Mitral valve disease: 3D TEE imaging will be a Transformational Technology

In a vast majority of patients with degenerative mitral valve disease, the native valve can be repaired and does not need replacement with a mechanical or bioprosthetic artificial valve. In reality, however, far too many patients still get a replacement. Live three-dimensional transesophageal echocardiography (Live 3D TEE) has the potential to make mitral valve repair far more common.

At the annual meeting of the European Society of Cardiology (ESC) in Munich, Dr. David Adams from the Department of Cardiothoracic Surgery at Mount Sinai Medical Center, New York, left no doubt that mitral valve repair and not replacement is preferable in most patients with mitral valve disease. According to a systematic review that analyzed more than twenty clinical studies, mitral valve repair was clearly superior in terms of survival to mitral valve replacement in patients with mitral valve disease of different etiology.1

Still, many patients are subjected to valve replacement and not repair. "We know that mitral valve repair is performed less than it should be performed according to guidelines," said Adams. This was true for North America as well as Europe, he said. As part of the European Heart Survey, for example, the rate of patients with MR who received a mitral valve repair was 46.5% - far less than the 90+ % goal recommended in the guidelines.2 "Although some of these cases are rheumatic valves that require replacement and overall repair rates are generally increasing, it is widely recognized we are still well below where we need to be for us to comfortably say that we are following the guidelines."

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Why is this the case? According to Adams, while both procedures are effective, mitral valve repair is more complicated to perform than mitral valve replacement. “Repair is a technically more advanced procedure. It requires a more complete valve analysis, and it takes more time.”

To decide whether and how exactly a valve can be repaired, highly specialized knowledge is needed.

In Adams’ opinion, a detailed valve analysis by Live 3D TEE is one of the solutions to this dilemma. “3D TEE first and foremost allows us to differentiate the disease of the valve and the lesions very precisely. This will give the cardiologist and cardiac surgeon at a low-volume mitral center the chance to differentiate which valve can be repaired right away, and which patients should rather be sent to a larger center in order to perform a more complicated valve repair.”

In degenerative mitral valve disease, for example, Live 3D TEE can help differentiate between the easier to repair Fibro-elastic Deficiency (FED) and the far more complicated Barlow’s Disease. Using the A single en face “surgeon’s view” a segmental analysis of the valve is greatly facilitated versus 2D TEE. Patients in particular need to understand how important this differentiation is. “They need to be asking their doctors: What are the specific lesions that you cannot repair, and are there centers that can repair these lesions?” According to Adams, in patients with degenerative mitral valve disease, “the vast majority of degenerative valves will be repairable today by a reference mitral surgeon”.

Live 3D TEE not only facilitates the diagnosis. It also may help cardiac surgeons in high-volume centers intra-operatively in patients who have really complex valve lesions. Live 3D TEE, Adams said, provides a roadmap during the operation, and is an excellent method for postoperative analysis and for the identification of residual leakage. “This, in particular, makes the method a valuable tool for further research. All in all, I am absolutely convinced that Live 3D TEE will have a major impact on mitral valve repair.”

He made the case that, in the long run, every transesophageal echocardiographic exam should include 3D data, since this represented additional information and no additional harm to the patient, who has to undergo esophageal intubation anyway. New types of valve interventions, too, should benefit from 3D analysis: “There is no question that Live 3D TEE will greatly facilitate percutaneous mitral valve repair.”

At Mount Sinai, at least, intra-operative Live 3D TEE has become a standard practice in caring for mitral valve patients and is used routinely.

2. Lung et al, European Heart Journal, 2003: 1231ff
3. Adams and Anyanwu, Curr Opin Cardiol 2008: 23:105

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