both ELBW and near-term to term infants with complex medical care and congenital anomalies

Objective

Analyze resuscitation events in a level IV NICU from 2012-2017 to determine whether there are identifiable differences between those who have a rapid response (RR) event and those with a short or long code (SCB/LCB) and determine factors post-event that may impact survival to discharge.

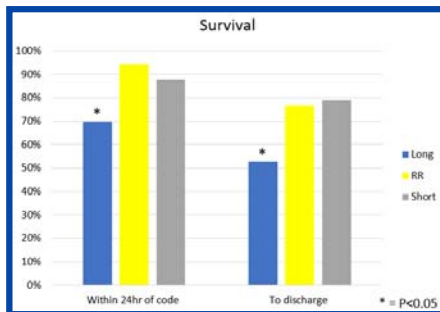
Methods

- Retrospective review of all RR/CB events that took place at CMH from 2012-2017 (n= 507)
 - RR: Resuscitation event requiring ventilation only
 - Short Code (SCB): Resuscitation requiring chest compressions for <60 seconds
 - Long code (LCB): Resuscitation requiring chest compressions for >60 seconds
- Pre-event factors
 - Gestational age (GA), birth weight (BW)
 - Respiratory Severity Score (RSS) (FiO2 x MAP)
 - Culture, source and organism 48 hours prior
 - Medications given in the 12 hours prior
 - Urine output and renal function 24 hours prior
- Post-event factors
 - Age at time of event
 - Culture, source and organism 48 hours after
 - Urine output and renal function 24 hours after
 - Survival to discharge, cause of death
- Kruskal-Wallis, chi-square and Fisher's exact tests were used for group comparisons

Results

- Factors not statistically significant between any group
 - GA or birth weight
 - BUN 24 hours before and after and Cr 24 hours before an event
- LCB significant factors compared to SCB and RR
 - Higher RSS compared to RR
 - Lower UOP 24 hours before compared to RR
 - Lower UOP 24 hours after compared to RR and SCB
- LCB had higher uses of:
 - Any pressors, dopamine, dobutamine, epinephrine
 - Bolus, IV electrolytes, diuretics
 - Hydrocortisone
- LCB events occurred earlier in the hospital stay and patients were less likely to survive 24hr after the code and less likely to survive to discharge

CMH NICU Demographics	
GA at Admission	Percentage
< 28 weeks	53%
28-36 weeks	28%
37-42 weeks	19%
> 42 weeks	< 0%
Reason for Admission	Percentage
Anomalies or syndromes (including cardiac)	23%
Respiratory	15%
Surgical	17%
Prematurity	35%
Other	10%

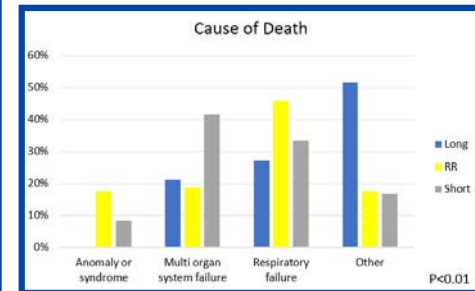
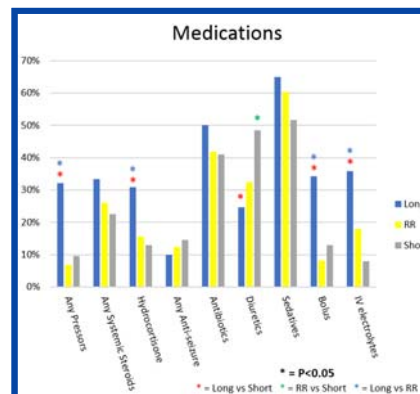


Discussion

- Requiring pressors and other medications are risk factors for LCB and subsequent death before discharge, independent of GA or BW
- Higher RSS and lower UOP before an event are predictors of a resuscitation event, particularly LCB
- Limitations:
 - Retrospective
 - No control group
 - Arbitrary distinction between LCB/SCB

Future Research

- Expand data set to include all data from 2017-present
- Analyze variables during the event (cause of event, duration of compressions, meds given, etc.) and their effect on outcome
- Incorporate a control group to determine if there are certain risk factors that will put neonates at increased risk of a code event



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