

## **RENIN -ALDOSTERONE PROFILING: ALDOSTERONE-RENIN RATIO (ARR)**

1. Obtain a morning specimen for serum aldosterone (redtop tube) and plasma renin (lavender-top) tube from an upright patient sitting for a period of 15 min prior to (being seated for) blood drawing. Fasting is not required and no salt restriction is necessary.
2. Spironolactone. The ratio cannot be assessed in patients receiving spironolactone. If primary aldosteronism (PA) is suspected in a patient receiving this drug, treatment should be discontinued for 4-6 weeks (1).
3. Hypokalemia should be corrected before ARR is measured as a low K will lower aldosterone and can lead to a falsely negative ARR (1).
4. Preferred antihypertensives that have a minimal effect on the ARR are doxazosin (Cardura), prazosin (Minipress), verapamil slow release, or hydralazine, singly or in combination for one month before sampling (1).
5. False-positive ARR: Beta-blockers, clonidine, methyldopa, and NSAID's lower levels of renin and can cause a falsely positive ARR (1). A minimum 3-day cessation prior to sampling is recommended (3). The renin direct assay is also lower in patients on oral contraceptives and hormone replacement therapy potentially causing the ARR to be falsely increased. Measurement of plasma renin activity is preferred in this situation, calculating the aldosterone/PRA ratio (positive if >20/1).
6. False-negative ARR: Diuretics cause false negatives by causing K loss lowering aldosterone and stimulating renin through volume loss. Angiotensin blockers (ARB's), ACE inhibitors, and some calcium channel blockers raise renin and can cause false negatives (1). A minimum three-day cessation prior to sampling is recommended (3).
7. Test is positive for primary aldosteronism (PA) if:  
  
Aldosterone / Direct Renin Ratio > 30 and Aldosterone level >= 15.0 ng/dL
8. Confirmation is required. The aldosterone-renin ratio (ARR) is a screening test for primary aldosteronism. Diagnosis of PA requires confirmation by demonstrating an inappropriate autonomous hypersecretion of aldosterone typically using either a Captopril- or saline-loading- suppression test to suppress secretion of aldosterone. False-positive ARR results due to antihypertensives should also be ruled out (see 5 above) and may require repeat testing eliminating these medications prior to testing.

### **References**

1. Gordon R, "The challenge of more robust and reproducible methodology in screening for primary aldosteronism", J. Hypertension 2004; 22: 251-5.
2. Hemmelgarn BR, et.al., "The 2004 Canadian Hypertension Education Program recommendations...", Can J Card 2004; 20: 31-40.
3. Perschel FH, et.al. "Rapid screening test for primary hyperaldosteronism: Ratio of plasma aldosterone to renin concentration determined by fully automated chemiluminescence assays", Clin Chem 2004; 50:1650-5.