Multiple Atrial Septal Defects in Multidetector-Row Computed Tomography

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A 70-year-old man was referred to our hospital for percutaneous closure of a secundum atrial septal defect (ASD). His transthoracic echocardiography (TTE) showed 2 left-to-right ASDs with a pulmonary/systemic flow ratio (Qp/Qs) of 1.89 and normal left ventricular function. Cardiac computed tomography (CT) using 320-detector row CT (Aquilion ONE VISION edition, Toshiba Medical Systems, Tokyo, Japan) was performed for further evaluation. A 20-gauge needle was inserted into the right median cubital vein, and iopamidol (370 mg/ml) was administrated biphase through a dual-head power injector (Dual Shot GX 7, Nemoto Kyorindo, Tokyo, Japan). In the first phase, contrast was administered at (body surface area/1.583/C2^4.2 ml/s) for 10 s. In the second phase, one-half dose of the contrast administered at the first phase was administrated with a simultaneous dose of saline for 10 s. The scan delay was 23 s. The volume-rendering (VR) image was reconstructed using ZIO STATION 2 PLUS, version 2.1.7.1 (Ziosoft, Tokyo, Japan). Both right atrial images obtained by cardiac CT and 3-dimensional (3D) transesophageal echocardiography (TEE) (iE33 ultrasound system, X7-2t transducer, Philips Medical Systems, Andover, Massachusetts) demonstrated 3 defects at the interatrial septum (Fig. 1) although TTE assessed them as 2 shunts.
The 3D assessment of defects is necessary in multiple ASDs, because percutaneous strategy is variable; for example, 1 device covers whole defects, or multiple devices are used with considerable interference between devices (1). If a percutaneous strategy is difficult, surgical closure is preferred.

Recent CT technological advances, with higher resolution and faster scanning time, have improved imaging quality. Using this biphasic contrast injection protocol (2), the right and the left heart were enhanced homogenously, and the optimal VR image from the right atrial aspect was obtained, even with multiple defects.

TEE is an invasive procedure (3), and the large 3D TEE probe cannot be tolerated by those with esophageal disorders and some pediatric cases (4). Cardiac CT is less invasive and may be an alternative imaging modality for 3D assessment of ASD.

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