Advanced airway management after out-of-hospital cardiac arrest

Overview: In the UK, around 60,000 cardiac arrests occur outside of hospital every year, about half of which are treated by emergency medical services. In England, about 9% of people who have an out-of-hospital cardiac arrest survive until discharge.

Current advice: Guidelines on resuscitation from the UK Resuscitation Council (NICE accredited) state that evidence is insufficient to support or refute the use of any specific technique to maintain an airway and provide ventilation in adults with pre-hospital or in-hospital cardiac arrest. Tracheal intubation has been perceived as the optimum method of providing and maintaining a clear and secure airway during cardiac arrest, but data are accumulating on problems associated with pre-hospital intubation. These guidelines now strongly recommend that tracheal intubation should be used only when trained personnel are available to carry out the procedure with a high level of skill and confidence. In the absence of experienced personnel, the use of supraglottic airway devices during cardiopulmonary resuscitation is probably more appropriate. However, only poor-quality data exist on the pre-hospital use of these devices during cardiac arrest.

New evidence: Hasegawa et al. (2013) reported a prospective population-based study in Japan (n=649,654) investigating the effect of advanced airway management on neurological outcomes after out-of-hospital cardiac arrest. All adults with out-of-hospital cardiac arrest who had cardiopulmonary resuscitation attempted by emergency medical services workers and had their age and method of airway management documented were included (n=649,359). The primary outcome was favourable neurological outcome, defined as ‘good performance’ or ‘moderate disability’ on the Glasgow-Pittsburgh cerebral performance rating scale.

Bag-valve-mask ventilation was used in 367,837 people and advanced airway management was used in 281,522 people (supraglottic airway devices in 239,550 people and endotracheal intubation in 41,972 people). Overall, 7% of people had return of spontaneous circulation, 5% survived for 1 month, and 2% had a favourable neurological outcome. Compared with bag-valve-mask ventilation, any advanced airway management was associated with a reduced chance of favourable neurological survival (odds ratio=0.38, 95% confidence interval 0.36 to 0.39).

The authors noted that the results of their study were consistent with other similar studies, but that others have shown favourable outcomes associated with advanced airway management. They discussed the possible reasons why advanced airway management may result in worse outcomes, including the competency of the emergency medical personnel and the time taken to apply advanced airway management. Although the authors conducted additional analyses to adjust for several possible confounding factors, they recognised that other variables may have affected the observed results and that their study does not prove that advanced airway management causes worse neurological outcomes.
Commentary: “This paper provides a valuable contribution to an area of practice where there is considerable controversy and a lack of high quality research. The authors’ conclusion that any form of advanced airway intervention during out-of-hospital cardiac arrest is associated with a worse neurological outcome challenges the previously accepted principle that tracheal intubation is the gold standard airway technique during cardiopulmonary resuscitation. It is particularly interesting to note that both supraglottic airway devices and tracheal intubation were associated with a similarly poor outcome. Mechanisms by which tracheal intubation could adversely influence outcome have been demonstrated, but this is not the case for supraglottic airway devices, which are believed to avoid many of the potential problems of intubation.

"However, this study, although large, is undermined by its observational design and potential for residual confounding, which make it impossible to draw robust conclusions regarding causation. Furthermore, pre-hospital practice differs between Japan and the UK, as evidenced by the very different rates of advanced airway management (43% in Japan versus 84% in London) and return of spontaneous circulation (7% in Japan versus 30% in London). As a result, this research is not sufficient to merit changes to clinical practice in the UK, but it does serve to further strengthen the case for a large-scale randomised trial of alternative airway management techniques during out-of-hospital cardiac arrest.” – Jonathan Benger, Professor of Emergency Care, University of the West of England, Bristol

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