Echocardiographic diagnosis of anomalous origin of the left coronary artery from the pulmonary artery

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Received 17 March 2006; accepted after revision 26 November 2006; online publish-ahead-of-print 22 January 2007

We found increased systolic coronary flow in transthoracic pulsed wave (PW) Doppler in a 42-year-old patient with anomalous origin of left main coronary artery from the pulmonary artery. This is a characteristic echocardiographic finding in this anomaly in the presence of collateral circulation and coronary L–R shunt. In comparison with so far used echocardiographic criteria this parameter when present allows quick recognition of anomalous origin of left coronary artery from the pulmonary artery, and its differentiation from other potentially lethal coronary anomalies.

KEYWORDS
Coronary artery anomalies; Anomalous origin of left coronary artery; Echocardiography; Pulsed wave Doppler

Introduction

We report on a young woman in whom a potentially lethal anomalous origin of left coronary artery from pulmonary artery was recognized by presence of characteristically increased systolic coronary flow in transthoracic PW Doppler.

Case report

A 42-year-old woman was referred for further evaluation of a ventricular septal defect diagnosed on an outpatient echocardiogram. We performed pre-catheterization transthoracic echocardiography and in the 4-chamber view multiple regions of colour flow turbulence in the ventricular septum were seen, which at first glance appeared as multiple ventricular septal defects (Figure 1A). However, in the LV short axis view it became immediately obvious that colour turbulences resulted from flow in a huge tortuous coronary artery (Figure 1B).

Coronary ostia were then interrogated, and only one large coronary artery arising from the right sinus Valsalva was visualized (Figure 2). PW Doppler examination with the sample volume placed just distal of the coronary ostium revealed higher coronary flow velocities in systole than in diastole. The same finding was present when the coronary artery was interrogated by PW Doppler in septal and apical regions suggesting the existence of L–R shunt in coronary circulation (Figure 3A and B).

The patient underwent cardiac catheterization. Coronary angiography revealed an enlarged tortuous right coronary artery (Figure 4A). Contrast injection in the pulmonary artery confirmed the origin of left main coronary artery from the pulmonary trunk (Figure 4B). Subsequently, a 1.67 L/min L–R shunt was calculated.

The patient was referred to cardiac operation. The orifice of the LCA was closed by a direct suture and a saphenous venous graft to the LCA was performed. The postoperative course was uneventful.

Discussion

An anomalous origin of one or more coronary arteries from the pulmonary artery is usually an isolated abnormality, occurring in 0.4% of all patients with congenital cardiac abnormalities.1 The most common defect of this type is origin of left coronary artery from the pulmonary artery, known as Bland-White-Garland syndrome.2 Echocardiography may suggest or demonstrate the abnormal coronary artery.3,4 However, differentiation between various coronary anomalies, particularly those with increased risk of sudden death (origin of coronary artery from pulmonary trunk, ectopic origin of coronary artery and single coronary artery) is rather time consuming and uncertain with this method.5 In our patient, a characteristic finding of increased systolic coronary flow in transthoracic PW Doppler was diagnostic for the origin of left coronary artery from the pulmonary artery. This is a unique echocardiographic diagnostic parameter of this anomaly in the presence of collateral circulation, and a coronary L–R shunt.

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In other coronary anomalies and in normals coronary blood flow is always substantially higher in diastole. Therefore, interrogation of coronary system at any site with PW Doppler for an increased systolic flow allows to differentiate the Bland-White-Garland syndrome from other coronary anomalies.

References