Test Definition: VORI

Voriconazole, Serum

Overview

Useful For

Monitoring trough levels of voriconazole suggested for:
-Individuals with reduced liver function
-Individuals with cytochrome P450 (CYP) 2C19 alterations associated with poor metabolic function
-Patients taking other medications that affect CYP2C19 activity
-Patients experiencing potential toxicity

Monitoring trough levels in patients who are not responding optimally or have drug interactions that may decrease voriconazole levels or to ensure adequate oral absorption

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Serum Red

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube: Red top (serum gel/SST **not** acceptable)
Submission Container/Tube: Plastic vial
Specimen Volume: 2 mL
Collection Instructions: Within 2 hours of collection, centrifuge and aliquot serum into a plastic vial.

Specimen Minimum Volume

0.6 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Voriconazole (Vfend) is an antifungal agent approved for treatment of invasive aspergillosis and candidemia/candidiasis, as well as for salvage therapy for infections in patients refractory to, or intolerant of, other antifungal therapy. The drug inhibits the fungal enzyme 14a-sterol demethylase, a critical step in ergosterol biosynthesis.

Voriconazole is metabolized in the liver primarily by cytochrome P450 (CYP) 2C19 with CYP2C9 and CYP3A4 having limited roles. The primary metabolite is voriconazole N-oxide, which has no antifungal activity. Drug clearance is primarily dependent on hepatic metabolism. The pharmacokinetics of voriconazole is highly variable and nonlinear, which results in an increased dose leading to a greater than proportional increase in serum concentration.

The bioavailability of oral voriconazole is greater than 95%. Approximately 60% of the drug in serum is protein bound. Voriconazole has a volume of distribution of 4.6 L/kg. Most (80%) of the drug is excreted in the urine, exclusively as metabolites.

Adverse effects of voriconazole include visual disturbances, skin rashes, and elevated liver enzyme levels.

Reference Values

1.0-5.5 mcg/mL
Trough level (ie, immediately before next dose) monitoring is recommended.

Interpretation

Trough levels above 6 mcg/mL (and especially >10 mcg/mL) have been associated with toxicity in several reports.

Trough levels below 1 mcg/mL have been associated with suboptimal response in several reports.

Cautions

Voriconazole metabolism may be altered by coadministration of drugs that metabolically induce or inhibit cytochrome P450 2C19 or by genetic alterations that affect enzyme activity.

Clinical Reference

1. Andes D, Pascual A, Marchetti O. Antifungal therapeutic drug monitoring: established and emerging indications. Antimicrob Agents Chemother. 2009;53(1):24-34. doi:10.1128/AAC.00705-08
2. Hope WW, Billaud EM, Lestner J, Denning DW. Therapeutic drug monitoring for triazoles. Curr Opin Infect Dis. 2008;21(6):580-586. doi:10.1097/QCO.0b013e3283184611
3. Wilson JW, Estes LL, eds: Mayo Clinic Antimicrobial Therapy: Quick Guide. 2nd ed. Oxford University Press; 2011
4. Donnelly JP, De Pauw BE. Voriconazole-a new therapeutic agent with an extended spectrum of antifungal activity. Clin Microbiol Infect. 2004;10 Suppl 1:107-117. doi:10.1111/j.1470-9465.2004.00838.x

5. Physicians Desk Reference, (PDR) 60th edition. Medical Economics Company, 2006 update to 2008
6. Brunton LL, ed: Goodman and Gilman's The Pharmacological Basis of Therapeutics. 11th ed. McGraw-Hill Book Company; 2006
7. Luong ML, Al-Dabbagh M, Groll AH, et al. Utility of voriconazole therapeutic drug monitoring: a meta-analysis. J Antimicrob Chemother. 2016;71(7):1786-1799. doi:10.1093/jac/dkw099

Performance

Method Description
The serum sample is diluted in an acetonitrile internal standard. The protein precipitate is centrifuged and a portion of the supernatant is diluted with mobile phase 1 for detection by a tandem mass spectrometer.(Unpublished Mayo method)

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 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
80285

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LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
VORI	Voriconazole, S	38370-3

Result ID	Test Result Name	Result LOINC® Value
88698	Voriconazole, S	38370-3