

AN INTERVIEW WITH...

Samir R. Kapadia, MD

Dr. Kapadia discusses in-progress and anticipated cardiovascular innovations, current research in mitral and tricuspid intervention, insight into stroke prevention during TAVR, and more.



Along with your many academic and clinical responsibilities, you are involved in device development and engineering, with several filed patents for treating valvular heart disease. What do you enjoy about this work, and is there a particular development that you're most proud of?

I personally enjoy device innovations and clinical research, with the hope to contribute in a meaningful way to the field. Over the years, I have developed several devices: Some of them still require more work and others have progressed to near final clinical stages. Currently, we are working on a mitral valve repair device that is being developed by a company—Mitria. This device was tested in experimental models, animal models, and with initial first-in-human experience. An easy-to-use, precise delivery system is being developed for this device at this time.

With this technology expertise, can you share a few predictions regarding cardiovascular innovation trends we might see in the next 5 years or so? Where do you want to see more advancement in terms of technology?

I think the next 5 years in cardiovascular medicine will be about precision medicine, with genetics and artificial intelligence (AI) helping to fine-tune our recommendations for diagnosis and management. Additionally, health care delivery will need to be more efficient and less costly.

Your work in recent years has focused on valvular interventions. What do you think is the most needed next phase of research here? What questions should we be asking as we advance in the next stage of our knowledge of and research base for structural heart disease?

Many patients are looking for minimally invasive options for valvular heart disease. However, in order to be widely applicable, these treatments must be safe and durable. In percutaneous therapies for valvular heart disease, the most important challenge is the detailed visualization of anatomy in the beating heart and precision of device manipulation. As we develop new devices, another important factor beyond procedural safety and effectiveness is the durability of device and treatment.

Among several recent publications centered around the mitral valve, you and colleagues considered the utility of the MitraCox score for predicting in-hospital mortality in patients undergoing transcatheter edge-to-edge mitral valve repair (TEER).¹ How does this scoring system work, and how would you explain its benefit to other clinicians?

As mentioned above, there are several new methods of predicting outcomes, including AI. The MitraCox score is an attempt to predict outcomes after TEER using an administrative database. This score informs patients and caregivers about possible outcomes using clinical variables at the time of presentation. Although the database does not include anatomic variables, it provides good estimation of the risks and benefits from presenting clinical variables. As we have more precise data and methods to analyze images with outcomes in a more sophisticated way, we will be even better prepared to predict the response to therapy in the near future.

Another key paper of yours from recent years looked at caval valve implantation for severe symptomatic tricuspid regurgitation.² What are the primary knowns and unknowns regarding this treatment?

Many patients with tricuspid regurgitation are not candidates for the currently available therapies, and

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the main problem with tricuspid regurgitation is systemic venous congestion. The TricValve (P&F Products & Features GmbH) is an easy solution for this problem, where superior and inferior vena cava valves are placed to prevent venous congestion, despite the tricuspid regurgitation. We are working on the pivotal trial to answer the key question of its safety and efficacy.

You have led the charge in research on stroke prevention in patients undergoing transcatheter aortic valve replacement (TAVR). How do potential risk factors for stroke factor into your decision-making process when considering a patient for TAVR? How do you manage patients' fears regarding this potential complication?

Stroke remains a major concern for patients undergoing TAVR. There are several potential ways to prevent stroke, including procedural modifications, cerebral embolic protection devices, and periprocedural pharmacologic therapies. One of these devices, the Sentinel (Boston Scientific Corporation), was studied in the PROTECTED TAVR trial. Even in that trial, although all strokes were not reduced, there was an indication that disabling strokes were less frequent with Sentinel use. There is increasing evidence to support this observation, as well as an ongoing trial in the United Kingdom (BHF PROTECT-TAVI) to answer this question of stroke reduction with Sentinel. We expect to have more data later this year on this device and similar devices for stroke prevention.

Further, other causes of stroke should be kept in mind, including atrial fibrillation (AF). WATCH-TAVR is another study that provides a treatment option for patients with AF and aortic stenosis who are looking for alternatives to anticoagulation.

In *Circulation: Cardiovascular Quality and Outcomes*, you published a research letter calling attention to the low number of African-led cardiovascular clinical trials.³ Can you tell us a bit about your group's rationale for embarking on this work? How can United States/European physicians help support these researchers and their work?

Research and innovations should be worldwide and include many different populations. To reach this goal, we have to encourage different countries (and continents) to lead and engage in research efforts. Awareness of disparities in research is the first step—the second step is to mitigate this problem with well-directed efforts. Training of trialists and investing in the infrastructure in underdeveloped countries can help improve health care research disparities.

What impact do you hope you ultimately have on the interventional cardiology field?

I hope to develop and promote methods to continuously innovate and then test these innovations in well-designed clinical trials. The most important element to attain this goal is to train leaders who can continue to move the field forward.

What are your favorite activities outside of work?

Whatever little time I get outside of work, I love to spend with my loving family. I have always enjoyed studying astronomy and mathematics. I love to watch deep sky objects with my telescope when I get the opportunity and read about the concepts in astrophysics. ■

1. Kathavarayan Ramu S, Agrawal A, Shekhar S, et al. MitraCox score predicts in-hospital mortality in patients admitted for transcatheter edge-to-edge mitral valve repair. *Am J Cardiol.* 2023;207:39-47. doi: 10.1016/j.amjcard.2023.08.160
2. Badwan OZ, Skoza W, Mirzai S, et al. Clinical outcomes after caval valve implantation for severe symptomatic tricuspid regurgitation: a meta-analysis. *Am J Cardiol.* 2023;205:84-86. doi: 10.1016/j.amjcard.2023.07.003
3. Abushouk AI, Sayed A, Ghanem E, et al. Africa on the global stage: analyzing 30 years of African-led clinical trials in cardiovascular medicine. *Circ Cardiovasc Qual Outcomes.* 2023;16:e009895. doi: 10.1161/CIRCOUT-OMES.122.009895

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