

# Two treatment innovations improve heart function after heart attack

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Supersaturated oxygen (SSO<sub>2</sub>) administered during catheter-based treatments for heart attack can significantly reduce heart muscle damage, according to a new study reported in *Circulation: Cardiovascular Interventions*, a journal of the American Heart Association.

In another study from the same issue, a different group of researchers found that manually removing a blood clot provided greater recovery of heart function after a [heart attack](#).

"The greatest benefits were seen in the patients most at risk," said Gregg W. Stone, M.D., lead author of the SSO<sub>2</sub> study, and professor of medicine at Columbia University Medical Center in New York, N.Y. "The larger the heart attack, the more [heart muscle](#) salvaged."

SSO<sub>2</sub> — highly concentrated oxygen mixed in blood and delivered to the area of heart muscle dying after a heart attack — showed promise in animal studies and a previous human trial (AMIHOT-I). So Stone and his colleagues conducted AMIHOT-II with a similar protocol, focusing on patients with anterior ST-segment elevation myocardial infarctions (STEMIs) who were treated within six hours of heart attack symptoms.

"STEMIs are the large attacks," Stone said. "They have a really bad early prognosis because there is so much heart muscle lost." When a large area of the heart is damaged, heart failure is more likely.

Of the 733,000 Americans who suffer acute coronary syndromes (i.e. heart attack or chest pain) each year, 361,000 (almost half) have a STEMI. Catheter-based percutaneous [coronary intervention](#) (PCI) is a procedure that can effectively open blocked arteries in STEMI patients.

The AMIHOT-II researchers studied 301 STEMI patients who arrived within six hours after the onset of symptoms at 20 sites in four countries. The researchers randomized 222 to receive PCI plus SSO2 — infused for 90 minutes during treatment -- and 79 to PCI only. Some of their analyses also included data pooled from 101 patients from the AMIHOT-I.

Major study findings included:

- In AMIHOT-II patients, heart damage 14 days after treatment averaged 26.5 percent of the left ventricle for PCI-only patients and 20 percent for the PCI plus SSO2 group. Pooled data from both AMIHOT studies showed 25 percent damage in PCI-only patients and 18.5 percent in the SSO2 group.
- Among 154 patients whose left ventricle ejected less than 40 percent of the blood with each contraction prior to treatment, the PCI-only group had 33.5 percent damage versus 23.5 percent in the SSO2 patients. "For patients with large heart attacks, this is the first therapy shown to be beneficial in an adequately powered, multicenter trial," Stone said.
- In those with more than 40 percent blood ejection, muscle damage was 16.5 percent in PCI-only patients and 12.5 percent in the SSO2 group, which is a similar relative reduction in heart attack size as in patients with larger attacks, but a smaller absolute reduction.

- Researchers found no significant differences between the two groups of AMIHOT-II patients in the levels of blood markers that indicate a heart attack, or in the percentage of heart muscle at risk of dying, which was measured three hours after treatment.
- At 30 days post-op, the pooled data showed the two groups had similar percentages of major adverse events — death, another heart attack, reopening the same heart artery and stroke: 4.7 percent for the SSO2 patients and 5.1 percent for PCI-only group.

"Some scientists have questioned the safety of SSO2 in heart patients, but only a few major and minor problems occurred in AMIHOT-II, and the study met all of its pre-defined safety endpoints," Stone said.

In the same issue of *Circulation: Cardiovascular Interventions*, Francesco Liistro, M.D., and colleagues at San Donato Hospital in Arezzo, Italy, reported that manually removing a blood clot during PCI provides STEMI patients greater heart muscle perfusion and recovery of left ventricle function.

In their single-center study, researchers randomized 55 patients to clot aspiration and 56 to standard PCI. In PCI, a physician typically inflates a balloon on a catheter tip to flatten a clot against the vessel wall, and then inserts a metal-mesh stent to prop the vessel open.

Instead of using a balloon, which leaves clot debris in the blood, the team pushed a special catheter into the blockage and sucked the clot into the tube to remove it from the body before stenting.

Major study findings included:

- The ST-segment of an electrocardiogram returned to normal in 39 (71 percent) of the clot-aspiration group versus 22 (39 percent) of those getting standard PCI.
- Ninety-six percent of aspiration patients reached TIMI grade 3, the desired blood flow through the opened artery, compared to 82 percent for the standard PCI group.
- Aspiration patients showed a higher rate of artery perfusion, as measured by ultrasound, than those getting standard PCI, 85 percent versus 64 percent.

Source: American Heart Association ([news](#) : [web](#))

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