

# Study raises questions over timing of heart shocks in resuscitation guidelines

April 6 2016

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Two studies published by *The BMJ* today evaluate treatments for patients with cardiac arrest in hospital.

The first study suggests that advice to delay giving a second heart shock, known as defibrillation, to patients with cardiac arrest in [hospital](#) is not associated with improved survival.

Guidelines previously called for "stacked" shocks with minimal time delay between defibrillation attempts. But in 2005 the [guidelines](#) were revised to recommend deferring a second attempt at defibrillation to allow time for [chest compressions](#).

However, data on the effect of these changes on survival for patients with cardiac arrest in hospital are lacking.

So a team of US-based researchers used data from a national registry to examine trends in the time interval between first and second defibrillation attempts among 2,733 patients undergoing cardiac arrest in 172 US hospitals.

In line with the guidelines, the proportion of patients with a deferred second defibrillation attempt doubled from about 25% in 2004 to slightly more than 50% in 2012. However, deferred second defibrillation was not associated with improved survival.

This is an observational study so no firm conclusions can be drawn about

cause and effect, but the authors say the findings raise questions about the specific benefit of deferred second defibrillation attempts for patients in hospital. They suggest that further study is necessary to understand whether current guidelines need reconsideration

The second study suggests that early administration of epinephrine (adrenaline) in hospital is associated with poorer outcomes in patients with cardiac arrest and a shockable rhythm (these are certain categories of arrest-associated heart rhythms in which the first line therapy is an electrical shock to restore a normal heart rhythm).

Epinephrine has been used in resuscitation after cardiac arrest for decades. But there are currently differing recommendations for treatment.

For instance, the American Heart Association (AHA) recommends epinephrine after the second defibrillation, while the European Resuscitation Council (ERC) recommends it after the third defibrillation. And clinical practice patterns suggest that epinephrine is used even earlier, such as after the first defibrillation.

So, an international team of researchers set out to describe the use of epinephrine during cardiac arrest in hospital and to assess compliance with AHA recommendations.

They used data from the same US national registry for almost 3,000 patients with cardiac arrest at more than 300 US hospitals. Over half (51%) of patients received epinephrine within two minutes after the first defibrillation, contrary to current guidelines.

Furthermore, receiving epinephrine at this time point was associated with a decreased chance of a good outcome, including survival to hospital discharge, compared with those who were not given epinephrine

within this period.

The same research group previously published a study showing a different association of epinephrine in patients with non-shockable categories of rhythms—early [epinephrine](#) was associated with improved outcomes in this category of patients.

Again the authors point out that this is an observational study so no firm conclusions can be drawn about cause and effect. But they say these findings "might be relevant to guideline developers, educators, and clinicians involved with the care of such [patients](#)."

In a linked editorial, experts from Warwick Medical School say the results from the two studies should inform medical practice.

"The finding of widespread non-adherence with clinical guidelines should prompt those responsible for organising or delivering advanced life support to review their practice and ensure that it is informed by the latest clinical guidelines," they explain.

They add that while "the jury remains out" on the safety or effectiveness of adrenaline in [cardiac arrest](#), "adrenaline should be given in accordance with current guidelines, and it should be deferred until at least after the second shock has been delivered."

**More information:** Defibrillation time intervals and outcomes of cardiac arrest in hospital: retrospective cohort study from Get With The Guidelines-Resuscitation registry

[www.bmj.com/cgi/doi/10.1136/bmj.i1653](http://www.bmj.com/cgi/doi/10.1136/bmj.i1653)

Early administration of epinephrine (adrenaline) in patients with cardiac arrest with initial shockable rhythm in hospital: propensity score matched analysis [www.bmj.com/cgi/doi/10.1136/bmj.i1577](http://www.bmj.com/cgi/doi/10.1136/bmj.i1577)

Editorial: Improving outcomes from in-hospital cardiac arrest  
[www.bmj.com/cgi/doi/10.1136/bmj.i1858](http://www.bmj.com/cgi/doi/10.1136/bmj.i1858)

Provided by British Medical Journal

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