

Overview

Useful For

Monitoring adequacy of blood concentration during amikacin therapy

Method Name

Kinetic Interaction of Microparticles in Solution (KIMS)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

Specimen for a peak level should be collected 30 to 60 minutes after last dose; order PAMIK / Amikacin, Peak, Serum.

Specimen for a trough level should be collected immediately before next scheduled dose; order TAMIK / Amikacin, Trough, 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.

Specimen Minimum Volume

0.25 mL

Reject Due To

| | |
|-----------------|--------|
| Gross hemolysis | Reject |
|-----------------|--------|

Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---------------|--------------------------|----------|-------------------|
| Serum | Refrigerated (preferred) | 14 days | |
| | Ambient | 72 hours | |
| | Frozen | 28 days | |

Clinical & Interpretive

Clinical Information

Amikacin is an aminoglycoside used to treat severe blood infections by susceptible strains of gram-negative bacteria. Aminoglycosides induce bacterial death by irreversibly binding bacterial ribosomes to inhibit protein synthesis. Amikacin is minimally absorbed from the gastrointestinal tract, and thus can be used orally to reduce intestinal flora.

Peak serum concentrations are seen 30 minutes after intravenous infusion, or 60 minutes after intramuscular administration. Serum half-lives in patients with normal renal function are generally 2 to 3 hours. Excretion of aminoglycosides is principally renal, and all aminoglycosides may accumulate in the kidney at 50 to 100 times the serum concentration.

Toxicity can present as dizziness, vertigo, or, if severe, ataxia and a Meniere disease-like syndrome. Auditory toxicity may be manifested by simple tinnitus or any degree of hearing loss, which may be temporary or permanent, and can extend to total irreversible deafness. Nephrotoxicity is most frequently manifested by transient proteinuria or azotemia, which may occasionally be severe. Aminoglycosides also are associated with variable degrees of neuromuscular blockade leading to apnea.

Reference Values

- Peak: 20.0-35.0 mcg/mL
- Toxic peak: >40.0 mcg/mL
- Trough: <8.0 mcg/mL
- Toxic trough:>10.0 mcg/mL

Interpretation

For conventional (nonpulse) dosing protocols, clinical effects may not be achieved if the peak serum concentration is <20.0 mcg/mL. Toxicity may occur if, for prolonged periods of time, peak serum concentrations are maintained >35.0 mcg/mL, or trough concentrations are maintained at >10.0 mcg/mL.

Cautions

Aminoglycosides are excreted primarily by glomerular filtration, thus, the serum half-life will be prolonged and significant accumulation will occur in patients with impaired renal function.

Clinical Reference

1. Wilson JW, Estes LL: Mayo Clinic Antimicrobial Therapy Quick Guide, 2008
2. Hammett-Stabler CA, Johns T: Laboratory Guidelines for Monitoring of Antimicrobial Drugs. National Academy of

Clinical Biochemistry. Clin Chem. 1998 May;44(5):1129-1140

3. Gonzalez LS III, Spencer JP: Aminoglycosides: a practical review. Am Fam Physician 1998 Nov 15;58(8):1811-1820

Performance

Method Description

Kinetic interaction of microparticles in solution (KIMS) as measured by changes in light transmission. The assay is a homogeneous immunoassay based on the principle of measuring changes in scattered light or absorbance which result when activated microparticles aggregate. The microparticles are coated with amikacin and rapidly aggregate in the presence of an amikacin antibody solution. When a sample containing amikacin is introduced, the aggregation reaction is partially inhibited, slowing the rate of the aggregation process. Antibody bound to sample drug is no longer available to promote microparticle aggregation, and subsequent particle lattice formation is inhibited. Thus, a classic inhibition curve with respect to amikacin concentration is obtained, with the maximum rate of aggregation at the lowest amikacin concentration. By monitoring the change in scattered light or absorbance, a concentration-dependent curve is obtained. (Package insert: Roche Amikacin reagent, Roche Diagnostic Corp, Indianapolis, IN)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 day

Specimen Retention Time

1 week

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

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

80150

LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---------|---------------------|--------------------|
| RAMIK | Amikacin, Random, S | 35669-1 |

| Result ID | Test Result Name | Result LOINC® Value |
|-----------|---------------------|---------------------|
| RAMIK | Amikacin, Random, S | 35669-1 |