EUROPEAN RESUSCITATION COUNCIL

Letter to the Editor

Reply to: Real-time audiovisual feedback during CPR: A clarification, meta-analysis update, and caution for interpretation

We thank Dr. Amir Vahedian-Azimi et al. for their insightful remarks on our article, recently published in *Resuscitation*, regarding the effect of real-time audiovisual feedback during CPR.[1] In our article, we reported a meta-analysis to compare patient outcomes with and without feedback. As the authors mentioned, we pooled studies of both OHCA and IHCA. We have performed subgroup analysis, however, which revealed that outcomes in different patient locations did not demonstrate

significant differences. Similarly, no significant differences were found in subgroup analysis of device types.

According to chapter 4 in Cochrane Handbook,[2] the decision to include NRSs is decided depends on the PICO. We think there are ethical dilemmas clinically in our review PICO, so we also included NRSs. Besides, studies featuring portable devices were all RCTs, which were more rigorous. Nevertheless, they showed better patient outcomes. This result reinforced our interpretation instead.
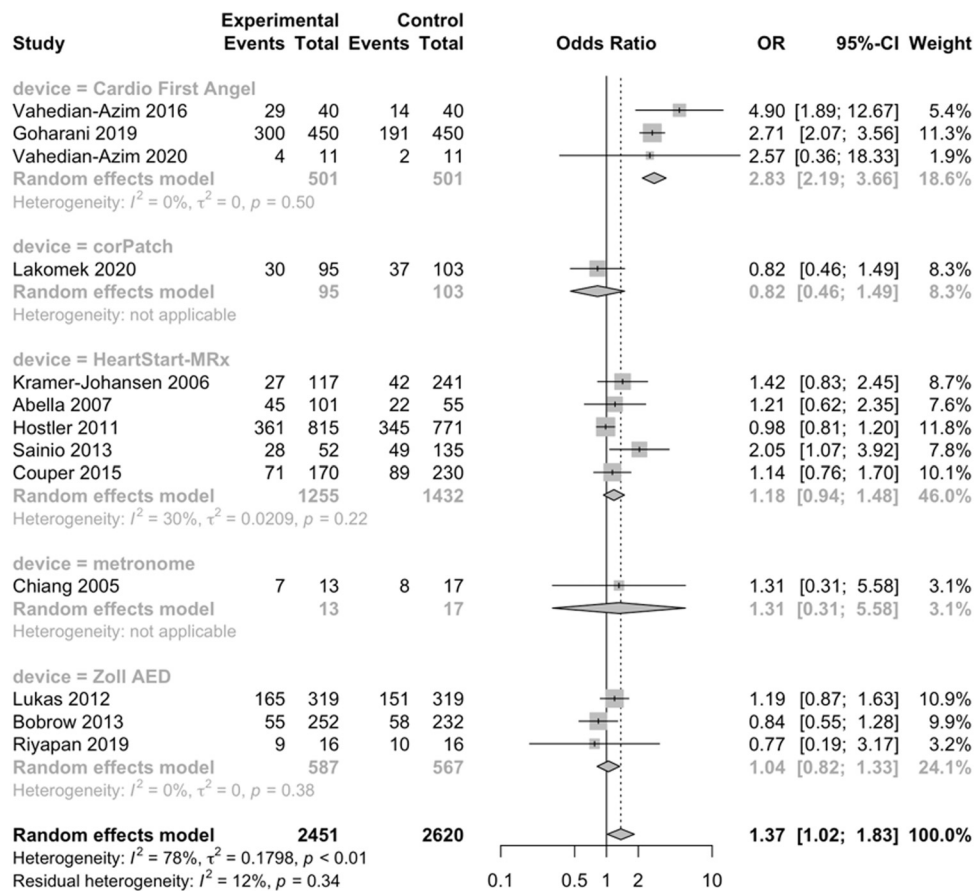

Fig. 1 – Forest plot for patient with ROSC.

Many studies had addressed that any ROSC is a prediction of good neurologic outcome.[3−5] Therefore, we regarded both any and sustained ROSC as good patient outcomes.

When it comes to the risk of bias assessment, the quality of RCTs included were assessed mainly according to the RoB II tool.[6] According to its updated guidance, the blinding affects two domains, bias arising from the randomization process and bias deviations from intended interventions. The guidance suggested that an allocation sequence generation such as using a computer-generated random number be necessary. The risk of bias from the randomization process would be at 'low risk' level when an allocation sequence is random and concealed. Regarding as bias deviations from intended interventions, blinding was considered as difficult or impossible in some contexts. Other measures, such as treating participants according to strict criteria, may be taken when blinding was difficult or impossible in some contexts. Back to the two articles mentioned by the authors,[7,8] a Random Allocation Software was used. The data analyzer was blinded and was not present during CPR. Besides, the protocol of treatments during CPR is rarely deviated from protocol. Therefore, we think these two studies should be labeled 'low risk'.

The author mentioned 3 clinical trials we might miss. The first study is a comparison of ACD-CPR with standard CPR.[9] The ACD-CPR not only gives feedback but also helps actively lift the chest during decompression. Given that our aim is to investigate effect of feedback only, we decided not to include this paper. We did not include the second and third studies mainly due to the delayed inclusion of Pubmed and EMBASE when conducting research.[10,11] After we renewed the pooling data, however, the subgroup analysis still revealed that a similar result of heterogeneity. The studies using Cardio First Angel demonstrated significant differences in patient ROSC (Fig. 1).

The main conclusion of our study is that types of devices might be the most important factors for improving patient outcomes such as ROSC. However, studies comparing different devices are still needed. Other outcomes and related side effects are also suggested to be explored.

Author contribution

All authors have made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

Author approval

The full manuscript has been read and approved by all authors. Each listed author fulfills the authorship requirements, and each author attests that the manuscript represents honest work.

Conflict of interest

All authors have no financial support and potential conflicts of interest for this work.

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