Case Report

Successful extracorporeal membrane oxygenation treatment for pheochromocytoma-induced acute cardiac failure☆,☆☆

Abstract

The aim of this study is to report the case of a catecholamine-induced cardiogenic shock bridged to curative adrenalectomy using extracorporeal membrane oxygenation (ECMO) and medical management. A 37-year-old woman presented an acute cardiogenic shock due to a left-sided pheochromocytoma. Echocardiography revealed a severe global hypokinesia with a left ventricular ejection fraction of 15%. Despite maximal ionotropic support, adequate perfusion could not be achieved; and ECMO was used to bridge the patient during medical management with calcium-channel blockers. The left ventricular ejection fraction improved to 65%, and ECMO was discontinued after 11 days. An open left adrenalectomy was performed 10 days after ECMO. At 1-year follow-up, the patient is in good health with normal cardiac function.

Pheochromocytomas are rare neuroendocrine tumors with a highly variable clinical presentation but most commonly manifest by a classical triad of headache, palpitations, and hypertension [1-3]. The prevalence of pheochromocytoma among hypertensive patients ranges from 0.05% to 0.6% [4,5]. A wide range of cardiac hyperexcitability symptoms such as hypertensive crisis and arrhythmias may occur with pheochromocytomas [6]. The first clinical manifestations of pheochromocytomas can be myocardial infarction [3], cardiogenic shock [7], and acute myocarditis [8]. Fortunately, the cardiogenic effects of pheochromocytoma can be reversed with timely recognition of the diagnosis, medical optimization, and surgical resection [9].

Publication of patient data was performed in accordance with the ethical guidelines of the institution. A 37-year-old white woman with no medical history was admitted to the emergency department of a referral institution for severe left-sided chest pain and fever. The patient was severely ill with profound fatigue and rigors. Her initial vital signs included a temperature of 38°C, a blood pressure of 80/60 mm Hg, and tachycardia to 130 beats per minute. There was no evidence of ischemia on electrocardiogram, and chest x-ray revealed a left upper lobe consolidation. Laboratories revealed a leukocytosis of 26290/mm³, C-reactive protein of 126 mg/L, lactate of 4.5 mmol/L, and a negative β human chorionic gonadotropin. Fluid resuscitation and antibiotic therapy were started for a presumed pneumonia. Further workup included a computed tomography of the chest, abdomen, and pelvis, which revealed diffuse pulmonary edema and a 7-cm diameter hypervascular lesion of the left adrenal gland Fig. 1. The patient was transferred to our region referral center for further intensive care unit management. The patient became progressively hypoxic and hypotensive, requiring mechanical ventilation and inotropic support. Echocardiography revealed a severe global hypokinesia with a left ventricular ejection fraction of 15%. Despite maximal ionotropic support, adequate perfusion could not be achieved and arterio-venous (A-V) extracorporeal membrane oxygenation (ECMO) was started.

Elevated urinary metanephrine and normetanephrine (73 750 nmol per 24 hours and 330 630 nmol per 24 hours) confirmed the suspicion of pheochromocytoma and acute catecholamine-induced cardiac failure. A magnetic resonance imaging confirmed the presence of an isolated large left adrenal mass without evidence of a secondary or ectopic pheochromocytoma. Medical therapy was immediately started with calcium blockers (nicardipine chlorhydrate 50 mg daily) to reverse the catecholamine-induced cardiac failure. The left ventricular ejection fraction improved to 65%, and ECMO was stopped after 11 days. An open left adrenalectomy was performed 10 days after the discontinuation of ECMO. The postoperative course was uneventful, and the patient was discharged on the fourth postoperative day. At 1-year follow-up, the patient is in good health with a normal cardiac function.

The life-threatening cardiovascular complications of pheochromocytomas are due to the effects of high-level secreted catecholamines [2]. Different factors have been...
Pheochromocytomas are rare but can present with dramatic cardiovascular collapse. The diagnosis should be suspected early, especially in young patients. With timely diagnosis and medical therapy, followed by surgical resection, the cardiovascular effects can be reversed; and the condition, cured [14]. Young patients with catecholamine-induced cardiac failure refractory to medical therapy are ideal candidates for short-term ECMO support as the underlying cause is imminently reversible.

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References


Fig. 1  Computed tomographic scan showing a 7-cm diameter hypervascular lesion of the left adrenal gland.


