Pathological Findings of Rivaroxaban-Associated Hemorrhagic Pericarditis

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Figure. Imaging and autopsy findings of hemorrhagic pericarditis. (A) Echocardiogram showing a moderate amount of pericardial effusion at the posterior position (dotted cross). (B) Contrast-enhanced computed tomography shows pleural and pericardial effusion with marginal contrast enhancement (white arrow). (C) T1-weighted magnetic resonance imaging showing pericardial effusion mimicking an isointense mass (yellow arrow). (D) Ventral surface of the mediastinum showing hemorrhagic pericardial effusion (white arrow, hemorrhage). (E) Hematoxylin-eosin staining of the hemorrhagic pericardium, showing hematoma and the presence of capillary vessels (scale bar, 1 mm) and (H) high-resolution image of the black box area (scale bar, 100 μm). (F, G, I, J) Immunostaining performed at the same site is equally positive for (F, I) CD34 (scale bars: F, 1 mm; I, 100 μm) and (G, J) D2-40 (scale bars: G, 1 mm; J, 100 μm).

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We describe the pathological findings of hemorrhagic pericarditis in a 76-year-old man who had been receiving rivaroxaban for atrial fibrillation (CHADS₂ score, 3) and who had a history of cardiac surgery (coronary artery bypass surgery and mitral valve repair) 9 years prior to admission. Although the patient had been on aspirin after surgery, the aspirin had to be discontinued due to continuous nasal hemorrhage 3 months earlier.

At admission for worsening heart failure, echocardiography showed a moderate amount of pericardial effusion (**Figure A**). Computed tomography showed a moderately sized enhancing pericardial effusion with marginal contrast enhancement (**Figure B**). T1-weighted magnetic resonance imaging (MRI) indicated an isointense pericardial effusion, which also suggested hemorrhagic pericardial effusion (**Figure C**). As a result, rivaroxaban had to be discontinued, which evoked cerebral infarction. The patient died and an autopsy was performed. Histology not only confirmed the diagnosis of hemorrhagic pericardial effusion (**Figure D–G**) and thromboembolic stroke, but also showed thrombi at the left atrial appendage. Also, angiogenesis and lymphan-

giogenesis, indicative of a relatively fresh hematoma, were seen on microscopy.

Rivaroxaban is an oral anticoagulant – a factor Xa inhibitor – approved for the prevention of stroke and thromboembolism in patients with atrial fibrillation.¹ The occurrence of hemorrhagic pericarditis as a complication is extremely rare. The present patient had previously undergone cardiac surgery, suggesting the possibility of post-pericardiotomy syndrome.²

Disclosures

The authors declare no conflicts of interest.

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