

Dynamic Three-Dimensional Reconstruction of the Heart by Transesophageal Echocardiography

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Abstract

Objective

To evaluate echocardiography accuracy in performing and obtaining images for dynamical threedimensional (3D) reconstruction.

Methods

Three-dimensional (3D) image reconstruction was obtained in 20 consecutive patients who underwent transesophageal echocardiography. A multiplanar 5 MHz transducer was used for 3D reconstruction.

Results

Twenty patients were studied consecutively. The following cardiac diseases were present: valvar prostheses – 6 (2 mitral, 2 aortic and 2 mitral and aortic); mitral valve prolapse – 3; mitral and aortic disease – 2; aortic valve disease – 5; congenital heart disease – 3 (2 atrial septal defect –ASD- and 1 transposition of the great arteries -TGA); arteriovenous fistula – 1. In 7 patients, color Doppler was also obtained and used for 3D flow reconstruction. Twenty five cardiac structures were acquired and 60 reconstructions generated (28 of mitral valves, 14 of aortic valves, 4 of mitral prostheses, 7 of aortic prostheses and 7 of the ASD). Fifty five of 60 (91.6%) reconstructions were considered of good quality by 2 independent observers. The 11 reconstructed mitral valves/prostheses and the 2 reconstructed ASDs provided more anatomical information than two dimensional echocardiography (2DE) alone.

Conclusion

3D echocardiography using a transesophageal transducer is a feasible technique, which improves detection of anatomical details of cardiac structures, particularly of the mitral valve and atrial septum.

Keywords

three-dimensional echocardiography, ultrasonography, valvar disease