New research addresses incidence of atrial fibrillation after aortic valve replacement

June 3 2019

Pankaj Arora, M.D., examines a patient. Credit: UAB

Physician-scientists from the University of Alabama at Birmingham and the University of Minnesota have published findings that conclude a substantial burden of new-onset atrial fibrillation was observed after

transcatheter aortic valve implantation and aortic valve replacement.

Their findings were recently published in the prestigious journal *JAMA Internal Medicine*.

Transcatheter aortic valve implantation, or TAVI, is a minimally invasive procedure used to treat aortic stenosis, which is a narrowing of the heart valve that connects the heart to the central blood vessel, the aorta. This problem typically afflicts people in the middle and elderly age groups. Surgical aortic valve replacement has been the gold standard treatment for many years for patients with aortic stenosis. TAVI was developed in the last 15 years and was initially used only for patients unable to undergo open heart surgery to receive surgical aortic valve replacement.

While TAVI has advanced significantly, researchers have also found that both TAVI and surgical aortic valve replacement may be associated with more atrial fibrillation, which is an irregular heart rhythm that causes the top chambers of the heart to quiver erratically. Atrial fibrillation is widely known to be associated with an increased risk of stroke. The authors attempted to evaluate how commonly patients developed atrial fibrillation after TAVI and surgical aortic valve replacement procedures and the consequences of developing new atrial fibrillation.

The authors said in their paper they hypothesized that atrial fibrillation "was a common occurrence after both TAVI and AVR, and that the incidence of atrial fibrillation was associated with greater in-hospital stroke and mortality." Data was used from more than 50,000 TAVI procedures and 100,000 surgical aortic valve replacement procedures from the National Inpatient Sample to evaluate their hypotheses.

The University of Minnesota's Rajat Kalra, M.D., a graduate of UAB's Tinsley Harrison Internal Medicine Residency, was the first author of

the study and collaborated with investigators from UAB to address the above themes.

"The progress that has been made to develop and test TAVI should be heralded as one of the greatest advances in modern-day medicine," Kalra said. "The use of TAVI and aortic valve replacement will only continue to increase as the American population ages. However, we are now acknowledging that there can be many unintended effects from TAVI and surgical aortic valve replacement. We felt strongly that we needed more data to clarify the effects of these procedures on heart rhythm, stroke and mortality for clinicians and patients who are jointly deciding how to treat aortic valve problems."

The researchers found that approximately 50 percent of hospitalizations for both TAVI and surgical aortic valve replacement were associated with the development of new atrial fibrillation. The hospitalizations with new atrial fibrillation had higher odds of in-hospital stroke and in-hospital death compared to hospitalizations that did not develop atrial fibrillation around the procedure. The hospitalizations with new atrial fibrillation also tended to be longer. These results were confirmed with the New York State Inpatient Database, an administrative database with a unique patient-linked identifier, where the group found a 15 percent risk of developing atrial fibrillation after TAVI. However, the patients developing atrial fibrillation had similar or even higher odds of in-hospital mortality and longer length of stay in the State Inpatient Database cohort.

"Whether the procedure is an open surgical procedure or minimally invasive, such as TAVI, we can all intuitively imagine that putting a prosthetic valve into the heart causes a number of inflammatory, hemodynamic and structural changes," said senior author Pankaj Arora, M.D., an assistant professor in UAB's Division of Cardiovascular Disease. "This may be the reason we see patients commonly develop

abnormal heart rhythms like atrial fibrillation after these procedures, particularly given that the population receiving these procedures is typically elderly with a number of other health problems."

Arora also stressed that there were important limitations of this study.

"Atrial fibrillation is notoriously hard to diagnose because it can be transient, so it is likely that a proportion of these patients had undiagnosed atrial fibrillation before the procedure, especially in the NIS database, which is less granular," Arora said. "This may be why we saw different estimates of atrial fibrillation in the two datasets. Nonetheless, the cumulative (incident plus prevalent) burden of atrial fibrillation if you are 80 years old is approximately 50 percent. Our results suggest that the occurrence of atrial fibrillation after TAVI and surgical aortic valve replacement is an important topic for clinicians to discuss with their patients before they have these procedures."

Considering more than 90 percent of payments for TAVI are from Medicare and—in a previous paper last year—Arora's group explored how proposed funding cuts may impact the sustainability of TAVI, putting the emphasis on patient selection.

"TAVI reminds me of an era in percutaneous coronary intervention where every community hospital in the United States is rushing to set up a TAVI program in order to start doing these procedures," Arora said. "It's not only about the technology or the techniques for doing the TAVI procedures but also about selecting the right patient by using a shared decision-making model. Objectivity in decision-making and selecting the correct patient for any of these percutaneous procedures is more than half the battle."

More information: *JAMA Internal Medicine* (2019). DOI: 10.1001/jamainternmed.2019.0205

Provided by University of Alabama at Birmingham