CPR: Compression to Ventilation Ratio – Dispatch assisted – Adult

Citation

Olasveengen T, Mancini MB, Berg, RA, Brooks S, Castren M, Chung SP, Considine J, Escalante R, Gazmuri R, Hatanaka T, Koster R, Kudenchuk P, Lim SH, Lofgren B, Nation, K, Nishiyma C, Perkins GD, Ristagno G, Sakamoto T, Sayre, M, Sierra A, Smyth M, Stanton D, Travers A, Valliancourt C, Morle, P, Nolan J. CPR: Chest Compression to Ventilation Ratio-Dispatch Assisted-Adult Consensus on Science and Treatment Recommendation [Internet]. Brussels, Belgium: International Liaison Committee on Resuscitation (ILCOR), Basic Life Support Task Force, 2017 July 30. Available from: http://www.ilcor.org

CPR: Compression to Ventilation PICOST

The PICOST (Population, Intervention, Comparator, Outcome, Study Designs and Timeframe)
Population: Patients of all ages (i.e., neonates, children, adults) with cardiac arrest from any cause and across all settings (in-hospital and outof-hospital). Studies that included animals were not eligible. Intervention: All manual CPR methods including Compression-only CPR (CO-CPR), Continuous Compression CPR (CC-CPR), and CPR with different compression-to-ventilation ratios. CO-CPR included compression with no ventilations, while CC-CPR included compression with asynchronous ventilations or minimally-interrupted cardiac resuscitation (MICR) Studies that mentioned the use of a mechanical device during CPR were only considered if the same device was used across all relevant intervention arms and would therefore not confound the observed effect.
Comparators: Studies had to compare at least two different CPR methods from the eligible interventions; studies without a comparator were excluded.
Outcomes: The primary outcome was favorable neurological outcomes, measured by cerebral performance or a modified Rankin Score. Secondary outcomes were survival, ROSC, and quality of life.
Study designs: Randomised controlled trials (RCTs) and non-randomised studies (non-randomised controlled trials, interrupted time series, controlled before-and-after studies, cohort studies) were eligible for inclusion. Study designs without a comparator group (e.g., case series, cross-sectional studies), reviews, and pooled analyses were excluded.
Timeframe: Published studies in English searched on January 15, 2016

For the critical outcome of favorable neurological function, we identified low quality evidence from one randomized controlled trial (Rea 2010 423). The quality of evidence was downgraded for serious imprecision. In unadjusted analysis of crude data from this study instructions to give continuous chest compressions had no demonstrable benefit for favorable neurological function (Relative Risk (RR) 1.25 (95% CI 0.94, 1.66); Risk Difference (RD) 2.86 (-0.80, 6.53)) when compared to instructions to give compressions and ventilations at a ratio of 15:2.

For the critical outcome of survival, we identified low quality evidence from three randomized controlled trials (Hallstrom 2000 1546, Rea 2010 423, Svensson 2010 424). The quality of evidence was downgraded for serious risk of bias. In meta-analysis of these studies, instructions to give continuous chest compressions had no demonstrable benefit for survival (RR 1.20 (1.00, 1.45); RD

1.88 (-0.05, 3.82)) when compared to instructions to give compressions and ventilations at a ratio of 15:2.

For the critical outcome of return of spontaneous circulation, we identified low quality evidence from one randomized controlled trial (Rea 2010 423). The quality of evidence was downgraded for serious imprecision. In unadjusted analysis of crude data from this study instructions to give continuous chest compressions had no demonstrable benefit for ROSC (RR 1.11 (0.98, 1.26); RD 3.4 (−0.8, 7.6)) when compared to instructions to give compressions and ventilations at a ratio of 15:2.

Treatment recommendations

We recommend that dispatchers provide instructions to perform continuous chest compressions (i.e. compression-only CPR) to callers for adults with suspected out of hospital cardiac arrest (strong recommendation, low-quality evidence).

Values and Preferences

In making these recommendations, we placed a higher value on the initiation of bystander CPR and a lower value on the harms of performing CPR on patients who are not in cardiac arrest. We recognize that the evidence in support of these recommendations comes from randomized trials of variable quality; however, the available evidence consistently favors telephone CPR protocols that use a compression-only CPR instruction set, suggesting a dose effect—that is, quick telephone instructions in chest compressions result in more compressions and faster administration of CPR to the patient.

Knowledge gaps

Current knowledge gaps include but are not limited to:

- The lack of randomized trials addressing this question
- What are the identifying key words used by callers that are associated with cardiac arrest?
- Should there be “trigger” words or phrases from the bystander that are so likely to indicate cardiac arrest that the dispatcher can skip parts of the protocol and shorten the time to dispatch and to CPR instruction?
- What is the impact of adherence to or failure to follow dispatch protocols?
- What are the best methods to optimize initial training methodology, educational content, retraining frequency interval, and quality improvement programs for optimal dispatcher performance and effectiveness?
- Is there a difference in recognition rates and performance between dispatchers with varying backgrounds (non-healthcare professional vs. paramedic or nurse)?
- What is the optimal instruction sequence for coaching callers in telephone-assisted CPR?
- What is the impact of telephone CPR instructions on non-cardiac etiology arrests such as drowning, trauma, asphyxia in adult and pediatric patients?
- What are the time-interval benchmarks for the completion of each step in the instruction process (transfer to ambulance dis-patch, cardiac arrest recognition, dispatch of resources, initiation of instructions, etc.)?
- What is the benefit or role in the use of an AED locator or enhanced citizen response?
- What is the benefit or role in the use of “dual-dispatch” or professional first-responder

system?

- What is the impact of language barriers to performance?
- What is the optimal system approach to provide instructions to the highest number of cardiac arrest patients?
- How many chest compressions should be given, and for how long, before ventilation instructions are introduced?
- Should resuscitation instructions be modified in the context of advanced directives from the victim asking not to be resuscitated
- Qualitative and observational research strategies need to be developed to explore and address issues such as optimal education, training, organization and development of useful clinical decision support tools.