

CASE REPORT

Recurrent Myocardial Infarction and Catecholamine-Induced Cardiomyopathy: A Case Report

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Key words: pheochromocytomas; paragangliomas; cardiomyopathy; myocardial infarction

Abstract Pheochromocytomas or paragangliomas are rare and the diagnosis remains a challenge for clinicians. We present a woman suffering from recurrent myocardial infarction and cardiomyopathy, who was finally diagnosed with paraganglioma. Pheochromocytomas or paraganglioma should be considered in the differential diagnosis of a patient with symptoms possibly referring to acute coronary syndrome and cardiomyopathy.

PHEOCHROMOCYTOMAS are rare neuroendocrine tumors that secrete excessive catecholamine and usually cause paroxysmal or persistent hypertension. The main cardiovascular system manifestations are ischemia, arrhythmia and cardiomyopathy.^[1] Usually, the diagnosis of pheochromocytomas is a challenge due to its atypical symptoms and rare occurrence. Here, we report a patient with recurrent myocardial infarction and transient left ventricular dysfunction, who was ultimately diagnosed as paraganglioma.

CASE DESCRIPTION

A 58-year-old woman was admitted to our hospital with acute onset of chest pain radiating to back. She had a history of hypertension and hyperlipidemia with

an intermittent follow-up for 8 years. Her blood pressure was under control with nifedipine and she denied predisposition to hypertension. The similar symptoms occurred 2 years ago, and a diagnosis of ST-elevated myocardial infarction was made. However, coronary angiography showed coronary artery was normal. She also complained episodic palpitation and retrosternal discomfort. On examination, her body temperature was 37.2°C, blood pressure was 203/113 mm Hg (1 mm Hg=0.133 kPa), and heart rate was 92 beats per minute. White blood cell count increased to $17.49 \times 10^9/L$ with 76.9% neutrophils. Troponin-I and N terminal pro-B type natriuretic peptide (NT-BNP) were elevated to 11.72 µg/L and 10 540 pg/ml, respectively. Electrocardiography revealed ST-segment elevation in leads III and aVF, ST-segment depression in leads I, aVL and V₁₋₆. Transthoracic echocardiogram showed normal-sized left ventricle, severe hypokinesia of the inferior wall and posterior wall, ejection fraction of 35%, diastolic dysfunction, and absence of pericardial effusion or pulmonary hypertension. Therefore, an ST elevation myocardial infarction was suspected. However,

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coronary angiography revealed no stenosis of coronary arteries. A 24-hour urine collection for catecholamines was within normal limits. Abdominal computer tomography showed a heterogeneous contrast-enhanced right adrenal mass measuring 1.3 cm×1.3 cm and a 3.1 cm×2.2 cm retroperitoneal tumor in contact with inferior vena cava (**Fig. 1**). Somatostatin receptors (OctreoScan) SPECT CT showed a normal uptake. So, pheochromocytoma and retroperitoneal paraganglioma were suspected.

After a four-week of alpha-adrenergic blockade treatment, when she was in a good condition with normal blood pressure and heart rate, she thereafter was referred for surgical treatment. Both right adrenal and retroperitoneal masses were resected laparoscopically. Postoperatively pathological report confirmed the diagnosis of nodular adrenal hyperplasia and paraganglioma. She remained hemodynamically stable without striking variations of blood pressure postoperatively and was discharged 3 days after the operation.

DISCUSSION

The case presented here demonstrated recurrent myocardial infarction and cardiomyopathy secondary to severe catecholamine excess. Differential diagnosis, although difficult, is important for prognosis. The patient was misdiagnosed 2 years ago because of atypical symptoms.

Pheochromocytomas are catecholamine-secreting tumors, which arise from the chromaffin cells of the adrenal medulla or extra-adrenal chromaffin tissue. Paragangliomas are those which arise from extra-adrenal chromaffin tissue. Their typical symptoms are the triad of headache, paroxysmal hypertension, and diaphoresis. But when the patients with atypical symptoms or symptoms mimicking other diseases, the di-

agnosis will become a considerable challenge clinicians face. Patients may experience chest pain, tachycardia, diaphoresis, and ST segment elevation or depression and T wave inversion. Elevated cardiac enzymes may also be detected, especially if patients associated with catecholamine-induced cardiomyopathy or with underlying coronary artery disease.

Pheochromocytomas associated myocardial ischemia may contribute to excessive catecholamine secreted into blood by pheochromocytomas. Excessive release of catecholamine would induce vasoconstriction, elevated myocardial contractility and heart rate, which thereby result in myocardial oxygen consumption increases, and ultimately myocardial oxygen supply-demand imbalance may lead to myocardial ischemia. However, it is difficult to differentiate pheochromocytoma-induced myocardial ischemia from acute coronary syndrome, especially in those with underlying coronary artery diseases. In addition, excessive catecholamine can directly affect the function of myocardium through enhancing intracellular calcium overload *via* beta-1 adrenoceptor^[2] and indirectly cause cardiomyocytes injury by generating oxygen radicals,^[3] finally giving rise to cardiomyopathy. Besides, downregulation of beta-adrenergic receptors due to excess catecholamine leading to decreased function of cardiac myofibers and reduced numbers of contractile units^[4] are contributing factors of cardiomyopathy.

Biochemical testing such as urine or plasma-free metadrenalines and imaging studies including computer tomography, metaiodobenzylguanidine scintigraphy, somatostatin receptors SPECT CT, positron emission tomography computerized tomography are useful in making diagnosis.

The treatment of pheochromocytoma induced myocardial infarction and cardiomyopathy includes supportive care, pharmaceutical preparation by alpha adrenergic blockade and surgical resection. For patients with pheochromocytoma or paragangliomas, alpha-adrenergic blocker administrated gradually at least 2 weeks before operation are recommended, to achieve the targeted blood pressure (blood pressure less than 130/80 mm Hg while seated and systolic blood pressure no less than 90 mm Hg while standing). Meanwhile, β -adrenergic receptor blocker can be administrated together several days after alpha adrenergic blockade treatment to reach a targeted heart rate of 80 beats per minute. Controlling blood pressure, heart rate and volume expansion is most

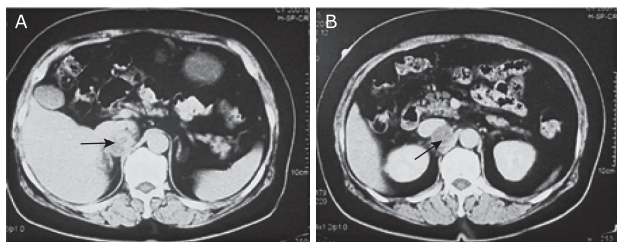


Figure 1. Abdominal computer tomography of the woman. A. A mass lesion of 1.3 cm×1.3 cm in size in the right adrenal gland (arrow). B. A 3.1 cm×2.2 cm retroperitoneal tumor in contact with inferior vena cava (arrow).

important in preoperative management. And extracorporeal membrane oxygenation had been used as a rescue method bridging alpha adrenergic preparation and surgical treatment.^[5, 6] Cardiomyopathy usually relieves after pharmaceutical therapy and surgical excision of tumor.

In conclusion, we reported a case of paraganglioma with clinical presentation mimicking acute coronary syndromes. For patients with clinical manifestations of myocardial ischemia and cardiomyopathy, pheochromocytoma or paraganglioma should be included in the differential diagnosis. Proper examination, supportive care and perioperative management are essential to the prognosis of paraganglioma patients.

Conflicts of interest statement

All authors declare no conflicts of interest.

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中文摘要

一例反复发作的心肌梗死和儿茶酚胺心肌病病例报告

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摘要

嗜铬细胞瘤 / 副神经节瘤是罕见的神经内分泌肿瘤。部分临床表现不典型患者的诊断比较困难。我们报道了 1 例以反复心肌梗死和心肌病为临床表现的嗜铬细胞瘤和副神经节瘤患者的诊治经过。因此, 嗜铬细胞瘤 / 副神经节瘤应作为不明原因急性冠脉综合症或心肌病的鉴别诊断之一。

关键词: 嗜铬细胞瘤、副神经节瘤、心肌病、心肌梗死

中文摘要

成功诊治宫内合并宫角妊娠 1 例及文献复习

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摘要

宫内合并宫角妊娠是一种罕见的严重妊娠并发症。本文报告一例 33 岁妇女, 在体外受精 - 胚胎移植后发生宫内合并宫角妊娠。为了防止宫角妊娠破裂, 宫角妊娠物在妊娠 7⁺² 周时经腹腔镜手术被清除。在妊娠 38⁺³ 周时, 此孕妇顺利分娩一名健康男婴。此外, 我们还回顾 MEDLINE (PubMed) 数据库收录的所有关于 CHP 的病例报告、病例系列和队列研究, 分析了 CHP 的临床表现、危险因素、治疗方法及妊娠结局。

关键词: 宫内合并宫角妊娠; 阴道超声; 腹腔镜; 辅助生殖技术