

Effect of chest-compression-only bystander cardiopulmonary resuscitation on the likelihood of initial shockable rhythm after out-of-hospital cardiac arrest: a propensity matching analysis

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Background/Introduction: Shockable rhythm after cardiac arrest is highly expected after early initiation of bystander cardiopulmonary resuscitation (CPR) owing to increased coronary perfusion. However, the relationship between bystander CPR and initial shockable rhythm in patients with out-of-hospital cardiac arrest (OHCA) remains unclear. We hypothesized that chest-compression-only CPR (CC-CPR) before emergency medical service (EMS) arrival has an equivalent effect on the likelihood of initial shockable rhythm to the standard CPR (chest compression plus rescue breathing [S-CPR]).

Purpose: We aimed to examine the rate of initial shockable rhythm and 1-month outcomes in patients who received bystander CPR after OHCA.

Methods: The study included 59,688 patients (age, ≥ 18 years) who received bystander CPR after an OHCA with a presumed cardiac origin witnessed by a layperson in a prospectively recorded Japanese nationwide Utstein-style database from 2013 to 2017. Patients who received public-access defibrillation before arrival of the EMS personnel were excluded. The patients were divided into CC-CPR (n=51,520) and S-CPR (n=8168) groups according to the type of bystander CPR received. The primary end point was initial shockable rhythm recorded by the EMS personnel just after arrival at the site. The secondary end point was the 1-month outcomes (survival and neurologically intact survival) after OHCA. In the statistical analyses, a Cox proportional hazards model was applied to reflect the dif-

ferent bystander CPR durations before/after propensity score (PS) matching.

Results: The crude rate of the initial shockable rhythm in the CC-CPR group (21.3%, 10,946/51,520) was significantly higher than that in the S-CPR group (17.6%, 1441/8168, $p < 0.0001$) before PS matching. However, no significant difference in the rate of initial shockable rhythm was found between the 2 groups after PS matching (18.3% [1493/8168] vs 17.6% [1441/8168], $p = 0.30$). In the Cox proportional hazards model, CC-CPR was more negatively associated with the initial shockable rhythm before PS matching (unadjusted hazards ratio [HR], 0.97; 95% confidence interval [CI], 0.94–0.99; $p = 0.012$; adjusted HR, 0.92; 95% CI, 0.89–0.94; $p < 0.0001$) than S-CPR. After PS matching, however, no significant difference was found between the 2 groups (adjusted HR of CC-CPR compared with S-CPR, 0.97; 95% CI, 0.94–1.00; $p = 0.09$). No significant differences were found between C-CPR and S-CPR in the 1-month outcomes after PS matching as follows, respectively: survival, 8.5% and 10.1%; adjusted odds ratio, 0.89; 95% CI, 0.79–1.00; $p = 0.07$; cerebral performance category 1 or 2, 5.5% and 6.9%; adjusted odds, 0.86; 95% CI, 0.74–1.00; $p = 0.052$.

Conclusions: Compared with S-CPR, the CC-CPR before EMS arrival had an equivalent multivariable-adjusted association with the likelihood of initial shockable rhythm in the patients with OHCA due to presumed cardiac causes that was witnessed by a layperson.