

New method for performing aortic valve replacement proves successful in high risk patients

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Researchers at the National Institutes of Health (NIH) have developed a new, less invasive way to perform transcatheter aortic valve replacement (TAVR), a procedure widely used to treat aortic valve stenosis, a lethal heart condition. The new approach, called transcaval access, will make TAVR more available to high risk patients, especially women, whose femoral arteries are too small or diseased to withstand the standard procedure. The *Journal of the American College of Cardiology* published the findings.

Aortic valve stenosis involves the narrowing of the heart's aortic valve which reduces blood flow through the heart. For about 85 percent of patients with this condition, doctors typically perform TAVR through the femoral artery in the leg. But for the other 15 percent, doctors must find a different access route. The most common alternative routes are through the chest, which requires surgery and are associated with significantly more complications.

Transcaval access, which can be performed in awake patients, involves electrifying a small wire so that it crosses between neighboring blood vessels in the abdomen. The technique calls for making large holes in both the abdominal aorta and the inferior vena cava, which physicians previously considered dangerous because of the risk of fatal bleeding.

The new method was developed by researchers at the National, Heart,



Lung and Blood Institute (NHLBI) and tested in a trial on 100 patients at 20 hospitals across the United States. Researchers said it proved successful in 99 of the patients.

"This is a seminal study," said the lead author, cardiologist Adam B. Greenbaum, M.D., co-director of the Henry Ford Hospital Center for Structural Heart Disease, Detroit. "It challenged conventional wisdom, objecting to the idea of safe passage between the vena cava and the aorta. More important, it is the first of many non-surgical minimallyinvasive tissue-crossing, or so-called transmural catheter procedures developed at NIH that can be applied to diverse fields of medicine."

Robert J. Lederman, M.D., a senior investigator in NHLBI's Division of Intramural Research who led the study, said researchers developed the method to address a specific clinical need, even though they knew it would be a challenging proposition for most surgeons and physicians to accept. The proposed and counterintuitive mechanism of action is that bleeding from the aorta spontaneously decompresses into a corresponding hole the physician makes in the vein, because the surrounding area behind the peritoneum has higher pressure than the vein.

The results of the research, which were independently confirmed by a committee of outside cardiologists, show the procedure not only has a high success rate, but also an acceptable rate of bleeding and vascular complications, particularly in the high risk patients studied. The study builds on the access technique that Lederman's NHLBI team developed and first tested in animals in 2012 and first applied with Henry Ford physicians to help patients in 2013. NHLBI and its collaborators are now working to find ways to train more specialists to perform the procedure.

The study will also be presented on Monday, October 31 at the Transcatheter Cardiovascular Therapeutics conference in Washington,



D.C. Co-authors include researchers from Henry Ford Hospital; Emory University, Atlanta; Oklahoma Heart Institute, Tulsa; Lexington Medical Center, West Columbia, South Carolina; and Oschner Medical Center, New Orleans.

Provided by NIH/National Heart, Lung and Blood Institute

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