



Editorial

Pre-hospital airway management: The data grows rapidly but controversy remains



This issue of the journal includes three papers that examine different aspects of emergency advanced airway management. Two relate to the pre-hospital phase of care^{1,2} and the third to the management of in-hospital cardiac arrest.³ There is general consensus that unconscious patients with airway compromise require rapid effective airway intervention and, where the level of consciousness is not rapidly expected to improve, tracheal intubation is the standard of care. Despite this, the provision of pre-hospital airway management in these patients is inconsistent and controversial.

The study by Diggs et al.¹ reports on nearly 75,000 pre-hospital intubations from a US national database (NEMESIS – The National Emergency Medical Services Information System) that involved the extraction of data from over 19 million EMS activations in 2012. The study follows on from an earlier report from the same database which included data from many fewer States.⁴ The report is structured as an update of out of hospital management practice in the US and concentrated on the frequency, success rates and complications of key airway interventions. Although the intubation success rates are in keeping with previous publications^{5,6} the large number of interventions reported considerably increase the available published data. The authors note that the intubation success rates are improved from the earlier data published from the same dataset in 2008.⁴ Overall reported intubation failure rates were 15%, which are predictably high and, where a rapid sequence induction technique was employed, improve to around 7%. The failure rate after administration of muscle relaxants is always of much more concern because of the association with hypoxic brain injury and death.^{7,8} 10.7% of the successful intubations required multiple attempts. The complication rates reported including oesophageal intubation and hypoxia are very much lower than previously reported. This either demonstrates significant improvement or raises the question of potential under reporting of complications in this type of self-reporting database study.⁹

The airway rescue and supraglottic device uses reported in this study are of considerable interest. The cricothyroidotomy data is unfortunately a mixture of needle and surgical techniques, which have previously had very different reported success rates.¹⁰ There are no large published series of needle cricothyroidotomy in real patients with a high success rate and the inclusion of needle cricothyroidotomy may have influenced the strikingly low success rate in this very large series (34% in 1332 procedures). The supraglottic airway success rates are very variable and depend on the type of device used. Overall success is 79% but the lowest

performing device was 38% (Oesophageal obturator airway™) compared to 89% with the best performing device (King™ Laryngeal Tube). Success rates overall are disappointing but some messages can be taken from this and other recent studies. Pre-hospital intubation has high success rates only when performed by well trained individuals and with the assistance of drugs.^{5,11} The authors of this study state that “alternative airways are not the answer” which is a strong and controversial statement. Although tracheal intubation is the (in-hospital) standard for a small group of pre-hospital emergency patients the current literature suggests that only systems with the highest levels of providers^{12,13} and governance infrastructure can deliver this intervention safely.⁵ Although supraglottic devices are clearly not all equal, the highest performing devices have similar success to intubation without the high training burden and risks of oesophageal intubation. Confirming the major difference between the performance of different supraglottic devices, and also published in this issue, is a pre-hospital randomised trial of the second generation I-GeI™ device vs an LMA™.² Significantly different success rates were demonstrated and the second generation device clearly outperformed the LMA™. Although the numbers in this trial are not large the authors are to be congratulated for contributing one of the very few randomised controlled trials conducted in pre-hospital emergency patients. Much of the available knowledge on resuscitation and airway management is transferable between the in-hospital and pre-hospital phases of care. The third paper on airway management published in this issue examines improvement in no flow ratio (NFR), an important quality indicator of cardiac resuscitation¹⁴ in the in-hospital cardiac arrest patient.³ The authors examined 100 cardiac arrest patients and demonstrated significant improvements in the NFR where a tracheal tube or an LMA was inserted in comparison with bag-valve-mask ventilation. This study is one of several that demonstrate potential improvements in quality indicators in resuscitation which may be in conflict with large studies with undifferentiated casemix and resuscitation techniques which generally question the value of advanced life support techniques in cardiac arrest or trauma patients.^{15,16}

The data available on pre-hospital airway management is rapidly expanding. In addition to the large study discussed above¹ two other significant papers with large numbers have been published in the last few months^{17,18} and others will follow this year. The increased data may help clarify which groups of patients may benefit from advanced pre-hospital airway interventions

and perhaps explain why some published outcomes are worse than expected. Intubation success is only one quality indicator of advanced airway management and other factors such as the quality of ventilation, hypoxaemia and multiple intubation attempts are just some factors that need to be considered when assessing quality and outcome data.^{19–21} The patient case mix, along with training and experience of providers, has to be fully explained to enable generalisation from one system to another. The importance of standardised airway reporting has been previously emphasised²² and comprehensive airway reporting templates are available²³ to make interpretation of airway data more straightforward.

Our interpretation of the currently available data on pre-hospital advanced airway management is that the risks and benefits need to be considered for every patient on scene with airway compromise. The management that results from this analysis will depend on the indications and condition of the patient as well as the skills and available interventions available on scene. If advanced interventions – particularly pre-hospital anaesthesia – are considered then they must be conducted with the same high standard as would be expected in an emergency department if complications and adverse outcomes are to be prevented. The constant evolution of existing supraglottic airways and the introduction of new devices makes generalisation and performance assessment of these devices difficult, but the expanding dataset will hopefully ensure that only the highly performing devices will be used in future studies, thus making interpretation more straightforward.

Conflict of interest statement

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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