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The Author's Response:

Compression Rate during Cardiopulmonary Resuscitation

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Ho et al. commented on the possibility that most of the subjects in the 120 compressions per minute (CPM) arm received a significant amount of chest compressions with 100 CPM by emergency medical system (EMS) personnel before arriving at hospital. Cardiopulmonary resuscitation (CPR) provided by bystander and/or EMS personnel may confound the results of our study because randomization and intervention were made at the emergency department (ED) instead of at initiation of resuscitation effort at the pre-hospital phase. In our study, most subjects (93.4% of the CPR-100 group and 92.9% of the CPR-120 group) received EMS CPR (1). During the study period, the subjects received manual CPR according to the 2010 CPR guidelines, which recommended compression rate of at least 100 CPM but not exceeding 120 CPM (2). This recommendation does not seem to result in favoring 100 CPM over 120 CPM during pre-hospital resuscitation. A retrospective analysis of the Resuscitation Outcome Consortium (ROC) data revealed that mean chest compression rate during CPR provided by EMS personnel was 111 ± 19 CPM, which was a middle value between 100 and 120 CPM (3). However, a lack of information on compression rate during pre-hospital resuscitation may be one of limiting factors in the course of applying our study results to clinical practice.

They also commented on the possibility of inclusion of the patients who attained restoration of spontaneous circulation (ROSC) en route or had a pulse at the time of arrival of ED. During our study, the patient was included if he or she was in cardiac arrest at the ED admission. Therefore, no patients with a pulse at the time of enrollment were included in the study.

The authors agree to using mechanical chest compression devices for further trials examining the association between chest compression rate and survival from cardiac arrest. Use of the mechanical chest compression device must be the only way to provide accurate and constant rate and depth of chest compression throughout resuscitation period. An important point should be considered when the mechanical chest compression device is used in determining the association between chest compression rate and resuscitation outcome. Differences in the mechanism of blood flow between mechanical chest compression devices and manual chest compressions may influence on the results of the study (4,5). Hemodynamic effect of some mechanical CPR devices may not depend on compression rate, but on compression duration or compression-relaxation ratio (6,7). Factors related to device application such as provider's skill for device application, the accuracy of device application, or the duration of CPR interruption while applying the device need to be considered if the mechanical device is used.

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