Clinical Summary

Metronome improves compression and ventilation rates during CPR on a manikin in a randomized trial

Kern KB, Stickney RE, Gallison L, Smith R. *Resuscitation.* 2010; 81:206-210.

Purpose:

To study the effects of customized compression/ventilation metronome prompts on over-ventilation by professional rescuers.

Methods:

- Prospective, randomized parallel study of a customized CPR metronome with "tock" prompts for compressions and a spoken "ventilate" prompt.
- Two groups of 34 firefighter EMTs performed 2-rescuer CPR on an instrumented manikin. One group used metronome guidance while the other group had no metronome guidance.
- The EMT groups performed 2 minutes of 30:2 CPR with an unsecured airway then 4 min of CPR with a secured airway (continuous chest compressions with 8-10 ventilations per minute) and repeated this sequence after switching roles.
- Endpoints included compression and ventilation rates.

Results:

- Significantly less variation of ventilation rate on the metronome group (p=<0.001).
- Compression rates were significantly better with the metronome.
  - During 30:2 CPR (unsecured airway) the target compression rate (90-110/min) was achieved in 15% of the CPR sessions in the control group vs. 100% for the metronome group (p=<0.001).
  - During CPR with an advanced airway the average target compression rate was achieved in 9% of the CPR sessions for the control group versus 97% for the metronome group (p=<0.001).

Conclusions:

The combined tone and voice prompt audio guidance was extremely effective at maintaining the target chest compression rate and avoiding the common problem of hyperventilation during CPR by professional rescuers.

Physio-Control Discussion Points:

Metronomes have been shown to be highly effective in guiding rescuers to the correct compression rate.[1,2,3] The CPR Metronome used in the study is incorporated in the LIFEPAK® 15 monitor/defibrillator.*

*LIFEPAK 15 monitor/defibrillator non-US ventilation prompt is a tone prompt instead of the word "ventilate."

References:

1. Kern KB, Sanders AB, Raife J, Milander MM, Otto CW, Ewy GA. 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.
2. Fletcher D, Galloway R, Chamberlain D, et al. Basics in advanced life support: A role for download audit and metronome. *Resuscitation* 2008;78:127-134.
3. Jost D, Degrange H, Verret C, et al. DEFI 2005. A randomized controlled trial of the effect of automated external defibrillator cardiopulmonary resuscitation protocol on outcome from out-of-hospital cardiac arrest. *Circulation* 2010;121:1614-1622.

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