MAYO CLINIC LABORATORIES

Test Definition: PA

Procainamide and N-Acetylprocainamide, Serum

Overview

Useful For

Monitoring therapy with procainamide

Assessing compliance

Evaluating procainamide toxicity

Method Name

Homogeneous Enzyme Immunoassay

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 0.5 mL Serum
Collection Instructions:
1. Within 2 hours of collection, centrifuge the specimen.
2. For serum gel tubes, plasma may sit on gel refrigerated or be aliquoted into a plastic vial.
3. For red top tubes, aliquot serum immediately into a plastic vial.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Cardiovascular Test Request (T724)
-Therapeutics Test Request (T831)

Specimen Minimum Volume

Serum: 0.25 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Frozen (preferred)	14 days	
	Ambient	24 hours	
	Refrigerated	7 days	

Clinical & Interpretive

Clinical Information

Procainamide (PA) is indicated in the treatment of life-threatening ventricular arrhythmias.

Procainamide is metabolized to an active metabolite, *N*-acetylprocainamide (NAPA), with metabolism controlled by genetically determined enzymes. In patients with normal kidney function, fast metabolizers will have a PA:NAPA ratio less than 1 at 3 hours after the dose is administered. Slow acetylators (PA:NAPA ratio >2 after 3 hours) are more likely to present with systemic lupus erythematosus-like symptoms and may test positive for antinuclear antibodies.

Patients who have prolonged exposure to procainamide levels above 12.0 mcg/mL or a NAPA concentration of 40.0 mcg/mL or higher are very likely to exhibit symptoms of toxicity, which are characterized by hypotension, ventricular fibrillation, widened QRS complex (intraventricular conduction delay), junctional tachycardia, oliguria, confusion, nausea, and vomiting.

Kidney disease, liver disease, cardiac failure, and states of low cardiac output reduce the metabolism and clearance of PA and NAPA.

Coadministration of histamine H2 receptor antagonists, such as cimetidine and ranitidine reduce renal clearance of PA and NAPA resulting in higher plasma concentrations of each.

Reference Values

Procainamide
Therapeutic: 4.0-10.0 mcg/mL
Critical value: >12.0 mcg/mL

N-acetylprocainamide
Therapeutic: 12.0-18.0 mcg/mL
Critical value: > or =40.0 mcg/mL

Interpretation

Administration of a dose of 50 mg/kg will usually yield the optimal trough concentration in the range of 4.0 to 10.0 mcg/mL for procainamide and 12.0 to 18.0 mcg/mL for *N*-acetylprocainamide.

Cautions

No significant cautionary statements

Clinical Reference

1. Milone MC, Shaw LM. Chapter 42: Therapeutic drugs and their management. In: Rifai N, Chiu RWK, Young I, Burnham C-AD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:420-453.e9
2. Brunton LL, Knollmann BC, eds. Goodman and Gilman's: The Pharmacological Basis of Therapeutics, 14th ed. McGraw-Hill Education, 2023

Performance

Method Description

These assays are based on a homogeneous enzyme immunoassay technique in which there is competition between drug in the sample and drug labeled with the enzyme glucose-6-phosphate dehydrogenase (G6PD) for antibody binding sites. Enzyme activity decreases upon binding to the antibody, so the drug concentration in the sample can be measured in terms of enzyme activity. Active enzyme converts oxidized nicotinamide adenine dinucleotide (NAD) to NADH, resulting in an absorbance change that is measured spectrophotometrically. Endogenous serum G6PD does not interfere because the coenzyme functions only with the bacterial *(Leuconostoc mesenteroides)* enzyme employed in the assay.(Package insert: PROC2. Roche Diagnostics; 02/2024; package insert: NAPA2. Roche Diagnostics; 12/2023)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

Same day/1 to 2 days

Specimen Retention Time

2 weeks

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 has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

80192

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
PA	Procainamide and NAPA, S	3983-4

Result ID	Test Result Name	Result LOINC® Value
8683	Procainamide, S	3982-6
2461	N-acetylprocainamide, S	3834-9
2462	Procainamide + NAPA	3983-4