Catecholamine-Induced Myocarditis in Pheochromocytoma

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A 25-year-old man arrived at the emergency room of his community hospital complaining of abdominal pain, headaches, and palpitations that had appeared suddenly while he was playing soccer. He had no history of hypertension. An abdominal ultrasound revealed a tumor located in the right adrenal gland.

He was subsequently transferred to our hospital for further evaluation. On admission, he presented acute pulmonary edema with severe hypertension (blood pressure, 220/120 mm Hg). He was admitted to the coronary care unit. Intravenous vasodilators and loop diuretics were administered, with rapid recovery of clinical status.

ECG showed sinus rhythm, a heart rate of 80 bpm, and T-wave inversion in the DI, DII, and AVL leads. Transthoracic echocardiography revealed left ventricular hypertrophy and T-wave inversion in the DI, DII, and AVL leads. Transthoracic echocardiography revealed left ventricular hypertrophy and dilated left atrium. The ejection fraction was preserved. Cardiac magnetic resonance depicted normal left ventricular wall thickness and reversal of myocardial edema with persistence of LGE (Figure 2D through 2F and Movie II in the online-only Data Supplement).

Catecholamine-induced myocarditis is an infrequent clinical manifestation seen in patients with pheochromocytoma.

Catecholamine and their oxidation products may have a toxic effect on the myocardium. Long-term elevation of catecholamines leads to downregulation of β-adrenergic receptors, thereby inducing suboptimal function of myofibers and decreasing the number of contracting units. Contraction band necrosis, neutrophil infiltration, and fibrosis are histological changes that are generally observed.1–3 Cardiac magnetic resonance is a noninvasive technique that enables to assess acute myocarditis. It combines T2- and T1-weighted imaging after contrast highlighting the presence of myocardial inflammation and edema. LGE is a technique that enables identification of myocardial cell injury and focal fibrosis.4

The typical pattern in the acute phase of myocarditis induced by pheochromocytoma consists of the presence of diffuse myocardial edema on T2-weighted images and focal midwall LGE. This case shows evidence of acute catecholamine myocarditis with resolution of myocardial edema after adrenalectomy.

Disclosures

None.

References


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Figure 1. Abdomen computed tomographic scan: 47.5×36.7-mm heterogeneous right adrenal mass.

Figure 2. A through C, Cardiac magnetic resonance (CMR) on presentation. Increased left ventricular wall thickness (A), diffuse myocardial edema on T2-weighted images (B), and focal midwall late gadolinium enhancement (LGE) in the inferior medial segment (C). D through F, CMR on recovery. Normal left ventricular wall thickness (D), absence of myocardial edema on T2-weighted images (E), and persistence of focal midwall LGE in the inferior medial segment (F).

Figure 3. A, Tumor (T) and normal adrenal gland (N). B, Tumor cells nests.
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**Movie Legend**

**Movie 1.** Cardiovascular magnetic resonance shows increase left ventricular wall thickness, diffuse myocardial edema on T2-weighted images, and focal mid-wall late gadolinium enhancement in the inferior medial segment. Best viewed with Windows Media Player.

**Movie 2.** Cardiovascular magnetic resonance shows normal left ventricular wall thickness, absence of myocardial edema on T2-weighted images, and persistence of focal mid-wall late gadolinium enhancement in the inferior medial segment. Best viewed with Windows Media Player.