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# Right Laparoscopic Adrenalectomy for a Cortisol-Producing Adrenal Endothelial Cyst

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**Abstract** | **Case Report**

Adrenal lesions comprise a heterogeneous spectrum of benign and malignant entities and are increasingly detected as incidentalomas due to widespread cross-sectional imaging. Cystic adrenal lesions are rare, with endothelial cysts representing an uncommon subtype that is typically non-functional. We report a rare case of a cortisol-producing adrenal endothelial cyst managed by laparoscopic adrenalectomy. The procedure was completed without intraoperative complications, postoperative recovery was uneventful, and serum cortisol normalized. This case highlights that even rare adrenal cystic lesions may present with hormonal activity, emphasizing the need for comprehensive endocrine evaluation and the role of minimally invasive surgery in definitive management.

**Keywords:** Adrenal endothelial cyst; adrenal incidentaloma; cortisol-producing adrenal lesion; laparoscopic adrenalectomy; functional adrenal cyst.

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## INTRODUCTION

Adrenal lesions comprise a heterogeneous group of pathologies, including benign adenomas, hyperplastic nodules, cysts, pheochromocytomas, and adrenocortical carcinomas [1,2]. With the increasing use of abdominal imaging, adrenal incidentalomas are detected in 1-5% of studies, with hormonal hypersecretion identified in 15-20% of cases, most commonly autonomous cortisol secretion [2].

Cystic adrenal lesions are uncommon, with an estimated incidence of 0.06-0.18% in autopsy series. Histopathologically, they are classified as pseudocysts, endothelial cysts, epithelial cysts, or parasitic cysts [3]. Endothelial cysts, arising from vascular or lymphatic structures, represent the most frequent true cysts (45% of adrenal cysts) but remain rare overall [3]. These lesions are typically benign and non-functional; functional adrenal endothelial cysts, particularly those causing cortisol hypersecretion, are exceedingly rare [4].

We present a rare case of a cortisol-producing adrenal endothelial cyst managed via laparoscopic adrenalectomy, highlighting surgical technique, perioperative outcomes, histopathology, and a literature review.

## CASE PRESENTATION

A female patient in her 50's years old was incidentally found to have a right adrenal cystic lesion during abdominal imaging. Contrast-enhanced CT revealed a right adrenal cyst with homogeneous hypodense content, thin walls, and no calcifications or solid nodules (Figure 1).

Endocrinological evaluation showed elevated morning serum cortisol that failed to suppress following an overnight low-dose dexamethasone suppression test, consistent with autonomous cortisol secretion [5]. Plasma metanephrines and the aldosterone-renin ratio were normal. Due to the functional nature of the lesion and indeterminate imaging features, surgical resection was recommended.

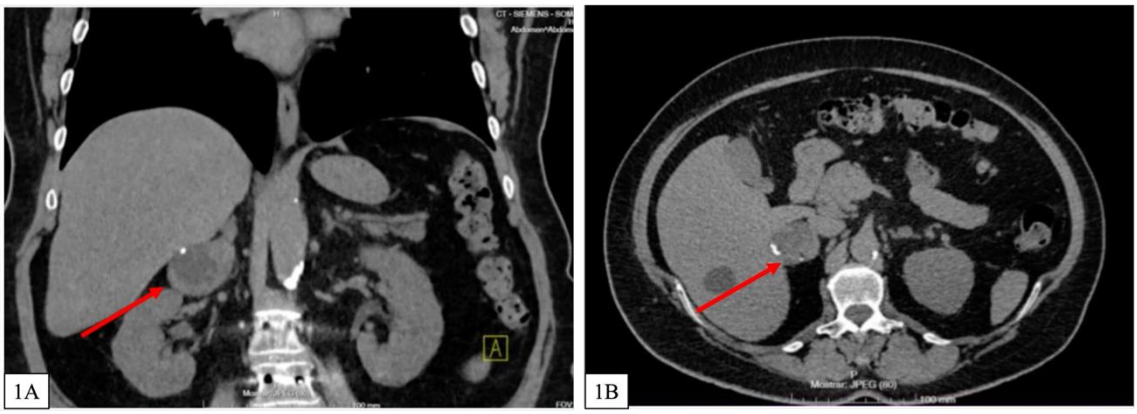



**Figure 1- Abdominal CT scan showing (red arrow) nodular lesion measuring 50 x 43.5 mm, solid with heterogeneous density and small peripheral calcifications**

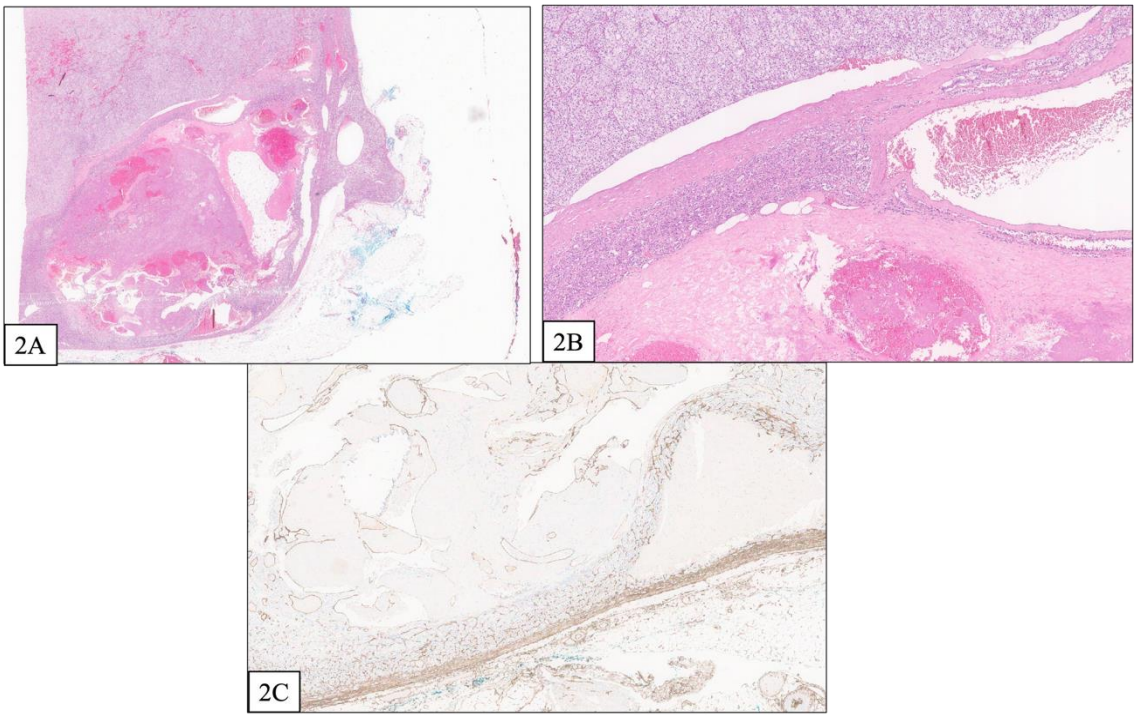



**Figure 2- Hystopatohogical analysis. 2A and 2B are Hematoxylin and eosin stained sections. 2A demonstrate a cortical cyst formed by vascular spaces; 2B with higher amplification shows the cyst wall with the adrenal gland positioned above and the endothelial cyst**

## Treatment

### Surgical Technique

The patient was placed in the left lateral decubitus position under general anesthesia. A standard transperitoneal laparoscopic approach was used. Following mobilization of the right hepatic lobe, the inferior vena cava was exposed. The right adrenal vein was identified, clipped, and divided. The adrenal gland containing the cyst was dissected circumferentially and removed *en bloc* using an endoscopic retrieval bag. Hemostasis was secured, and no drains were placed.

Laparoscopic adrenalectomy was chosen for its advantages in visualization, reduced blood loss, shorter operative time, and rapid postoperative recovery for benign and functional adrenal lesions [6-8]. The procedure was completed without intraoperative complications. Operative time was approximately 60 minutes, with minimal blood loss.

### Outcome and Follow-up

Postoperative recovery was uneventful, and the patient was discharged on postoperative day two. At three-month follow-up, serum cortisol was normal, and the patient remained asymptomatic.

Histopathology showed a cystic lesion lined by flattened endothelial cells with a fibrous wall, without atypia or malignancy. Immunohistochemistry was positive for CD31 and CD34 and negative for cytokeratin, confirming an adrenal endothelial cyst (Figure 2).

## DISCUSSION

Endothelial adrenal cysts are rare benign lesions, usually non-functional, and cortisol-producing variants are exceptionally uncommon [4,5]. Hormonal secretion may arise from adjacent cortical hyperplasia or hormonally active tissue within the cyst wall [7].

Radiological differentiation between benign cysts and cystic adrenal neoplasms remains challenging; imaging alone is insufficient, especially in functional or indeterminate lesions [3,5]. Surgical excision is therefore recommended in such cases [6,8].

Laparoscopic adrenalectomy is the gold standard for benign and functional adrenal lesions, offering excellent visualization, minimal morbidity, and rapid recovery [6,8]. Right-sided adrenalectomy requires careful handling due to the short adrenal vein draining into the inferior vena cava [6].

Comparison with previously reported cases highlights that cortisol-secreting endothelial cysts are extremely rare [4,5,7]. Most published cases describe functional cysts presenting with mild hypercortisolism or subclinical Cushing's syndrome. The current case aligns with these reports regarding clinical presentation and biochemical findings, but it expands upon the literature by demonstrating successful laparoscopic management with detailed perioperative outcomes and histopathological confirmation. This reinforces the importance of comprehensive endocrine evaluation and individualized surgical planning for rare functional adrenal cysts.

Cortisol-producing adrenal endothelial cysts are exceedingly rare. This case emphasizes the importance of thorough hormonal assessment of adrenal incidentalomas, including cystic lesions. Laparoscopic adrenalectomy is a safe and definitive treatment, ensuring resolution of hormonal excess and accurate histopathological diagnosis.

Beyond confirming the diagnosis and resolving hypercortisolism, this case illustrates that minimally invasive approaches can be effectively applied even in rare, functional adrenal lesions. Awareness of such uncommon presentations aids clinicians in recognizing, evaluating, and managing atypical adrenal pathologies, ultimately improving patient care.

**Learning points**

- Adrenal cystic lesions, although typically non-functional, may rarely exhibit hormonal activity, including cortisol secretion, and therefore require comprehensive endocrine evaluation.
- Imaging alone is insufficient to reliably distinguish benign from neoplastic adrenal lesions, particularly in functional or indeterminate cases, making surgical management often necessary.

Laparoscopic adrenalectomy is the gold standard for benign and functional adrenal lesions, providing a safe, minimally invasive approach with low morbidity and rapid recovery.

**Human and Animal Rights:** Informed consent was obtained from the patient for the procedure and publication of this case. No animal studies were conducted.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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