J Anesth (2011) 25:467–468
DOI 10.1007/s00540-011-1138-z

LETTER TO THE EDITOR

Is out-of-hospital intubation by paramedics valid enough to be continued?

Maki Morita · Toshimichi Takahashi · Toshiki Kondo · Takahiro Ando · Satoshi Kimura

Received: 8 December 2010 / Accepted: 17 January 2011 / Published online: 19 April 2011

To the Editor:

Takei et al. [1] reported that out-of-hospital intubation by paramedics was associated with increased incidence of sustained return of spontaneous circulation comparing with bag-valve-mask ventilation and alternative airway techniques. Their findings are consistent with previous studies, which have provoked the current worldwide trend of reluctance to support out-of-hospital intubation by paramedics. Out-of-hospital intubation by paramedics has been implemented for several decades in an effort to improve outcomes from cardiac arrest and major trauma in Western countries. Increasing evidence suggests that tracheal intubation is not the optimal method of out-of-hospital airway management by paramedics and may be detrimental to patient outcome. For pediatric patients and cases of severe multiple trauma and head injury, a developing body of literature indicates adverse survival outcome of out-of-hospital tracheal intubation by paramedics. The most recent studies have shown that out-of-hospital intubation is associated with decreased survival to hospital discharge among out-of-hospital cardiac arrest patients comparing with bag-valve-mask ventilation [2–4]. In the light of the findings of these reports, a number of articles and guidelines recommend discontinuing the current practices of out-of-hospital intubation by paramedics. For instance, a critical review from a scientific UK committee concluded that out-of-hospital intubation by paramedics was more likely to be harmful than beneficial [5]. Other guidelines also recommend that paramedics should not perform tracheal intubation when performing resuscitation [6].

Similar to previous studies, the authors revealed that out-of-hospital intubation did not improve clinically robust outcomes (i.e., survival to discharge and neurological performance). Their data implied that intubation by paramedics might only result in increased burden for hospitals. They might consider that sustained return of spontaneous circulation was a significant measure to evaluate the outcome of cardiac arrests. However, the primary outcome measure has been survival to hospital discharge in most of the current literature investigating the impact of out-of-hospital intubation. They suggested not to discontinue out-of-hospital intubation under limited indication criteria, at least in cardiac arrest with noncardiac origin. It is hard to determine the reason why they justified continuing out-of-hospital intubation by paramedics with tenuous or even negative evidence to support it.

The authors excluded the cases where attempts of advanced airway management failed because they expected poor prognosis of such cases [1]. In 641 cases, advanced airway management was attempted by intubation-certified paramedics. Of those, advanced airway management failed or was discontinued in 72 cases. That is, intubation-certified paramedics did not successfully handle the airway in more than 10% of the patients requiring advanced airway management. The authors did not depict these failed cases in detail, and they completely abandoned them in their analysis. However, the failed cases after intubation attempts are necessary to be investigated intensely because they might represent the overall skills of intubation and airway management by paramedics. No intubation will be accomplished without an attempt, and any attempts could

An answer to this letter to the editor is available at doi:10.1007/s00540-011-1139-y.

M. Morita (✉) · T. Takahashi · T. Kondo · T. Ando · S. Kimura
Department of Anesthesiology and Critical Care Medicine, Kasugai Municipal Hospital, 1-1-1 Takaki, Kasugai, Aichi 486-8510, Japan
e-mail: mlotusm@xa2.so-net.ne.jp

cause serious complications. The cases in which intubation attempts failed are expected to illustrate the realistic harm associated with out-of-hospital intubation. Although the potential benefits of successful out-of-hospital intubation remain controversial, the harm caused by intubation error is indisputable [7, 8]. They should have elucidated the cases where intubation was attempted but failed and included these cases to evaluate the impact of intubation on survival and neurological outcome after cardiac arrest.

They also should have clearly indicated the verification method of out-of-hospital intubation by paramedics. Are there no cases of unrecognized esophageal intubation or unrecognized dislodgment? It has been reported that the rates of unrecognized esophageal intubation by paramedics were between 6% and 25% when tracheal tube position was verified by independent observers. It has even been shown that 6.7% of out-of-hospital intubations by emergency physicians was unrecognized esophageal intubation when on-scene verification of tube position was carried out by anesthesiologists [9]. Among adverse events and errors of out-of-hospital intubation, unrecognized misplacement of tracheal tubes is one of the most serious disasters [7]. It could hardly be justified to insist the appropriateness of out-of-hospital intubation by paramedics without investigating the influence of unrecognized misplacement.

In their setting, out-of-hospital advanced airway management by paramedics including intubation was performed only after bag-valve-mask ventilation appeared to be difficult [1]. Figure 1 of their article shows that there were 1,255 patients with out-of-hospital cardiac arrest handled by intubation-certified paramedics. Of those, advanced airway management was attempted in 641 cases (51%). In contrast, among 1,331 patients handled by paramedics lacking certification of intubation, advanced airway management was attempted only in 406 cases (30%). There was a substantial gap in the frequency of difficult bag-valve-mask ventilation between intubation-certified and non-intubation-certified paramedics. The authors should have found an explanation for this huge gap, because it might be caused by arbitrary application of their 'limited' criteria, or it might be a ramification of the poor competency of intubation-certified paramedics for bag-valve-mask ventilation.

The authors indicated that the Japanese education program of tracheal intubation was more rigorous than programs employed in other countries [1]. The authors mentioned only the U.S. programs, in which very small numbers of intubations are required, to justify the Japanese standard. Japanese paramedics are required to accomplish successful intubation in 30 surgical patients to be qualified for out-of-hospital intubation. This standard were considered appropriate in their article, based on a result of multivariable modeling, implying about 20 intubations were required to attain baseline competence. This number was shown in an article that was not focused on the learning curve of intubation. In the UK, however, current standards require trainee paramedics to achieve 25 intubations during hospital training [5]. In the guidelines from the UK, they present a number of pertinent articles defining the learning curve of a given procedure [5]. In these articles, 50–60 intubations were reported to be necessary to achieve a 90% success rate [10]. In the guidelines, 25 intubations are considered to be inadequate to attain competence [5]. There is no reason to suppose that Japanese paramedics have a steeper learning curve than paramedics of other countries. The current Japanese education program of intubation for paramedics is hardly considered to be appropriate.

References

1. Takei Y, Enami M, Yachida T, Ohta K, Inaba H. Tracheal intubation by paramedics under limited indication criteria may improve the short-term outcome of out-of-hospital cardiac arrests with noncardiac origin. J Anesth. 2010;24:716–25.
2. Arslan Hanif M, Kaji AH, Niemann JT. Advanced airway management does not improve outcome of out-of-hospital cardiac arrest. Acad Emerg Med. 2010;17:926–31.
3. Studnek JR, Thestrup L, Vandeventer S, Ward SR, Staley K, Garvey L, Blackwell T. The association between prehospital endotracheal intubation attempts and survival to hospital discharge among out-of-hospital cardiac arrest patients. Acad Emerg Med. 2010;17:918–25.
4. Egly J, Custodio D, Bishop N, Prescott M, Lucia V, Jackson RE, Swor RA. Assessing the impact of prehospital intubation on survival in out-of-hospital cardiac arrest. Prehosp Emerg Care. 2011;15:44–9.
5. Deakin CD, Clarke T, Nolan J, Zideman DA, Gwinnutt C, Moore F, Ward M, Keeble C, Blancke W. A critical reassessment of ambulance service airway management in pre-hospital care: Joint Royal Colleges Ambulance Liaison Committee Airway Working Group, June 2008. Emerg Med J. 2010;27:226–33.
6. Berlac P, Hyldmo PK, Kongstad P, Kurola J, Nakstad AR, Sandberg M. Pre-hospital airway management: guidelines from a task force from the Scandinavian society for anaesthesiology and intensive care medicine. Acta Anaesthesiol Scand. 2008;52:897–907.
7. von Goedecke A, Herff H, Paal P, Dörges V, Wenzel V. Field airway management disasters. Anesth Analg. 2007;104:481–3.
8. Lyon RM, Ferris JD, Young DM, McKeown DM, Oglesby AJ, Robertson C. Field intubation of cardiac arrest patients: a dying art? Emerg Med J. 2010;27:321–3.
9. Timmermann A, Russo SG, Eich C, Roessler M, Braun U, Rosenblatt WH, Quintel M. The out-of-hospital esophageal and endobronchial intubations performed by emergency physicians. Anesth Analg. 2007;104:619–23.
10. Konrad C, Schüpfer G, Wietlisbach M, Gerber H. Learning manual skills in anesthesiology: is there a recommended number of cases for anesthetic procedures? Anesth Analg. 1998;86:635–9.