Live three-dimensional transthoracic echocardiography in the assessment of the papillary muscle abnormality with mitral regurgitation

Mitral yetmezliğiyle gelen hastada papiller adale anomalisinin canlı üç-boyutlu ekokardiyografi ile görüntülenmesi

An isolated papillary muscle abnormality is a relatively rare anomaly. In the adult patient it could be missed even by two dimensional (2D) echocardiography and the finding might be detected for the first time during surgery for severe mitral regurgitation. Live three-dimensional transthoracic echocardiography (3DTTE) has become a new promising method in the evaluation of the valves and subvalvular apparatus in detail (1-4). We hereby reporting a case, whose three papillary muscles with severe insufficiency in the coaptation of the mitral valve leaflets were assessed with the use of the live three-dimensional transthoracic echocardiography.

The patient was a 17 years old girl presented with dyspnea on exertion of 3 months duration. There was no previous history suggestive of rheumatic fever or infective endocarditis. Physical examination was significant for a loud first heart sound, a grade III pansystolic murmur at the apex. An electrocardiogram showed a regular sinus rhythm. A chest roentgenogram showed normal cardiothoracic index. A 2D transthoracic echocardiography showed a normal ranged left ventricular dimension. Left atrial dimension was 43 mm in parasternal long-axis view and mitral valve was mildly thickened with prolapse of both leaflets and severe mitral regurgitation (Fig. 1). Three papillary muscles (anterolateral, middle and posteromedial) were demonstrated at the level of papillary muscles (Fig. 2). To evaluate the subvalvular apparatus in detail, transesophageal 2D echocardiography was performed. Interestingly, the third (middle) papillary muscle was attached to the bases of the anterior mitral valve directly (Fig. 3, 4. Video 1. See corresponding video/movie images at www.anakarder.com). The anterolateral and posteromedial papillary muscles with the normal tensor apparatus were demonstrated. The patient underwent live 3DTTE using Vivid 7 Dimension ultrasound system (GE, Vingmed, Horton, Norway). A prominent coaptation problem in the mitral valve leaflet was clearly visualized by 3DTTE (Video 2, 3 See corresponding video/movie images at www.anakarder.com). The patient underwent mitral valve replacement.

Nurcan Arat, Zehra Gölbası, Erdoğan İlkay, İrfan Sabah, Ayşenur Paç*

From Departments of Cardiology and *Pediatric Cardiology, Türkiye Yüksek Ihtisas Hospital, Ankara, Turkey

References

1. Oshima K, Takahashi T, Sato Y, Mohara J, Ishikawa S, Morishita Y. Mitral regurgitation with an isolated anterior mitral leaflet cleft: a case report. Circ J 2005; 69: 114-5.
2. Wong S, French R, Bolson E, McDonald J, Legget M, Sheehan F. Morphologic features of the rheumatic mitral regurgitant valve by three-dimensional echocardiography. Am Heart J 2001 Nov; 142: 897-907.
3. Sinha A, Kasliwal RR, Nanda NC. Chauhan N, Agrawal G, Khanna D, et al. Live three-dimensional transthoracic echocardiographic assessment of isolated cleft mitral valve. Echocardiography 2004; 7: 657-61.
4. Abadir S, Dulac Y, Taktak A, Acar P. Images in cardiology: cleft mitral valve assessed by transthoracic real time three dimensional echocardiography. Heart 2005; 91: 1632.

Address for Correspondence/Yazışma Adresi: Dr. Nurcan Arat, 9. cadde, 110.sokak, Vadi 3000 Sitesi, No=2 / A-24 06400 Birlik Mahallesi, Ankara, Turkey
Phone: +90 312 439 30 30 Gsm: +90 505 502 50 77
E-mail: nurcanarat@superonline.com - aratnurcan@gmail.com

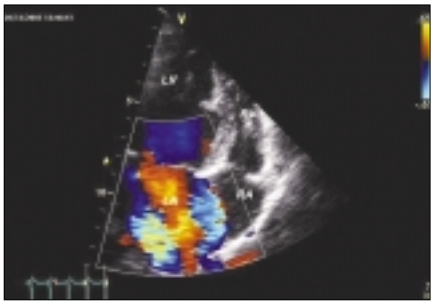

Figure 1. Color Doppler echocardiography apical long-axis view of two eccentric regurgitant jets

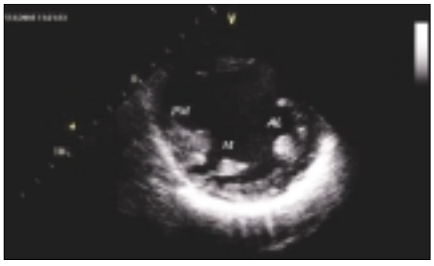

Figure 2. Parasternal short – axis view of three papillary muscles (anterolateral (AL), middle (M) and posteromedial (PM) papillary muscles showed by arrows)

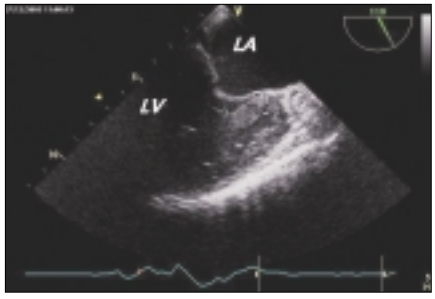

Figure 3. Transesophageal imaging of a middle papillary muscle (arrow) directly attached to the basis of the anterior mitral valve

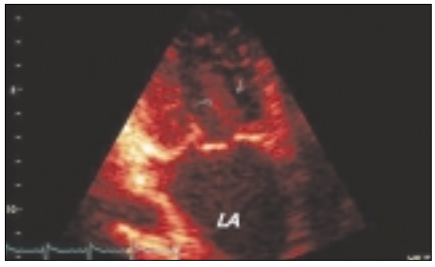

Figure 4. Three-dimensional transthoracic echocardiographic assessment of the papillary muscle directly attached to the basis of the anterior mitral valve