

Right ventricular thrombi treated with apixaban in a patient with arrhythmogenic right ventricular cardiomyopathy

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A 30-year-old man with previously diagnosed arrhythmogenic right ventricular cardiomyopathy (ARVC) and with a family history of the disease was admitted due to hemodynamically unstable ventricular tachycardia (VT). Sinus rhythm was restored by electrical cardioversion. Echocardiographic evaluation was consistent with magnetic resonance imaging (MRI) performed several months earlier, which showed right ventricular (RV) enlargement with multiple local aneurysms. No intracardiac thrombi were seen at that time (FIGURE 1A and 1B). Two days later, the patient underwent implantable cardioverter-defibrillator implantation. On the second postprocedural day, 2 RV thrombi were found on control echocardiography and visualized on computed tomography (CT) performed to exclude pulmonary embolism (FIGURE 1C–1E). Both the larger thrombus (29 × 13 mm, in the RV outflow tract) and

the smaller one (17 × 10, near the lateral site of the tricuspid anulus) were connected with RV aneurysms. Apixaban (5 mg twice daily) was introduced. Daily echocardiography showed gradual resolution of thrombi and their disappearance after 18 days, confirmed by CT (FIGURE 1F–1H).

ARVC is an inherited disease characterized by progressive fibrofatty replacement of the RV myocardium resulting in RV dilation, hypokinesis, and development of local aneurysms, with associated arrhythmias originating in the RV. Such arrhythmias may lead to sudden cardiac death. The estimated prevalence of all thromboembolic complications in ARVC is 2% to 4% of patients.^{1,2} In some patients, pulmonary embolization from right-sided intracardiac thrombi may be responsible for an unfavorable course of the disease. In multimodality imaging of RV thrombi by echocardiography, MRI, or CT, the availability of

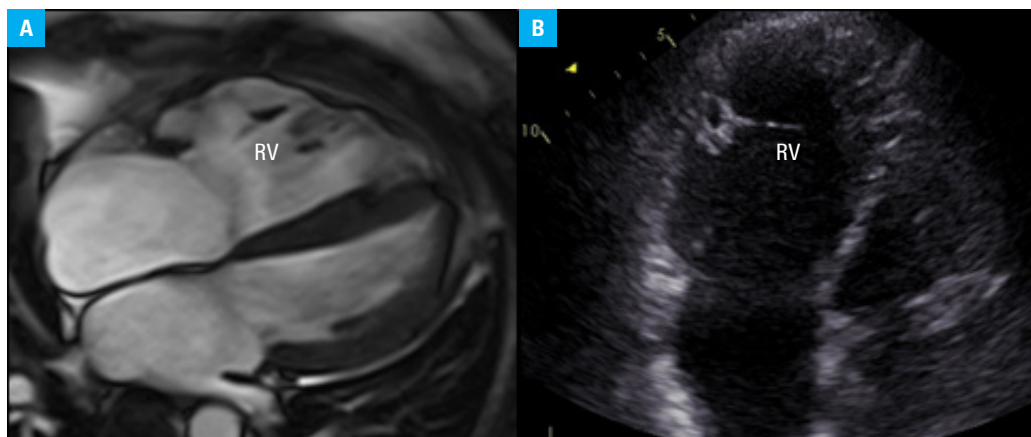
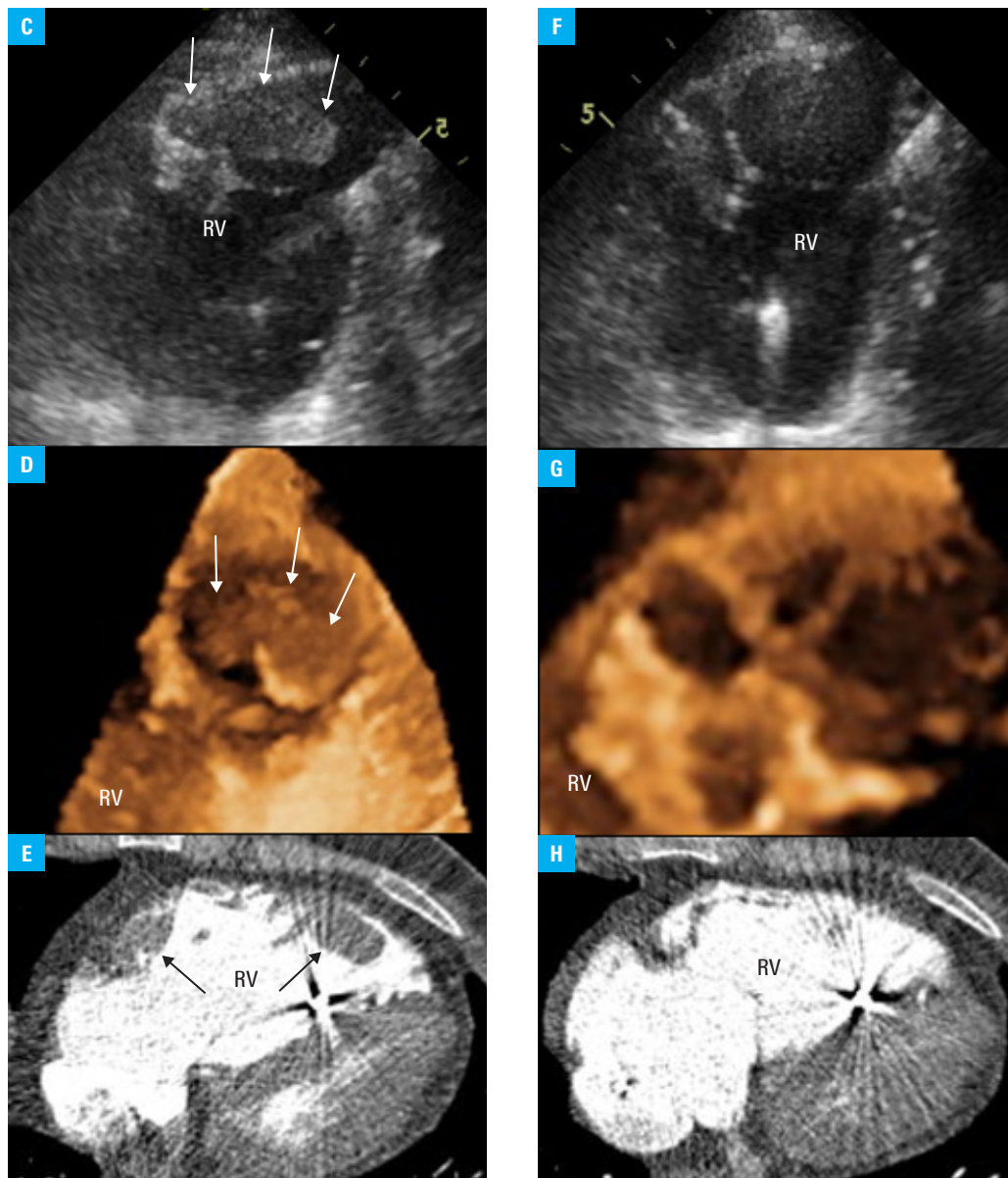


FIGURE 1 Cardiac magnetic resonance imaging performed several months before admission (A) and echocardiography after electrical cardioversion without right ventricular (RV) thrombi (B)

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FIGURE 1

Two-dimensional echocardiography (C), magnified 3-dimensional echocardiography (D), and computed tomography images (E) at diagnosis of right ventricular (RV) thrombi (arrows), and the corresponding images after thrombi resolution at 18 days of apixaban treatment (F–H)



echocardiography makes it a superior method on condition that the image is satisfactory. RV thrombi may be multiple,^{1,3} may develop rapidly,⁴ and may coexist with intracardiac thrombi in other cardiac chambers.^{1,3} Conditions predisposing to RV thrombus formation include advanced RV dysfunction, presence of multiple local aneurysms, invasive procedures (arrhythmia ablation, probably implantable cardioverter-defibrillator implantation), and, in our opinion, long-lasting VT, which leads to blood stasis in aneurysms.¹⁻⁵ The development of RV thrombi after VT can be delayed and the sensitivity of a single examination may be limited. Control examination immediately before invasive procedures, and before the patient's discharge after a VT episode, seems to be essential.

Most RV thrombi in ARVC reported in the literature were treated with vitamin K antagonists,^{1,2} and in 2 cases, with direct oral anticoagulants (DOACs), apixaban⁵ or dabigatran. However, in these 2 cases, other anticoagulants (heparin, warfarin) were applied before DOAC use. Irrespectively of the selected drug, anticoagulation

should be long-term because of the risk of thrombi recurrence. An optimal apixaban dose in a patient without pulmonary embolism should be probably limited to 5 mg twice daily, particularly in the presence of coexisting transient or persistent renal or liver impairment; however, further studies are needed to confirm this. Currently, anticoagulation in ARVC is recommended only for thromboembolic events or when atrial fibrillation is present. Perhaps recommendations should be extended to prophylaxis in patients with severe RV dysfunction, multiple aneurysms, and/or recurring VT despite appropriate treatment. It seems that the use of apixaban (or other DOAC) for RV thrombus in ARVC may be a safe and effective anticoagulant treatment.

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