Episode 38: Pediatric Peri-Intubation Cardiac Arrest Show Notes

Abstract:

Objectives: Cardiac arrest is a significant complication of emergent endotracheal intubation (ETI) within the pediatric population. No studies have evaluated risk factors for peri-intubation cardiac arrest (PICA) in a pediatric emergency department (ED) setting. This study identified risk factors for PICA among patients undergoing emergent ETI in a pediatric ED.

Methods: We performed a nested case-control study within the cohort of children who underwent emergent ETI in our pediatric ED during a 9-year period. Cases were children with PICA within 20 minutes of ETI. Controls (4 per case) were randomly selected children without PICA after ETI. We analyzed potential risk factors based on published data and physiologic plausibility and created a simple risk model using univariate results, model fit statistics, and clinical judgment.

Results: In the cohort of patients undergoing ETI, PICA occurred in 21 of 543 subjects (3.9%; 95% confidence interval [CI], 2.2-5.9%), with return of spontaneous circulation in 16 of 21 (76.2%; 95% CI, 52.8-91.8%) and survival to discharge in 12 of 21 (57.1%; 95% CI, 34.0-78.2%). On univariate analysis, cases were more likely to be younger, have delayed capillary refill time, systolic or diastolic hypotension, hypoxia, greater than one intubation attempt, no sedative or paralytic used, and pulmonary disease compared with controls. Our 4-category risk model for PICA combined preintubation hypoxia (or an unobtainable pulse oximetry value) and younger than 1 year. The area under the receiver operating characteristic curve for this model was 0.87 (95% CI, 0.77-0.97).

Conclusions: Hypoxia (or an unobtainable pulse oximetry value) was the strongest predictor for PICA among children after emergent ETI in our sample. A simple risk model combining pre-ETI hypoxia and younger than 1 year showed excellent discrimination in this sample. Our results require independent validation.

TABLE 3. Adjusted Probability of PICA Within Source Population

	Case (n = 21)	Control (n = 84)	LR	*Probability	95% CI Probability
Hypoxia and age >1 y	8 (38.1)	0 (0.0)	N/A	100%	63.1%–100%
Hypoxia and age <1 y	5 (23.8)	2 (2.4)	10.0	29%	7.8%–65.9%
No hypoxia and age <1 y	4 (19.0)	11 (13.1)	1.5	6%	2.0%–14.2%
No hypoxia and age >1 y	4 (19.0)	71 (84.5)	0.2	1%	0.0%–2.2%

Data are presented as n (%).

Hypoxia is defined as pulse oximetry <92% or unobtainable.

*Probability of PICA within source population of 543 patients assuming controls are representative of all non-PICA patients.

LR, likelihood ratio; CI, confidence interval.