MAYO CLINIC LABORATORIES

Test Definition: PA

Procainamide and NAPA, S

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

Collection Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Submission Container/Tube: Plastic vial

Specimen Volume: 0.5 mL

Collection Instructions:

1. Serum gel tubes should be centrifuged within 2 hours of collection.
2. Red-top tubes should be centrifuged and the serum aliquoted into a plastic vial within 2 hours of collection.

Forms

If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) with the specimen.

Reject Due To

Gross hemolysis	Reject

Specimen Minimum Volume

0.25 mL

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Procainamide (PA) is indicated in the treatment of life-threatening ventricular arrhythmias.
PA is metabolized to an active metabolite, *N*-acetylprocainamide (NAPA), with metabolism controlled by genetically determined enzymes. In patients with normal renal 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 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, junctional tachycardia, oliguria, confusion, nausea, and vomiting.
Renal disease, hepatic 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: Therapeutic drugs and their management. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, Elsevier; 2018: 800-831
2. Brunton LL, Hilal-Dandan R, Knollmann BC, eds. Goodman and Gilman's: The Pharmacological Basis of Therapeutics. McGraw-Hill; 2018

Performance

Method Description

These assays are based on a homogeneous enzyme immunoassay technique. The assay is a competition assay between the 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 inserts: Roche Procainamide and N-acetylprocainamide. Roche Diagnostics; 08/2015)

PDF Report

No

Specimen Retention Time

2 weeks

Performing Laboratory Location

Rochester

Fees & Codes

Test Classification

This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

80192