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## Case Report

# Adrenal Vein Sampling for Primary Hyperaldosteronism - 3

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## INTRODUCTION

Primary hyperaldosteronism is characterized by an increase in the adrenal production of aldosterone. It is critical for its treatment to determine whether it is caused by unilateral or bilateral overproduction of aldosterone. When imaging studies are ambiguous, adrenal venous sampling is the choice to confirm lateralization. It consists in dosing plasma aldosterone and cortisol in both adrenal veins simultaneously with the femoral vein, and establishing the aldosterone/cortisol ratio. On the affected side this ratio is at least 2 times higher than the femoral vein's.

## CASE REPORT

A 53-year-old male patient with history of long-standing hypertension treated with 4 drugs (daily doses: 160 mg valsartan, 10 mg amlodipine, 25 mg hydrochlorothiazide, 25 mg atenolol), consulted for hypokalemia (2.5 mEq/ L) detected in a routine study. He was treated with potassium gluconate and further examined to determine the cause of hypokalemia. His blood pressure was 120/70 mmHg. The blood work showed normal cortisol and catecholamines (plasmatic and urinary), an increase in aldosterone concentration (698 pg/ ml) and a decrease in plasma renin activity (0.27 ng/ ml/ h). This was highly suggestive of Conn's disease; so abdomen computed tomography (CT- scan) with intravenous contrast was performed to evaluate the adrenal glands. It showed a 9 mm. nodule with more than 50% enhancement washout in the right adrenal gland, and a similar 25 mm. nodule in the left.

Adrenal venous catheterization was performed to determine lateralization. Both adrenal veins were sampled simultaneously with the femoral vein and values of aldosterone and cortisol were measured. The obtained values are shown in table 1. In the left adrenal vein the aldosterone/cortisol ratio was more than 2 times the femoral vein's, confirming the pathological side. Laparoscopic left adrenalectomy was then performed.

The pathology report informed two cortical adenomas, measuring 1 and 3 cm in diameter respectively.

The patient had an uneventful postoperative period, with better control of blood pressure (he discontinued three antihypertensive drugs) and normalization of potassium blood concentration without potassium gluconate.

## DISCUSSION

Primary hyperaldosteronism was first described by Jerome Conn in 1954 [1]. It has a prevalence of 5-10% in hypertensive patients [2].

CT-scan is widely used to diagnose the hyperfunctioning

gland, but it's results are frequently inconclusive. Magill, et al. [3,4] compared CT-scan with adrenal vein sampling in 62 patients and found that their results weren't accurate in 68%. Daunt [5] reports that nearly 50% of aldosterone-producing adenomas surgically removed at their center were less than 1 cm in diameter, and that in many patients with adenomas diagnosed with CT-scan, disease was localized to the contralateral side with adrenal vein sampling.

In this scenario, adrenal vein sampling becomes essential to determine if the glands are affected uni or bilaterally and there for decide the best treatment for each patient, as unilateral disease is candidate for surgery, with excellent results in blood pressure management, whereas bilateral affection is treated medically [2,6].

During the procedure, to confirm that the sample is obtained from the adrenal vein, the cortisol concentration should be at least two times the femoral vein's. In our case, although adequate position with good demonstration of adrenal vasculature, we didn't get this results. On rare occasions, the majority of the adrenal blood is drained by a different vein, superficial or emissary veins and so cortisol levels are only slightly raised, if at all, over those of the peripheral samples. We assume this may have happened in our case [5].

Even though it is an invasive procedure, complications of adrenal vein sampling are rare. There are reports as high as 5%-10% in the literature, but most large volume centers report complication rates of 1% [7]. Our patient had an uneventful postoperative period and achieved a better control of his blood pressure, with withdrawal of most of the antihypertensive medication.

Although this report is not without limitations, since we are starting our experience with adrenal vein sampling and present only one patient that underwent the procedure, we can conclude that adrenal venous catheterization is a technically demanding procedure that is feasible in highly specialized centers. It is a key tool in the study of primary hyperaldosteronism. It allows differentiating between unilateral adenoma producing aldosterone, surgically treated, from bilateral adrenal hyperplasia, of medical treatment, when imaging studies do not define laterality.

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**Table 1:** Adrenal and femoral venous sampling results and aldosterone/ cortisol ratio.

	Right Adrenal Vein	Left Femoral Vein	Left Adrenal Vein
<b>Aldosterone (pg/ ml)</b>	81.5	125	>1000
<b>Cortisol (mcg/ dl)</b>	23.35	19.17	55.46
<b>Aldosterone/ Cortisol Ratio</b>	3.47	6.52	18