

Clinical Summary

Effect of real-time feedback during cardiopulmonary resuscitation outside hospital: prospective, cluster-randomised trial

Hostler D, Everson-Stewart S, Rea TD, et al. The BMJ. 2011; 342: d512.

Purpose

To test whether automated real time CPR feedback compared to standard CPR alone would increase return of spontaneous circulation (ROSC) during out-of-hospital cardiac arrest (OHCA).

Methods

Cluster randomized trial taking place in 21 U.S. and Canadian EMS agencies from three sites in the Research Outcomes Consortium (ROC). Philips® MRx defibrillators were used with real time audio and visual feedback. Baseline data without feedback was initially collected in 233 cases, then cluster groups of varying sizes were randomly assigned to feedback on or feedback off groups. Assignment of the groups to feedback on and feedback off groups changed every two to seven months depending on the expected number of cardiac arrests in each cluster group. Primary outcome was to detect difference in any pre-hospital ROSC. Secondary outcomes were ROSC at ED arrival, survival to hospital discharge and improvement in CPR process.

Results

	Feedback ON N=815	Feedback OFF N=771
Frequency of pre-hospital ROSC	44%	45%
ROSC in the ED	32%	32%
Survival to hospital discharge	11%	12%
CPR fraction (% of time CPR was being done)	66%	64%
Compression depth	40 mm (1.57 inch)	38 mm (1.49 inch)
Incomplete release	10%	15%

Feedback was muted by EMS in 14% of cases during the feedback-on period

Conclusions

The use of accelerometer based real time CPR feedback resulted in marginal improvement in CPR performance. There was no difference in ROSC or survival to discharge.

Stryker discussion points

This randomized, controlled study was conducted under rigorous scientific standards with a very large group of OHCA patients. Some minimal improvement in CPR occurred, but there was no difference in clinically meaningful outcomes, either in ROSC or survival to hospital discharge. Accelerometer based real time feedback devices such as the one used in this study are intriguing but some important limitations have been reported including inaccuracy in a moving vehicle and on compliant surfaces such as mattresses and stretchers.^{1,2,3}

More significant improvement in CPR quality has been achieved by downloading and reviewing CPR data and giving prompt feedback to the responders, rather than from real time feedback.⁴ All currently marketed LIFEPAK® defibrillators are capable of automatically gathering CPR data through conventional therapy electrodes. Data can then be downloaded and viewed with CODE-STAT™ software with Advanced CPR Analytics. Reports can be generated and feedback from the reports can be shared with responders. Baseline CPR statistics can be gathered in a cost-effective way using existing equipment before implementing changes in protocol.

Metronomes have also been shown to be highly effective in guiding rescuers to the correct compression rate.^{5,6,7} The CPR Metronome in the LIFEPAK 15 monitor/defibrillator is a proven technology⁵ that actively guides users to a consistent compression rate without the need for extra external hardware.

References

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7. Kern KB, Sanders AB, Raife J, et al. A study of chest compression rates during cardiopulmonary resuscitation in humans: the importance of rate-directed chest compressions. *Arch Intern Med*. 1992;152:145-149.

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