Medical Xpress

Safety data favor norepinephrine over dopamine for shock

March 3 2010

Physicians treating patients with shock should consider norepinephrine instead of dopamine as a tool for stabilizing blood pressure, according to an editorial in the March 4, 2010, issue of the *New England Journal of Medicine* (NEJM).

Jerrold Levy, MD, FAHA, professor and deputy chair for research, Department of Anesthesiology, Emory University School of Medicine, and co-director of cardiothoracic anesthesiology, Emory Healthcare, authored the editorial.

The editorial accompanies a report in the same issue of NEJM on a European clinical trial evaluating dopamine and norepinephrine in shock patients. The randomized trial, led by Daniel De Backer, MD, PhD, at Erasme University Hospital in Belgium, compared 28-day mortality in 1679 patients treated for shock with dopamine or norepinephrine in Austria, Belgium and Spain between 2003 and 2007.

"Dopamine has been commonly used as a first-line therapy for shock at many hospitals for years, partially because of the widespread perception that norepinephrine is associated with adverse events," Levy says. "The current study supports the concept that shock from any cause carries a high risk of death, and raises significant concerns about the safety of dopamine."

Shock, or dangerously low blood pressure, can occur as a result of sepsis (severe inflammation resulting from bacterial infection), heart failure

(cardiogenic), hemorrhage (severe blood loss) or anaphylaxis. Most of the patients (62.2 percent) in the European trial had septic shock, 16.7 percent had heart failure and 15.7 percent hemorrhage.

The authors of the clinical study reported no overall difference in death rates at 28 days. However, heart arrhythmias were almost twice as common in the dopamine group (24.1 percent vs 12.4 percent) and mortality was higher for patients with cardiogenic shock treated with dopamine.

A previous observational study showed that dopamine's use in intensive care units added to the risk of death, and rapid heart rate is known to be a frequent side effect of dopamine, Levy notes.

Norepinephrine has been used to stabilize patients' blood pressure during cardiac and non cardiac surgery, and in intensive care units after surgery. Vasopressin, although not studied in the European clinical trial, is also a viable alternative treatment for shock, Levy says.

The hormones dopamine and norepinephrine have functions in the brain, helping neurons communicate, as well as in the body to maintain vascular tone. In an emergency situation, they both can increase blood pressure by constricting blood vessels. Dopamine is the precursor to norepinephrine in the sympathetic nervous system, and thus acts indirectly.

"The data challenge consensus guidelines that recommend dopamine as the initial vasopressor for increasing arterial pressure in the case of septic shock or cardiogenic shock," Levy writes in the editorial.

"In addition, norepinephrine needs to be considered as an initial therapeutic agent for patients in circulatory shock. … The results of the study by De Backer et al should also put an end to the outdated view that

the use of norepinephrine increases the risk of death."

Provided by Emory University