Research Brief

Effectiveness of different compression-to-ventilation methods for cardiopulmonary resuscitation: A systematic review

Summary

Cardiopulmonary resuscitation (CPR) is important for patient survival of sudden cardiac arrest, however it can be challenging to learn and difficult to perform. New approaches have been developed, though the effectiveness of the newer techniques remains unclear. We aimed to determine the effectiveness of different compression-to-ventilation methods during CPR in patients with cardiac arrest. Our results suggest that for adults, CPR 30:2 is associated with better survival and favourable neurological outcomes compared to CPR 15:2. More children who received either CPR 15:2 or 30:2 experienced favourable neurological function, survival, and return of spontaneous circulation (ROSC) when compared to compression-only CPR though for those <1 year of age, no statistically significant differences were observed.

Implications

Informed International Liaison Committee on Resuscitation (ILCOR) guideline recommendations on CPR methods.

Reference: Ashoor HM, Lillie E, Zarin W, et al. Effectiveness of different compression-to-ventilation methods for cardiopulmonary resuscitation: A systematic review. Resuscitation. 2017;pii: S0300-9572(17):30243-5.

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What is the current situation?

- Out-of-hospital cardiac arrest is a leading cause of mortality worldwide. Though cardiopulmonary resuscitation is crucial for patient survival of sudden cardiac arrest, bystander CPR rates remain very low. New techniques of CPR administration have been developed to make CPR easier to learn and perform but their effectiveness remains unclear.

What is the objective?

- To compare the effectiveness of different compression-to-ventilation methods during CPR in patients with cardiac arrest.

How was the review conducted?

- MEDLINE and the Cochrane CENTRAL Register of Controlled Trials were searched from inception until January 2016.
- Randomised controlled trials and non-randomised studies that compared different chest compression-to-ventilation ratios during CPR for patients of all ages (either in hospital or out-of-hospital) and assessed at least one outcome of interest (favourable neurological outcomes, survival, ROSC and quality of life) were included.
- Two reviewers independently performed study selection, data abstraction and risk of bias appraisal of included articles.
- Random-effects meta-analyses were conducted separately for randomised and non-randomised studies, as well as for study characteristics, such as CPR provider.

What did the review find?

- 41 studies were included in the analysis, of which 13 were companion reports.
- For adults who received bystander or dispatcher-instructed CPR, there were no significant differences (across all comparisons and outcomes). Overall, for adults, our findings demonstrate that CPR 30:2 is associated with better survival and favourable neurological outcomes when compared to CPR 15:2.
- For children, results varied by age. More patients who received CPR with either 15:2 or 30:2 compression-to-ventilation ratio experienced favourable neurological outcomes, survival, and ROSC when compared to compression-only-CPR though for those less than one year of age; no statistically significant differences were observed.
- The International Liaison Committee on Resuscitation recommends that all cardiac arrest victims receive chest compressions; our review findings suggest that there are additional benefits from CPR with a synchronous compression-to-ventilation ratio (if possible).

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