

## Emergency Medicine Journal Club: Eastern Virginia Medical School

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**CITATION:** Rea, T.D., Farenbruch, C. et al. “**CPR with Chest Compression Alone or with Rescue Breathing.**” New England Journal of Medicine. 363; 5. July 29, 2010.

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| I. WHAT IS BEING STUDIED? | Whether <b>chest compression alone</b> in cardiac arrest victims would result in improved survival when compared to <b>chest compression plus rescue breathing.</b>  |
| 1. Study Objective        | The study objective is to determine whether rescue breathing can be eliminated from pre-hospital CPR in favor of uninterrupted chest compressions without deleterious effects on patient survival.   |
| 2. Study Design           | Randomized, single blinded control trial among 3 EMS system in Washington state. Study was initiated and conducted by lay-people and EMS dispatchers with results evaluated by investigators blinded to which therapy the patient received.  |
| 3. Inclusion Criteria     | Unconscious and not breathing properly.<br>Over age 18.  |
| 4. Exclusion Criteria     | --Bystander CPR in progress at time of initial phone contact with EMS<br>--Likely traumatic, drowning, or asphyxiation(choking, strangulated, suffocation)<br>--DNR order in place<br>Post randomization exclusion criteria included:<br>--Patients who were either not in arrest or clearly dead by EMS estimation. |
| 5. Interventions Compared | Instruction in CPR with both chest compression and rescue breathing is compared to instruction in CPR with only chest compressions.  |
| 6. Outcomes Evaluated     | Primary:<br>-Survival to hospital discharge.<br>Secondary:<br>-Return of spontaneous circulation while in EMS care   |

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|  | -Favorable neuro status at discharge.  |
| <b>II. Are the results of the study valid?</b>   |  |
| 1. Was the assignment of patients randomized?  | The assignment of patients was randomized.   |
| 2. Were all patients who entered the trial properly accounted for and attributed at its conclusions? | Yes.   |
| 3. Was follow-up complete?   | Follow-up was limited at one study site by the lack of ability to track neuro outcomes on hospital discharge.<br>However, overall follow-up was very effective.  |
| 4. Were patients, health workers and study personnel “blind” to treatment?                           | The health workers who analyzed the data were blinded to the group assignments. However, the EMS dispatchers and bystanders performing CPR could not be blinded.<br>The patients were unconscious initially, but survivors were informed of their participation if/when they regained unconsciousness.   |
| 5. Were study groups similar at the start of the trial?  | Yes. No statistically sig differences between two groups were noted.   |
| 6. Aside from the experimental intervention, were the groups treated equally                         | Yes.   |
| <b>III. What were the results?</b>   |  |
| 1. How large was the treatment effect? (difference between treatment and control group).             | Overall, there was no statistically significant difference in the proportion of patients surviving to hospital discharge 3.2% (95%CI -0.5 to 6.8) which was the primary outcome. There was no statistically sig difference in secondary outcome neuro function by Cerebral Performance Index between the two major groups at discharge 2.9% (CI 95% -0.8-6.5) This may be a consequence of an under-powered study. The authors report needing 4200 subjects to have 80% power. |
| 2. What was the estimated treatment effect at a 95% confidence interval?                             | There appeared to be statistically significant difference in a favorable   |

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|   | <p>outcome regarding cerebral performance scores in one of the four pre-specified subgroups namely those whose cause of arrest was cardiac 5.4% ARR (CI 95% 0.6-10.3)</p> <p>There were no other statistically significant differences in selected, pre-specified subgroups defined by four parameters cause of arrest, presenting arrest rhythm, witness status, and EMS response time.</p> |
| IV. Will the results help me in caring for my patients? (applicable?) | Translating these results to the ED, the importance of uninterrupted CPR is highlighted, especially in patients who may have a cardiac etiology.   |
| 1. Were all clinically important outcomes considered?                 | Yes. Return of Spontaneous Circulation and functional survival at hospital discharge are the most important clinical considerations in evaluating the effectiveness of CPR.  |
| 2. Are treatment outcomes worth the potential harms?                  | There was no evidence that withholding rescue breathing was associated with worse outcomes. In fact sub group analysis in those with cardiac cause of their arrest showed improvement in outcome. Had the authors constructed a forest plot there was a trend towards statistical significance with withholding rescue breathing however all CI's crossed non-significance.                  |

**Additional Comments:** This study is underpowered and is therefore unable to provide definitive data regarding clinically important differences in the study groups. There appears to be some evidence in support of others findings that withholding rescue breathing in those with a cardiac cause for their arrest is associated with more favorable outcomes. Controlling for the quality of pre-hospital instructions, bystander CPR or rescue breathing were all potential confounding issues that could have sig. bias the results.

Despite weaknesses, this study suggests that bystander rescue breathing is not associated with favorable outcomes in those with a cardiac cause for their arrest and withholding rescue breathing may in fact may be associated with better outcomes.