Test Definition: HDVQU

Hepatitis D Virus RNA Detection and Quantification, Real-Time RT-PCR, Serum

Overview

Useful For

Detection of hepatitis D virus (HDV) for diagnosis of acute or chronic hepatitis D

Determine HDV RNA level in serum to monitor progression and response to antiviral therapy for chronic hepatitis D

Testing Algorithm

For more information see Hepatitis D: Testing Algorithm for Diagnosis.

Highlights

This molecular test detects and quantify hepatitis D virus (HDV) RNA present in serum of individuals suspected or known to have acute or chronic hepatitis D. It also serves to confirm the diagnosis of chronic hepatitis D in individuals with positive HDV total antibodies in serum.

Method Name

Real-Time, Reverse Transcription-Polymerase Chain Reaction (RT-PCR)

NY State Available

Yes

Specimen

Ordering Guidance

This test should be requested for all individuals who are newly confirmed to be positive for hepatitis B virus surface antigen (HBsAg) or HDV total antibodies in serum.

Shipping Instructions

1. Freeze serum immediately, and ship specimen frozen on dry ice.
2. If shipment will be delayed for more 24 hours, freeze serum at -20 to -80 degrees C (up to 35 days) until shipment on dry ice.

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 2.2 mL
Collection Instructions:
1. Centrifuge blood collection tube per collection tube manufacturer's instructions (eg, centrifuge within 2 hours of collection for BD Vacutainer tubes).
2. Aliquot serum into plastic vial.

Specimen Minimum Volume
1.0 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	OK

Clinical & Interpretive

Clinical Information
Infection with the hepatitis delta virus (HDV) always occurs in association with hepatitis B virus (HBV) infection, where it may occur either as acute co-infection or acute super-infection superimposed upon existing chronic hepatitis B. HDV is an RNA virus that requires the presence of HBV for viral replication.

Diagnosis of acute HBV-HDV co-infection and HDV super-infection depends upon the presence of HDV antigen (HDV Ag) and HDV RNA in serum or plasma, with or without the presence of HDV-specific total antibodies, in addition to detectable hepatitis B virus surface antigen (HBs Ag), HBV e antigen, and/or HBV core total antibodies. Individuals with acute HBV-HDV co-infection will have detectable HBV core IgM antibody, which is absent in those with HDV super-infection with pre-existing chronic hepatitis B.

In acute co-infection, HDV Ag and HDV RNA appears early after HBs Ag becomes detectable and then both disappear with convalescence, while both markers persist in HDV superinfection that frequently leads to chronic HBV-HDV co-infection. HDV total antibodies persist in both resolved and chronic co-infection.

Reference Values
Undetected

Interpretation
Quantification range of this assay is 20 to 2,000,000 IU/mL (1.30 log to 6.30 log IU/mL), with a limit of detection (based on a 95% detection rate) of 4.17 IU/mL (0.62 log IU/mL).

An "Undetected" result indicates that hepatitis D virus (HDV) RNA is not detected in the serum specimen (see Cautions). Repeat testing in 1 to 2 months is recommended for those at risk of HDV infection. The limit of detection (based on a 95% detection rate) for this assay is 4.17 IU/mL.

A result of "<20 IU/mL" indicates that the HDV RNA level present in the serum specimen is below 20 IU/mL (1.30 log IU/mL), and the assay cannot accurately quantify the HDV RNA present below this level.

A quantitative value (reported in IU/mL and log IU/mL) indicates the HDV RNA level (ie, viral load) present in the serum specimen.

A result of ">2,000,000 IU/mL" indicates that the HDV RNA level present in the serum specimen is above 2,000,000 IU/mL (6.30 log IU/mL), and this assay cannot accurately quantify the HDV RNA present above this level.

An "Inconclusive" result indicates that the presence or absence of HDV RNA in the serum specimen could not be determined with certainty after repeat testing in the laboratory, possibly due to reverse transcription-polymerase chain reaction inhibition. Submission of a new specimen for testing is recommended.

Cautions

This assay is optimized for the detection and quantification of hepatitis D virus (HDV) genotypes 1 to 8, but due to unexpected mismatches between the polymerase chain reaction assay primers and unusual or rare HDV target sequences, some serum specimens may yield "Undetected" results despite the presence of HDV RNA. Therefore, results should be interpreted with caution, considering the patient's risk factors for HDV infection, the analytical sensitivity of the assay, and possible geographic origin of the infecting HDV strain. Follow-up HDV RNA testing is recommended for patients with initially "Undetected" HDV RNA test results but at high risk for or suspected to have chronic hepatitis D.

In immunocompetent individuals, undetectable HDV RNA results indicate only the absence of HDV RNA in the serum specimen tested but do not exclude the diagnosis of HDV infection, given the relatively short duration of viremia (2 to 8 weeks after infection) in these individuals. Immunocompetent individuals with HDV infection would be expected to have repeatedly positive HDV-specific IgG and total antibody test results.

Heparinized or visibly lipemic serum specimens may result in reduced assay sensitivity, with possible false-negative or under-quantified HDV RNA test results.

Due to differences in design and analytical performance for different assays detecting and quantifying HDV RNA in human serum, serial testing of HDV viral load in a given patient over time should be performed using the same molecular assay.

Clinical Reference

1. Negro F. Hepatitis D virus coinfection and superinfection. Cold Spring Harb Perspect Med. 2014;4(11):a021550. Published 2014 Nov 3. doi:10.1101/cshperspect.a021550
2. European Association for the Study of the Liver. EASL Clinical Practice Guidelines on hepatitis delta virus. J Hepatol. 2023;79(2):433-460. doi:10.1016/j.jhep.2023.05.001
3. Umukoro E, Alukal JJ, Pak K, Gutierrez J. State of the art: Test all for anti-hepatitis D virus and reflex to hepatitis D virus RNA polymerase chain reaction quantification. Clin Liver Dis. 2023;27(4):937-954. doi:10.1016/j.cld.2023.05.008
4. Asselah T, Rizzetto M. Hepatitis D Virus Infection [published correction appears in N Engl J Med. 2023 Oct 12;389(15):1444. doi: 10.1056/NEJMx230006.]. N Engl J Med. 2023;389(1):58-70. doi:10.1056/NEJMra2212151

Performance

Test Definition: HDVQU

Hepatitis D Virus RNA Detection and Quantification, Real-Time RT-PCR, Serum

Method Description

This assay utilizes the real-time polymerase chain reaction (PCR) with TaqMan probe chemistry with the RealStar HDV RT-PCR Kit 1.0 (altona Diagnostics GmbH, Hamburg, Germany) for qualitative and quantitative detection of hepatitis D virus (HDV) RNA in human serum. Testing involves 3 major processes with the ELITe InGenius integrated system: automated extraction and purification of viral and internal control (MS2 phage) RNA, reverse transcription of HDV RNA target sequence and MS2 RNA to generate complementary DNA (cDNA), PCR amplification, and real-time detection of amplified products with fluorescent dye-labeled oligonucleotide probes. This assay amplifies a conserved sequence located between two autocatalytic sites in the HDV genome, with simultaneous detection and quantification of the target-specific amplified products and the MS2 (internal control) sequence. The assay is calibrated to the First World Health Organization International Standard for HDV RNA, PEI code 7657/12, and test results are reported in IU/mL.(Package insert: RealStar HDV RT-PCR Kit 1.0. Altona Diagnostics GmbH; 05/2018)

PDF Report

No

Day(s) Performed

Varies (once per week)

Report Available

1 to 10 days

Specimen Retention Time

2 months

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

87523