

# Conn's Syndrome: A Diagnostic Dilemma. Case Report

W Butt, M Butt, T Gauhar, A Khawaja, A Afzal, A Ahmed, K Azim

## Citation

W Butt, M Butt, T Gauhar, A Khawaja, A Afzal, A Ahmed, K Azim. *Conn's Syndrome: A Diagnostic Dilemma. Case Report*. The Internet Journal of Surgery. 2009 Volume 24 Number 1.

## Abstract

Conn's syndrome or primary hyperaldosteronism is characterized by hypertension, hypokalemia and increased ratio of plasma aldosterone concentration (ng/dl) to plasma renin activity (ng/ml per hour). Primary aldosteronism occurs most commonly due to aldosterone producing adenoma (Conn's syndrome) or bilateral adrenal hyperplasia. The clinical manifestation may be varied. We report an atypical neurological presentation of primary aldosteronism due to an aldosterone-producing adenoma.

## INTRODUCTION

Primary aldosteronism is characterized by hypertension, hypokalemia, suppressed renin activity and increased aldosterone excretion and was first described by J. W. Conn in 1955<sup>1</sup>. Primary aldosteronism used to be considered as a rare form of hypertension but it is now recognized to be the most common form of secondary hypertension with prevalence estimates of 5-13% of all patients with hypertension<sup>2,3</sup>. Primary aldosteronism occurs most commonly due to aldosterone-producing adenoma (Conn's syndrome) or bilateral idiopathic hyperplasia and less commonly due to primary (unilateral) adrenal hyperplasia, aldosterone-producing adrenocortical carcinoma or familial hyperaldosteronism<sup>4</sup>.

Primary aldosteronism can sometimes pose a diagnostic dilemma as the presentation may be very varied and misleading. We report a case with an atypical neurological presentation of primary aldosteronism due to an aldosterone-producing adenoma.

## CASE REPORT

A 57-year-old lady presented to Mayo Hospital, Lahore, with uncontrolled blood pressure for a year despite using multiple combinations of anti-hypertensive drugs. Previously, she had been on different regimens for variable periods of time to achieve good blood pressure control during the past 16 years. The patient also had a peculiar history of remitting and relapsing neurological problems that she had been experiencing for the last four years. A major episode occurred three years back; while on thiazide diuretic and beta blocker therapy for adequate control of hypertension, she developed progressively increasing

weakness of her upper and then lower limbs. Neurological consultation revealed no focal or localizing defect but flaccid paralysis of all four limbs. She was empirically put on steroids but her weakness progressed, nevertheless, to involve the respiratory muscles and she had to be put on mechanical ventilation. The only significant finding in lab reports was a very low serum potassium level of 1.7mmol/L. The patient improved gradually with potassium replacement and was weaned off the ventilator on the third day. Extensive work-up for hypokalemia was done which did not reveal anything significant. Serum aldosterone concentration to plasma renin activity, urine aldosterone and 24-hour potassium loss were all found to be within normal range. Thus, hypokalemia was attributed to diuretic use and the patient was discharged from the hospital on oral potassium supplements and amlodipine for her blood pressure control. Combination anti-hypertensive therapy had to be started soon to achieve adequate control of her hypertension.

Despite multiple drug therapy during the last year before presenting to us, her blood pressure was not well controlled. She was thoroughly worked up again. She had a haemoglobin of 12.1g/dl, an ESR of 51mm for the first hour, random blood glucose levels of 132mg/dl, urea of 51mg/dL, creatinine of 1.6mg/dL, of sodium 140mmol/L and potassium of 3.9mmol/L (with oral potassium supplementation); urine vanillyl mandelic acid was 6mg/24hrs (1.9-9.8mg/24hrs), urine 5-hydroxyindoleacetic acid was 5.8mg/24hrs but serum aldosterone was found to be elevated this time, 48.3ng/dL(4-31ng/dL) with a low plasma renin activity of 0.006ng/mL/hr (0.15-2.33ng/mL/hr). Serum aldosterone concentration to plasma renin activity turned out to be very high suggesting a diagnosis of primary

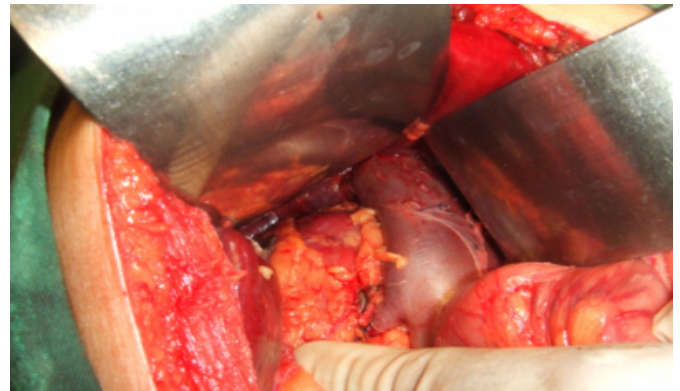
aldosteronism. Transabdominal ultrasonography revealed bilateral simple renal cortical cysts and a solid mass of 3.1x2.8cm in the right adrenal gland. These findings were confirmed on MRI. <sup>99m</sup>Tc-DTPA renal scan showed a differential function of 48% on the left and 52% on the right side. Chest radiograph and EKG revealed no significant findings. Echocardiography showed an ejection fraction of 60%. Her blood pressure was controlled pre-operatively on amlodipine, prazosin and spironolactone. Serum potassium levels were maintained within normal range but arterial gasometry still showed metabolic alkalosis.

After careful consultation with the anaesthetists, open right adrenalectomy was performed due to unavailability of laproscopic facilities and expertise at our centre. Figure 1 shows the inferior vena cava, right renal vein and the upper pole of the right kidney after the adrenal gland had been removed. The surgery went smoothly and post operatively the patient was monitored closely for blood pH, serum potassium, urine output and blood pressure, all of which remained within normal range. The patient required only mild analgesia post-operatively for pain control and was discharged on the third post-operative day. The pathology report confirmed the diagnosis of an aldosteronoma, revealing a nodule measuring 4x3x3.5cm in the right adrenal gland as shown in figure 2. Microscopically the nodule showed a mixture of fasciculata and granulosa cells arranged in small nests and cords. Most of the cells had small vesicular nuclei but occasional cells with enlarged hyperchromatic nuclei were also visualized.

The patient is normotensive without any medication with normal potassium levels and has had no complaints of weakness or any other neurological symptoms for a year of follow-up after surgery.

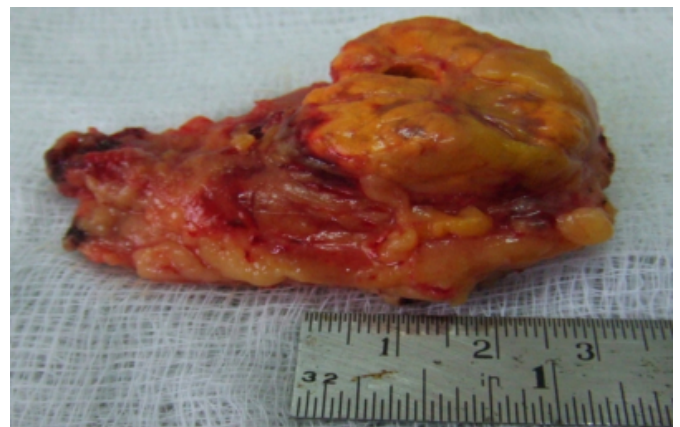
**Figure 1**

Fig. 1: Picture showing IVC, right renal vein and superior border of right kidney after adrenalectomy.



**Figure 2**

Fig. 2: Picture showing the right adrenal gland with the adenoma.



## DISCUSSION

Recent studies suggest that 10 to 15% of individuals with hypertension fulfill the biochemical criteria for primary aldosteronism<sup>5</sup>. These studies have used the serum aldosterone to plasma renin activity ratio as a screening test to demonstrate this high prevalence. This frequency is much higher than that previously described when hypokalemia was used as a screening tool<sup>6</sup>.

Aldosterone-producing adenoma and bilateral idiopathic hyperaldosteronism are the 2 most common subtypes of primary aldosteronism; aldosterone-producing adenomas account for approximately 35% of cases, and bilateral idiopathic hyperaldosteronism accounts for approximately 60% of cases<sup>2</sup>. Primary aldosteronism is usually associated with hypokalemia, renal potassium leakage, and arterial hypertension due to excessive aldosterone secretion<sup>7,8</sup>. However, the clinical and biological spectrum of primary

hyperaldosteronism varies. In particular, hypokalemia is lacking in 7 to 38% of cases<sup>9,10</sup>. In contrast, normotensive primary hyperaldosteronism is exceedingly rare<sup>11</sup>. Primary aldosteronism can also present as paralytic myopathy and it appears to be more common in Oriental people. This symptom is rarely reported among western populations<sup>12</sup>.

Our patient also presented with muscular paralysis and hypokalemia at the first instance but then the biochemical investigations did not support the diagnosis of hyperaldosteronism. Perhaps potassium wasting diuretics had played a key role to precipitate that episode. Later she presented to us with uncontrolled hypertension. This time her serum aldosterone to plasma renin activity was found to be markedly increased and abdominal imaging showed a mass in one of the adrenals, pointing towards an aldosterone producing adenoma as the cause of her mystical symptoms. Biochemical screening in hypertensive patients for serum aldosterone to plasma renin activity is not being carried out in Pakistan; so primary aldosteronism is not as frequent a diagnosis in our country as is mentioned in the foreign studies.

Studies have shown that for the majority of patients with benign surgical adrenal disease, laparoscopic surgery is now the gold standard treatment<sup>13,14</sup>. However, since almost no facilities and expertise for laproscopic adrenal surgery is available in Pakistan, an open adrenalectomy was done safely through a right paramedian abdominal incision. In conclusion, primary hyperaldosteronism can pose a diagnostic dilemma to the clinicians because of its varied presentations. Screening for hyperaldosteronism should be

undertaken more frequently in cases of resistant hypertension, hypertension with spontaneous or secondary hypokalemia and in patients with hypokalemic paralysis to treat them effectively.

## References

1. Conn JW: Primary aldosteronism, a new clinical syndrome. *J Lab Clin Med*; 1955;45:3-17.
2. Young WF: Primary aldosteronism-renaissance of a syndrome: Review. *Clin Endocrinol*; 2007;66:607-18.
3. Krysiak R, Okopieł B, Herman ZS: Primary aldosteronism. *Przegl Lek*; 2007;64(1):31-6.
4. Young WF Jr: Minireview: primary aldosteronism—changing concepts in diagnosis and treatment. *Endocrinology*; 2003;144(6):2208-13.
5. Calhoun D: Aldosteronism and hypertension. *Clin J Am Soc Nephrol*; 2006;1:1039-45.
6. Mosso L, Carvajal C, Gonzalez A, Barraza A, Avila F, Montero J et al.: Primary aldosteronism and hypertensive disease. *Hypertension*; 2003;42:161-5.
7. Vallotton MB: Primary aldosteronism. *Clin Endocrinol*; 1996;45:47-60.
8. Fraser R, Murray GD, Connell JM. Conn's syndrome: no longer a needle in a haystack. *Clin Endocrinol*; 1988;49:709-10.
9. Conn JW, Rovner D, Cohen E, Nesbit R: Normokalemic primary hyperaldosteronism. Its masquerade as essential hypertension. *J Am Med Assoc*; 1966;195:111-6.
10. Bravo E, Tarazi R, Dustan H, Fouad F, Textor S, Gifford R et al.: The changing clinical spectrum of primary hyperaldosteronism. *Am J Med*; 1983;74(4):641-51.
11. Vantyghem MC, Ronci N, Provost F, Ghulam A, Lefebvre J, Jeunemaitre X et al.: Aldosterone-producing adenoma without hypertension: a report of two cases. *Eur J Endocrinol*; 1999;141:279-85.
12. Huang YY, Hsu BR, Tsai JS: Paralytic myopathy – a leading clinical presentation for primary aldosteronism in Taiwan. *J Clin Endocrinol Metab*; 1996;81:4038-41.
13. Sung GT, Gill IS. Laparoscopic adrenalectomy. *Semin Laparosc Surg*; 2000;7(3):211-22.
14. Pantuso G, Grassi N, Bottino A, Cipolla C, Lo Iacono A, Cacace E et al.: Laparoscopic adrenalectomy: our experience. *Chir Ital*; 2007;59(3):275-85.

**Author Information**

**Waqas Tariq Butt, M.B, B.S.**

House Surgeon, Department of Surgery, East Surgical Ward, Mayo Hospital & King Edward Medical University Lahore

**Muhammad Umer Butt, M.B, B.S.**

House Surgeon, Department of Surgery, East Surgical Ward, Mayo Hospital & King Edward Medical University Lahore

**Tooba Mahmud Gauhar, M.B, B.S.**

Postgraduate Resident, Department of Surgery, East Surgical Ward, Mayo Hospital & King Edward Medical University Lahore

**Ali Azim Khawaja**

Medical Student, Department of Surgery, East Surgical Ward, Mayo Hospital & King Edward Medical University Lahore

**Ameer Afzal, FCPS**

Senior Registrar, Department of Surgery, East Surgical Ward, Mayo Hospital & King Edward Medical University Lahore

**Ashfaq Ahmed, FCPS**

Associate Professor, Department of Surgery, East Surgical Ward, Mayo Hospital & King Edward Medical University Lahore

**Khawaja Muhammad Azim, FRCS**

Professor of Surgery, Department of Surgery, East Surgical Ward, Mayo Hospital & King Edward Medical University Lahore