100 TAVRs at Oklahoma Heart Institute

By Kamran I. Muhammad, MD, FACC, FSCAI and Georgianne Tokarchik, APRN-CNS

On July 22, 2014, Oklahoma Heart Institute's valve team performed the 100th transcatheter aortic valve replacement (TAVR) procedure at our facility. This represents a highly significant milestone for our patients, institution and community. In the next few pages I will share with you the life-saving role of TAVR, the history of our TAVR program, the important milestones and "firsts" that we have achieved, and our excellent outcomes over the past three years.

On July 22, 2014, Oklahoma Heart Institute's valve team performed the 100th transcatheter aortic valve replacement (TAVR) procedure.

Oklahoma Heart Institute performed the first TAVR in Tulsa and the region on May 2, 2012, just six months after this lifesaving technology was FDA approved for commercial use in the US.

Aortic Stenosis and Transcatheter Aortic Valve Replacement

Aortic stenosis is the most common cardiac valvular abnormality in the United States. This disorder results in restricted opening of the main valve of the heart that separates the left ventricle from the aorta. It is estimated that aortic stenosis affects approximately 5 of every 10,000 adults, with the prevalence increasing with age. Severe aortic stenosis results in severe symptoms of congestive heart failure (shortness of breath, leg swelling, pulmonary edema), chest pain/angina or syncope (nearly passing out or passing out). Many patients, however, also present with non-specific symptoms, such as decreased exercise tolerance. Prompt recognition of the onset of symptoms due to severe aortic stenosis is essential, as mortality dramatically increases after such symptoms develop. Specifically, the 2-year mortality after the onset of symptoms in severe aortic stenosis is 50%, and the 5-year mortality is 80%. As such, prompt evaluation for aortic valve replacement is recommended for patients with severe symptomatic aortic stenosis.

Surgical aortic valve replacement is a well-established and effective treatment for severe aortic stenosis, is generally associated with low operative mortality, and is considered the gold-standard therapy. Surgical replacement of the aortic valve results in improvement of symptoms and normalizes survival. However, given the highly invasive nature of open-heart surgery for surgical aortic valve replacement, coupled with the age group and associated comorbidities of patients with severe aortic stenosis, there remain a large number of patients with severe aortic stenosis that go untreated. Indeed, numerous studies over the past decade have shown that at least 40% of patients with severe aortic stenosis never undergo surgical aortic valve replacement.

Transcatheter aortic valve replacement (TAVR) has been developed as a minimally-invasive approach to aortic valve replacement in patients with severe symptomatic aortic stenosis who are high-risk for surgical aortic valve replacement. Major trials of TAVR across the US and the world have demonstrated that it is an extremely effective therapy in this population, dramatically improving quality of life, reducing hospital admissions and markedly improving survival. In fact, recent data have demonstrated that TAVR is superior to surgical aortic valve replacement in reducing mortality in high-risk patients.

In contrast to surgical aortic valve replacement, TAVR is performed without major surgical incisions, and generally there is no need to stop the heart or use cardiopulmonary bypass (heart-lung machine) with TAVR as compared with surgery. Most TAVR procedures can be performed percutaneously (without any surgery) through the femoral artery (major artery in the groin), similar in concept to a heart catheterization procedure. Because of this, most patients undergoing transfemoral TAVR are able to go home within 2-4 days of

We have achieved many firsts in a short time period, including performing the first alternative-access TAVRs in the city, the first valve-in-valve TAVR in the state as well as the first TAVR without general anesthesia in the state (Table 1). Now we are the first program in the city to have achieved the milestone of 100 TAVR procedures.

Table 1
OHI TAVR Program – Firsts

May 2, 2012	Performed first TAVR in Tulsa
Nov. 13, 2012	First transapical TAVR in Tulsa
June 4, 2013	First transaortic TAVR in Tulsa
Nov. 26, 2013	First valve-in-valve TAVR in Oklahoma
Feb. 21, 2014	First commercial CoreValve TAVR in Oklahoma
Feb. 21, 2014	First TAVR without general anesthesia in Oklahoma
June 24, 2014	First commercial Sapien XT TAVR in Oklahoma

their procedure.

Transcatheter Aortic Valve Replacement at Oklahoma Heart Institute

Oklahoma Heart Institute performed the first TAVR in Tulsa and the region on May 2, 2012, just six months after this lifesaving technology was FDA approved for commercial use in the US. This was a major achievement and breakthrough to bring this important therapy to our city and larger community. Since then, the Oklahoma Heart Institute valve team has been on the forefront of advances in valve and TAVR technology. Through the support of our referring physician partners, hospital system, and patients we have successfully built the premier and most comprehensive valve program in the city and state. With this collaborative and innovative spirit, we have achieved many firsts in a short time period, including performing the first alternative-access TAVRs in the city, the first valve-in-valve TAVR in the state, as well as the first TAVR without general anesthesia in the state (Table 1). Now we are the first program in Tulsa to have achieved the milestone of 100 TAVR procedures.

Achieving the milestone of 100 TAVR procedures at Oklahoma Heart Institute is something we are very proud of. It is well known that larger procedural volumes are associated with better outcomes in medicine and surgery, and this is certainly true for TAVR. Our TAVR volumes are more than double that of any program in Tulsa, and are in the top 15% of TAVR programs nationally. Out of approximately 300 centers in the US that perform TAVR, only about 50 have performed more than 100 TAVR procedures. This puts Oklahoma Heart Institute into an elite and exclusive group of advanced heart and valve centers in the United States.

With this spirit of innovation and advancement, Oklahoma Heart Institute has always put patients first. This is evident in the excellent outcomes we have experienced following TAVR. Table 2 summarizes the age range and demographics of the patients treated at Oklahoma Heart Institute with TAVR. As is noted, the average age of patients undergoing TAVR at Oklahoma Heart Institute is 82 years. Additionally, our patients typically have multiple serious co-morbidities, and more than a quarter (29%) have had previous open-heart surgery. Table 3 highlights important outcomes from our TAVR program, including 30-day and 1-year mortality rates as well as stroke, with comparisons to nationally reported data. As noted, our outcomes are superior to nationally reported data, consistent with our mission to be the premier valve program in the region. Additionally, as also noted in Table 3, the average patient length of stay after TAVR at our institution is very low (3.4 days for transfemoral cases), and significantly lower than nationally reported data.

Conclusions

With your support, Oklahoma Heart Institute will continue to expand its valve and TAVR programs over the coming months and years. It is expected that the technology associated with TAVR will continue to improve, thereby making the procedure safer and available to larger numbers of patients. Additionally, we expect that TAVR will be approved for lower risk populations in the future. Percutaneous, minimally-invasive technology for mitral valve repair has also been recently approved but is currently only available at a few centers in the US. Oklahoma Heart Institute aims to be the first program to bring this technology to Tulsa and the region in the next few months, similar to what was achieved with TAVR. With these and other initiatives, we are confident that Oklahoma Heart Institute will remain the premier and most comprehensive valve and TAVR center in the region.

Kamran I. Muhammad, MD is a subspecialist in interventional cardiology at Oklahoma Heart Institute in Tulsa, OK with expertise in cardiac catheterization, coronary intervention (including angioplasty, stent placement, atherectomy, intravascular imaging), peripheral vascular intervention (including carotid intervention), as well as interventional therapies for structural heart disease, including PFO, ASD, and valvular disease. Dr. Muhammad serves as the Director of the Structural Heart Disease and TAVR programs at Oklahoma Heart Institute.

Table 2
Demographics

Baseline Characteristics	100 TAVR Patients
Average age	82 years (57-97)
Female gender	48%
Coronary artery disease	60%
Prior CABG	29%
COPD	35%
Chronic kidney disease	47%
Diabetes mellitus	42%
Frailty	48%
Severe LV dysfunction	15%

Table 3
Outcomes

Outcome	OHI	ACC / STS Guidelines	PARTNER Trial	TVT Registry
Transfermoral 30-day mortality	4.2%	<15%	5%	7.6%
Past year	2.3%			
1-year mortality	24.5%	<40%	31% (TAVR) 51% (Medical Rx)	26.2%
Stroke	2%	<15%	11.2%	3.6%
30-day CHF rehospitalization	2.4%		5.6%	
Length of stay (days)	6		12 (TAVR) 16 (SAVR)	6
Transfemoral	3.4		10	5