Transoesophageal real-time three-dimensional echocardiography in assessing large multiperforated atrial septal aneurysm

Radoslaw Piatkowski*, Piotr Scislo, and Janusz Kochanowski

Department of Cardiology, Medical University of Warsaw, Banacha 1a, Warsaw 02-097, Poland

* Corresponding author. Tel: +48 60 479 2956, Fax: +48 22 599 1234, Email: radekp1@wp.pl

A 51-year-old woman presented with a 2 year history of declining exercise capacity and irregular palpitations. Clinical examination revealed sinus rhythm at 86 b.p.m., and blood pressure of 112/70 mmHg, without pedal oedema. Initial transthoracic echocardiography (TTE) revealed moderate right ventricular (RV) enlargement with moderate tricuspid regurgitation and mild pulmonary hypertension (estimated PASP 40 mmHg). There was interventricular septal flattening in diastole due to RV volume overload. Transoesophageal two-dimensional echocardiography (2D TEE) demonstrated multiperforated atrial septal aneurysm (ASD II-atrial septal defects type II) and associated left-to-right shunt (Qp/Qs = 1.7:1) (Panels A and B). The largest defect was about 17 mm in diameter. Three-dimensional, real-time TEE (3D TEE) was performed for ‘en face’ reconstructions of aneurysm and accurate assessment of the morphology of the defects and tissue rims. Three-dimensional, real-time TEE revealed a complex shape of aneurysm and defects with the largest diameter of 36 mm as well as a deficient aortic and postero-inferior tissue rims (Panel C). 2D TEE underestimated the size of atrial defects. Three-dimensional, real-time TEE also demonstrated the variability in the shape and size of the ASD during systole and diastole, which was not possible using 2D TEE (Panels D and E). This variability might alter the accuracy of the ASD diameter and area calculation as well as the measurement of the rims with 2D TEE. After 3D TEE, the patient was referred for surgical correction due to the multiperforated nature of the aneurysm with multiple shunts and inadequate atrial septal rims in order to permit stable device deployment (e.g. Amplatzer device). In patients with multiperforated aneurysms of interatrial septum, 3D TEE is a valuable diagnostic tool, which provides additional information about the nature of defects and dynamic changes in the defect area. It is also an excellent and useful alternative to conventional 2D TEE in qualification of patients with ASD II for specific treatment (transcatheter closure vs. cardiosurgery treatment).

Panel A. Transthoracic echocardiography showing the atrial septal aneurysm and the two septal defects.

Panel B. Transthoracic echocardiography. Colour flow Doppler across the atrial septum demonstrates multiple perforations with two distinct jets seen crossing the septum (arrows).

Panel C. Three-dimensional transthoracic echocardiography. Three-dimensional view of multiperforated atrial septal aneurysm (arrows) viewed from the left atrium.

Panel D and E. Variability in the shape and size of the atrial septal aneurysm during systole (Panel D) and diastole (Panel E) viewed from the left atrium (arrows). During systole the main defect is large (36 mm) and the aortic rim is not clearly defined.

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