Case report

Stroke Secondary to Hypertension as Initial Presentation in Pheochromocytoma: A Case Report

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Abstract

Pheochromocytoma presenting with stroke as the initial presentation is rare and carries a high mortality rate. Early detection is essential to prevent the attendant life-threatening effects. There is no algorithmic approach in diagnosing and managing this condition due to a lack of evidence-based guidelines and randomized control studies. The objective of this study was to analyze the prevalence of pheochromocytoma among patients presenting with secondary hypertension and stroke and to identify the diagnostic challenges and the outcome of a patient with pheochromocytoma-associated secondary hypertension presenting with stroke. This is a retrospective study of a 54-year-old male presenting with stroke and hypertensive crisis diagnosed with pheochromocytoma. He had complaints of sudden left-sided weakness, facial drooping, slurred speech, and severe global headache with no history of chronic illnesses. Non-contrast computed tomography of the brain revealed a hyperdense intracerebral haemorrhage, confirming stroke. An electrocardiogram revealed left ventricular and atrial enlargement, confirming cardiovascular manifestation. A transthoracic echocardiogram showed left ventricular hypertrophy and grade 1 diastolic dysfunction with an ejection fraction of 79%, suggestive of hypertensive heart disease. The persistently high blood pressure raised suspicion, and a 24-hour urine monitor for catecholamine and metanephrines was normal. Abdominal pelvic ultrasound showed a left adrenal mass. Adrenalectomy and biopsy were done, which confirmed pheochromocytoma. There was an improvement in the patient's clinical status post-adrenalectomy. There are significant diagnostic challenges, including symptom overlap with other conditions, low clinical awareness, and the need for specific biochemical and imaging tests, which delay diagnosis and appropriate treatment. Early detection is essential to prevent life-threatening cardiovascular effects.

Key words: Pheochromocytoma, Secondary hypertension, Stroke

Introduction

Pheochromocytoma is a potentially life-threatening condition and may result in severe hypertension and cardiovascular issues like arrhythmias, strokes, and heart attacks. Early diagnosis and treatment help to prevent these complications. Stroke may be the early presentation of hypertension associated with pheochromocytoma; it is not the most frequent one (1). Common manifestations are anxiety, perspiration, palpitations, excruciating headaches, and severe, uncontrolled hypertension, may result in fatal consequences, such as stroke (2).

The incidence and presentation of pheochromocytoma as stroke as the initial presentation accounts for 0.2%-0.6% (3). A report on pheochromocytoma and stroke as the initial presentation was published on a norepinephrine-secreting pheochromocytoma with multiple cerebral infarctions, severe paroxysmal headaches, and episodic hypertension on a 76-year-old male patient with a history of papillary thyroid carcinoma (4). The pheochromocytoma was the cause of the Reversible Cerebral Vasoconstriction Syndrome (RCVS) (5).

A report from sub-Saharan Africa, Durban, indicates the prevalence of 0.1%-0.6% of

stroke's early appearance that is linked to pheochromocytoma. It has been estimated that approximately 1% of instances of hypertension are caused by pheochromocytoma (6).

Early identification and appropriate surgical intervention are paramount for positive prognosis, as evidenced by the resolution of hypertension and catecholamine excess post-tumuor resection in these patients (7).

Haemorrhagic strokes can result from cerebral blood vessel ruptures brought on by hypertensive crises as they bleed into the surrounding brain tissue (8). Long-term high blood pressure can lead to blood clot development and damage to blood vessels. Blood clots have the potential to cause an ischemic stroke by blocking blood flow to a particular region of the brain (9).

Patients with underlying cardiovascular risk factors, viz. obesity, diabetes, or smoking, have a greater chance of stroke (10). To our knowledge, there are no studies on the diagnosis and management of stroke as initial presentation of pheochromocytoma-associated secondary hypertension in Eastern Africa.

Case report

A 54-year-old man presented to The Karen Hospital (TKH) Accident and Emergency Department (A&E) after developing sudden left-sided weakness, numbness, facial drooping, slurred speech, and severe global headache for a day duration. A severe headache that started in the morning was throbbing and was not alleviated with medication. Weakness on his left side followed. He was not on any drugs and had no history of chronic illnesses or smoking; he consumed alcohol occasionally. His family medical history was unremarkable, with no history of hypertension, diabetes, premature coronary artery disease, or sudden cardiac death (Table 1).

Table 1: Vital signs at the time of presentation in the ER

Vital sign	Unit	Value	Reference values	Results
Blood pressure (BP)	mm/hg	195/129	<120/80	High
Pulse rate	Beats per minute	85	60-100	Normal
Oxygen saturation	%	96	95-100	Normal
Temperature	Degrees celsius	36.5	36.1-37.2	Normal

At the time of the presentation, he was ill-looking and confused. There was no associated pallor, jaundice, cyanosis, lymphadenopathy, or dehydration. Cardiovascular and respiratory, and the GIT system was normal (Tables 2 - 3).

Central nervous system: The Glasgow Coma Scale (GCS) 13/15 shows that it is not oriented to time, place, and person. Pupils were bilaterally equal and reactive to light, left-sided hemiplegia, facial palsy, reduced left muscle tone and power, and preserved touch and pain.

Table 2: Full haemogram

	Unit	Value	Reference value	Results
Lymphocytes	g/l	4.83	0.4-4.8	High
Haemoglobin	g/dl	14.2	11.6-15	Normal
Platelet count	g/l	257	140-450	Normal

Table 3: Renal function test

	Unit	Value	Reference value	Results
Sodium	mmol/l	143	135-150	Normal
Potassium	mmol/l	2.4	3.3-5.3	Low
Chloride	mmol/l	102	99-110	Normal
Urea	mmol/l	3.9	2.6-7.0	Normal
Creatinine	mmol/l	127	50-120	High

Table 4: Blood clotting time

	Unit	Value	Reference value	Results
INR		1.14	<1.0	High
aPTT	Seconds	29.05	30-40	Normal

24-hour urine monitor for catecholamine and metanephrines

	Unit	Value	Reference value	Results
Catecholamines	mcg/24hours	70	14-110	Normal
Metanephrines	mcg/24hours	60	24-96	Normal

A non-contrast brain CT scan (NCCT) revealed a hyperdense intracerebral haemorrhage in the right basal ganglia. Bilateral carotid and vertebral Doppler ultrasound reported patency of both common carotids and revealed bilateral intimal thickening suggestive of carotid atherosclerotic disease (Table 4) The electrocardiogram (ECG) showed sinus rhythm, and the 2D echo showed Left Ventricular Hypertrophy (LVH) with LVEF 79%. An abdominal-pelvic CT scan showed a well-defined rounded left adrenal mass, grade 1 fatty liver, and simple hepatic cysts. The CT Aortogram showed a left-sided suprarenal mass of left adrenal origin and multiple hypodense liver parenchymal lesions. Left upper limb venous doppler U/S showed chronic thrombus. Medical therapy and supportive care for acute stroke was initiated.

The patient was prescribed the following medications and physiotherapy at discharge;

(i) Phenoxybenzamine 1mg BD,
(ii) Telmisartan/Amlodipine 80mg od,
(iii) Spironolactone 100mg od,
(iv) Hydralazine 25mg bd*3/12,
(v) Bisoprolol 5mg od *3/12,
(vi) Atorvastatin 80mg od*3/12,
(vii) Castor oil 500mg bd*6/12,
(viii) Itopride 150mg od*3/12,
(ix) Carbamazepine 200mg od*3/12,
(x) Potassium 1tab od *1/12,
(xi) Pregabalin 25mg od *1/12.

The patient came for review and reported that he moves with support; however, the left upper and lower limbs are still not moving. He was advised to continue with physiotherapy.

Table 5: Vital statistics at the time of review

Vital sign	Unit	Value	Reference value	Results
Blood pressure	mm/hg	137/91	<120/80	High
Pulse rate	Beats per minute	93	60-100	Normal
Oxygen saturation	%	96	95-100	Normal
Temperature	Degrees celsius	36.5	36.1-37.5	Normal

The cardiologist reviewed the patient's persistent blood pressure and adjusted medications accordingly. The risks and benefits of surgery were discussed (Table 5).

Figure 1: 12 Lead ECG showing deep S waves in v1-v3 and tall R waves in v5 and v6

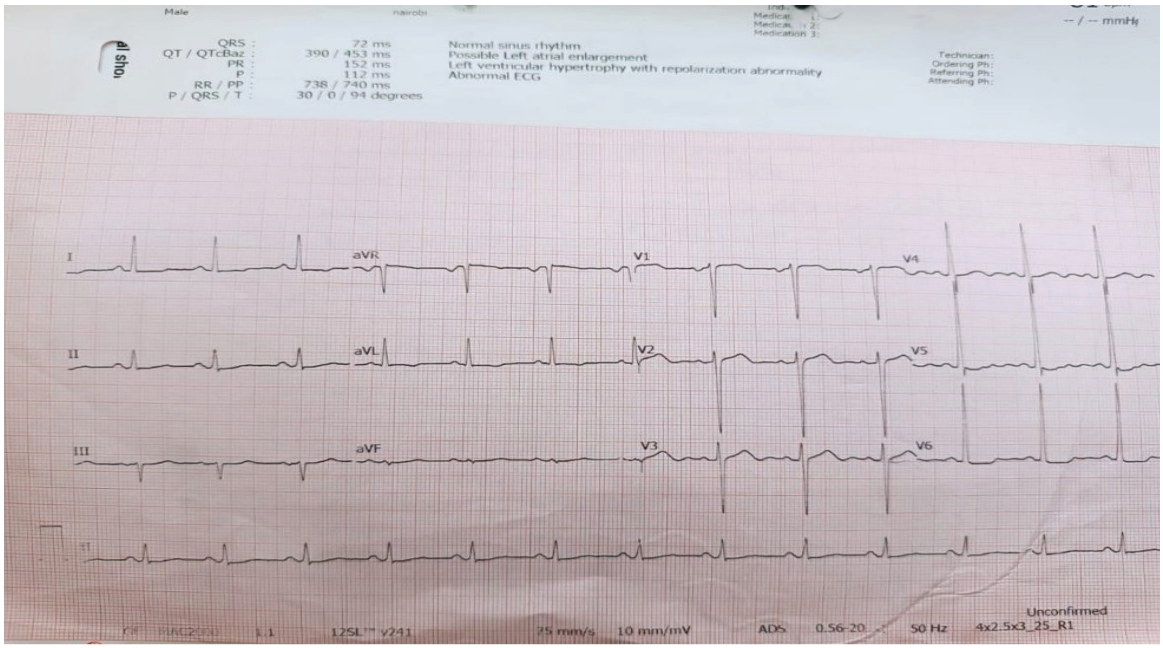
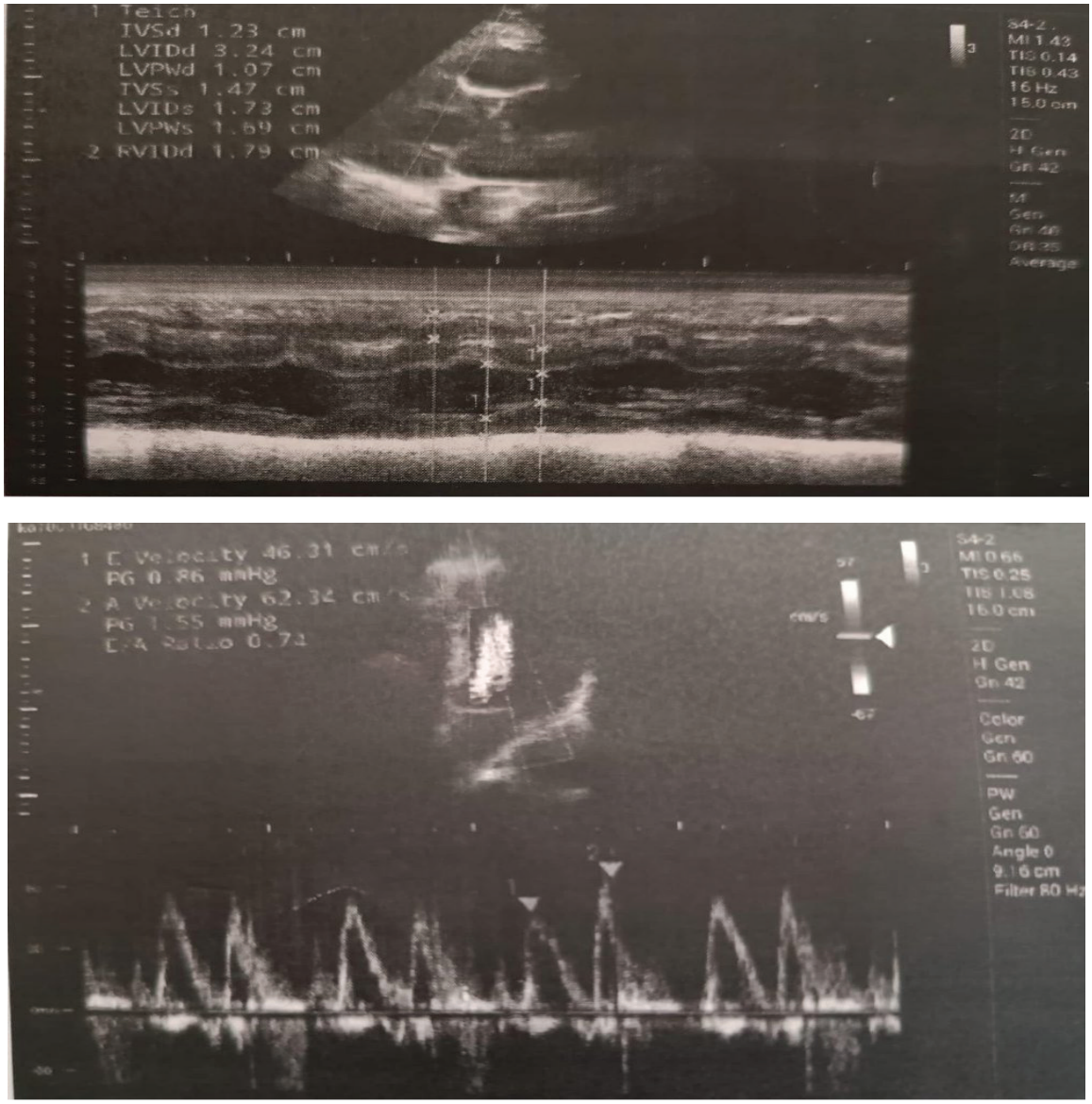


Figure 2: Transthoracic Echocardiography (TTE) showing left ventricular hypertrophy and Grade 1 **Diastolic dysfunction**



Adrenalectomy was done successfully. Histology confirmed adrenocortical neoplasm. Blood pressure monitoring after adrenalectomy was in the normal range. At the time of discharge, he was on anti-hypertensive, antiplatelets, and multivitamins.

Discussion

Pheochromocytoma, though a rare tumuor, is a critical condition to recognize due to its potential to cause severe secondary hypertension and life-threatening complications such as stroke. Clinicians should consider pheochromocytoma in the differential diagnosis of secondary hypertension, particularly in patients with an atypical presentation or those who are resistant to conventional antihypertensive therapy. There were reports of a 12-year-old girl who had blood pressure from an undetected pheochromocytoma that resulted in a cerebral haemorrhage (6), 53-year-old woman with pheochromocytoma presenting with the haemorrhagic transformation of an ischemic stroke (7), and a 65-year-old man with a 6-year history of hypertension who presented with dilated cardiomyopathy (8), a transient cerebrovascular event, paroxysmal sweating, and intractable hypertension in Texas (9), all these being the different manifestation of the same disease. A case report from Spain had a complex course with electrocardiographic findings characteristic of diffuse myocardial damage and normal coronary angiography with left intraventricular thrombus complicated by embolic stroke (10).

Diagnosing pheochromocytoma presents numerous challenges. Biochemical confirmation of pheochromocytoma requires specific tests, such as plasma-free metanephrines or 24-hour urinary fractionated metanephrines, which may not be readily available in all healthcare settings. Imaging studies, including CT or MRI scans, are necessary to locate the tumuor, adding another layer of complexity to the diagnostic process (7). Early intervention, typically involving surgical resection of the cancer, can resolve hypertension and reduce the risk of recurrent strokes and other complications (8,9).

Conclusions

Pheochromocytoma is a notable cause of secondary hypertension in patients presenting with stroke. A small but significant percentage of these patients had undiagnosed pheochromocytoma, emphasizing the need for awareness and routine screening.

Hypertensive crisis is a potentially fatal side effect of pheochromocytoma and can be prevented, or their intensity can be reduced with early recognition and treatment (10,11). The delayed diagnosis was associated with higher morbidity and poorer prognosis, underscoring the importance of early detection and intervention.

Many patients experience delayed diagnosis due to the condition's rarity and the complexity of the required tests. Enhanced educational programs and the development of clear diagnostic guidelines can help clinicians recognize and diagnose more effectively (12).

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