MAYO CLINIC LABORATORIES

Test Definition: AIVC

Aldosterone, Inferior Vena Cava, Serum

Overview

Useful For

Investigation using inferior vena cava specimen for:
-Primary aldosteronism (eg, adrenal adenoma/carcinoma and adrenal cortical hyperplasia)
-Secondary aldosteronism (renovascular disease, salt depletion, potassium loading, cardiac failure with ascites, pregnancy, Bartter syndrome)

Special Instructions

- Renin-Aldosterone Studies
- Steroid Pathways

Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Patient Preparation: Spironolactone (Aldactone) should be discontinued for 4 to 6 weeks before specimen collection. The plasma renin activity cannot be interpreted if the patient is being treated with spironolactone.
Supplies: Sarstedt Aliquot Tube 5 mL (T914)
Collection Container/Tube:
Preferred: Red top
Acceptable: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 1.8 mL Serum
Collection Instructions:
1. See Renin-Aldosterone Studies for detailed instructions.
2. The recommended collection time is 8 a.m., after the patient is active for approximately 2 hours. Try to collect the specimen as close to that time as possible and no later than 10 a.m.
3. Centrifuge and aliquot serum into a plastic vial.

Specimen Minimum Volume

Serum: 1 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	28 days	
	Ambient	4 days	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Aldosterone stimulates sodium transport across cell membranes, particularly in the distal renal tubule where sodium is exchanged for hydrogen and potassium. Secondarily, aldosterone is important in the maintenance of blood pressure and blood volume.

Aldosterone is the major mineralocorticoid and is produced by the adrenal cortex.

The renin-angiotensin system is the primary regulator of the synthesis and secretion of aldosterone. Likewise, increased concentrations of potassium in the plasma may directly stimulate adrenal production of the hormone. Under physiologic conditions, pituitary adrenocorticotropic hormone is not a major factor in regulating aldosterone secretion.

For more information see Steroid Pathways.

Reference Values

No established reference values.

Interpretation

A high ratio of serum aldosterone (SA) in ng/dL to plasma renin activity (PRA) in ng/mL per hour is a positive screening test result, a finding that warrants further testing. An SA:PRA ratio 20 or higher is only interpretable with an SA of 15 ng/dL or higher and indicates probable primary aldosteronism.

Kidney disease, such as unilateral renal artery stenosis, results in elevated renin and aldosterone levels. Renal venous catheterization may be helpful. A positive test is a renal venous renin ratio (affected:normal) greater than 1.5.

Note: Advice on stimulation or suppression tests is available from Mayo Clinic's Division of Endocrinology and may be obtained by calling 800-533-1710.

Cautions

Late p.m. levels can be up to 30% lower than early a.m. levels. Supine values are on average 50% lower than upright collections. Sodium-deplete patients have significantly elevated serum aldosterone (SA) levels, potentially exceeding the upper limit of the salt replete upright reference range by several fold. To account for these variables, at least in part, it is recommended that plasma renin activity (PRA) is measured concomitantly. In situations of physiological variability, PRA should be altered in the same direction as aldosterone. For more information see Renin-Aldosterone Studies.

Angiotensin converting enzyme (ACE) inhibitors have the potential to falsely elevate PRA. Therefore, in a patient treated with an ACE inhibitor, the findings of a detectable PRA level or a low SA/PRA ratio do not exclude the diagnosis of primary aldosteronism. In addition, in a patient taking an ACE inhibitor, an undetectably low PRA level is a strong predictor for primary aldosteronism.

Clinical Reference

1. Young WF Jr. Primary aldosteronism: A common and curable form of hypertension. Cardiol Rev. 1999;7(4):207-214
2. Young WF Jr. Pheochromocytoma and primary aldosteronism: diagnostic approaches. Endocrinol Metab Clin North Am. 1997;26(4):801-827
3. Hurwitz S, Cohen RJ, Williams GH. Diurnal variation of aldosterone and plasma renin activity: timing relation to melatonin and cortisol and consistency after prolonged bed rest. J Appl Physiol (1985). 2004;96(4):1406-1414
4. Inoue K, Goldwater D, Allison M, Seeman T, Kestenbaum BR, Watson KE. Serum aldosterone concentration, blood pressure, and coronary artery calcium: The Multi-Ethnic Study of Atherosclerosis. Hypertension. 2020;76(1):113-120. doi:10.1161/HYPERTENSIONAHA.120.15006

Performance

Method Description

Aldosterone-d6 is added to serum and plasma samples as an internal standard. Aldosterone and aldosterone-d6 are extracted from the specimens using a Strata X cartridge. The eluate is dried down under nitrogen, reconstituted with 70/30 methanol/water containing estriol and analyzed by liquid chromatography tandem mass spectrometry using multiple reaction monitoring in the negative mode.(Fredline VF, Taylor PJ, Dodds HM, Johnson AG. A reference method for the analysis of aldosterone in blood by high-performance liquid chromatography-atmospheric pressure chemical ionization-tandem mass spectrometry. Anal Biochem. 1997;252[2]:308-313)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

2 to 5 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

82088

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
AIVC	Aldosterone, IVC	1763-2

Result ID	Test Result Name	Result LOINC® Value
6503	Aldosterone, IVC	1763-2