

IMAGES IN INTERVENTION

2-Year Follow-Up of the First in Human Transapical Implantation of Transcatheter Inverted Aortic Valve to Treat Native Mitral Valve Stenosis



Vaikom Subramanian Mahadevan, MD,* Imthiaz Manoly, MD,† Ragheb Hasan, MD†

After our initial publication of the first in human transapical implantation of an inverted transcatheter (SAPIEN valve, Edwards Lifesciences, Irvine, California) in the native mitral position (1), we now report a 2-year clinical and echocardiographic follow-up with transesophageal echocardiographic images from the same patient. There has been a further report of successful implantation of transcatheter valve percutaneously as well for native mitral valve stenosis (2).

As reported previously, an inverted 29-mm SAPIEN valve was implanted in the native mitral position 2 years ago. The patient has been undergoing routine clinical follow-up for 2 years and underwent further transesophageal echocardiographic assessment at 20 months after providing informed consent to assess valve function in detail because there are no follow-up data on such implants in the native mitral position.

During the follow-up-period, she was admitted to the hospital for a respiratory infection and made a good recovery. She had no cardiac issues, with good exercise tolerance compared with her pre-procedural status. Transesophageal echocardiography revealed

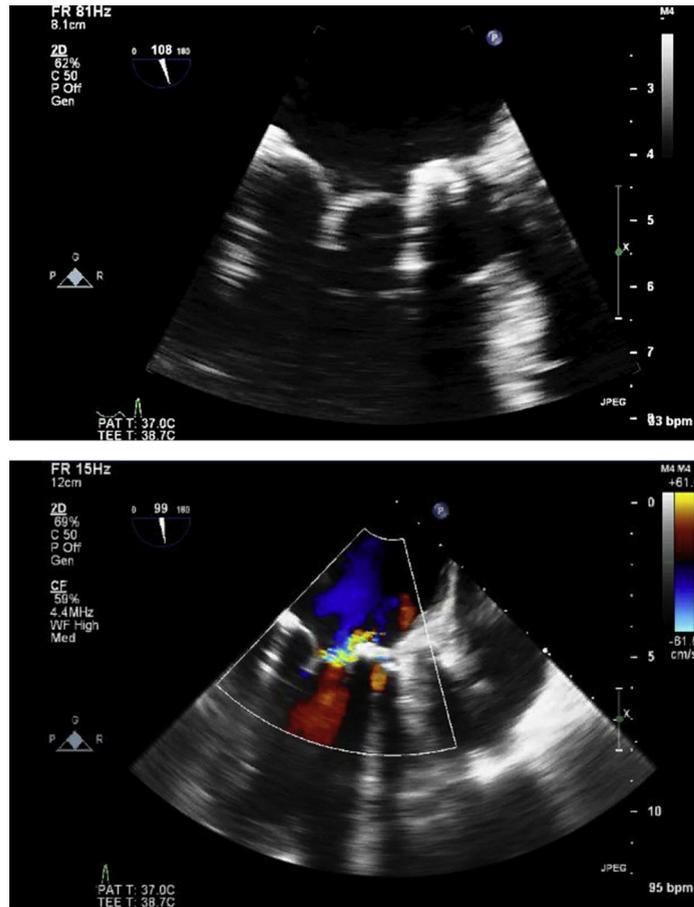
excellent valve function with trivial mitral regurgitation (Figure 1, Online Videos 1 and 2). Mean gradient across the mitral prosthesis was 7 mm Hg, which was again very similar to the measurement post-procedure (7 mm Hg). Prosthetic aortic valve function was well preserved (Figure 2, Online Videos 3 and 4). The patient had been continued on warfarin during the entire follow-up, which she had been pre-procedurally as well, because of her prosthetic aortic valve.

We conclude that transcatheter valve therapy using an inverted implantation of a SAPIEN XT prosthesis in the native mitral position has preserved valve function with maintained clinical improvement in this first in-human implant patient. We therefore recommend this as an alternate approach for patients who are deemed unfit for surgery and hope that this will pave the way for purposely designed transcatheter valves for native mitral disease in the future.

REPRINT REQUESTS AND CORRESPONDENCE: Dr. Vaikom Subramanian Mahadevan, University of California, 505 Parnassus Avenue, San Francisco, California 94141. E-mail: vaikom.mahadevan@ucsf.edu.

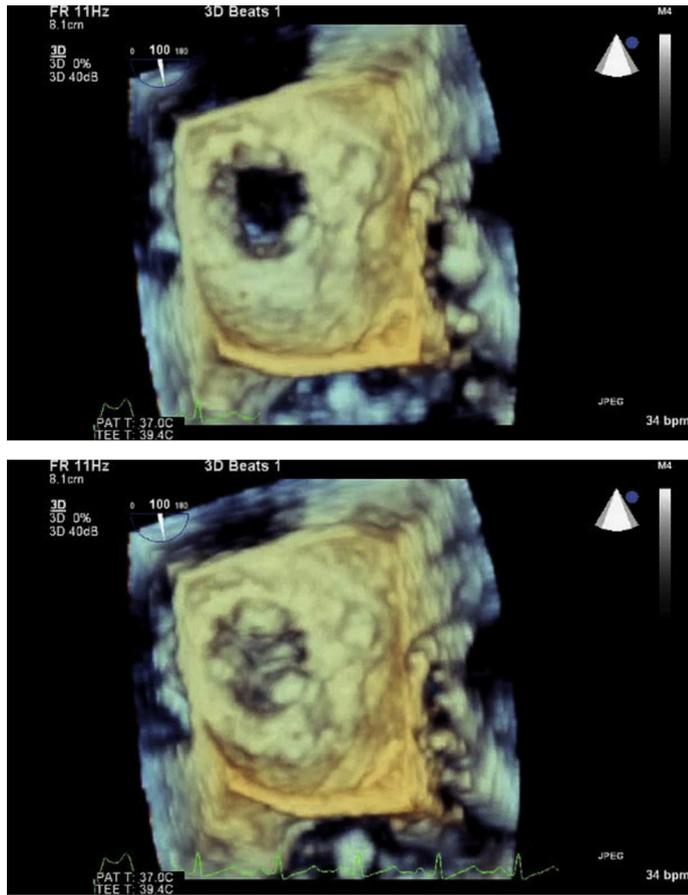
From *Department of Cardiology, University of California, San Francisco, San Francisco, California; and the †Cardiac Surgery, Central Manchester University Hospitals Foundation Trust, Manchester, United Kingdom. Dr. Mahadevan is a proctor for Edwards Lifesciences for transcatheter valve implants. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

FIGURE 1 Two-Dimensional Snapshots of the Transesophageal Echocardiogram Demonstrating the Closure and Color Doppler of the Inverted Aortic Valve in the Mitral Position With Trivial Regurgitation



Two-dimensional snapshots of the transesophageal echocardiogram demonstrating the closure and color Doppler of the inverted aortic valve with trivial regurgitation ([Online Videos 1 and 2](#)).

FIGURE 2 Three-Dimensional Echocardiogram Images Showing Opening and Closing of the Inverted Transcatheter Aortic Valve Replacement Valve Leaflets in the Mitral Position



Three-dimensional echocardiogram images showing opening and closing of the valve leaflets (Online Videos 3 and 4).

REFERENCES

1. Hasan R, Mahadevan VS, Schneider H, Clarke B. First in human transapical implantation of an inverted transcatheter aortic valve prosthesis to treat native mitral valve stenosis. *Circulation* 2013; 128:74-6.
2. Guerrero MI, Greenbaum A, O'Neill W. First in human percutaneous implantation of a balloon expandable transcatheter heart valve in a severely stenosed native mitral valve. *Catheter Cardiovasc Interv* 2014;83:287-91.

KEY WORDS inverted TAVR prosthesis, mitral stenosis, transcatheter mitral valve

APPENDIX For supplemental videos, please see the online version of this article.