

New resuscitation approach for out-of-hospital cardiac arrest associated with increased survival

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Patients who had cardiac arrests outside of the hospital setting and were treated with a resuscitation approach designed to limit interruption of chest compressions, termed minimally interrupted cardiac resuscitation (MICR), were more likely to survive than those patients who received standard treatments, according to a study in the March 12 issue of JAMA.

“Out-of-hospital cardiac arrest is a major public health problem and a leading cause of death,” the authors write. “Although early defibrillation with automated external defibrillators improves survival, early defibrillation is rare and few patients with out-of-hospital cardiac arrest survive. In 2004, the average survival of patients with out-of-hospital cardiac arrest was 3 percent in the state of Arizona.”

MICR, previously referred to as cardiocerebral resuscitation, is a new approach to out-of-hospital cardiac arrest for emergency medical services (EMS) personnel. MICR focuses on maximizing blood flow to the heart and brain through a series of coordinated interventions, and includes an initial series of 200 uninterrupted chest compressions, rhythm analysis with a single shock, 200 immediate post-shock chest compressions before pulse check or rhythm re-analysis, early administration of epinephrine (adrenaline, used to stimulate the heart), and delayed endotracheal intubation (placement of a flexible plastic tube into the trachea for the purpose of ventilating the lungs).

Bentley J. Bobrow, M.D., of Mayo Clinic, Scottsdale, Ariz., and colleagues investigated whether MICR would improve survival from out-of-hospital cardiac arrest. Patients with out-of-hospital cardiac arrests in two metropolitan cities in Arizona before and after MICR training of fire department emergency medical personnel were assessed. In a second analysis of protocol compliance, patients from the two metropolitan cities and 60 additional fire departments in Arizona who actually received MICR were compared with patients who did not receive MICR but received standard advanced life support.

Among the 886 patients with cardiac arrest in the two metropolitan cities, survival-to-hospital discharge increased from 4 of 218 patients (1.8 percent) in the before MICR training group to 36 of 668 patients (5.4 percent) in the after MICR training group. In the subgroup of 174 patients with a witnessed cardiac arrest and ventricular fibrillation (chaotic, irregular heart rhythm that results in little or no circulation but that may respond to defibrillation), survival increased from 2 of 43 patients (4.7 percent) in the before MICR training group to 23 of 131 patients (17.6 percent) in the after MICR training group.

For the protocol compliance analysis, overall survival-to-hospital discharge occurred in 69 of 1,799 patients (3.8 percent) who did not receive MICR and in 60 of 661 (9.1 percent) who received MICR. Survival with witnessed ventricular fibrillation and cardiac arrest occurred in 46 of 387 patients (11.9 percent) who did not receive MICR and in 40 of 141 patients (28.4 percent) who received MICR.

“Why should MICR be associated with improved outcomes after out-of-hospital cardiac arrest” One major contributor to the poor survival rates of patients with out-of-hospital cardiac arrest is prolonged inadequate myocardial and cerebral perfusion. During resuscitation efforts, the forward blood flow produced by chest compressions is so marginal that any interruption of chest compressions is extremely [harmful], especially

for favorable neurological outcomes. Excessive interruptions of chest compressions by pre-hospital personnel are common. Therefore, MICR emphasizes uninterrupted chest compressions,” the authors write.

“In this study, survival-to-hospital discharge of patients with an out-of-hospital cardiac arrest improved significantly after implementation of MICR as an alternate EMS protocol. These findings require confirmation in randomized trials.”

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