CASE REPORT

Uncommon presentation, rare complication and previously undescribed oncologic association of pheochromocytoma; the great masquerader

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SUMMARY

We describe the case of a 67-year-old man presenting with ventricular tachycardia (VT) and systolic heart failure secondary to a left adrenal pheochromocytoma. After treatment with amiodarone, the patient's VT resolved. However, his course was complicated by femoral deep venous thrombosis secondary to an incidentally discovered dedifferentiated liposarcoma of the thigh, for which he was prescribed a course of enoxaparin. The patient was discharged with plans for adrenalectomy following achievement of sufficient preoperative heart rate and blood pressure control with alpha-adrenergic receptor blockade, but re-presented to an outside facility in haemorrhagic shock, where he ultimately expired. Autopsy determined his death to be caused by spontaneous haemorrhage of the pheochromocytoma. Cardiac manifestations, complications and oncological associations of pheochromocytoma are discussed.

BACKGROUND

Pheochromocytoma is a rare neuroendocrine tumor that arises from the chromaffin cells of the adrenal medulla, with an annual incidence of 0.8 per 100,000 person years.¹ The average age at diagnosis is in the fourth to fifth decades of life, with an equal incidence between men and women.¹ The pathogenesis of pheochromocytoma is strongly influenced by genetics, with approximately 40% of all cases linked to a mutation in one of twelve known susceptibility gene.²

Classically, the tumor presents as a triad of paroxysmal headache, sweating, and tachycardia, but it is known for a wide range of clinical manifestations including sustained or paroxysmal hypertension, anxiety, pallor, nausea, abdominal pain and fatigue.³ In one case series, the classic symptomatic triad was present in only 24% of cases, and nearly 50% of patients were asymptomatic, with the diagnosis made incidentally by abdominal imaging.⁴

It is for this variable and unpredictable nature that pheochromocytoma is nicknamed the 'great masquerader'. Here, we describe a case that underscores this reputation.

CASE PRESENTATION

A 67-year-old man with a history of hypertension, pre-diabetes, dyslipidaemia and coronary artery disease with an inferior wall myocardial infarction 16 years prior presented to the hospital with

sudden-onset exertional dyspnoea, fatigue, diaphoresis, nausea and palpitations. The patient reported two similar episodes in the preceding months, for which he had undergone unremarkable 24-hour cardiac rhythm monitoring, a transthoracic echocardiogram which demonstrated a normal ejection fraction and a negative cardiac stress test.

Physical examination was notable for regular tachycardia, a thready peripheral pulse and clear lung fields. ECG showed monomorphic VT.

After successful cardioversion to normal sinus rhythm and initiation of intravenous amiodarone, urgent left heart catheterisation revealed non-obstructive coronary artery disease. Echocardiogram showed a newly reduced ejection fraction of 35%, with inferior and posterolateral hypokinesis.

Despite amiodarone loading, the patient's rhythm reverted to VT, although at a slower rate, and without recurrent symptoms or haemodynamic compromise. An electrophysiology study showed intermittent episodes of non-sustained VT originating from a large posterior scar, to which extensive radio-frequency ablation was delivered.

After the procedure, he developed right groin pain and a drop in haemoglobin. Contrast-enhanced CT showed a large haematoma near the femoral access site, but no retroperitoneal bleeding. The scan also incidentally identified a heterogeneously enhancing left adrenal mass and a large complex fatty mass extending from the posterior right thigh superiorly to the pelvis (figure 1).

Plasma and 24-hour urine metanephrine levels were greater than 10 and 6 times the upper limit of normal, respectively, establishing a diagnosis of pheochromocytoma localising to the left adrenal mass.

Family history revealed no first-degree or second-degree relatives with history of malignancy. The patient's skin examination was unremarkable. Serum calcium was normal, and a dedicated neck CT demonstrated a normal-appearing thyroid gland.

MRI of the right lower extremity showed a heterogeneously hypoenhancing thigh mass and an associated non-occlusive right femoral venous thrombosis. Core needle biopsy of the thigh mass established a diagnosis of dedifferentiated liposarcoma.

TREATMENT

Laparoscopic left adrenalectomy for resection of the pheochromocytoma was recommended.

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Figure 1 Dedifferentiated liposarcoma and haemorrhagic pheochromocytoma. (A) Contrast-enhanced CT of pelvis. Coronal view demonstrating complex, fatty, partially calcified right thigh mass extending into the pelvis. (B) Gross autopsy image. Serial sections of partially haemorrhagic left adrenal mass.

Pheochromocytoma is associated with a high risk of perioperative cardiovascular complications, including hypertensive crises, malignant arrhythmias and multiorgan failure.⁵ To reduce these risks, guidelines recommend preoperative medical management with at least 7 days of alpha-adrenergic receptor blocker therapy for control of hypertension and tachycardia, and fluid repletion for reversal of catecholamine-induced blood volume contraction.⁶

Our patient was started on the alpha-blocking agent phenoxybenzaprime and instructed to increase his sodium and fluid intake. Because of the recent myocardial infarction and catecholamine-induced cardiomyopathy, a longer (3 week) duration of preoperative alpha-blockade was planned. To prevent recurrent VT, the patient was continued on oral amiodarone, and for the provoked deep venous thrombosis, he was started on a course of subcutaneous enoxaparin.

The patient was discharged with plans for readmission for adrenalectomy following his preoperative medical preparation.

OUTCOME AND FOLLOW-UP

Fourteen days later, the patient awoke from an afternoon nap with abrupt, intense left-sided flank pain. Paramedics found him hypotensive, hypoxic and in normal sinus rhythm. He was rushed to a nearby emergency department where he became pulseless. Aggressive cardiopulmonary resuscitation was unsuccessful, and the patient expired.

Autopsy revealed large volumes of thrombus and blood in the abdominal cavity and a large haematoma encasing the left kidney and adrenal gland. The left adrenal mass was haemorrhagic on gross examination and by microscopy (figure). The cause of death was designated retroperitoneal haemorrhage secondary to haemorrhagic pheochromocytoma.

DISCUSSION

Pheochromocytoma is an uncommon catecholamine-producing neuroendocrine tumour known as the 'great masquerader' for its widely variable presentation.⁴ Uncommonly, pheochromocytoma produces cardiac dysfunction through beta-adrenergic overstimulation and direct myocardiotoxicity

from excess catecholamines.⁷ Our patient's old myocardial scar may have predisposed him to VT and myocardial dysfunction in the absence of obstructive coronary artery disease. Spontaneous haemorrhage is a rare complication of pheochromocytoma that is associated with trauma, corticosteroids and systemic anticoagulation.⁸

Pheochromocytoma pathogenesis is strongly influenced by genetics, with over half of the cases linked to one of seven known genetic syndromes, many of which are characterised by additional malignancies.² None of these syndromes describe liposarcoma as a characteristic feature, and we believe this case represents the first report of comorbid pheochromocytoma and liposarcoma in the English language literature.

Learning points

- ▶ Pheochromocytoma should be considered in cases of new cardiomyopathy, myocardial infarction and paroxysmal arrhythmias when there is no obstructive coronary disease.⁹
- ▶ Anticoagulation in pheochromocytoma should be pursued with caution.
- ▶ Further investigation into a shared oncogenic mechanism between pheochromocytoma and liposarcoma may be warranted.

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