

Clinical Biochemistry Department  
Endocrinology Department

**SOP ALDOSTERONE/RENIN STUDIES:  
OVERNIGHT STUDIES**

**CLINB-CF-14**

## **ALDOSTERONE / RENIN STUDIES: OVERNIGHT STUDIES**

### **INTRODUCTION**

Aldosterone and renin levels are useful in investigation of suspected disorders of aldosterone production such as primary hyperaldosteronism and hyporeninaemic hypoaldosteronism. This protocol is only usually undertaken following an equivocal aldosterone:renin ratio screening result (see [screening protocol](#) for aldosterone and renin studies)

### **PATIENT PREPARATION**

The renin-aldosterone axis is primarily regulated by renal blood flow. Patients under investigation should therefore be normally hydrated, have an adequate sodium intake (100-150 mmol/day) and be normokalaemic or maximum potassium level obtainable (gross potassium depletion inhibits aldosterone production and may give artefactually low results). Correction of potassium should be with potassium supplements **not** potassium sparing diuretics. Any potassium replacement should be stopped the day before the test.

All drugs that interfere with fluid balance or potassium (see appendix) should be stopped for 2 weeks before the test (spironolactone or oestrogens must be discontinued for at least 6 weeks). If the patient's hypertension is such that all drug therapy cannot be withdrawn safely, alpha-blockers such as doxazosin or prazosin can be used.

**Please ensure that all relevant clinical details (e.g. blood pressure) and current medication is noted on the request form. Failure to give adequate clinical information will delay sample analysis. It is imperative that Biochemistry department is informed beforehand so that arrangements can be made for specimen handling.**

This test can only be performed as an inpatient procedure.

### **PROTOCOL**

**Day before: ensure Biochemistry department is aware of the test and collect samples tubes from Phlebotomy.**

**The patient must observe strict overnight recumbency. After waking the patient must remain lying down and not alter posture in any way until the initial blood samples have been taken.**

1. **At 08:00 h after overnight recumbency and before breakfast take blood for aldosterone and renin (see box below).**

#### **Sample Instructions**

**Aldosterone & Renin: 7ml EDTA (purple top) tube.**  
**For children less than 6 years of age a minimum of one full paediatric EDTA (red top) tube**  
**Samples **must** be taken to the Biochemistry laboratory immediately after collection**

2. **At 08:30 h after patient has been out of bed since the 08:00 am sample and before breakfast take blood for aldosterone and renin levels (see box).**
3. **At 12:00 h after the patient has been out of bed since the 08:00 h sample and before lunch take blood for aldosterone and renin levels (see box).**

## **INTERPRETATION**

Primary hyperaldosteronism is indicated by an elevated aldosterone value at 08.00h together with a suppressed renin which shows little or no increase after 30 min of mobility. To aid the distinction between hyperaldosteronism due to adrenal adenoma and that due to bilateral adrenal hyperplasia, it is helpful to consider the plasma aldosterone concentrations at 08.00h and 12.00h. If cortisol values at 08.00h and 12.00h show a decrease due to normal diurnal rhythm, an elevated aldosterone level at 08.00h decreasing by 50% or more at 12.00h is suggestive of, but not exclusive to, an adenoma.

In Bartter's and Gitelman's syndrome both the plasma concentration of aldosterone and the PRA at 08.00h after overnight recumbency are raised. In such patients who are normotensive, Bartter's syndrome should be suspected provided diuretic/laxative abuse and psychogenic vomiting have been excluded.

A diagnosis of isolated primary hypoaldosteronism rests upon raised PRA, low plasma aldosterone concentration, inadequate response of aldosterone to ACTH associated with a normal cortisol response. Failure of aldosterone concentrations to increase by at least 150 pmol/L from baseline 30 min after administration of Synacthen (250 microgram i.m.) is indicative of inadequate zona glomerulosa function.

## **REFERENCES**

1. Supra-regional assay service – aldosterone test information  
<http://www.sas-centre.org/assays/hormones/aldosterone.html> (update 06 Aug 2013)
2. Cartledge S, Lawson N. Aldosterone and renin measurements. *Ann Clin Biochem* 2000; **37**: 262-278

## **CONTACT**

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**APPENDIX 1: Effect of drugs on aldosterone-renin system<sup>2</sup>**

Drug group	Examples	Effect on renin	Effect on aldosterone	Comments
Non-steroidal anti-inflammatory drugs (NSAIDs)	Aspirin, ibuprofen, indomethacin		↓	Generally consistent effect, probably mediated via renal prostaglandins
β-Blockers	Atenolol, carvedilol, metoprolol, propranolol	↓	↓	Generally consistent effect
Potassium-sparing diuretics	Amiloride, spironolactone, trimterene	↑	↑	Very large increases in renin observed.
ACE inhibitors	Captopril, cilazapril, enalapril, fosinopril, lisinopril, perindopril, ramipril	↑	↓	Consistent and large increases in renin nearly always seen; effects on aldosterone inconsistent.
Thiazide diuretics	Chlorthalidone, hydrochlorothiazide, metolazone, xipamide	↑	↑	Generally consistent effect with renin; more variable with aldosterone
Loop diuretics	Frusemide	↑	↓	Only small changes seen; effect on aldosterone variable
Calcium channel antagonists	Felodipine, lacidipine, nicardipine, nifedipine	↑↓ None	↑↓ None	Very variable effects; significant increases and decreases have been reported, as well as no significant differences
Laxatives	Most types when used in excess	↑	↑	Probably linked to dehydration with abuse
Oestrogen Preparations		↑	↑	