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International Journal of Clinical Case Reports and Reviews
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Case Report

Adrenal Pseudocyst Associated Secondary Hypertension Complicated with Takotsubo Cardiomyopathy: a Rare Case Report

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Received Date: August 05, 2025 | **Accepted Date:** August 14, 2025 | **Published Date:** August 20, 2025

Citation: Chamika Wijedasa, Faheemah Kaleel, VadivelVijitharan, Muththu Murugamoorthy, (2025), Adrenal Pseudocyst Associated Secondary Hypertension Complicated with Takotsubo Cardiomyopathy: a Rare Case Report, *International Journal of Clinical Case Reports and Reviews*, 28(4); **DOI:**10.31579/2690-4861/877

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Abstract:

Adrenal pseudocysts are uncommon, non-secreting benign cystic formations which may infrequently result in secondary hypertension due to mass effect or hormonal imbalance. Stress-induced cardiomyopathy, also known as Takotsubo cardiomyopathy, is a short-term heart disorder commonly brought on by physical or emotional stress. This case report details an isolated occurrence of secondary high blood pressure resulting from an adrenal pseudocyst, complicated by the onset of Takotsubo cardiomyopathy. This report emphasizes the difficulties in diagnosing, the approaches to management, and the complex relationship between adrenal disease and heart problems.

Key words: adrenal pseudocyst; secondary hypertension; takotsubo cardiomyopathy; resistant hypertension; adrenalectomy; cardiac dysfunction

Introduction

Adrenal pseudocysts are uncommon benign growths that appear as cysts in the adrenal gland, making up less than 0.2% of all adrenal gland masses. These lesions are usually non-functioning and symptom-free, frequently found incidentally during imaging tests for unrelated health issues. Rarely adrenal pseudocysts can lead to secondary hypertension, primarily through hormonal imbalance, and very occasionally due to mechanical pressure on nearby renal blood vessels. If secondary hypertension is not treated, it can result in life-threatening and severe hypertensive crises, which may include acute heart failure and cardiomyopathies, leading to substantial mortality and morbidity.

Takotsubo cardiomyopathy (TCM), also referred to as stress-induced cardiomyopathy or "broken heart syndrome," is a temporary heart condition marked by sudden left ventricle dysfunction, typically resembling acute coronary syndrome. This condition is often caused by physical or emotional strain and occurs more frequently in women. The pathophysiology involves an excessive release of catecholamines, resulting in myocardial stunning and apical ballooning of the left ventricle. TCM can be a life-threatening condition if it is not diagnosed and treated promptly, as it typically reversible otherwise.

This case report presents a unique instance of secondary hypertension caused by an adrenal pseudocyst, complicated by the development of Takotsubo cardiomyopathy. The interplay between adrenal pathology and cardiac dysfunction highlights the importance of a multidisciplinary approach to diagnosis and management. Early recognition of adrenal lesions in patients with refractory hypertension is crucial to prevent cardiovascular complications.

Reference: Rozenblit A, Morehouse HT, Amis ES. "Adrenal Cysts: Diagnosis and Management." Radiology. 2001;218(3):753-758.

Case Presentation

A 46-year-old female presented to the emergency department with acute onset of chest pain, dyspnea, and palpitations. Her past medical history included Diabetes Mellitus complicated with DKA, NSTEMI, HFrEF (40%), recurrent episodes of hypertensive crisis for the last three years. Patient's routine medication included, Maximum tolerable doses of ACE inhibitors, Calcium Channel Blockers, Thiazide Diuretics, Beta Blockers and Dual Anti-platelets and Anti-coagulation with Warfarin due to Left Ventricle Apical Ballooning with Left Ventricular Clots and On Insulin for Diabetic Control. On Physical examination revealed elevated blood pressure (180/110 mm Hg), tachycardia (heart rate: 110 bpm), with fine basal crepitations in the lungs with SpO2-89% in RA with unremarkable abdominal examination

An urgent onsite electrocardiogram (ECG) demonstrated ST-segment elevation in the anterior leads, and along with the elevated levels of Troponin I: 0.5 ng/mL, (<0.04 ng/mL) raising the suspicion for acute myocardial infarction. Further investigating, Trans-thoracic

echocardiography revealed apical ballooning of the left ventricle with reduced ejection fraction (35%) and an urgent coronary angiography revealed no significant coronary artery disease, hence ruling out acute coronary syndrome, and confirming the diagnosis of Takotsubo cardiomyopathy.

The patient's clinical condition improved with standard acute heart failure protocol. Once the acute condition stabilized, the patient was investigated for possible secondary causes of resistant hypertension.

Her renal function test including Serum Electrolytes and Liver Function tests were normal. Special blood investigations were ordered, that included, Thyroid function tests, 9am cortisol, 24-hour VMA levels DHEAS level were normal.

Imaging studies were ordered, US Scan of the abdomen revealed solid lesion in the right supra renal region measuring (4.25 x 4 cm in size), Renal artery Duplex was normal, Computed Tomography (CT) Abdomen and Pelvis showed right adrenal heterogeneous nodule measuring 3 cm, Absolute washout less than 60% suggestive possible adrenal cyst, pheochromocytoma or adrenal carcinoma.

Diagnosis and Treatment

With the above investigation findings, the patient was referred for surgical excision of the adrenal lesion. The patient underwent a laparoscopic adrenalectomy and recovered uneventfully. Histopathological examination confirmed the diagnosis of an adrenal pseudocyst with no evidence of malignancy.

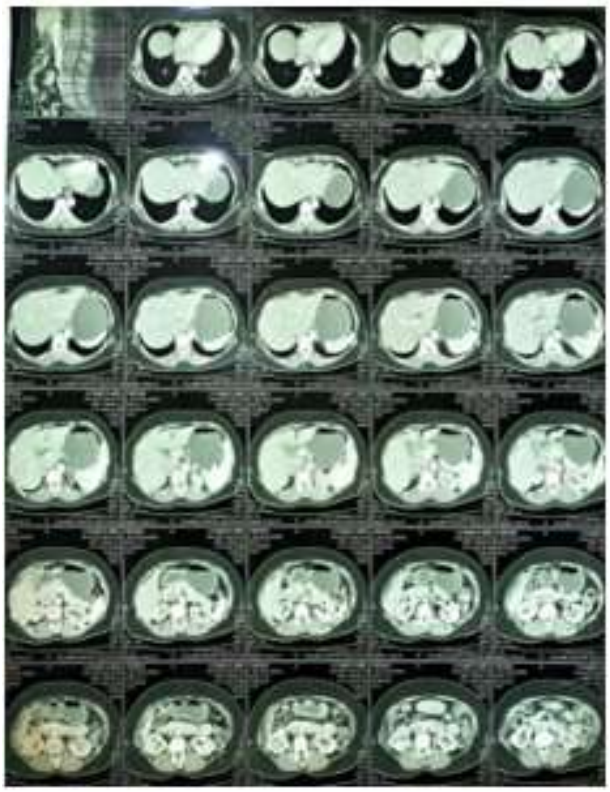

Figure 1: CECT Abdomen

Figure 2: surgical sample [Adrenal mass]

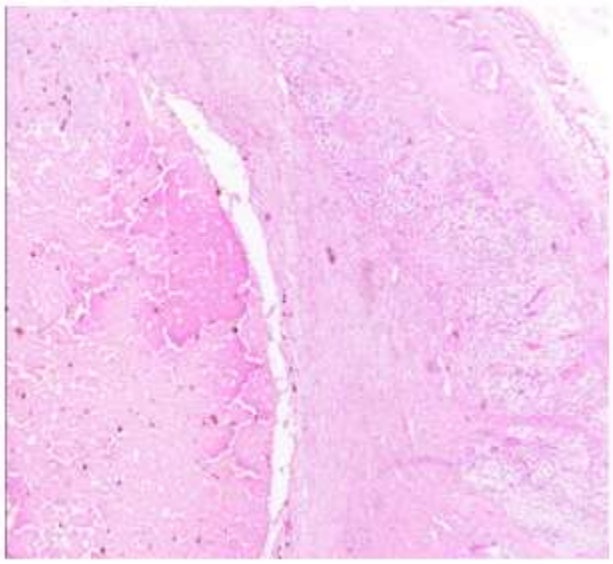

Figure 3: Histology of Adrenal cyst

Blood pressure normalized within two weeks post-surgery, and the patient was gradually weaned off antihypertensive medications. Repeat echocardiography at six weeks showed complete resolution of left ventricular dysfunction, with an ejection fraction of 55%. The patient was discharged on a low-dose ACE-Inhibitors, beta-blocker Asprin and Metformin and followed up with cardiology and endocrinology.

In Conclusion we came to the consensus that the patient's resistant hypertension is contributed by the presence of the adrenal pseudocyst, and it was hypothesized that the acute stress of the uncontrolled hypertension could have triggered the cardiac event leading to Takotsubo cardiomyopathy and the acute heart failure.

Discussion

Adrenal Pseudocysts and Secondary Hypertension

Adrenal pseudocysts are uncommon, occurring in approximately 0.064% to 0.18% of autopsy cases. They usually do not display symptoms, but may cause them due to hormonal imbalances and occasionally due to mass effect. It is believed that the pseudocyst led to high blood pressure by disrupting the body's hormonal balance.

The pathophysiology of secondary resistant hypertension in adrenal pseudocysts involves two main mechanisms: hormonal dysregulation and mechanical compression. In our patient it was thought that hormonal dysregulation played a major role in leading to her presentation.

Diagnosis of adrenal pseudocysts relies heavily on imaging studies, including CT and MRI. These modalities help differentiate pseudocysts from other adrenal lesions, such as adenomas, pheochromocytomas, and malignant tumors. Surgical excision is the definitive treatment for symptomatic pseudocysts and is associated with excellent outcomes.

Reference: Rozenblit A, Morehouse HT, Amis ES. "Adrenal Cysts: Diagnosis and Management." Radiology. 2001;218(3):753-758.

2. Takotsubo Cardiomyopathy

Takotsubo cardiomyopathy is characterized by transient left ventricular dysfunction, often triggered by physical or emotional stress. The exact pathophysiology remains unclear, but catecholamine excess and microvascular dysfunction are implicated. In this case, the chronic stress of uncontrolled hypertension and the acute stress of adrenal pathology likely precipitated the cardiac event.

The clinical presentation of TCM mimics acute coronary syndrome, with symptoms such as chest pain, dyspnea, and ECG changes. However, coronary angiography typically reveals no significant coronary artery disease. The hallmark feature of TCM is apical ballooning of the left ventricle, which is reversible within weeks to months.

Conclusion

This case highlights the rare but significant association between adrenal pseudocysts, secondary hypertension, and Takotsubo cardiomyopathy. Early recognition and appropriate management of adrenal lesions are essential to prevent cardiovascular complications. A multidisciplinary approach is key to achieving favorable outcomes in such complex cases.

Acknowledgements

We are grateful to the house officers and staff of ward 01, TH-Batticaloa for their help in managing this patient. We are also thankful to surgical team and histo-pathology team at TH-Kalubowila for their immense help in the diagnosis and treatment.

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DOI:10.31579/2690-4861/877

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