

Giant Right-Sided Pheochromocytoma Presenting with Hypertensive Crisis After Renal Biopsy: A Case Report

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ABSTRACT

Pheochromocytoma is a rare catecholamine-producing tumor that can lead to life-threatening cardiovascular complications when undiagnosed. This report describes the case of a 71-year-old male with no significant prior medical history, who developed progressive fatigue, weight loss, night sweats, headache, tinnitus, and visual disturbances over the course of several weeks. Initial evaluations suggested urinary and gastrointestinal infections, but multiple empirical treatments failed to yield improvement. A renal biopsy was performed due to persistent renal abnormalities. Shortly after the procedure, the patient developed a hypertensive crisis along with acute kidney injury and generalized edema. Further imaging and biochemical testing revealed a giant right-sided pheochromocytoma. Management included intensive supportive care and pharmacologic alpha-blockade. This case emphasizes the importance of recognizing pheochromocytoma in patients with unexplained systemic symptoms and highlights the potential risk of invasive procedures in undiagnosed cases.

KEYWORDS: Pheochromocytoma, hypertensive crisis, renal biopsy, catecholamine-secreting tumor, case report.

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I. INTRODUCTION

Pheochromocytoma is a rare neuroendocrine tumor originating from chromaffin cells, most commonly located in the adrenal medulla, though it may also arise in extra-adrenal sympathetic ganglia where it is classified as a paraganglioma. Although its overall prevalence is low—estimated at approximately 0.6% among hypertensive patients—the clinical implications are significant due to the tumor's potential to secrete large quantities of catecholamines. This excessive hormonal output can precipitate severe hypertensive crises and life-threatening cardiovascular events if left undiagnosed^{2,4,6}.

The clinical presentation of pheochromocytoma is diverse and often nonspecific, which contributes to diagnostic delays. The classic symptom triad includes headache, sweating, and palpitations, which may or may not be accompanied by sustained or paroxysmal hypertension. These symptoms are

frequently misattributed to anxiety disorders, gastrointestinal complaints, or infections, further complicating the diagnostic process. It is estimated that up to 80% of patients with pheochromocytoma experience hypertensive crises, with 7–17% developing major complications such as myocardial infarction, aortic dissection, stroke, or acute pulmonary edema^{2,4}.

Catecholamine-induced hypertensive crises (CIHC) are defined by blood pressure readings $\geq 180/120$ mm Hg and result from the sudden release of noradrenaline and/or adrenaline. These episodes may be spontaneous or triggered by physical or emotional stress, tumor manipulation, anesthesia, or invasive procedures. Unlike other forms of severe hypertension, CIHC requires a specialized therapeutic approach. The use of conventional antihypertensives such as hydralazine or labetalol, without prior alpha blockade, may be ineffective or even exacerbate the crisis^{2,4}.

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Biochemical diagnosis involves measuring plasma or urinary metanephrines, which are stable metabolites of catecholamines. However, in acute settings, levels may be falsely elevated due to stress, pain, or comorbid conditions like renal or cardiac dysfunction. Therefore, initial evaluation in emergency scenarios should prioritize imaging—especially contrast-enhanced abdominal and pelvic CT scans—which can detect adrenal masses in over 97% of cases and guide further diagnostic confirmation ^{2,5}.

Once a pheochromocytoma is identified, medical management must begin with alpha-adrenergic blockade, using agents such as intravenous phentolamine or oral phenoxybenzamine. This step is essential before initiating beta-blockade, as unopposed alpha stimulation from premature beta-blocker use can provoke paradoxical hypertension. Treatment may also include fast-acting calcium channel blockers, intravenous nitrates, or magnesium sulfate, depending on clinical context and resource availability. Due to the risk of arrhythmias, refractory hypotension, and multiorgan failure, patients should be closely monitored in an intensive care setting ^{2,4}.

A critical aspect is the performance of invasive procedures in patients with undiagnosed pheochromocytoma. Interventions such as renal biopsies, general anesthesia, or surgical manipulation can precipitate massive catecholamine release and a subsequent severe CIHC. Documented case reports highlight hypertensive crises following adrenal biopsies, underscoring the need to rule out this condition in patients presenting with unexplained hypertension and systemic symptoms before any invasive approach is undertaken ⁶.

II. CASE REPORT

This case involves a 71-year-old male patient with a background as a retired professional driver and no significant surgical or chronic medical history, who presented to the internal medicine outpatient clinic due to progressive asthenia, adynamia, poor oral intake, and a diminished response to verbal stimuli. The patient reported a four-month history of general malaise, nocturnal diaphoresis, and increasing fatigue. Initial management by alternative medicine practitioners and general physicians was ineffective, despite multiple herbal remedies and antibiotic regimens for presumed urinary tract infection.

Over the course of one month, the patient experienced worsening symptoms including hematuria with clots, an 8 kg weight loss, intense headaches with tinnitus and photopsias, and peripheral edema. He later developed progressive nausea, vomiting, dysphagia, and odynophagia, ultimately leading to an inability to tolerate oral intake. Laboratory workup revealed severe anemia (Hb 6 g/dL), impaired renal function (creatinine 3.2 mg/dL), and electrolyte disturbances including hypocalcemia, mild hypokalemia, and hyponatremia.

On admission, the patient was somnolent but responsive, with preserved orientation and mental functions. Vital signs revealed blood pressure of 144/82 mmHg, heart rate of 78 bpm, respiratory rate of 22 bpm, and oxygen saturation of 91%. Physical examination showed signs of dehydration, generalized pallor, basal pulmonary wheezing, and significant lower extremity edema. A renal biopsy was planned to investigate the persistent renal dysfunction. Shortly after the biopsy procedure, the patient experienced a sudden hypertensive crisis with severe headache, chest pain, and visual disturbances, requiring urgent stabilization.

During focused anamnesis, the patient reported experiencing the classic triad of pheochromocytoma intermittently: intense headache, palpitations, and profuse sweating, which coincided with hypertensive spikes and episodes of anxiety without clear triggers.

Imaging studies revealed a large right adrenal mass. Biochemical confirmation showed elevated plasma metanephrines, consistent with the diagnosis of pheochromocytoma. Specific values were: total metanephrine 1850 pg/mL (reference value < 57 pg/mL) and normetanephrine 2120 pg/mL (reference value < 148 pg/mL), strongly supporting the presence of a catecholamine-secreting tumor. Additionally, an MIBG (I-123 metaiodobenzylguanidine) scintigraphy was performed, which revealed increased focal uptake in the right adrenal gland, confirming the functional localization of the tumor.

III. METHODS

Upon admission, the 71-year-old male patient was placed under continuous medical observation due to somnolence, poor oral intake, dehydration, generalized pallor, and marked peripheral edema. He was admitted to the internal medicine department for comprehensive evaluation under strict bed rest and intravenous hydration, with close monitoring of vital signs, renal function, and mental status.

Initial laboratory tests revealed severe microcytic hypochromic anemia (hemoglobin 6 g/dL), serum creatinine of 3.2 mg/dL, hypocalcemia, mild hypokalemia, and mild hyponatremia, without electrocardiographic abnormalities. Electrolyte imbalances were corrected progressively, and supportive treatment was started.

Due to the history of hematuria with clots, significant weight loss, and persistent renal dysfunction, a percutaneous renal biopsy was performed. Minutes after the procedure, the patient developed a hypertensive emergency, characterized by sudden-onset severe headache, tinnitus, photopsias, and systolic blood pressure exceeding 200 mmHg. Emergency management was initiated promptly.

Subsequent imaging studies revealed a large right adrenal mass, raising clinical suspicion for pheochromocytoma. Plasma metanephrine and normetanephrine levels were requested, as these are stable catecholamine metabolites and the diagnostic test of choice for biochemical confirmation. Additionally, an MIBG (I-123 metaiodobenzylguanidine)

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scintigraphy was performed to assess functional uptake of the tumor and rule out multifocal or metastatic disease. Alpha-adrenergic blockade with oral therapy was initiated, and the patient remained under close observation by the multidisciplinary team.

IV. RESULTS

During the first hours of hospitalization, the patient remained clinically unstable. Despite initial fluid resuscitation and correction of electrolyte imbalances, he continued to exhibit generalized weakness, poor oral intake, and progressive deterioration in functional status. He remained somnolent but responsive to verbal and physical stimuli, with preserved orientation and cognitive functions.

Vital signs upon admission included blood pressure of 144/82 mmHg, heart rate of 78 bpm, respiratory rate of 22 bpm, oxygen saturation of 91%, and a temperature of 35.8°C. Physical examination showed signs of moderate dehydration, mucosal pallor, and marked bilateral lower limb edema (+++++) without associated pain. Auscultation revealed diminished breath sounds with diffuse wheezing in the left hemithorax and right lung base. Abdominal examination was notable for mild epigastric and left flank tenderness, without signs of peritoneal irritation or visceromegaly.

Laboratory studies showed severe microcytic hypochromic anemia (Hb 6 g/dL), anisocytosis, moderate presence of ovalocytes and echinocytes, and elevated RDW. Biochemistry demonstrated acute kidney injury (creatinine 3.2 mg/dL, urea 87.7 mg/dL), with hyponatremia (Na^+ 131 mmol/L), mild hypokalemia (K^+ 4.8 mmol/L), and normal glucose levels. Liver enzymes were within normal limits, although alkaline phosphatase was elevated (287 U/L).

Coagulation tests revealed a prolonged activated partial thromboplastin time (aPTT: 49.6 seconds), with a normal prothrombin time and INR (1.05). Urinalysis prior to admission reported amorphous urates, hematuria with clots, and signs of urinary tract infection. The patient also showed progressive dysphagia, odynophagia, nausea, vomiting, and weight loss totaling 8 kg over one month.

Due to worsening renal parameters, a percutaneous renal biopsy was performed. Minutes after the procedure, the patient developed a hypertensive emergency characterized by intense headache, photopsias, and marked elevation of blood pressure. Given the abrupt and atypical response, imaging studies were obtained, identifying a large right adrenal mass.

Biochemical confirmation with elevated plasma metanephrines supported the diagnosis of pheochromocytoma. Alpha-adrenergic blockade was initiated, and the patient was stabilized under close monitoring in the internal medicine ward, pending referral for endocrine surgery evaluation.

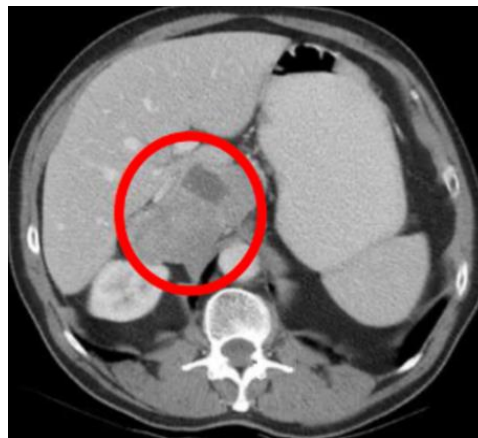


Figure 1. Contrast-enhanced abdominal CT scan reveals a large mass (approximately 9.5 cm) arising from the right adrenal gland. The lesion exhibits poorly defined margins and demonstrates heterogeneous density and enhancement, findings that are suggestive of a malignant pheochromocytoma.

V. DISCUSSION

Pheochromocytoma is a catecholamine-secreting tumor originating from chromaffin cells, representing a rare but serious secondary cause of hypertension. It frequently presents with hypertensive crises that may result in end-organ damage².

Diagnosis is often challenging due to its non-specific clinical presentation. A combination of symptoms such as headache, palpitations, diaphoresis, and labile blood pressure—especially in a patient with refractory hypertension—should prompt consideration of pheochromocytoma⁴. In this case, the hypertensive crisis occurred after a renal biopsy, a known trigger in the literature due to potential tumor manipulation⁶.

In patients with suspected catecholamine-induced hypertensive crises, contrast-enhanced abdominal CT is a key first-line diagnostic tool, as most pheochromocytomas are located in the adrenal glands². Current clinical guidelines, such as those from the Endocrine Society, recommend plasma or urinary metanephrines as the initial diagnostic test due to their high sensitivity. In cases with large tumors, suspected multifocal disease, or for surgical planning, functional imaging with metaiodobenzylguanidine (MIBG) scintigraphy is advised. In this case, a right adrenal mass was identified through imaging and later biochemically confirmed by elevated plasma metanephrines.

From a pathophysiological standpoint, excessive catecholamines stimulate both alpha and beta adrenergic receptors, causing intense vasoconstriction, tachyarrhythmias, and cardiac or vascular dysfunction. These effects can result in serious complications such as pulmonary edema, myocardial infarction, aortic dissection, or shock^{2,3}.

Initial treatment must begin with alpha-adrenergic blockade, ideally using agents such as phenoxybenzamine or doxazosin. Beta-blockers should only be introduced later if tachyarrhythmias persist. Using beta-blockers before alpha-

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blockade can worsen hypertension due to unopposed vasoconstriction^{2,5}. Proper preoperative preparation is essential to avoid intraoperative cardiovascular complications³.

This case highlights the importance of considering pheochromocytoma in patients with hypertensive crises following invasive procedures, as early suspicion and appropriate treatment can significantly impact outcomes.

CONCLUSIONS

This clinical case provides a valuable opportunity to reflect on the diagnostic and therapeutic challenges posed by pheochromocytoma—an uncommon but critical condition that must be strongly considered in suggestive clinical scenarios such as patients presenting with atypical hypertensive crises, persistent autonomic symptoms, and unexplained multisystem deterioration. In this patient, the development of a hypertensive emergency following a renal biopsy served as the turning point that uncovered an otherwise unsuspected diagnosis.

Throughout his clinical course, the patient exhibited hallmark features—including fatigue, weight loss, headache, palpitations, tinnitus, poor oral intake, and hematuria—that, when analyzed individually, could easily be misattributed to more common conditions. However, their coexistence, alongside refractory hypertension and a sudden post-procedural crisis, pointed toward the presence of a catecholamine-secreting tumor.

The use of contrast-enhanced computed tomography was instrumental in identifying the right adrenal mass, which directed the diagnostic pathway. This was followed by plasma metanephrine measurement, which biochemically confirmed the presence of pheochromocytoma in accordance with current clinical guidelines. The initiation of alpha-adrenergic blockade proved to be a critical therapeutic intervention, stabilizing the patient's hemodynamic status, reducing the risk of cardiovascular complications, and enabling proper preoperative preparation for surgical resection.

This case reinforces the importance of adopting a thorough, integrative, and dynamic clinical approach—one that is willing to reevaluate initial assumptions when the clinical evolution suggests an alternative underlying pathology. It also highlights the need to consider pheochromocytoma as part of the differential diagnosis for secondary hypertension, particularly when blood pressure elevations are abrupt, episodic, or occur in relation to invasive medical procedures.

Moreover, the case underscores the necessity of a multidisciplinary medical team—including internal medicine, endocrinology, nephrology, radiology, and surgery—capable of acting in a coordinated and timely manner in the face of complex clinical presentations. Such collaboration can significantly reduce the risk of severe complications and improve patient outcomes.

Ultimately, this case serves as a vivid illustration of how an acute and seemingly isolated event—a hypertensive crisis following a renal biopsy—can unmask a rare yet clinically significant condition. It confirms that in medicine, careful contextual analysis, awareness of clinical red flags, and responsiveness to unexpected developments remain essential tools for accurate diagnosis and effective treatment.

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