

Shorter pause in CPR before defibrillator use improves cardiac arrest survival

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A shorter pause in CPR just before a defibrillator delivered an electric shock to a cardiac arrest victim's heart significantly increased survival, according to a study in *Circulation: Journal of the American Heart Association*.

Researchers found the odds of surviving until [hospital discharge](#) were significantly lower for patients whose rescuers paused [CPR](#) for 20 seconds or more before delivering a shock (the pre-shock pause), and for patients whose [rescuers](#) paused CPR before and after defibrillation (the peri-shock pause) for 40 seconds or more, compared to patients with a pre-shock pause of less than 10 seconds and a peri-shock pause of less than 20 seconds.

"We found that if the interval between ending CPR and delivering a shock was over 20 seconds, the chance of a patient surviving was 53 percent less than if that interval was less than 10 seconds," said Sheldon Cheskes, M.D., principal investigator of the study and assistant professor of [emergency medicine](#) at the University of Toronto. "Interestingly there was no significant association between the time from delivering a shock to restarting CPR, known as the post-shock pause, and survival to discharge. This led us to believe that a primary driver for survival was related to the pre-shock pause interval."

The team also found that patients with peri-shock pauses of more than 40 seconds had a 45 percent decrease in survival when compared to those who had peri-shock pauses of less than 20 seconds.

Based on previous studies, [American Heart Association](#) resuscitation guidelines advise minimizing interruptions to [chest compressions](#) to 10 seconds or less. However, previous studies didn't measure how such pauses in CPR affected survival to hospital discharge.

According to this study, [emergency medical services](#) (EMS) in the United States treat nearly 300,000 cardiac arrest cases a year that occur outside the hospital. Less than 8 percent survive.

Cheskes and colleagues used data gathered by the Resuscitation Outcomes Consortium (ROC), a group of 11 U. S. and Canadian Emergency Medical Services that carry out research studies related to cardiac arrest resuscitation and life-threatening traumatic injury.

Between Dec. 1, 2005, and June 30, 2007, 815 patients suffered a cardiac arrest and were included in the study. They were treated by EMS paramedics in Toronto and Ottawa, Ontario; Vancouver, B.C.; Seattle/King County, Wash. and Pittsburgh, Pa. The patients were treated with either an automated external defibrillator (AED) or a manual defibrillator.

Other findings from the study:

- The length of the post-shock pause showed no significant survival difference between the two groups.
- AEDs were used to treat 40 percent of the cardiac arrests; 20 percent received shocks from a manual defibrillator.
- Patients treated with AEDs had pre-shock pause times nearly double those treated in the manual mode, a median of 18 seconds versus 10 seconds. This likely resulted from the time required for

an AED to analyze the patient's rhythm as well as the time required to charge it prior to delivering a shock.

The study findings could prompt EMS providers and defibrillator manufacturers to adopt changes likely to increase the number of successful cardiac arrest resuscitations, researchers said. These include:

- Paramedics should minimize all CPR [interruptions](#); preferably defibrillate patients in manual mode to limit the pre-shock pause to an "optimal time" of five seconds.
- Manufacturers should modify [defibrillator](#) software to quicken the assessment of a patient's heart rhythm, and allow devices to deliver more timely shocks while in AED mode. "If these changes occur, I think you have at least the potential to see a greater number of patients surviving cardiac arrest," Cheskes said.

Although the study was not a randomized controlled trial, researchers said their findings confirm those of other smaller observational studies and that it would be very difficult to perform a randomized controlled trial given the evidence to date. Furthermore, higher rates of bystander witnessed [cardiac arrest](#) and bystander-provided CPR occurred in the study group which may have resulted in a selection bias. Although the study controlled for a large number of resuscitation variables, the potential for other components of CPR such as compression rate and depth may have also confounded the findings.

Provided by American Heart Association

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