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Myocarditis revealing a pheochromocytoma: When the heart gives the adrenal gland away

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ABSTRACT

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Introduction: Pheochromocytoma is a rare tumour that secretes catecholamines and can present with a variety of complications, including severe cardiovascular complications such as myocarditis and cardiomyopathy. Early diagnosis of these atypical presentations is essential for prompt management.

Case report: We report the case of a 62-year-old patient, a chronic smoker, admitted for management of a deterioration in his general condition. He presented with asthenia, weight loss, sweating, palpitations, headaches, abdominal pain and vomiting. Clinical examination revealed a hypertensive crisis (250/130 mmHg), tachycardia, proximal muscle weakness and abnormalities on the electrocardiogram. Laboratory tests revealed an infectious syndrome, acute renal failure and elevated cardiac biomarkers. Plasma methoxylated derivatives were very high. Imaging showed a left adrenal mass with central necrosis. The diagnosis was severe myocarditis with rhabdomyolysis secondary to a pheochromocytoma. Management involved antihypertensive treatment, antibiotic therapy and plans for adrenal surgery.

Conclusion: This case highlights the importance of considering pheochromocytoma in the presence of cardiac symptoms that may sometimes be atypical, such as acute myocarditis, particularly when accompanied by a hypertensive crisis. Early diagnosis enables optimal management and improves the prognosis.

KEYWORDS:

Cardiomyositis, rhabdomyolysis, catecholamines, pheochromocytoma

INTRODUCTION

Pheochromocytoma is a rare neuroendocrine tumour that develops from the chromaffin cells of the adrenal medulla.

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Pheochromocytomas are more common in patients with incidental adrenal masses, with a prevalence of 0.6% to 4.2% of such cases [1].

Clinical presentation varies, ranging from the classic triad of headaches, palpitations and sweating to serious cardiovascular complications such as myocarditis, cardiomyopathy and arrhythmias [2].

Catecholamine-induced myocarditis is a relatively rare cardiac manifestation of pheochromocytoma, but one that has been documented in recent literature. It may rarely present as the first

sign of pheochromocytoma, sometimes even before the adrenal mass is identified [3,4].

We report a rare case of cardiomyositis with rhabdomyolysis that unusually revealed a pheochromocytoma, and discuss the pathophysiological, clinical and therapeutic aspects in the light of the literature.

CLINICAL CASE

A 62-year-old patient, a chronic smoker for 35 years, was admitted for management of a deterioration in general health.

The medical history revealed symptoms dating back one week prior to admission, comprising asthenia, significant weight loss and night sweats; these were exacerbated by headaches and palpitations associated with abdominal pain and vomiting in the context of fever.

The infectious history noted feverish sensations and a cough.

The clinical examination revealed a conscious patient, a blood pressure reading of 250/130 mmHg, a heart rate of 120 beats per minute, a body mass index of 24.9 kg/m², muscle weakness, myalgia in the shoulders and hips, and a sub-apical lateral shift on the electrocardiogram.

Biological tests revealed rhabdomyolysis (very high CPK and LDH levels) associated with cardiac distress (very high troponin levels) and a biological infectious and inflammatory syndrome (Table 1)

Table 1: The patient's laboratory results showing rhabdomyolysis, cardiac distress and an infectious and inflammatory syndrome.

Paramètres [normal values] / Date		Day 1	Day 8	Day 12
White blood cells	[4000-11000]	26000	22920	6000
Neutrophilis	[1400-7700]	21690	20320	
Eosinophilis	[0,02-0,63]	0.00		
CRP in mg/l	[<5]	157.9	7.1	
ESR in mm/h	[<20]		29	
Procalcitonine in ng/ml	[<0,5]	2.74		0.02
LDH en U/l	[135 - 225]	422		
CPK en U/l	[<200]	>4267	94	62
GFR en ml/min/1,73 m²	[80-120]	26	50	50
Troponines en ng/l	[<14]	16497	870	240

CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, LDH: lactate dehydrogenase, CPK: creatine phosphokinase, GFR: glomerular filtration rate.

In light of Ménard's triad and the hypertensive crisis, the investigation was supplemented by methoxylated metabolites, which were found to be elevated, with metadrenaline at 8.6 times the normal level and normetadrenaline at 1.6 times the normal level.

On radiological assessment, echocardiography revealed hypokinetic cardiomyopathy with preserved left ventricular ejection fraction; coronary angiography revealed moderate 50% stenosis of the middle anterior interventricular artery; and a thoracic CT angiogram revealed the presence of a left adrenal mass, roughly oval in shape, measuring 50x55x55 mm, well-defined, hypodense, largely necrotic, and showing moderate enhancement of its wall following contrast injection.

A CT scan of the adrenal glands revealed a nodular mass in the left adrenal gland involving the outer and inner cortices and the medulla; it was spontaneously isodense and heterogeneous, with a central area of necrosis, measuring 36 × 35 mm, with a spontaneous density of 32 Hounsfield units and a washout of 33%. The right adrenal gland appears normal. She concludes that the left nodular mass is of indeterminate nature based on the absolute washout, and recommends that this be followed up with adrenal magnetic resonance imaging for further characterisation (Figure 1).

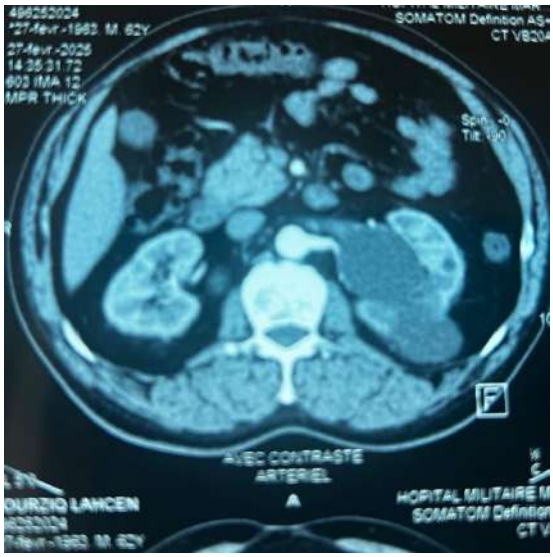

Figure 1: CT scan of the adrenal glands showing an indeterminate nodular mass on the left measuring 36 × 35 mm

Given the persistence of the infectious syndrome, with suspected myositis and/or vasculitis, the patient was transferred to the Department of Internal Medicine for further management. The diagnosis was myositis with severe myocardial involvement and rhabdomyolysis, secondary to a pheochromocytoma and complicated by acute renal failure in the context of an infection.

The patient was placed on antihypertensive and antibiotic treatment, with plans for surgical management of the adrenal mass.

DISCUSSION

Cardiovascular symptoms are often the first sign of a pheochromocytoma [1].

Our patient presented with a rarely described combination: acute myocarditis, rhabdomyolysis and renal failure. Other authors have reported cases of pheochromocytomas revealed by myocarditis, notably Uçaktürk et al. in 2019, who reported a case of catecholaminergic myocarditis revealing a pheochromocytoma in a child, Wu et al. in 2008, who described two cases of fulminant myocarditis with cardiogenic shock, and Bouamoud et al. in 2024, who reported recurrent myocarditis revealing a pheochromocytoma [5,3,4].

These studies confirm that catecholaminergic myocarditis can precede the diagnosis of the tumour and present in a fulminant manner.

From a pathophysiological perspective, myocarditis and rhabdomyolysis result from the direct toxicity of catecholamines on cardiac and skeletal myocytes, leading to contraction band necrosis, fibrosis, and transient or persistent myocardial dysfunction, as well as skeletal muscle damage due to hyperstimulation and metabolic stress [2, 6] .

Clinically, cardiac manifestations may present as fulminant myocarditis, cardiogenic shock [3,6], or Takotsubo-like cardiomyopathy [1].

In our case, the electrocardiogram showed ST-segment depression in the apicolateral leads; segmental hypokinesis and elevated cardiac biomarkers are consistent with catecholaminergic cardiomyositis. Elevated methoxylated metabolites confirm catecholamine excess, which is responsible for the cardiovascular and metabolic manifestations.

Differential diagnoses such as infectious myocarditis, autoimmune myopathy, non-tumoural takotsubo syndrome, or rhabdomyolysis secondary to infection or toxin must be ruled out. The presence of an adrenal mass and elevated catecholamines suggest a pheochromocytoma.

Management involves haemodynamic stabilisation, treatment with alpha- and then beta-blockers, management of multi-organ complications (rhabdomyolysis, renal failure [5,6]) and curative surgery consisting of tumour resection [1,2].

The prognosis depends on the initial severity of myocardial damage, the speed of tumour resection and the presence of multi-organ complications.

Recurrent myocarditis requires close monitoring via cardiac imaging, biomarker testing and blood pressure monitoring, and long-term follow-up is necessary for all patients with pheochromocytoma due to the risk of recurrence [4,7].

Table 2 illustrates the clinical variability and the importance of integrating clinical, laboratory and radiological findings for diagnosis.

Table 2: Comparison of our case with data from the literature

Study	Age / Sex	Cardiac manifestation	Treatment	Outcome
Uçaktürk et al., 2020	8 years old / F	Myocarditis	Surgery + supportive care	Full recovery
Wu et al., 2008	2 adult cases	Fulminant myocarditis, shock	Haemodynamic support + surgery	Gradual recovery
Bouamoud et al., 2024	Adult	Recurrent myocarditis	Surgery	Stabilisation, close monitoring
Levin et al., 2021	Adult	Eosinophilic myocarditis	Surgery + immunosuppression	Stabilisation
Niyogushima et al., 2025	62 years old / Male	Acute myocarditis + rhabdomyolysis	Antihypertensives, antibiotics, planned surgery	Post-operative follow-up pending

CONCLUSION

Pheochromocytoma can present with a variety of clinical and laboratory features. Acute myocarditis, cardiomyopathy or rhabdomyolysis are non-classical signs.

Our case illustrates the need to consider the diagnosis of pheochromocytoma when faced with unusual signs, particularly in patients presenting with unexplained myocarditis and paroxysmal hypertension. The diagnosis must be considered promptly to allow for early management, including haemodynamic stabilisation and surgery. The literature shows that the cardiac presentation can be fulminant and recurrent, highlighting the importance of rigorous follow-up.

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