Case Report

A Case of Myocardial Infarction With Nonobstructive Coronary Arteries due to the Compressive Effects of a Type B Thymoma With Internal Hemorrhage

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ABSTRACT

Our case was a 45-year-old woman who presented with a chief complaint of intermittent typical chest pain. In electrocardiography, ST-elevation in the lateral leads was observed. Echocardiography showed mild left ventricular systolic dysfunction with hypokinesia in the anteroapical segment. Coronary angiography was normal, and chest computed tomography showed a large mediastinal mass without any compression on the coronary arteries. Cardiac magnetic resonance imaging demonstrated a nonhomogeneous encapsulated mass close to the right ventricle and adjacent to the ascending aorta, the pulmonary artery trunk, and the superior vena cava, with compression effects on the coronary artery. There was transmural gadolinium enhancement in the mid-to-apical anterior and inferior walls with akinesia in these segments, in favor of myocardial infarction with nonobstructive coronary arteries. The patient underwent surgical mass resection, and the pathological investigation confirmed the diagnosis of a type B1 thymoma. ***(Iranian Heart Journal 2022; 23(1): 214-219)***

KEYWORDS: Myocardial infarction with nonobstructive coronary arteries, Coronary artery compression, Thymoma

Learning Objective: In every case with myocardial infarction with nonobstructive coronary arteries, external coronary artery compression should be borne in mind. In this regard, cardiac magnetic resonance imaging could help establish a critical diagnosis.

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The prevalence of myocardial infarction with nonobstructive coronary arteries (MINOCA) is about 3% and is more common in younger patients. [1] MINOCA may occur due to coronary artery compression induced by external cardiac masses. [2] We herein report a case of MINOCA due to a large thymoma with internal hemorrhage.

Case Presentation

Our case was a 45-year-old woman with a history of migraine and hypertension

presenting with a chief complaint of intermittent typical chest pain following emotional stress of 24 hours' duration. Physical examination was within normal limits, and the patient had no other symptoms. In electrocardiography (ECG), ST-elevation in the lateral leads, accompanied by deep T inversions in the V_1–V_4 precordial leads, was observed (Fig. 1). Echocardiography showed mild left ventricular systolic dysfunction with hypokinesia in the anteroapical segment. The cardiac troponin value was elevated. Chest X-ray showed mediastinal widening and cardiac silhouette (Fig. 2). The patient underwent coronary angiography, which was normal without any stenosis. Chest computed tomography was performed, and it showed a large mass in the anterior mediastinum (49×113×101 mm) close to the right ventricle and adjacent to the ascending aorta, the pulmonary artery trunk, and the superior vena cava. The mass was filled with a dense fluid, and it included some tiny hyperdense portions without any contrast enhancement within the mass (Fig. 3). Cardiac magnetic resonance imaging was performed, and it confirmed the presence of a nonhomogeneous, lobulated, and encapsulated mass lesion at the computed tomography-reported site with multiple low- and high-intensity signals. Indeed, there was transmural gadolinium enhancement in the mid-to-apical anterior and inferior walls with the akinesia of these segments, in favor of MINOCA in the myocardial territory of the left anterior descending and diagonal coronary arteries (Fig. 4). She underwent surgical mass resection, and the pathological investigation confirmed the diagnosis of a type B1 thymoma with internal hemorrhage and compressive effects on the coronary artery.

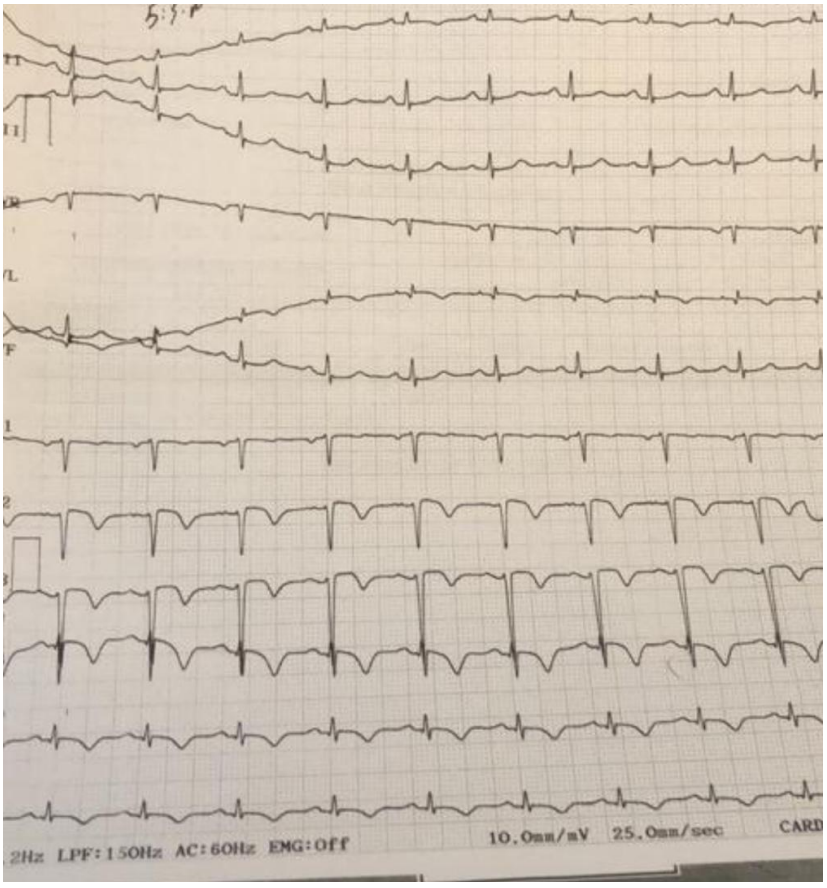


Figure 1. The image illustrates ST-elevation in the lateral leads, accompanied by deep T inversions in the V_1–V_4 precordial leads.

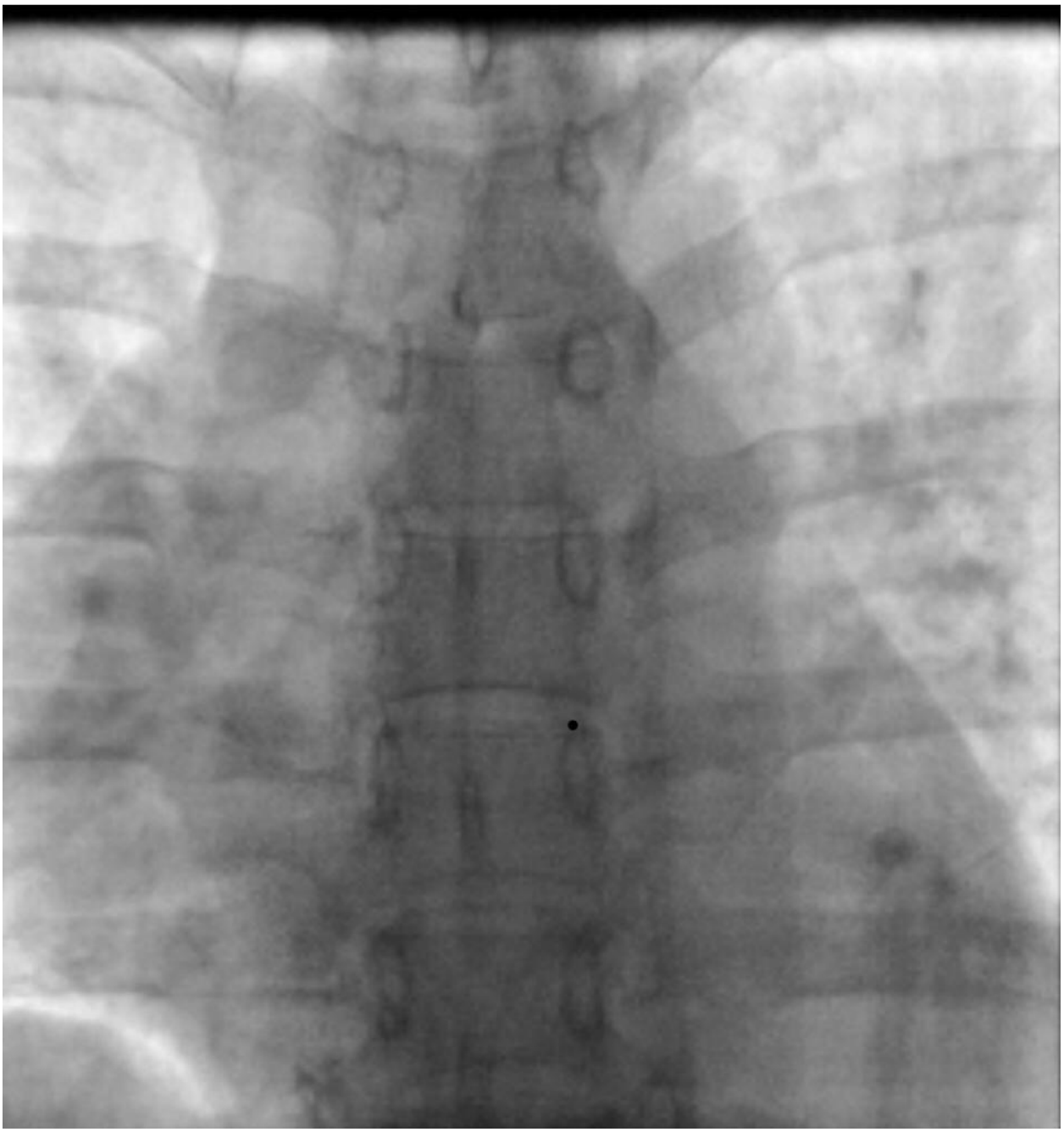


Figure 2. Chest X-ray shows mediastinal widening and cardiac silhouette.

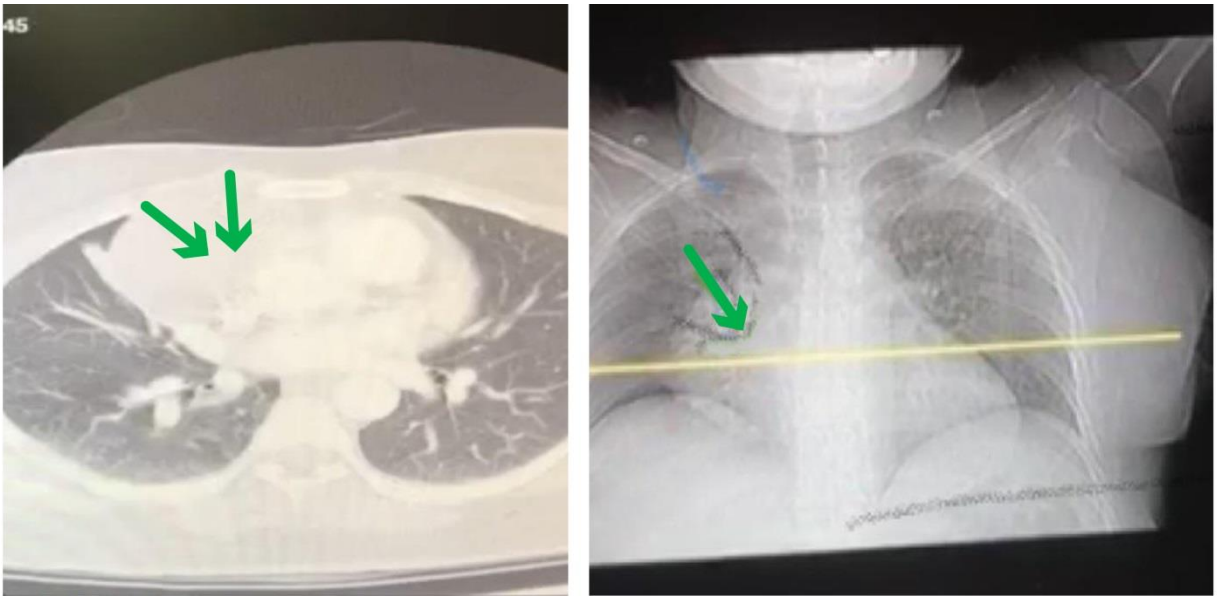
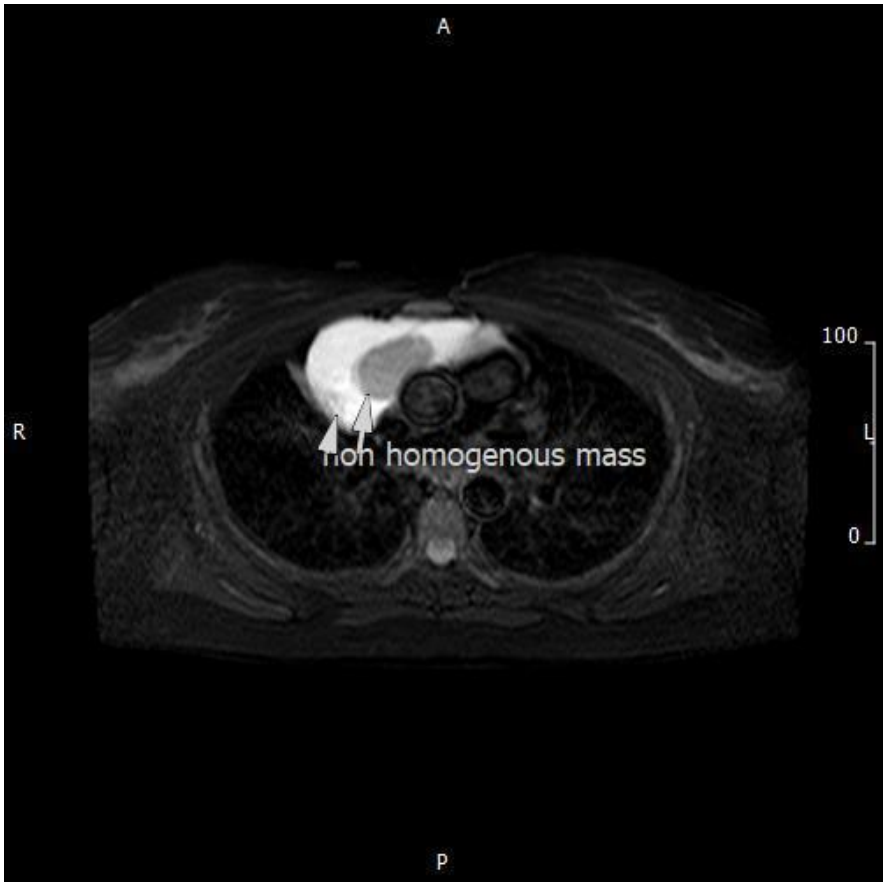
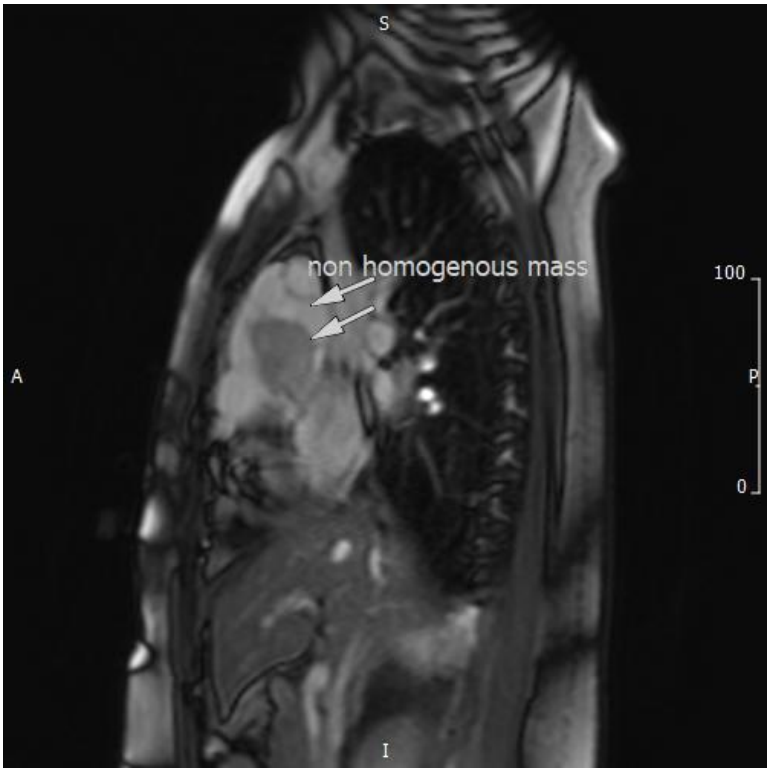


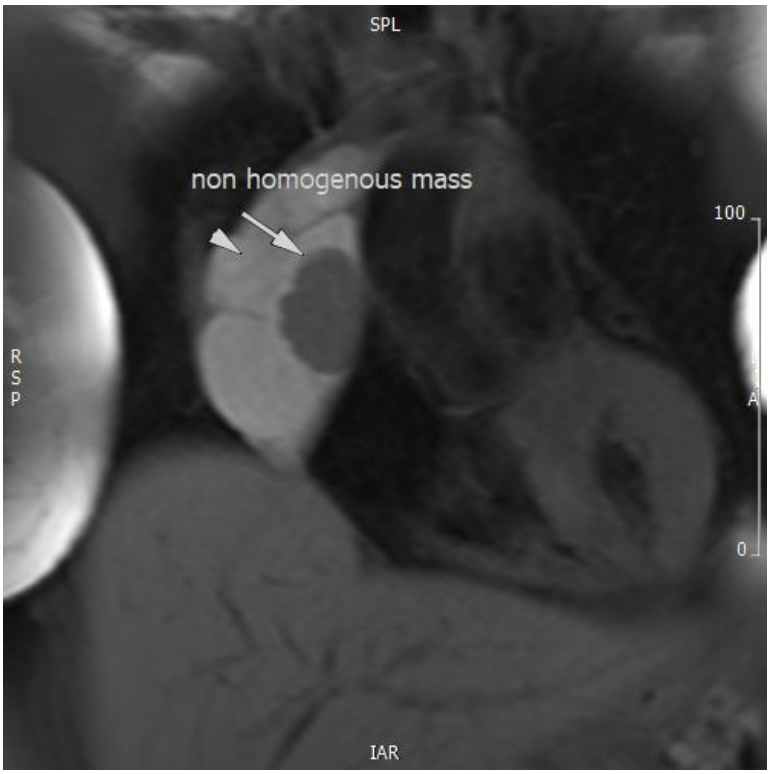
Figure 3. Chest computed tomography shows a large mass in the anterior mediastinum (49x113x101 mm) close to the right ventricle and adjacent to the ascending aorta, the pulmonary artery trunk, and the superior vena cava. The mass is filled with a dense fluid, and it includes some tiny hyperdense portions without any contrast enhancement within the mass.



a) The STIR image shows a mediastinal mass anterior to the aorta. It is strongly high signal and includes a low-signal compartment.



b) The sagittal view of a nonhomogeneous, encapsulated mass in the anterosuperior mediastinum. The mass includes a compartment with both low and high signals at its center.



c) A low-signal compartment within the mass predicts internal hemorrhage, which has probably resulted in mass expansion.

Figure 4. Cardiac magnetic resonance imaging shows the presence of a nonhomogeneous, lobulated, and encapsulated mass lesion at the computed tomography-reported site with multiple low- and high-intensity signals. There is transmural gadolinium enhancement in the mid-to-apical anterior and inferior walls with the akinesia of these segments.

DISCUSSION

Cardiac compression due to thymomas is a very rare reported pathology that needs prompt surgical treatment (PMCID: PMC3844940). Chest pain could also occur due to hemorrhage or infarction within the tumor and could be diagnosed differentially as the cardiac source of chest pain. [3] This could also happen due to the invasion of the myocardium and epicardial vessels by invasive thymomas. [4] Likaj et al [5] described a 30-year-old woman with compression on the right ventricle due to a necrotic type A thymoma. Rajo P et al [6] reported a case of an invasive type B thymoma that caused ST-elevation MI in a 39-year-old African man. Our case was affected by MINOCA induced by compression due to a noninvasive type B thymoma. To the best of our knowledge, this is the first case of MINOCA reported in the left anterior descending and diagonal territories due to a thymoma with internal hemorrhage.

Cardiac magnetic resonance imaging is a powerful tool to investigate the cause of MINOCA and the mechanism of MI. [7] This case illustrates a very rare case of MINOCA and highlights the importance of not being satisfied just with a normal coronary angiography. Indeed, further imaging modalities of the thorax and the myocardium is essential to provide the patient with the most appropriate diagnosis and therapeutic options.

Conflict of Interest: The authors have no conflicts of interest to declare.

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