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Editorial Comment

3D Echocardiography for Interventional Procedures

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The accompanying article by McKendrick and Owada describes the use of a new investigational tool for interventional cardiology, 3D echocardiography. This methodology has been in development for several years but the time required for image processing has made it difficult to apply to interventional procedures, which need the instantaneous feedback that is available with fluoroscopy. Advances in computer processing now permit 3D echocardiographic images of the heart in real time. This technique will have significant benefits for interventional cardiac procedures both in children and in adults.

In children, the imaging window is sufficient to permit 3D echocardiographic images to be obtained from the chest wall. This obviates the necessity for transesophageal echocardiography, which in children requires the use of general anesthesia. This also reduces some personnel requirements for the procedure and should decrease the risk to the patients. The downside is that it requires moving the X-ray tube for access to the chest wall for the sonographer. Depending on the operator and the type of case being performed, this could be quite a nuisance during the procedure and expose the sonographer to a greater X-ray dose.

In adults, the echocardiographic window from the chest wall is less reliable and it remains to be seen whether the image quality would be adequate to perform these studies. However, transesophageal echocardiography is less traumatic in adults and can be performed for 30–60 min if necessary, without general anesthesia. In adults, ASD repair can also be performed quite satisfactorily with intracardiac ultrasound guidance. This reduces the discomfort of transesophageal echocardiography and decreases the amount of sedation required. Either of these options could be enhanced by 3D presentation of the images.

There are several new interventional procedures that are currently in experimental stages that would be ideal candidates for the use of 3D ultrasound imaging to guide the procedure. The most obvious application would be 3D guidance for mitral valve repair of mitral regurgitation, either using a device with a clip, a suture, or during an annuloplasty. Another potential application would be to guide precise placement of a catheter delivered stent valve. To be truly useful in guiding these procedures, the 3D images must be available in real time. Whether or not this technology is ready for prime time remains to be seen as more operators gain experience with the method. Nevertheless, this report opens up the possibility of having a clinically useful 3D echocardiographic guiding system just in time for advances in interventional procedures that require enhanced imaging capabilities.

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