CASE REPORTS

Noninvasive assessment of myocardial bridging in the left coronary artery by transthoracic Doppler echocardiography

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Abstract Myocardial bridging is a common congenital coronary abnormality recognized primarily with systolic narrowing or "milking effect" shown by coronary angiography. We report the case of a 58-year-old man with signs and symptoms of myocardial ischemia who underwent transthoracic echocardiography and coronary angiography. The present case suggests the clinical role of transthoracic echocardiography in demonstrating characteristic coronary flow abnormalities in patients with muscular bridge in the region of the mid LAD.

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Introduction

Myocardial bridge (MB) is diagnosed in vivo by angiography when a systolic compression of a coronary artery which disappears during diastole is evidenced. Quantitative coronary angiography, intracoronary Doppler studies and intravascular ultrasonography have revealed characteristics and pathophysiologic processes in MB.1−3 Transthoracic echocardiography (TTE) is a new and promising diagnostic tool in imaging coronary arteries,4 nonetheless, no informed data could be found about its use in imaging myocardial bridge. In this case report, we presented a patient with symptoms of ischemia associated with MB which was detected by transthoracic echocardiography.

Case report

A 58-year-old man was referred to our institution for the evaluation of dyspnea, syncope and stable angina pectoris which showed an increase after the initiation of nitrate therapy. His cardiac examination and electrocardiography were normal. Blood count, biochemical parameters including cardiac enzyme and troponin levels were also normal. Chest X-ray showed mildly increased cardiothoracic ratio. Transthoracic echocardiography demonstrated relaxative type
diastolic dysfunction with normal systolic and diastolic left ventricle internal diameters. Interventricular septum and left ventricle wall thicknesses were mildly increased. However, there was no wall motion abnormality and significant valvular pathology. Coronary flow velocity recordings were measured with a Vivid 7 Dimension ultrasound scanner (GE Vingmed, Horten, Norway) using a high 3.5 mHz transthoracic transducer (Figs. 1—4). The diagnosis of MB was confirmed by coronary angiography (Figs. 5 and 6).

Figure 1 Via Doppler color flow mapping guidance, coronary blood flow in the mid of the LAD was identified as a color-filled tubular structure in the anterior interventricular sulcus. The segment distal to it showed turbulence in the color flow signal which was detected to be running intramurally through the myocardium.

Figure 2 Systolic flow reversal (white arrow) with antegrade diastolic flow demonstrated by PW-Doppler measured from maximum aliasing localization.
Discussion

In this case report, typical coronary flow findings, which were previously defined by intravascular Doppler study,\(^3\) were also demonstrated by TTE. Evident systolic reverse flow proximal to MB, decreased diastolic flow velocity and lack of systolic flow distal to MB were demonstrated. The role of TTE for the evaluation of MB should be further investigated by prospective studies.

Figure 3  Abrupt early diastolic acceleration, a mid diastolic deceleration and a plateau and no systolic flow reversal in maximal aliasing spot.

Figure 4  Diastolic and little systolic forward flow in regions distal to maximum aliasing spot.
Figure 5  Angiography of the left anterior descending coronary artery (LAD) in right anterior cranial projection during systole.

Figure 6  Angiography of the left anterior descending coronary artery (LAD) in right anterior cranial projection during diastole.
Prominent crista terminalis and Eustachian ridge in the right atrium: Two dimensional (2D) and three dimensional (3D) imaging

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KEYWORDS
Crista terminalis; Eustachian ridge; 3D echocardiography

Abstract The crista terminalis and Eustachian ridge are normal anatomical structures within the right atrium that are not normally looked for or visualised in the standard views obtained while performing a transthoracic echocardiogram (TTE).

In this case report, the prominent terminal ridge (a normal anatomical variant) appeared as a "mass" in the right atrium that needed to be differentiated from a pathological cardiac mass. Identification of physiological structures in the right atrium on TTE using additional 3D imaging can avoid unnecessary additional tests that are both more invasive and expensive such as transesophageal echocardiography or MRIs.

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Case presentation
A 49-year-old female who volunteered as a healthy control for a research study presented for a transthoracic echocardiogram (TTE). There was no history of heart disease, nor any cardiovascular risk factors for cardiac involvement (i.e. hypertension, diabetes mellitus or hypercholesterolemia), as determined by a questionnaire. The subject denied chest pain, dyspnea on exertion or palpitations. During the TTE an echogenic structure was noted in the right atrium protruding laterally from the lower third of the interatrial septum (Fig. 1).

The atrium was imaged in the standard apical 4 chamber view. When the standard view was modified with the ventricle foreshortened, an