



From Persistence to Resolution

Surgical Management of Resistant Hypertension Due to Adrenal Adenoma

Introduction

Resistant hypertension associated with persistent hypokalemia should raise suspicion for secondary endocrine causes, particularly primary hyperaldosteronism (Conn's syndrome). Early recognition and appropriate surgical management can lead to significant clinical improvement and even cure of hypertension.

This presentation reviews two adrenal tumor cases, focusing on diagnostic evaluation, perioperative management, and surgical outcomes.

Case 1

Patient Information

An adult patient presented with recurrent episodes of weakness and persistent hypertension.

(All identifying information including name, age, sex, and residence has been removed to maintain confidentiality.)

History

Initial Presentation

The patient presented with:

- Generalized weakness
- Tingling sensation
- Symptoms lasting several days

No limb paralysis, sensory loss & reduced oral intake

Past history:

- Hyperuricemia

No history of:

- Smoking
- Alcohol consumption
- Previous surgery

Examination

General Examination

- General condition: Fair
- Afebrile

Vital signs:

- Blood pressure: Elevated
- Pulse rate: Normal

Systemic Examination

Cardiovascular

- Heart sounds normal

Respiratory

- Lungs clear

Abdominal Examination

- Abdomen soft
- No palpable abdominal mass

Neurological Examination

- No focal motor weakness initially

Investigations

Initial Laboratory Findings

Investigation	Result
Hemoglobin	Elevated-normal
White blood cells	Normal
Platelets	Normal
Sodium	Mildly low
Potassium	Severely low
Chloride	Reduced
Creatinine	Mildly elevated
Thyroid function	Normal
HbA1c	Borderline elevated

Cardiac & Imaging Evaluation

- Troponin I: Negative
- ECG:
 - Sinus rhythm
 - Non-specific ST/T changes

Chest X-ray

- No active cardiopulmonary abnormality

Ultrasound Abdomen

- Mild bilateral nephropathy
- Small bilateral renal stones

Initial Diagnosis

- Severe hypokalemia
- Resistant hypertension
- Nephropathy
- Hyperuricemia

Initial Management

- Intravenous potassium replacement
- Magnesium supplementation
- Antihypertensive therapy:
 - Aldosterone antagonist
 - Calcium channel blocker
 - Potassium supplementation

Clinical Course

Despite repeated treatment:

- Persistent hypokalemia continued
- Blood pressure remained poorly controlled
- Multiple antihypertensive medications required
- Recurrent hospital visits occurred over several months

Maximum recorded blood pressure:

- Approximately 200/120 mmHg

Further Evaluation

Suspicion of Secondary Hypertension

Due to:

- Resistant hypertension
- Persistent hypokalemia
- Requirement for escalating therapy

Secondary endocrine hypertension was suspected.

Contrast-Enhanced CT Abdomen

Findings:

- Left adrenal adenoma measuring approximately 1.9×1.9 cm
- Mild lumbar spine degenerative changes

Hormonal Assessment

Aldosterone-Renin Ratio (ARR)

- Elevated ARR consistent with:
 - **Primary hyperaldosteronism (Conn's syndrome)**

Final Diagnosis

Primary Hyperaldosteronism Secondary to Left Adrenal Adenoma

Preoperative Preparation

- Blood pressure optimization
- Correction of electrolyte imbalance
- Hormonal assessment
- Baseline perioperative investigations

Surgical Management

Procedure

Open Left Adrenalectomy

Performed under:

- General anesthesia
- Epidural analgesia

Surgical Approach

- Midline abdominal incision

Intraoperative Findings

- Left adrenal tumor approximately 2 × 2 cm identified and removed

Intraoperative Hemodynamic Monitoring

Initial hypertension gradually improved intraoperatively after tumor removal.

Postoperative Course

- ICU monitoring initially
- Subsequently transferred to surgical ward

Blood Pressure

- Gradual postoperative improvement

Electrolytes

- Potassium normalized progressively

Histopathology

Adrenocortical Adenoma

- Benign adrenal cortical tumor

Outcome

At follow-up:

- Surgical wound healed well
- Electrolytes normalized
- Blood pressure controlled without antihypertensive medication

Case 2

Presentation

Another patient presented with:

- Abdominal bloating
- Abdominal pain

Investigations

Ultrasound Abdomen

- Fatty liver
- Large left adrenal mass
- Mild hydronephrosis

CT Imaging

- Large left adrenal tumor approximately 13 cm in size
- Imaging favored atypical adrenal adenoma

Hormonal Workup

- Cortisol level: Normal
- Plasma and urinary metanephrines: Normal

Suggestive of:

- **Non-functioning adrenal tumor**

Management

Left Adrenalectomy

- Surgery performed successfully
- Perioperative condition remained stable

Outcome

- Uneventful recovery
- Discharged in stable condition

Discussion

Primary Hyperaldosteronism (Conn's Syndrome)

Conn's syndrome results from excessive aldosterone production causing:

- Sodium retention

- Hypertension
- Potassium loss
- Metabolic alkalosis

Clinical Features Suggestive of Primary Hyperaldosteronism

- Resistant hypertension
- Persistent hypokalemia
- Muscle weakness
- Tingling sensation
- Recurrent hypertensive crises

Diagnostic Evaluation

Biochemical Diagnosis

Aldosterone-Renin Ratio

- Key screening investigation

Elevated ARR strongly suggests:

- Primary hyperaldosteronism

Radiological Evaluation

CT Scan

Typical adrenal adenoma features:

- Unilateral lesion
- Small size
- Hypodense appearance

Adrenal Vein Sampling

Useful to differentiate:

- Unilateral disease
- Bilateral adrenal hyperplasia

Treatment Principles

Medical Management

- Blood pressure control
- Potassium correction
- Aldosterone antagonists

Surgical Management

Adrenalectomy

Preferred for:

- Unilateral aldosterone-producing adenoma

Can result in:

- Resolution of hypokalemia
- Significant improvement or cure of hypertension

Perioperative Considerations

Preoperative

- Correct hypokalemia
- Optimize blood pressure
- Full hormonal evaluation

Intraoperative

- Close cardiovascular monitoring
- Anticipation of hormonal changes

Postoperative

- Monitor blood pressure
- Monitor electrolyte changes
- Assess for adrenal insufficiency if indicated

Key Learning Points

- Persistent hypokalemia with resistant hypertension strongly suggests secondary hypertension
- Primary hyperaldosteronism is a potentially curable cause of hypertension
- CT imaging and hormonal assessment are essential diagnostic tools
- Surgical adrenalectomy provides excellent outcomes in unilateral adrenal adenoma

Conclusion

These cases highlight the importance of considering endocrine causes in resistant hypertension. Careful biochemical evaluation and imaging led to successful diagnosis and surgical management of adrenal adenoma, resulting in normalization of potassium levels and marked improvement in blood pressure control.

References

- Bailey & Love's Short Practice of Surgery
- Farquharson's Textbook of Operative Surgery