

Compression-to-Ventilation Ratio and Incidence of Rearrest - A Secondary Analysis of the ROC CCC Trial

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BACKGROUND: Previous work has demonstrated that when out-of-hospital cardiac arrest (OHCA) patients achieve return of spontaneous circulation (ROSC), but subsequently have another cardiac arrest prior to hospital arrival (rearrest), the probability of survival to hospital discharge is significantly decreased. Additionally, few modifiable factors for rearrest are known. We sought to examine the association between rearrest and compression-to-ventilation ratio during cardiopulmonary resuscitation (CPR) and to confirm the association between rearrest and outcomes.

HYPOTHESIS: Rearrest incidence would be similar between cases treated with 30:2 or continuous chest compression (CCC) CPR, but inversely related to survival and good neurological outcome.

METHODS: We conducted a secondary analysis of a large randomized-controlled trial of CCC versus 30:2 CPR for the treatment of OHCA between 2011 and 2015 among 8 sites of the Resuscitation OUTCOMES: Consortium (ROC). Patients were randomized through an emergency medical services (EMS) agency-level cluster randomization design to receive either 30:2 or CCC CPR. Case data were derived from prehospital patient care reports, digital defibrillator files, and hospital records. The primary analysis was an as-treated comparison of the proportion of patients with a rearrest for patients who received 30:2 versus those who received CCC. In addition, we assessed the association between rearrest and both survival to hospital discharge and favourable neurological outcome (Modified Rankin Score \leq 3) in patients with and without ROSC upon ED arrival using multivariable logistic regression adjusting for age, sex, initial rhythm and measures of CPR quality.

RESULTS: There were 14,109 analysable cases that were determined to have definitively received either CCC or 30:2 CPR. Of these, 4,713 had prehospital ROSC and 2,040 (43.2%) had at least one rearrest. Incidence of rearrest was not significantly different between patients receiving CCC and 30:2 (44.1% vs 41.8%; adjusted OR: 1.01; 95% CI: 0.88, 1.16). Rearrest was significantly associated with lower survival (23.3% vs 36.9%; adjusted OR: 0.46; 95%CI: 0.36-0.51) and worse neurological outcome (19.4% vs 30.2%; adjusted OR: 0.46; 95%CI: 0.38, 0.55).

CONCLUSION: Rearrest occurrence was not significantly different between patients receiving CCC and 30:2, and was inversely associated with survival to hospital discharge and MRS.