A Use of bag-mask ventilation for cardiopulmonary resuscitation: Do we need more evidence for low resource setting?

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ABSTRACT

Clinical Question: Can victims of cardiac arrest be managed without endotracheal intubation in resource-limited settings without compromising survival with good neurologic outcomes?

Article Chosen: Jabre P, Penaloza A, Pinero D, et al. Effect of Bag-Mask Ventilation versus Endotracheal Intubation During Cardiopulmonary Resuscitation on Neurological Outcome After Out-of-Hospital Cardiorespiratory Arrest: A Randomized Clinical Trial. *JAMA.* 2018;319(8):779–787. doi:10.1001/jama.2018.0156

Objective: To assess the non-inferiority of bag-mask valve ventilation versus endotracheal intubation for advanced airway management with regard to survival with favorable neurological outcome at 28 days.

Conclusion: Among several take away from this paper, our conclusion is why not to continue bag and mask ventilation if working well instead of switching to endotracheal intubation while doing cardiopulmonary resuscitation in a cardiac arrest patient.

Keywords: bag and mask, cardiopulmonary resuscitation, low resource setting

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BACKGROUND

The optimal approach to airway management in victims of cardiac arrest remains unclear.[1,2] Tracheal intubation is perceived to be the optimal method to maintain a patent airway, and facilitate ventilation and oxygenation, but requires skilled providers who are able to perform a sufficient number of intubations to maintain competency and minimize complications.[1]

Bag-mask ventilation is less complex and easier to perform, compared to endotracheal intubation. Studies have shown better outcomes of bag- mask ventilation over intubation for patient with cardiac arrest patient during cardiopulmonary resuscitation.[3] The 2015 Advanced cardiac life support (ACLS) American Heart Association (AHA) guidelines recommend either bag-mask ventilation or endotracheal intubation for initial management of breathing and ventilation, provided that bag-mask ventilation does not interfere with high-quality chest compression.[2] Benger et al., showed no difference in survival with good neurological outcomes between airway management with placement of a laryngeal mask compared to endotracheal intubation.[4] Yet, conclusive evidence comparing bag-mask ventilation with endotracheal intubation in cardiac arrest patients remains lacking. Jabre et al., completed a randomized controlled trial to determine whether ventilation by bag-mask valve is non-inferior compared to endotracheal intubation in victims of out of hospital cardiac arrest.

Should bag-mask valve ventilation prove non-inferior compared with endotracheal intubation for cardiac arrest patients, airway management could be simplified, in particular in resource poor settings.

POPULATION STUDIED

The randomized trial enrolled patients aged 18 years or older in out of hospital cardiac arrest who presented to one of participating centers in France and Belgium. Patients with suspected massive aspiration before resuscitation, do not resuscitate orders, known pregnancy and imprisonment were excluded.

STUDY DESIGN

This was a parallel-group, non-inferiority, multi-centre randomized trial. Only outcomes assessors were blinded to patient outcomes.

OUTCOMES

The primary end point of study was survival at 28 days with favorable neurological function. The authors chose a non-inferiority margin of 1%. Secondary end points included survival to hospital admission, survival at 28 days (regardless of neurological function), return of spontaneous circulation, and endotracheal intubation and bag-mask valve ventilation difficulty or failure.

RESULT

The study enrolled a total of 2,043 patients, 1020 in the bag-mask valve group, and 1,023 in the endotracheal intubation group. Among the 2,043 patients randomized, 2,040 completed the trial. In the intention-to-treat population, favorable functional survival at day 28 was 44 of 1018 patients (4.3%) in the BMV group and 43 of 1022 patients (4.2%) in the ETI group, a difference of 0.1 (95% confidence intervals). Despite the lack of difference between groups in the primary outcome, the study failed to demonstrate non-inferiority of bag-mask valve ventilation as the 95% confidence interval of the estimate extended beyond the pre-specified 1% difference between-group difference favoring endotracheal intubation. The study also found no between group differences in the per protocol analysis. While the rate of ROSC was significantly higher in the endotracheal intubation group, there was no difference in rate of survival to hospital admission.

CRITICAL THINKING

Although the authors could not prove that bag-mask ventilation was non-inferior compared with endotracheal intubation, this was a well-conducted relevant study focusing on important issue that we believe is relevant to our practice setting in a low-resource setting.

Also the primary outcome is best possible patient centered one.

There were more adverse events in bag and mask ventilation group than endotracheal intubation group, but in our opinion, that does not matter as 28-day neurological outcome (which matters the most) is not different. Despite the very large sample size, there was a little difference in 28-day favorable neurological outcome.

Most of the time we tend to intubate patient early during resuscitation to prevent regurgitation and prevent pneumonia, but studies have shown that eventually most of the patients develop pneumonia irrespective of the ventilation strategy during the cardiac resuscitation.

So why not to prefer the cheapest and easiest approach, the bag and mask over more clinically complex logistically demanding and expensive approach.

CONCLUSION

Among several take away from this paper, our conclusion is why not to continue bag and mask ventilation if working well instead of switching to endotracheal intubation while doing cardiopulmonary resuscitation in a cardiac arrest patient.

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