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Letter to the Editor

Earlier time to tracheal intubation does not improve return of spontaneous circulation during in-hospital cardiac arrest☆

Sir,

Multiple studies have shown an association between high quality, uninterrupted CPR and improved survival and neurologic outcomes following in-hospital cardiac arrest (IHCA),[1,2] although the ideal airway management strategy during IHCA is less clear. Endotracheal intubation has been recommended during IHCA if appropriate resources and expertise are available, particularly if long pauses in high quality CPR can be minimized.[1,3] However, a number of recent studies have demonstrated an association between endotracheal intubation and poor outcomes.[4,5] Unfortunately, these results may be confounded by indication by comparing intubated to non-intubated patients or utilizing arbitrary cut-off values to define "early" and "late" intubation groups. Focusing only on patients intubated during IHCA resuscitation, we hypothesized that decreased time-to-intubation (TTI) would positively impact return of spontaneous circulation (ROSC) and improve neurologic outcomes.

We conducted a retrospective review of IHCA patients at an urban, academic hospital between 7/1/2007 and 3/31/2016 utilizing a well-established institutional arrest registry. Patients were included if endotracheal intubation and TTI were documented during their resuscitation. Demographic and arrest-specific variables were collected, including the primary outcome measures of ROSC and cerebral performance category (CPC) score at discharge. Median TTI was compared between those who achieved ROSC and those who did not and between those with good (1–2) and poor (3–5) CPC scores. Univariate regression analysis was performed on the outcome of ROSC.

116 patients had complete data and were included in the analysis. 70 (60%) were male with a median age of 65 [53–73] years. ROSC was achieved in 89 (77%) patients. Overall median TTI was 7 [4–12] min. There were no differences between those who achieved ROSC and those who did not with respect to age, gender, time-to-chest compressions, arrest location, cardiac etiology, initial shockable rhythm, and whether or not the arrest was witnessed. There was no difference in median TTI between those who achieved ROSC and those who did not (8 [4–12] min vs. 7 [3–9] min, $p = 0.16$). Demographic and arrest characteristics, including TTI, were not associated with ROSC in unadjusted univariate analysis (Table 1) and were not considered for inclusion in a multivariable logistic regression model. There was no difference in median TTI between those with good vs. poor CPC scores (7 [5–13] min vs. 7.5 [4–12] min), $p = 0.91$).

In our patient population, earlier TTI was not associated with increased rates of ROSC or improved neurologic outcomes. In fact, patients who achieved ROSC had a median TTI that was 60 s longer than those who did not. In contrast to recent work, we evaluated only patients who were intubated during their resuscitations in an attempt to limit confounding by indication and evaluated TTI as a continuous variable to better characterize the temporal relationship between intubation and ROSC. Our results suggest that early endotracheal intubation is less important during the early phase of resuscitation and

Table 1 – Unadjusted univariate analysis on the outcome of ROSC.

Variable	OR	95% CI	p-Value
Age (years)	0.98	(0.94–1.02)	0.333
Male gender	0.68	(0.20–2.28)	0.530
Time to chest compressions (min)	1.00	(0.74–1.36)	0.996
Floor location	1.44	(0.46–4.52)	0.532
Cardiac etiology	2.75	(0.78–9.71)	0.116
Non-shockable rhythm	2.71	(0.48–15.27)	0.258
Witnessed arrest	1.01	(0.16–6.61)	0.988
Time to intubation (min)	1.13	(1.00–1.27)	0.054

ROSC = return of spontaneous circulation.

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should not delay other interventions like high quality CPR. Video review technology may help to overcome some of the inherent limitations of retrospective IHCA review and is an important area of future research.

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Conflicts of interest

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Michael A. Vella*
Charles R. Vasquez
Division of Traumatology, Surgical Critical Care and Emergency Surgery, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, United States

David Buckler
Center for Resuscitation Science, Department of Emergency Medicine, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, United States

Sarah Root
Division of Traumatology, Surgical Critical Care and Emergency Surgery, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, United States

Benjamin S. Abella
Center for Resuscitation Science, Department of Emergency Medicine, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, United States

Carrie Sims
Division of Traumatology, Surgical Critical Care and Emergency Surgery, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, United States

* Corresponding author at: Division of Traumatology, Surgical Critical Care and Emergency Surgery, Perelman School of Medicine at the University of Pennsylvania, 51 North 39th Street, MOB 1st Floor Suite 120, Philadelphia, PA, 19104, United States.
E-mail address: Michael.Vella2@uphs.upenn.edu (M. Vella).

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