Case Report

Patent foramen ovale diagnosed by real-time three-dimensional contrast transesophageal echocardiography: A case report

Noriko Tomita (MD, PhD)a,b, Hirotsugu Yamada (MD, PhD)a,b,* Susumu Nishio (RDS)a,b, Rina Tamai (RDS)a,b, Kenya Kusunose (MD, PhD)a,b, Shuji Hayashi (MD)a,b, Junko Hotchi (MD)a,b, Masataka Sata (MD, PhD)a,b

a Department of Cardiovascular Medicine, Tokushima University Hospital, 2-50-1 Kuramoto, Tokushima, Japan
b Ultrasound Examination Center, Tokushima University Hospital, Tokushima, Japan

Introduction

Contrast echocardiography has been considered as the most useful and accurate diagnostic tool for diagnosing patent foramen ovale (PFO), however it is sometimes difficult to detect a few microbubbles even using transesophageal echocardiography (TEE). Recently 3-dimensional echocardiography has been utilized for the diagnosis of various cardiac diseases. We report a case of PFO who was successfully diagnosed by contrast 3-dimensional TEE.

Case report

A 67-year-old man was admitted to our hospital in emergency due to insensitiveness of right upper limb and dysarthria. He had been treated for hypertension medically for 8 years. Magnetic resonance imaging of brain and angiography showed no cerebral infarction, bleeding, or stenosis of main brain arteries. He was treated with argatroban and edaravon for the possibility of lacunar infarction or branch atherosclerotic disease, and his symptoms disappeared on the next day.

There were no abnormalities in the carotid ultrasonography. Transthoracic echocardiography results were almost normal. Two-dimensional TEE revealed that there was no thrombus in left atrium and no shunt flow was found by color Doppler imaging. Intravenously administered microbubbles did not appear in left atrium by 2-dimensional echocardiography, while contrasts were observed in left atrium using 3-dimensional echocardiography. Real-time 3-dimensional contrast transesophageal echocardiography may be the most useful method for the diagnosis of small PFO.

The presence of patent foramen ovale has been suggested as a potential cause of paradoxical embolism and, in particular, of cerebral emboli in stroke of unknown origin. Transthoracic or transesophageal contrast echocardiography is the method for the detection of the patent foramen ovale, however, real-time 3-dimensional contrast transesophageal echocardiography has an advantage for this purpose.

At a 67-year-old man was admitted due to insensitiveness of right upper limb and dysarthria, and treated for suspected lacunar infarction or branch atherosclerotic disease. Carotid ultrasonography showed no abnormalities, and agitated contrast transesophageal echocardiography was performed to detect patent foramen ovale (PFO). Intravenously administered microbubbles did not appear in left atrium by 2-dimensional echocardiography, while contrasts were observed in left atrium using 3-dimensional echocardiography. Real-time 3-dimensional contrast transesophageal echocardiography may be the most useful method for the diagnosis of small PFO.

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agitated saline contrast echocardiography with cough or release of Valsalva maneuvers is the most sensitive tool for diagnosing PFO [4]. Two-dimensional TEE has become an essential and integral tool for identifying PFO and preferred because the demonstration of PFO by transthoracic echocardiography is usually difficult. Multiple shots of the contrast medium are recommended even using 2-dimensional TEE because it is sometimes difficult to detect a few microbubbles in left atrium by observing only in a single cut plane [5]. Using real-time 3-dimensional TEE, one can observe left atrium in a volume which is equal to observation by multiple 2-dimensional imaging in the same time. The 3-dimensional TEE has some technical limitations, mainly low temporal and spatial resolution compared with 2-dimensional TEE. The combination of both 2- and 3-dimensional techniques may be the useful method to demonstrate PFO using agitated saline bubble study. A prospective study design randomizing patients to either 2-dimensional TEE or real-time 3-dimensional TEE would be preferable for assessment of PFO in the future.

References