

Michael J. Davidson, MD

Young Clinician Award 2006

Investigator Profile

Education

- AB, Princeton University, Philosophy
- MD, Yale University School of Medicine

Clinical /Professional Appointment

- Fellow in Integrative Cardiovascular Interventions
- Associate Surgeon, Division of Cardiac Surgery, BWH



Honors and Awards:

Dr. Davidson received the Award for Excellence in Teaching for residents by Tufts University. He is a two-time winner of the Weck Surgical Research Award for Translational Research and also for Basic Science Research. Yale University School of Medicine awarded Dr. Davidson the Merck award for outstanding graduating student. He has authored or co-authored nine peer-reviewed publications in top journals. Dr. Davidson is the first recipient of a CIMIT Career Development Award for a cross-training fellowship in the cardiac catheterization laboratory which has inspired a new paradigm in training of both cardiac surgeons and cardiologists at the BWH.

Impact on Care

- Mitral regurgitation (MR) affects approximately 150,000 people in the US
- Chronic mitral regurgitation affects approximately 6% of women and 3% of men, but after 55 years of age, some degree of mitral regurgitation is found in almost 20% of men and women who undergo echocardiograms.
- Mitral valve repair for degenerative disease currently requires open-heart surgery with its attendant risks and morbidity.
- The availability of a viable technique for catheter-based mitral valve repair might enable more patients with myxomatous MR to undergo repair

Abstract

In Mitral regurgitation (MR) from myxomatous valve degeneration is a common clinical problem, often requiring open-heart surgical repair. Over the past few years a number of innovative devices have emerged to permit percutaneous transcatheter mitral valve repair, drawing upon various aspects of the open surgical methods (e.g. reduction in annular dimension or edge-to-edge leaflet repair). To date, no device has been created that can address the critical problem of modulating mitral leaflet height, particularly in the setting of a flail leaflet due to rupture or extreme laxity of the chordae tendini.

This proposal is to develop a percutaneous transcatheter method and device that emulates an established surgical technique, by the insertion of artificial mitral valve chordae. The proposed system would allow real-time adjustment of artificial chordal length under image guidance, allowing optimal modulation of mitral leaflet height. The ability to adjust leaflet height and address flail leaflet and bileaflet prolapse using catheter-based methods could significantly broaden the patient population eligible for percutaneous valve repair. This proposal aims to build on the ex-vivo device development through a prior CIMIT new concept award and apply the new technology to in-vivo animal testing.



Screw in metal anchor has been applied to the papillary muscle of an ex-vivo heart