


**Transesophageal Imaging in Cor Triatriatum**

A rare congenital heart defect, cor triatriatum, can demonstrate variability with regard to (1) location and orientation of the obstructing structure; (2) relative position and size of atrial septal defects (ASD); and (3) pulmonary venous connection. A classification system proposed by Lucas and Krabill incorporates these variables and includes cases of "subtotal" cor triatriatum wherein only a portion of the pulmonary venous return connects to the accessory chamber. In these cases, the remainder of the pulmonary venous return may connect to the left atrium directly or to the right atrium, either directly or indirectly.1 The usual anatomic arrangement ("classic cor triatriatum") results in a posterosuperior accessory chamber receiving the pulmonary veins and an anterosuperior chamber which communicates with the left atrial appendage and pulmonary mitral valve. If present, an ASD can communicate with either chamber.2

**Imaging in Cor Triatriatum**

Transthoracic echocardiographic Doppler techniques may provide high quality images. Diagnostic hemodynamic assessment can be refined with standard color flow, pulsed, and continuous wave Doppler techniques. In children (where the lesion usually presents), Doppler transthoracic echocardiography is usually diagnostic.3 Detailed images may be more difficult to obtain in older children and adults. A combination of parasternal long axis, apical four-chamber, and subxiphoid four-chamber views will allow visualization of the membrane and characterization of any resultant flow disturbance. Angiographic detection of the membrane is possible using pulmonary arteriography or direct left atrial injection contrast material. The membrane will appear as a luency within the left atrium.4 Detailed information concerning the orientation of the membrane and its attachments may be difficult to obtain, particularly in older children and adults.

Transesophageal echocardiography places the imaging apparatus adjacent to the left atrium, and biplane transesophageal echocardiography provides an enhanced capability for complete and detailed visualization of the left atrial cavity, left atrial appendage, pulmonary veins, and vividly depicts the atrial septum as seen in the excellent images in the review by Seward and colleagues.5 The ability to obtain high resolution detailed images of the left atrium and of the atrial septum has resulted in application of single and multiplane transesophageal echocardiography to a multitude of clinical problems, including (1) precise definition of atrial sinus based on morphology of atrial appendages;6 (2) assessment of anomalies of the atrioventricular junction;7 (3) intraoperative assessment of atrioventricular septal defect;8 (4) postoperative assessment of intra-atrial baffles;9 (5) endocarditis;10 and (6) hemodynamic assessment of atrial pressure dynamics based on atrial septal configuration throughout the cardiac cycle,11 to name a few. The safety of the technique has been documented in adults and children.12,13

Multiplanar images coupled with computer-assisted dynamic special reconstruction, as reviewed by Belohlavek and colleagues,14 create almost fantastic images. The transesophageal approach provides high quality images which appear to be well suited to spatial reconstruction techniques.

In this issue of Chest (see page 601), Kacenelenbogen and Decoodt review a case in which biplane transesophageal echocardiography confirmed the presence of a left atrial membrane in what appears to be a partial cor triatriatum. Doppler data provided complete hemodynamic characterization of the severity of the lesion. In this case, the data demonstrated the lesion to be sufficiently mild to forgo any surgical therapy. The case illustrates the role for biplane technology in that imaging in the longitudinal plane provided a more complete anatomic and hemodynamic picture.

While the role of biplane technology appears to be obvious with regard to imaging capability, the clinical role of transesophageal echocardiography in general in cases such as these is unclear, particularly in the setting of a normal physical exam, ECG, and x-ray film. The case in larger context, however, illustrates that transesophageal echocardiography may be able to obtain information not completely obtained by transthoracic study, thereby avoiding the need for catheterization in some cases. Clearly, the Doppler velocities confirmed the absence of hemodynamically im-
portant left ventricular inflow obstruction and gave good support to a decision against further workup or surgery.

The Future

The capabilities of transesophageal echocardiography and now multplanar transesophageal echocardiography are increasingly being recognized and applied. Three-dimensional image reconstruction and "virtual reality" may provide the clinician with more detailed anatomic images than ever before.

The images provided by transesophageal echocardiography will no doubt make this technique an important research and clinical tool for some time to come. These techniques have evolved considerably in a relatively short period, and as yet, there is no standardized terminology analogous to that previously adopted for two-dimensional echocardiography. A standardized terminology will promote uniformity of image display which will enhance communication between diagnostic and treatment centers, as well as teaching and research.

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REFERENCES


Transesophageal Echocardiography in Endocarditis

Transthoracic echocardiography (TTE) can detect vegetations and other associated abnormalities in 50 to 70 percent of cases of endocarditis. This sensitivity is too low to permit excluding the diagnosis of endocarditis based on a negative study. Transesophageal echocardiography (TEE) is the latest advance in echocardiographic technology. The signal generator-transducer is passed via the esophagus to a position behind the left atrium. This close proximity to the heart valves allows the use of a higher frequency (and therefore higher resolution) transducer than in TTE. Signal artifacts generated by the echocologically heterogeneous sternum and air within the lungs also are avoided. Thus, TEE is more sensitive than TTE for visualizing valvular vegetations and other abnormalities (eg, perivalvular abscess) caused by endocarditis. The sensitivity of TEE was 95 to 100 percent in the first studies reporting the technique. Since these studies were conducted in patients in whom the diagnosis of endocarditis was confirmed either at surgery or autopsy, their results cannot be generalized to the clinical setting where the diagnosis is less certain. The sensitivity of TEE in less advanced, less obvious cases of endocarditis is not known.

The study by Shapiro et al in this issue of Chest (see page 377), helps clarify the role of TEE in the clinical diagnosis of endocarditis. Patients with suspected endocarditis were evaluated with both TTE and TEE. Clinical criteria were the "gold standard" for diagnosis of endocarditis against which TTE and TEE were measured. Specificity (91 percent) was good for both, but TEE was more sensitive than TTE, 85 percent vs 60 percent. Since the case definition included evidence of vegeta-