Case Reports

Acute Myocarditis Secondary to Pheochromocytoma

Lucelia Cunha Magalhães, Eduardo S. Darze,Antônio Ximenes, Oto Santana, Jorge Bastos, Armênio Guimarães
Salvador, BA - Brazil

Acute carditis as the primary manifestation of pheochromocytoma is rare, and only a few cases have been reported in the literature [1]. Many times, the diagnosis is established only on an anatomicopathological basis, being frequently confounded with acute myocardial infarction or viral carditis. We report the case of a 40-year-old woman with pheochromocytoma and previous mild and labile hypertension, who suddenly developed low cardiac output with severe and potentially lethal arrhythmias, and whose follow-up allowed the suspicion and investigation of the underlying condition. The patient had a complete recovery without sequelae and no need for invasive examinations. The patient maintained her same previous hypertensive condition.

Pheochromocytoma is a functioning tumor composed of chromaffin cells that secrete catecholamines. Most of the pheochromocytomas (85%) are found in the medullae of the adrenal glands, but they may also occur in the paraganglia, which extend from the pelvis to the head. Pheochromocytoma may have a familial origin, being associated with multiple endocrine neoplasias. It has a large spectrum of clinical and biochemical manifestations, most of which are related to the excess of catecholamines that circulate in a paroxysmal manner. Although hypertension is the major manifestation, cases lacking hypertension have been reported [2]. The great majority of the patients (75%) have the classical sudden triad characterized by headache, palpitations, and severe hypertension. The condition is life threatening due to cardiovascular complications, mainly hemorrhagic stroke, arrhythmias, and hemodynamic impairment of the heart. Acute carditis, as its primary manifestation, is not common, and was first reported by Imperato-McGinley et al [3] in 1987 as norepinephrinic myocarditis, and later, in 1990, by Sardesai et al [4] as catecholamine-induced cardiomyopathy.

Case Report

The patient is a 40-year-old, single, white saleswoman, born and residing in the city of Salvador.

In March 2003, the patient sought medical care complaining of sporadic palpitations and mild tremors since October 2002, a period that she classified as very stressful due to her new job. She reported that 1 month earlier, these symptoms got worse, coinciding with her job loss and the end of a long-term relationship. She reported being used to moderate and regular physical activity, without problem. Five years earlier, the patient had been diagnosed with mild and labile hypertension, evidenced as occipital headache during physical activity. Since then, she has been on regular use of 25 mg of atenolol and 12.5 mg per day of hydrochlorothiazide, achieving excellent blood pressure control. On the same occasion, a rectification of the mitral valve with escape was diagnosed on the echocardiogram. On her biannual follow-ups, no target-organ lesion was evidenced. She reported smoking since 1999 and also an important familial history of hypertension, including both parents, with a significant "white-coat" effect. On physical examination, her radial pulse (RP) was 64 bpm, regular, and full, and her blood pressure was 154/88 mmHg (mean of 2 measurements). Ambulatory blood pressure monitoring, Holter monitoring, and exercise testing were normal. Her glycemia was 128 mg/dL, and her urinalysis showed 5 pyocytes per field. She was using Tenoretic (25 mg/morning), and atenolol (25 mg every night) was added. The patient improved with an increase in the dosage of atenolol, but, 1 month after the first medical visit, and after her usual physical activity, she experienced intense malaise, accompanied by tachycardia, sweating, pallor, and epigastric pain followed by lipothymia, being then referred to the emergency unit. She began to complain of high abdominal band-like pain, nausea, and frequent vomiting. Her RP was 92 bpm, weak, and her BP was 156/75 mmHg. She underwent ultrasonography of the total abdomen, 2 electrocardiographies, and measurement of amylase and cardiac, hepatic, and muscle enzymes, which were within the normal range. Her leukogram showed 28,000 leukocytes, and no eosinophils. The patient was referred to a general hospital, and, at the end of the day, her troponin was 9 ncg/dL, and later, 10. Her leukocyte count remained elevated and the leukogram maintained with the same pattern. She began to have mild hypotension. Two more electrocardiographies were performed, but were normal. The echocardiography revealed chambers of normal dimensions, akinesia of all myocardial segments, except for the apical segments, which were hyperkinetic, important systolic dysfunction, and moderate pulmonary hypertension. Acute heart disease, probably of viral origin, was suspected. Treatment for ventricular dysfunction (25 mg of captopril, BID; and 40 mg/day of furosemide) was initiated, with an excellent response. Gallium-67 myocardial scintigraphy was performed to confirm the diagnosis of viral myocarditis.

The complaints disappeared and the hemodynamic findings became stable. On the third day of hospitalization, the patient developed arrhythmias, such as atrial fibrillation, paroxysmal atrial

Serviço de Cardiologia Preventiva - Centrocor - Salvador
Mailling address: Lucelia Cunha Magalhães - Serviço de Cardiologia Preventiva Centrocor - Rua Agnelo de Brito, 102 - Sl. 101 - Federação Salvador, BA CEP 40210-245 - Brazil - E-mail: luceliamagalhaes@terra.com.br
Received for publication: 04/23/2004
Accepted for publication: 04/27/2004
English version by Stela Maris Costalonga

tachycardia, and periods of bidirectional ventricular tachycardia (fig. 1). On that occasion, total normalization of the ventricular function had already occurred, on a clinical and echocardiographic basis; the leukogram and troponin had also normalized. Gallium scintigraphy (fig. 2) showed active acute myocarditis, and, 2 days later, the viral serology revealed high titers for Coxsackie B, fractions 2 and 5, IgG antibodies. A few days later, despite the antiarrhythmic and antihypertensive treatments, and the use of high doses of anxiolytic agents, the patient had an acute crisis of tremors, with pallor and very increased intensity of the cardiac sounds, exacerbation of the systolic murmur in the apex, with the sensation of eminent death, intense motor agitation, and, right afterwards, periods of sustained ventricular tachycardia with BP = 260/110 mmHg, and filiform RP = 48 bpm. We immediately measured the levels of serum adrenaline and noradrenaline, and 24-hour urinary metanephrines. With the introduction of 900 mg of Mexitil in association with 600 mg of amiodarone, the cardiac rhythm stabilized. Six days later, with a mild increase in the levels of catecholamines and their metabolites (adrenaline = 21 ng, normal range: 0-16 ng; noradrenaline = 90 ng, normal range: 11-86 ng), computerized tomography of the abdomen was performed to investigate the sympathetic chain and the adrenal glands. The computerized tomography revealed a tumor in the right adrenal gland suggestive of pheochromocytoma. After alpha-adrenergic block with prazosin, successful adrenalectomy was performed (fig. 3 and 4). Currently, the patient is asymptomatic, and returned to her previous condition of mild and labile hypertension on 5 mg of ramipril and 12.5 mg of hydrochlorothiazide daily.

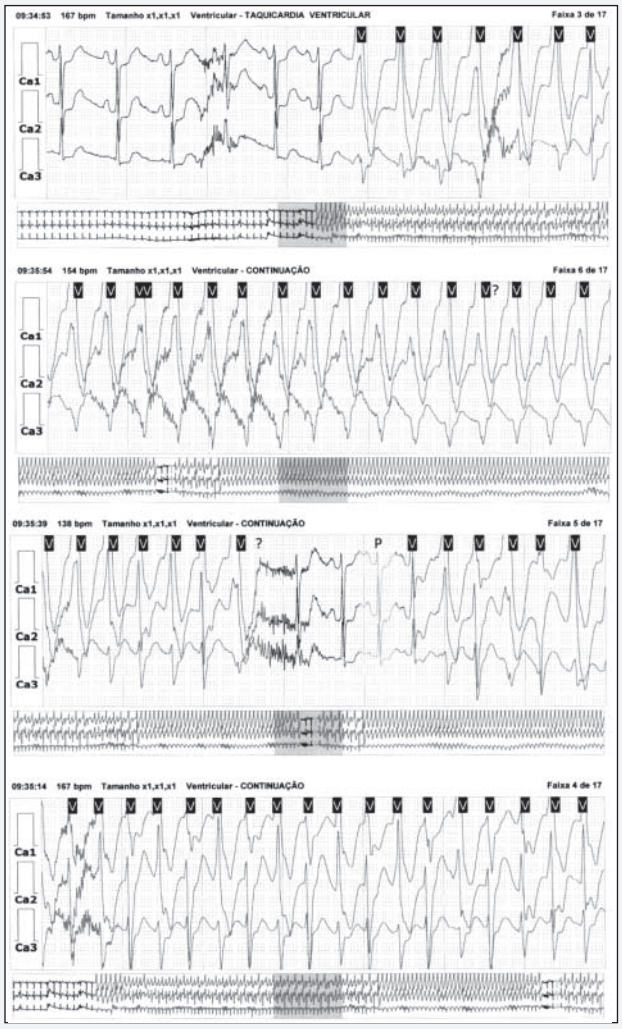

Fig. 1 - Paroxysmal ventricular tachycardia with up to 118 heartbeats and HR of 167 bpm, monomorphic, and with bidirectional aspect (05/15/2003, 9h 34').

Discussion

No reports on the prevalence of noradrenergic acute carditis as a primary manifestation of pheochromocytoma exist, but it is known

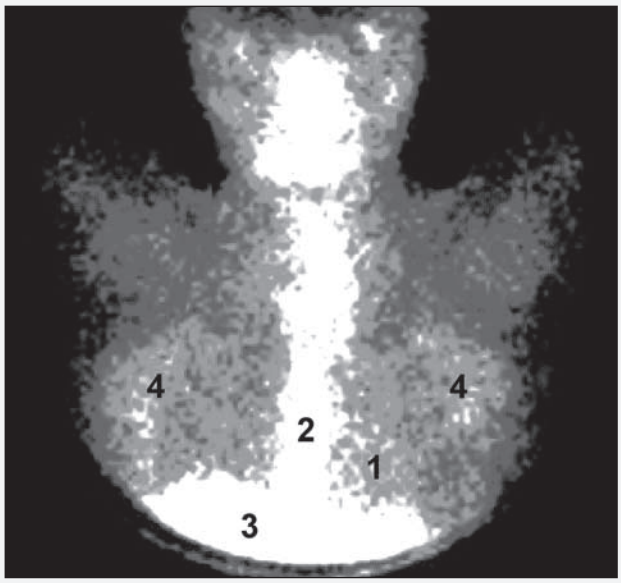

Fig. 2 - Chest scintigraphic images 72 hours after venous administration – High probability of active myocarditis. Caption of the gallium-67 scintigraphy: 1- heart; 2 - sternum; 3 - liver; 4 - breasts.

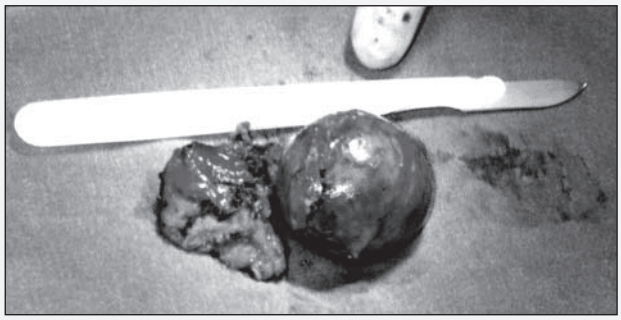

Fig. 3 - Anatomical specimen consisting of the tumor (pheochromocytoma) coupled with the right adrenal gland (removed on May 23, 2003).

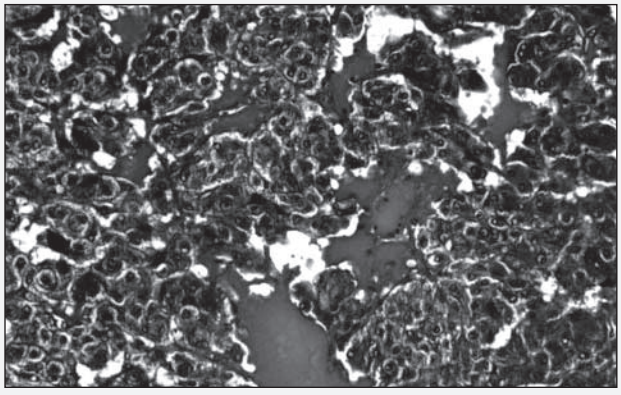

Fig. 4 - Microscopic section showing typical pheochromocytes in a trabecular pattern, intermingled with congestive blood vessels and hemorrhage. (hematoxylin-eosin; magnification: 200x).

to occur in less than 5% of the cases of pheochromocytoma [5,6]. In our case, the following aspects are worth noting: 1) the lack of headache, considered the most common symptom of pheochromocytoma; 2) the nonexistence of severe hypertensive crises refractory to therapy in a previous hypertensive patient; 3) the form of initial manifestation as a band-like abdominal pain, sweating, hypotension, and vomiting led us to investigate pancreatitis or complicated gastric ulcer; 4) after a few hours, the findings concentrated on the cardiac area, with extremely elevated troponin levels, associated retrosternal and abdominal discomfort, and signs of low cardiac output. The electrocardiogram and the epidemiological cardiovascular aspects led us to favor the echocardiogram rather than the hemodynamic study, because, on that occasion, we considered the possibility of carditis, and in the presence of coronaritis and pancarditis, the contrast medium used in the hemodynamic study could impair even more acutely left ventricular function. The diversified, severe arrhythmia refractory to therapy in the absence of left ventricular dysfunction surprised us, as well as the occurrence of viral carditis in adults, which is not a usual manifestation. The temporal cadence that occurred on the 15th day of hospitalization, whose entire cycle was followed up for the first time by the attending physician, led us to consider the possibility of the acute circulation of a substance producing these findings, which would constitute a classical picture of an acute dysfunctional adrenergic discharge. The temporal cadence comprised indescribable malaise, involuntary tremor, sinus tachycardia with filiform pulse, increased intensity of the cardiac sounds, a significant increase in the systolic murmur (from second-degree protomesosystolic murmur to fourth-degree holosystolic murmur) with valvular ictus, but very impulsive. The arrhythmias appeared only 4 minutes after the manifestation, first as isolated ventricular extrasystoles, then paired, and finally as sustained bidirectional ventricular tachycardia with low cardiac output.

It is worth noting that gallium-67 scintigraphy suggested active acute myocarditis, because that finding had only been classically reported in the acute myocarditis of childhood, mainly of the viral type. No report on a case of pheochromocytoma exists in the literature consulted.

The elevated titers of IgG for the Coxsackie B fractions 2 and 5 are difficult to interpret; it may be an associated finding with no causal relation to myocarditis, or may be consequent to the exhaustion of the immune system by the stress hormones, leading to the occurrence of acute viral myocarditis.

References

1. Baratella MC, Menti L, Angelini A, et al. An unusual case of myocarditis. Intern Cardiol 1998; 65: 305-10.
2. Williams DT, Dann S, Wheeler MH. Phaeochromocytoma-views on current management. EJSO 2003; 29: 483-90.
3. Imperato-McGinley J, Gautier T, Ehlers K. Reversibility of catecholamines-induced dilated cardiomyopathy in a child with phaeochromocytoma. N Engl Med 1987; 316(13):793-7.
4. Sardesai SH, Mourant AJ, Sivathandon Y, et al. Phaeochromocytoma and catecholamines-induced cardiomyopathy presenting as heart failure. Br Heart J 1990; 63: 234-7.
5. Ganguly PK, Beanish RE, Dhalla NS. Catecholamine cardiotoxicity in phaeochromocytoma. Am Heart J 1989; 117: 1399-400.
6. Salathe M, Weiss P, Ritz R. Rapid reversal of heart failure in a patient with phaeochromocytoma and catecholamines-induced cardiomyopathy who was treated with captopril. Br Heart J 1992; 68: 527-8.