

Mackenzie Gabler, M.D.  
Block 5 CAT

Andersen LW, Raymond TT, Berg RA, Nadkarni VM, Grossestreuer AV, Kurth T, Donnino MW, .  
Association Between Tracheal Intubation During Pediatric In-Hospital Cardiac Arrest and  
Survival. *JAMA*.2016;316(17):1786-1797. doi:10.1001/jama.2016.14486

**Background:** In-hospital cardiac arrests in pediatrics are most often due to respiratory failure and rarely due to primary cardiac events as in adults. Standard practice places a large emphasis on early respiratory support as well as on adequate chest compressions. There is increasing evidence in both the pediatric and adult literature on the importance of early and effective compressions; however, little evidence exists to support the emphasis on early intubation to establish adequate oxygenation and ventilation. Intubation in pediatrics presents many challenges and is often quite dangerous. This paper investigated whether early intubation in in-hospital pediatric arrest impacted survival to discharge. Given the incidence of respiratory arrest in pediatrics, they hypothesized that early intubation would improve survival.

**Methods:**

The researchers used data from the Get With the Guidelines-Resuscitation (GWTG-R) registry, which is a prospective quality improvement registry, sponsored by the American Heart Association of in-hospital cardiac arrests. The study defined a cohort that included patients younger than 18 with in-hospital cardiac arrest that included chest compressions for at least 1 minute between January 2000 and December 2014. Exclusion criteria included patients receiving assisted ventilation, patients with invasive airway (tracheostomy), and infants with arrest at time of delivery or in the NICU. In addition, patients with inadequate data were excluded but included in subgroup analysis when appropriate. The primary outcome of the study was survival to discharge. The secondary outcome was neurological outcome, based on the pediatric cerebral performance category score, and return of spontaneous circulation (ROSC). The researchers identified time to intubation in minutes and matched outcomes of patients that were intubated during arrest with those that were not intubated or intubated after arrest.

**Results:** Over the four-year period, the study identified 2294 patients, 57% were male and the median age was 7 months, although patients of all ages were represented. 68% (1555 patients) were intubated during arrest. When matched with patients that were not intubated during arrest, survival was lower (36% vs 41%). The same difference was seen in subgroup analyses including cases with inadequate data. In regards to ROSC or favorable neurologic outcome, there was no significant difference.

**Limitations:** There were several limitations in this study. First the registry did not include all data points that may have been relevant such as the number of intubation attempts (unsuccessful intubation was counted as not intubated during resuscitation), the care received after ROSC, and the skill level of the intubating provider. Additionally, this is an observational study and so there are likely many unmeasured confounders. Finally, the study may have been underpowered to detect a significant difference in neurologic outcome.

**Bottom Line:** For pediatric in-hospital cardiac arrest, patients that were intubated during arrest had decreased survival rates when compared to those that were not intubated during arrest. Although this study analyzed only in-hospital cardiac arrest, there is likely similarity with pediatric arrests presenting to the emergency department. Currently, there is a large focus on early airway intervention in pediatrics; however, this study would suggest that we might actually be doing harm when the emphasis

is on intubation. It is worth pointing out that in-hospital cardiac arrests generally occur in the ICU and emergency department where the skills of endotracheal intubation are presumably the highest and perhaps out-of-hospital cardiac arrest patients do even worse when early intubation is performed.

---