

COMMENTARY

# The key to advanced airways during cardiac arrest: well trained and early

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See related research by Kajino *et al.*, <http://ccforum.com/content/15/5/R236>

## Abstract

Airway management during cardiac arrests is a controversial area. There are advantages to the provision of a patent airway with an airway adjunct, especially as this can optimize oxygenation and carbon dioxide clearance as well as facilitate continuous compressions. These advantages come at a potential cost, in particular errors in placement of the devices and interruption to compressions necessitated for insertion. The widespread availability of supraglottic airways (SGAs), their ease of insertion, and their ability to be inserted without interruptions to compressions have meant that the role of the definitive airway device – the endotracheal tube – is being challenged. In the previous issue of *Critical Care*, a study from Japan reported the use of advanced airways in more than 5,000 victims of cardiac arrests. The authors were not able to demonstrate a survival advantage with either SGAs or endotracheal intubation (ETI). They did, however, demonstrate improved outcomes when the emergency life-saving technicians had been trained to perform ETI and when the advanced airway device was inserted earlier.

One of the unanswered questions in cardiac arrest management is which approach to airway management is best: both the specific technique and the time to intervene. The International Liaison Committee on Resuscitation summarized this issue in its 2010 Consensus on Science document: ‘There are no data to support the routine use of any specific approach to airway management during cardiac arrest. The best technique depends on the precise circumstances of the

cardiac arrest, local guidelines, training facilities, and the competence of the rescuer’ [2].

Our understanding of this issue is taken one step further by an intriguing Japanese study that was published in the previous issue of *Critical Care* [1]. In this observational study from Osaka, 5,377 consecutive, witnessed, non-traumatic, out-of-hospital cardiac arrests (OHCAs) were treated with an advanced airway by emergency life-saving technicians (ELSTs) in the calendar years 2005 through 2008. The authors evaluated the time to advanced airway placement and the difference in outcomes between the use of endotracheal intubation (ETI) and the use of supraglottic airways (SGAs). The SGAs in use in Japan at the time of the study were the Combitube, the laryngeal mask airway (LMA), and the laryngeal tube.

The primary outcome measure of this study was neurologically favorable 1-month survival, defined as a cerebral performance category score of 1 or 2. Favorable neurological outcomes were low (3.6%) but similar between ETI and SGAs. Although the ETI group had a number of adverse prognostic features (2 years older, four times as many receiving epinephrine, and 1.4 minutes more to insert the airway), there were actually some statistically significant short-term survival benefits seen in this group: a greater proportion of pre-hospital return of spontaneous circulation (ROSC) (16.6% versus 10.1%) and an increase in ROSC in the emergency department (47.8% versus 44.4%).

During this study, CPR was performed according to the Japanese CPR guidelines, which initially were based on the 2000 American Heart Association (AHA) guidelines and which after October 2006 [3] were based on the 2005 AHA guidelines [4]. There was, unfortunately, no information about why the ELSTs chose a particular type of advanced airway device. By means of multivariable analysis, improvements in favorable neurological outcomes were demonstrated (irrespective of the airway device used) with the earlier insertion of the airway (9% decrease for every 1-minute delay) and the presence of an ELST who received the additional training required to be certified to use ETI.

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This association between improved outcome and the early placement of an advanced airway is consistent with recently published in-hospital cardiac arrest data in which the best short-term survival was seen in those patients in whom the advanced airway (including ETI or LMA) was placed within 5 minutes from collapse [5]. The observation that improved outcomes were seen with better-trained providers is also consistent with studies performed in the in-hospital setting [6,7].

As this study was not a randomized controlled trial, there may be unknown confounders. One word of caution about the interpretation of studies with unknown confounders is exemplified by an observational study from Australia [8]. In that study of OHCA, multivariate analysis demonstrated a threefold survival improvement associated with the use of ETI, and this was almost certainly due to the selection of patients more likely to survive [8].

Kajino and colleagues [1] rightfully point out that their study does not address whether an advanced airway is necessary at all during cardiac arrests. Earlier studies that were unable to find improved outcomes with the use of advanced airways [9,10] may have had benefits outweighed by the adverse effects of ventilation, but a recent publication from Japan reported that the establishment of an SGA was actually a significant negative predictor of pre-hospital ROSC [11].

Unconscious patients requiring intensive care management after cardiac arrest will almost always require an advanced airway at some stage. It is still unclear whether the insertion of an advanced airway during cardiac arrest is necessary. If the decision to manage cardiac arrests by using advanced airways is made, a focus on increased training and earlier insertion seems beneficial.

#### Abbreviations

AHA, American Heart Association; ELST, emergency life-saving technician; ETI, endotracheal intubation; LMA, laryngeal mask airway; OHCA, out-of-hospital cardiac arrest; ROSC, return of spontaneous circulation; SGA, supraglottic airway.

#### Competing interests

The author declares that he has no competing interests.

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