

Large field-of-view intravascular ultrasound for periprocedural cross-sectional assessment of right ventricular outflow tract anatomy offering a detailed tomographic perspective

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A 35-year-old male born with tetralogy of Fallot with total surgical correction at the age of 3 years and reoperation at the age of 15 years with homograft insertion in the right ventricular outflow tract (RVOT) was admitted due to deterioration in exercise tolerance and arrhythmia. Echocardiography showed severe pulmonary insufficiency and stenosis (pressure half-time of 89 ms with maximal/mean gradient of 67/44 mm Hg). Pulmonary regurgitant volume measured in cardiac magnetic resonance was 13 ml with a regurgitant fraction of 16% and a substantially increased right ventricular end-diastolic volume (219 ml/m²). Multi-slice computed tomography (MSCT) angiography (384-row SOMATOM[®] Definition Flash, Dual Source, SIEMENS, Forchheim, Germany) showed diffusely calcified and narrowed RVOT with minimal lumen cross-sectional area (CSA) of 1.89 cm² measured in systole (Figure 1, panels 3 and 4). Lumen CSAs measured in systole at the proximal and distal references were 2.99 and 3.15 cm², respectively (Figure 1, panels 1 and 7) with calculated stenosis area of 40% (1.89 cm²/3.07 cm²). Given our recent experiences documenting a unique 60-mm periprocedural tomographic imaging perspective offered by a Vision

PV035 10 MHz intravascular ultrasound (IVUS, Philips North America Corporation, Andover, MA, US), novel imaging instrumentation was used to verify its diagnostic performance in the highly calcified RVOT (Figure 1, panel 3, white arrow indicates the transducer location) [1–4]. Intravascular ultrasound cross-sectional visualization measured lumen dimensions that corresponded closely with those made in angio-MSCT (Figure 1, the lower row). Contrast-free cross-sectional imaging using a large field of view IVUS is feasible even in highly calcified RVOT anatomy, offering an understanding of the target zone anatomy and its dimensions that are crucial for planning transcatheter intervention.

Article information

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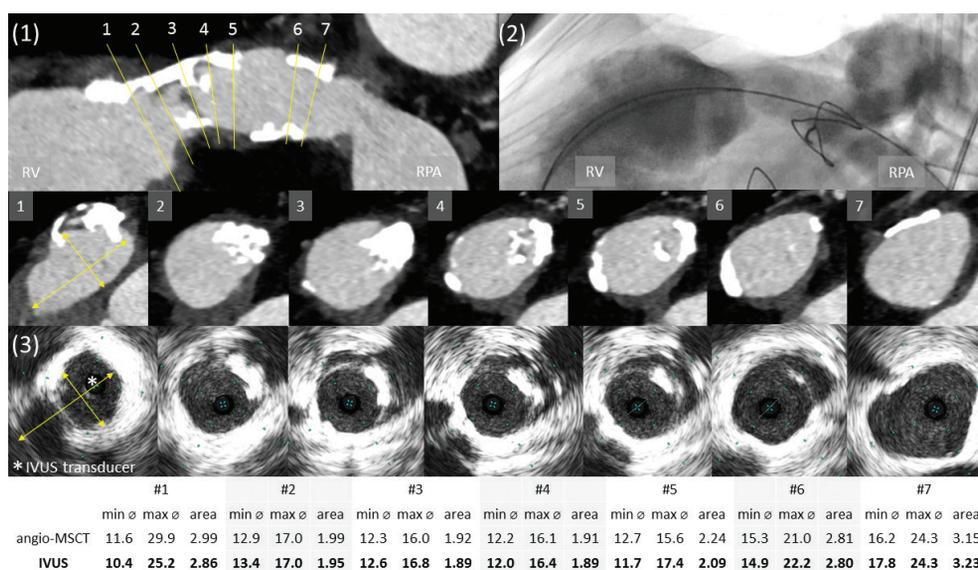


Figure 1. Baseline RVOT anatomy in: angio-MSCT (panel 1: longitudinal and cross-sectional views seen in the upper and middle row, respectively), angiography (panel 2: corresponding longitudinal view), and parallel IVUS (panel 3: cross-sectional view). Corresponding relevant dimensions of RVOT lumen measured in angio-MSCT and parallel IVUS cross-sections presented are in the lower row

Abbreviations: angio-MSCT, multi-slice computed tomography angiography; IVUS, intravascular ultrasound; RPA, right pulmonary artery; RV, right ventricle; RVOT, right ventricular outflow tract

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