

Hepatitis D virus infection

GETTING TO KNOW HDV LAB MARKERS

Laboratory markers of hepatitis D infection

The hepatitis D virus requires parts of the hepatitis B virus in order to function. Consequently, hepatitis D infection cannot occur without a simultaneous hepatitis B infection. Therefore, in order to diagnose a hepatitis D infection we measure markers for both viruses.

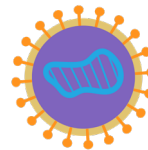
We distinguish markers that represent the active, living virus, (e.g. HDV RNA and hepatitis B surface

antigen [HBsAg]), from markers that represent the immune system's response to that virus (e.g. anti-HDV IgM and IgG antibodies [total anti-HDV] as well as anti-HB core IgM and total anti-HB core antibodies).

There is also a test to detect only IgM antibodies, but this test is not widely available, so the total anti-HDV test is generally used.

HDV

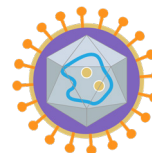
- Total Anti-HDV (IgM+IgG)
- HDV RNA
- (Anti-HDV IgM)



+

HBV

- HBsAg
- Anti-HBc IgM
- Total Anti-HBc



Total Anti-HDV: Anti-Hepatitis D IgM and IgG antibodies
 HBsAg: Hepatitis B surface antigen
 Anti-HBc IgM: Anti-Hepatitis B core antigen IgM antibodies
 Total Anti-HBc: Anti-Hepatitis B core antigen IgM and IgG antibodies

COURSE OF INFECTION

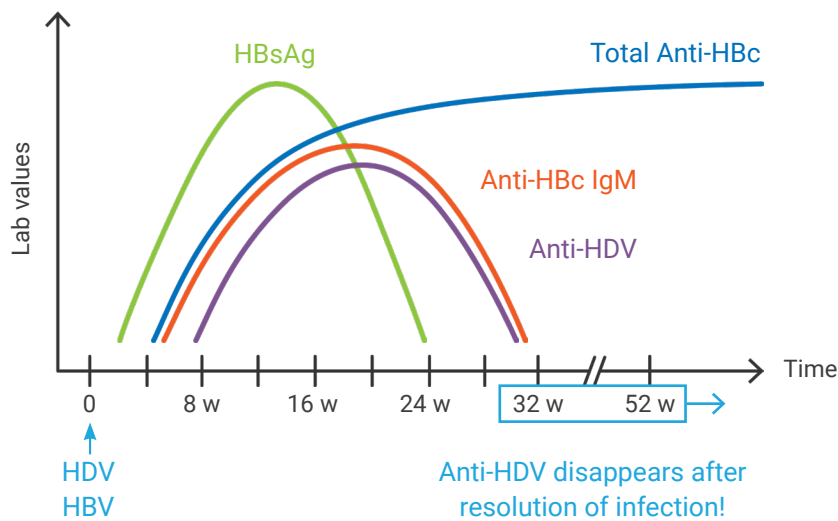
In HDV infection it is important to distinguish coinfection from superinfection.

Coinfection

In coinfection, there is a simultaneous infection of hepatitis D and hepatitis B virus.

Anti-HDV antibodies rise about 4–8 weeks after infection. Since coinfections most often resolve, anti-

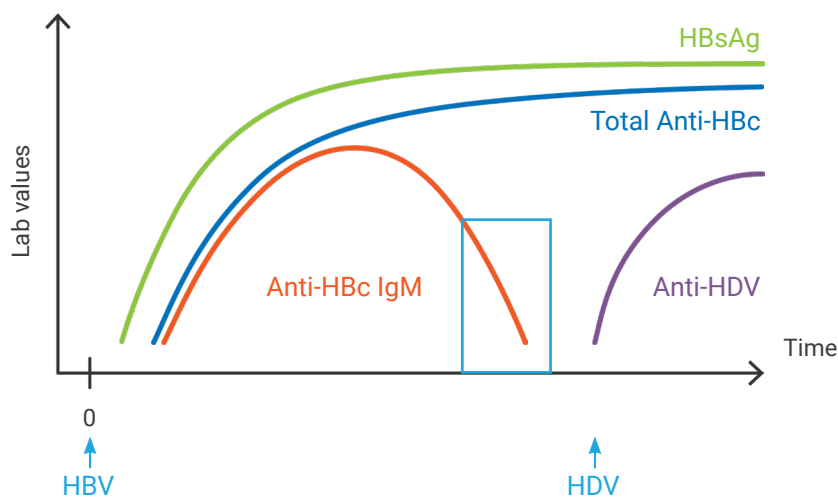
HDV antibodies eventually fall below the level of detection. Since both IgM and IgG antibodies against HDV disappear after resolution of infection, there is no long-term immunity against future HDV infection.



Superinfection

Superinfection occurs when a chronic carrier of HBsAg becomes infected with hepatitis D virus. Shortly after HDV infection, anti-HDV levels rise.

In contrast to coinfection, in superinfection anti-HB core IgM has already fallen before HDV infection.



Chronic infection

Chronic hepatitis D infection occurs when viral RNA is present in the blood for longer than six months. Since HDV needs HBV to function, chronic

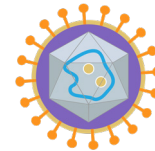
HDV infection is always accompanied by chronic HBV infection.



Chronic HDV



> 6 months



Chronic HBV

Laboratory work up

In many countries, measurement of HDV RNA is recommended in order to confirm positive anti-HDV results. Taken together, the following table sums up the possible lab results after hepatitis D screening.

	HBV/HDV coinfection	HDV superinfection	Chronic HDV infection
HBsAg	+	+	+
Anti-HBc IgM	+	-	-
Anti-HBc, total	+	+	+
Anti-HDV (IgG+IgM)	+	+	++
HDV RNA	+	+	+

Further Reading

Wedemeyer, H and Manns, MP. 2010. Epidemiology, pathogenesis and management of hepatitis D: update and challenges ahead. *Nat Rev Gastroenterol Hepatol*. 7: 31-40.

Turgeon, ML. 2018. *Immunology and Serology in Laboratory Medicine*. 6th Edition. St. Louis, Missouri: Elsevier.