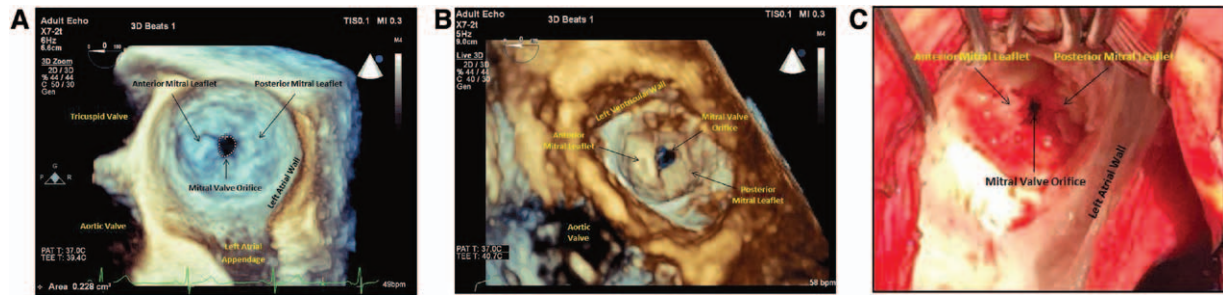


Real-time Three-dimensional Echocardiographic Assessment of Rheumatic Mitral Valve Stenosis

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THE severity of rheumatic mitral stenosis (MS) has traditionally been quantified using two-dimensional (2D) transthoracic echocardiography (TTE).¹⁻³ Recent studies show the utility of three-dimensional (3D) TTE in the assessment of MS.^{1,3} A potential benefit exists for 3D transesophageal echocardiography (TEE) in evaluating the degree of rheumatic MS.

Figure A (see also the video, Supplemental Digital Content 1, <http://links.lww.com/ALN/B180>, a 3D echocardiographic view of a rheumatic mitral valve [MV] from the left atrial perspective, demonstrating complete commissural fusion) is an en face view of a stenotic rheumatic MV from the left atrial perspective (valve area = 0.228 cm²; normal >4 cm²), whereas figure B (see also the video, Supplemental Digital Content 2, <http://links.lww.com/ALN/B181>, a 3D echocardiographic en face view of a rheumatic MV from the left ventricular standpoint) delineates the MV from the left ventricular perspective.³ These images were obtained using the 3D zoom feature, and the largest MV area was traced during diastole. These images clearly depict the severity of MS and the fusion of the MV commissures, which is a classic characteristic of rheumatic MS.³ The anatomical details provided by 3D TEE (figs. A and B) can help clinicians to formulate better treatment strategies, such as balloon valvuloplasty or surgical replacement. Figure C is an image of the same MV during surgical replacement. This image is notably identical to figure A and thus supporting the potential benefit of 3D TEE in rheumatic MS evaluation.

Two-dimensional TTE directly quantifies MS by diastolic valve area planimetry. Indirect 2D TTE MS assessment includes Doppler techniques inclusive of transvalvular diastolic pressure gradients, pressure half-time, proximal isovelocity surface area, and the continuity equation.¹⁻³ However, these parameters can lead to inaccurate assessment of MV area.^{1,3} Therefore, adding 3D imaging to standard 2D TEE techniques should be strongly considered when assessing the severity of rheumatic MS.

Competing Interests

The author declares no competing interests.

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References

1. Binder TM, Rosenhek R, Porenta G, Maurer G, Baumgartner H: Improved assessment of mitral valve stenosis by volumetric real-time three-dimensional echocardiography. *J Am Coll Cardiol* 2000; 36:1355-61
2. Wunderlich NC, Beigel R, Siegel RJ: Management of mitral stenosis using 2D and 3D echo-Doppler imaging. *JACC Cardiovasc Imaging* 2013; 6:1191-205
3. Baumgartner H, Hung J, Bermejo J, Chambers JB, Evangelista A, Griffin BP, Iung B, Otto CM, Pellikka PA, Quiñones M; EAE/ASE: Echocardiographic assessment of valve stenosis: EAE/ASE recommendations for clinical practice. *Eur J Echocardiogr* 2009; 10:1-25

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