

Hyperaldosteronism - First Line Investigation of Suspected Hyperaldosteronism - Full Clinical Guideline

Reference No: CHISCG6

1. Introduction

Primary aldosteronism (PA) involves about 5% of the hypertensives seen by general practitioners, more than 11% of those referred to specialized hypertension centres and up to 20% of those with difficult to treat hypertension. Moreover, unilateral adrenal-vein sampling (AVS)-guided adrenalectomy has been shown to resolve resistant hypertension in practically all patients.

The main causes of primary hyperaldosteronism are: bilateral idiopathic adrenal hyperplasia (incidence ~65%), unilateral aldosterone-producing adenoma (Conn's Syndrome) (incidence ~30%), unilateral primary adrenal hyperplasia (incidence ~3%), Glucocorticoid-suppressible hyperaldosteronism (incidence ~1%), Adrenocortical carcinoma (incidence <1%).

The use of single simultaneous samples for aldosterone and renin measurement, with derivation of the "aldosterone/renin ratio" has been advocated as the first line in the investigation of suspected hyperaldosteronism. Low or undetectable renin levels along with inappropriately raised plasma aldosterone concentration (PAC) are the biochemical hallmarks of PA.

Since the renin-aldosterone axis is primarily regulated by renal blood flow, subjects under investigation should not be taking any drugs that interfere with fluid balance or potassium. Subjects should also be adequately hydrated and have an adequate oral intake of sodium. Hypokalaemia should be avoided since it suppresses aldosterone secretion.

2. Guideline for measurement of plasma renin and aldosterone

INDICATIONS

This test is indicated in the differential diagnosis of secondary hypertension.

- Hypertension and hypokalaemia (spontaneous or diuretic induced)
- Resistant hypertension (≥ 150 mm Hg resistant to 3 conventional antihypertensive drugs)
- Adrenal "incidentaloma" ≥ 10 mm and hypertension
- Hypertension with a Family history of primary hyperaldosteronism
- Hypertension onset or Stroke before 40 years of age

PREPARATION

Patient

- Give potassium replacement (Slow K or Sando-K tabs) sufficient to raise serum potassium into reference range (3.5 – 5.3 mmol/L)
- Patients should be normally hydrated and have an adequate oral intake of sodium

INTERPRETATION**Plasma Renin reference ranges (mIU/L)**

Supine	–	<59.7
Ambulant	–	5.3 – 99.1

Plasma Aldosterone reference ranges (pmol/L)

Supine	–	103 - 859
Ambulant	–	103 - 1197

Aldosterone / Renin Ratio (ARR)

Raised ARR (>30 pmol/mIU) suggests possible primary hyperaldosteronism.

Interpretative comments are included on reports.

The aldosterone:renin ratio is only an additional indicator of the state of the aldosterone:renin axis, and must be considered in the light of the actual aldosterone and renin levels. A high aldosterone together with a suppressed renin and elevated aldosterone:renin ratio indicates primary hyperaldosteronism.

Note that:

1. Some patients with significant renal disease may give similar results.
2. For patients taking ACE inhibitors at the time of assessment:
 - detectable renin does not exclude primary hyperaldosteronism
 - undetectable renin would strongly suggest primary hyperaldosteronism

Higher aldosterone values are seen in children and very high renin values are seen in neonates.

The differential diagnosis of mineralocorticoid excess**Low Renin** (primary mineralocorticoid excess)

Aldosterone producing adenoma (Conn's)	34%
Bilateral adrenal hyperplasia	60%
Glucocorticoid suppressible hyperaldosteronism	<1%
Primary adrenal hyperplasia	<1%
Adrenal carcinoma	Rare

High Renin (secondary mineralocorticoid excess)

Renovascular hypertension
 Renin secreting tumor
 Malignant hypertension

Low renin, low aldosterone (pseudohyperaldosteronism)

Deoxycorticosterone secreting tumor
 Ectopic ACTH secreting tumor
 Hypertensive forms of CAH
 Syndrome of apparent mineralocorticoid excess
 Liquorice
 Liddle's syndrome

Further investigations may include “aldosterone suppression tests” (e.g. saline loading, captopril challenge test), adrenal imaging with venous mapping and adrenal venous sampling.

ASSAYING LABORATORY

Royal Victoria Infirmary, Newcastle-upon-Tyne

TURNAROUND TIME

Results will normally be available within 3 weeks.

3. References

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4. Documentation Controls

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