Editöre Mektup — Letter to the Editor

The value of real-time three-dimensional transesophageal echocardiography in the assessment of paravalvular leak origin following prosthetic mitral valve replacement

Real-time three-dimensional echocardiography and cardiology

Dear Editor,

Cardiology is undergoing a continuous development in many aspects of heart diseases. These developments include both the therapeutic and diagnostic modalities. As a consequence of these developments, some areas of treatments are shifting from cardiovascular surgery to cardiology. Recently, two important developments have found a great place in practice. Although their first emergence occurred previously, their translation into practice has gained importance in the last decade. These two developments are transcatheter closure of congenital or acquired defects, a treatment modality, and three-dimensional echocardiography, a diagnostic modality.

In a previous issue of the journal, Yıldız et al.[1] reported the results of real-time 3D transesophageal echocardiographic (RT 3D TEE) examination of 13 patients with mitral paravalvular leak. They used real-time 3D TEE in assessing the location, size, and relationship to other structures of paravalvular leaks. They found that RT 3D TEE was superior in anatomically defining the leak origin and size to 2D TTE and 2D TEE, following prosthetic mitral valve replacement.

Approximately 210,000 patients undergo valve replacement annually worldwide.[2] Up to 12.5% of these valves demonstrate a clinically important paravalvular leak in the course of the disease. Most of them are repaired surgically. However, the risks of a repeat operation should be taken into consideration during the decision process. In this regard, transcatheter closure of paravalvular leaks has gained attention among the interventional cardiologists. Transcatheter closure of paravalvular leaks was first described by Hourihan et al.[3] in 1992. However, it was not much popular until the anatomic features of the leaks were properly defined. In recent years, there has been a growing interest in the use of RT 3D TEE in clinical practice. In Turkey, RT 3D TEE is being used increasingly in routine practice. Due to the increased experience of the cardiologists with RT 3D TEE, the anatomic definition of the defects can be made in a more detailed fashion. This experience resulted in the first successful transcatheter closure of a mitral paravalvular leak in our country by Kursaklioglu and Baysan (unpublished data). It seems that the publication of Yıldız et al.[1] on the use of RT 3D TEE in assessing mitral paravalvular leaks will increase the number of transcatheter closure operations of paravalvular leaks in the near future in our country.

In addition to its clinical implications, in my opinion, RT 3D echocardiography, TTE or TEE, has another important effect in Turkey. The introduction of this new technique will enhance the relations between interventional and noninterventional cardiologists. In the last two decades, the growing increase in the number of coronary interventions have directed cardiologists to two areas of primary interest: some are predominantly engaged in interventional cardiology, while some are heading to echocardiography. These two areas of cardiology have progressed independently with a negligible cooperation. However, as the transcatheter closure of the defects gains more popularity among the interventional cardiologists, more importance will be accorded to the anatomic definition of the defects. Although 2D echocardiography yields some definition, it is frequently not optimal. Real-time 3D echocardiography allows optimal visualization of the defect, so that the interventional cardiologists can make the decision for the closure, choose the appropriate device with appropriate size, perform the closure, check the results, and make the follow-up more safely.

There are many developments in each area of cardiology. It seems that these developments will force the cardiologists to cooperate more efficiently in future. From this standpoint, the study by Yıldız et al.[1] may prove be one of the cornerstones of the future cooperation among various areas of cardiology and between cardiology and cardiovascular surgery in Turkey.

Sincerely,

Mehmet Uzun, M.D.

GATA Haydarpaşa Eğitim ve Araştırma
Hastanesi, Kardiyoloji Kliniği,
34668 Kadıköy, İstanbul, Turkey.
Tel: 0216 - 542 20 20 / 3453
e-mail: muzun1@yahoo.com

REFERENCES

1. Yıldız M, Duran NE, Gökdeniz T, Kaya H, Özkan M. The value of real-time three-dimensional transesophageal echocardiography in the assessment of paravalvular leak origin following prosthetic mitral valve replacement. Türk Kardiyol Dern Arş 2009;37:371-7.
2. Latson LA. Transcatheter closure of paraprosthetic valve leaks after surgical mitral and aortic valve replacements. Expert Rev Cardiovasc Ther 2009;7:507-14.
3. Hourihan M, Perry SB, Mandell VS, Keane JF, Rome JJ, Bittl JA, et al. Transcatheter umbrella closure of valvular and paravalvular leaks. J Am Coll Cardiol 1992;20:1371-7.

Anomalous right coronary artery from the left sinus of Valsalva presenting a challenge for percutaneous coronary intervention

Dear Editor,

Treatment of atherosclerotic lesion(s) with percutaneous coronary intervention (PCI) in the setting of anomalous coronary artery origin from the opposite (improper) sinus (ACAOS) is always challenging. Çalışkan et al.[1] presented a case of right coronary artery (RCA) originating from the left aortic sinus, i.e. right ACAOS with a proximal obstructive lesion that was successfully treated with PCI. However, the authors did not describe the course of the aberrant RCA, obviously considering that such a defect is invariably associated with an interarterial course. Although this is true, we should have in mind that other courses such as retrocardiac, retroaortic, intraseptal, and prepulmonic courses are theoretically possible and may not always be benign.[2,3] The interarterial course, in particular, has the most potential for adverse sequelae, specifically exercise-related sudden cardiac death (SCD) in the young.[2-5] In such settings, identification of the anatomo-functional disturbances related to the specific circumstances of the crossing of the anomalous vessel towards its dependent territory is important for patient management.

During a 30° right anterior oblique ventriculography or aortography, a right ACAOS with an interarterial course will be depicted anterior to the aorta and may appear as a radiopaque "dot".[3] Based on the circle and loop approach for interpreting coronary angiograms, i.e. the atrioventricular groove is a circle and the interventricular septum forms a loop that intersects this circle both anteriorly and posteriorly. The straight rightward course of the anomalous RCA presented in an anteroposterior (frontal)-caudal view favors an interarterial trajectory being oriented directly towards the right atrioventricular groove. Carriers of a left or right ACAOS with the interarterial course aged less than 30 or 35 years comprise the group at the highest risk for SCD.[2,4] Other manifestations such as syncope, dyspnea, angina, and myocardial infarction are more prevalent among older individuals and may not be related to exercise but emotional stress, the onset of hypertension, and possibly aortic regurgitation or rapid weight gain.[2] Such defects result in clinically evident ischemia only occasionally; however, subclinical ischemic episodes may occur. The latter is supported by pathologic evidence for replacement-type fibrosis that could predispose to malignant arrhythmias and SCD.[4] Indeed, in more than 70%, SCD occurs without forewarning symptoms, being more frequently in carries of left ACAOS. Using intracoronary ultrasound studies, Angelini et al.[2,5] showed that the interarterial course invariably entailed intussusception of the tangentially originating proximal ectopic vessel within the aortic media for a variable length. The intramural segment was stenotic (30-70% area stenosis at rest) due to hypoplasia and lateral compression. Moreover, stenosis worsened intermittently due to phasic systolic accentuation of compression, and it was further aggravated following pharmacologic simulation of exercise conditions. Such evidence favors the presence of a potentially decreased coronary flow reserve at baseline, which may further decrease to a critical level under conditions entailing increased stroke volume and/or aortic pressure, thus leading to ischemia. Spasm of the proximal intramural vessel, secondary to mechanical endothelial injury has also been proposed as a mechanism of ischemia.[5,6] Although it has not been confirmed in a large series, there have been reported cases of right and left ACAOS where spasm, either spontaneous or induced was evident in the catheterization laboratory. It has been proposed that intracoronary ultrasound examination should be carried out, targeting the anatomo-functional behavior of the proximal intramural vessel under exercise-like conditions and spasmogenic stimuli in all the carriers of such defects presenting serious symptoms.[5] Clinical manifestations are mainly determined by the size of the dependent myocardium, thus in right ACAOS.