

Giving trauma patients blood pressure stabilizing hormone cuts transfusions by half

29 August 2019



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Giving trauma patients with severe blood loss the hormone arginine vasopressin (AVP) cut the volume of blood products required to stabilize them by half, according to results of a new, first-of-its-kind clinical trial from Penn Medicine. The finding, published online this week in *JAMA Surgery*, suggests that administering AVP to trauma patients with severe bleeding could become standard practice in trauma care, reducing the use of blood products and their adverse side effects. The authors say the study is particularly important for the treatment of patients with gun-related injuries. Each year, there are over 100,00 firearm-related injuries with over 36,000 deaths.

"Unintentional traumatic injuries are the leading cause of death in the United States for people younger than 45, and the injuries often involve severe [blood](#) loss. We can replace a patient's lost blood with blood products such as packed [red blood cells](#), fresh frozen plasma, and platelets, but use of these options can lead to serious

complications and they may not fully replace key molecules in blood that are needed to support blood pressure and the normal function of vital organs," said Carrie A. Sims, MD, Ph.D., an associate professor of Surgery and Laboratory Director of the Penn Acute Research Collaboration. "The results of this trial suggest a promising way to reduce the amount of blood needed to save the lives of patients with life-threatening injuries."

In the trial, 100 [trauma patients](#) were treated using low-dose AVP, a small protein produced in the hypothalamus and stored in the pituitary gland. AVP is secreted into the bloodstream when blood pressure is too low, and has the effect of constricting some blood vessels to bring blood pressure back up to the normal range. Treating [trauma](#) patients with AVP significantly decreased the need for blood products without increasing complications.

Prior studies have shown that patients with severe blood loss—a condition called hemorrhagic shock—may have lost most of their stores of AVP and/or their ability to secrete it into the circulation. For that reason, restoring an adequate [blood pressure](#) in these patients often requires the infusion of more blood products, involving more potential complications, than would otherwise be needed if AVP were present. Replacing AVP artificially in hemorrhagic shock patients may be a good way to reduce unnecessary blood product use and improve patient outcomes. Experiments in animal models have suggested that is the case, but Sims and colleagues are the first to test the idea with a rigorous clinical trial design.

From May 2013 through May 2017 at a Penn Medicine trauma center, they enrolled 100 trauma patients who had been brought in with hemorrhagic shock and otherwise met the study criteria. All but

seven were male victims of gunshot or knife wounds. The researchers randomized 49 of the patients to receive AVP in an initial moderate dose plus a slow infusion—during the first 48 hours of care—and the other 51 to receive the placebo equivalent.

The researchers found that the patients treated with AVP for 48 hours ended up receiving an average of 1.4 liters of blood products—less than half the average amount given to those treated with the placebo (2.9 liters).

The AVP group also had a markedly lower rate (11 percent vs. 34 percent) of deep-vein thrombosis—blood clot in a leg vein—which is a common complication in trauma patients. Rates of complications within 30 days for the AVP and placebo groups were otherwise similar (55 percent vs. 64 percent), and the numbers of deaths in that period were the same (six in each group). Other findings showed that although the AVP group had shorter average stays in the hospital compared to the placebo group, the relatively small number of patients in the study meant that these length-of-stay differences were not statistically significant.

With the promising results from this initial study in hand, the researchers hope to initiate a larger study that would help determine whether AVP could save lives affected by severe trauma.

More information: Carrie A. Sims et al, Effect of Low-Dose Supplementation of Arginine Vasopressin on Need for Blood Product Transfusions in Patients With Trauma and Hemorrhagic Shock, *JAMA Surgery* (2019). DOI: [10.1001/jamasurg.2019.2884](https://doi.org/10.1001/jamasurg.2019.2884)

Provided by Perelman School of Medicine at the University of Pennsylvania

APA citation: Giving trauma patients blood pressure stabilizing hormone cuts transfusions by half (2019, August 29) retrieved 2 August 2022 from <https://medicalxpress.com/news/2019-08-trauma-patients-blood-pressure-stabilizing.html>

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