

For cardiac arrest, epinephrine may do more harm than good

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For patients in cardiac arrest, administering epinephrine helps to restart the heart but may increase the overall likelihood of death or debilitating brain damage, according to a study published today in the *Journal of the American College of Cardiology*.

The study offers new data in an ongoing debate over the risks and benefits of using [epinephrine](#) to treat [cardiac arrest](#), an often-fatal condition in which the heart stops beating. Epinephrine, also known as adrenaline, is a hormone that stimulates the heart and promotes the flow of blood. Current international guidelines recommend administering 1 milligram of epinephrine every 3-5 minutes during resuscitation.

"The role of epinephrine is more and more questionable in cardiac arrest," said the study's lead author Florence Dumas, M.D., Ph.D., of the Parisian Cardiovascular Research Center in France. "We need to constantly assess our procedures and protocols to make sure that the use of epinephrine is effective and done at the correct time."

She added that this study underscores the need for caution when using epinephrine. Administering epinephrine to patients in cardiac arrest has been shown to improve the chance of restarting the heart, known as return of spontaneous circulation or ROSC. But the new study adds to mounting evidence suggesting the drug harms patients' chances of surviving past the post-resuscitation period with brain function intact.

Dumas and colleagues analyzed hospital records for more than 1,500

people admitted to a large Parisian hospital over a 12-year period. Patients included in the analysis had suffered out-of-hospital cardiac arrest, been resuscitated and achieved ROSC. Nearly three-quarters of the patients had received at least one dose of epinephrine.

The primary outcome measured was discharge from the hospital with normal or only moderately compromised brain functioning. Sixty-three percent of patients who did not receive epinephrine achieved this outcome, compared to only 19 percent of those who received epinephrine.

Patients receiving higher doses of epinephrine fared worse than those with lower doses. As compared to patients who received no epinephrine, those receiving 1-milligram doses were 52 percent more likely to have a bad outcome and those receiving 5-milligram or larger doses were 77 percent more likely to have a bad outcome.

Timing also appears to be an important factor. Patients receiving epinephrine in the later stages of resuscitation were more likely to die than those who got their first epinephrine dose shortly after collapsing. The adverse effects of epinephrine appeared to be unaffected by the use of post-resuscitation medical treatments, such as techniques to cool the body to reduce tissue damage or interventions to restore the flow of blood through blocked arteries.

The patients who had not received epinephrine typically had other characteristics that improved their outlook. For example, patients in this group were generally younger and more likely to have been near a witness when they collapsed. However, the research team employed a variety of robust statistical methods to account for these differences.

Dumas said the results do not necessarily indicate an immediate need to change the guidelines, however. "It's very difficult, because epinephrine

at a low dose seems to have a good impact in the first few minutes, but appears more harmful if used later," said Dumas. "It would be dangerous to completely incriminate this drug, because it may well be helpful for certain [patients](#) under certain circumstances. This is one more study that points strongly to the need to study epinephrine further in animals and in randomized trials."

In addition to further research on epinephrine, Dumas said the study reinforces the need to continue investigating other drugs and drug combinations that might offer safer alternatives to epinephrine during cardiac arrest.

Each year, more than 420,000 cardiac arrests occur in the United States. Its immediate cause is typically an abnormality in the heart's rhythm, which can result from numerous risk factors including [coronary artery disease](#), heart attack, an enlarged heart or other heart conditions. Cardiopulmonary resuscitation and defibrillation are the primary treatments.

Provided by American College of Cardiology

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