

Hepatitis B virus infection

DIAGNOSING PAST INFECTION VERSUS VACCINATION

Patient 1

Case history

- Pain in upper abdomen
- Sudden onset
- Cardiovascular disease
- Smoker



Bob Doe,
63-years-old

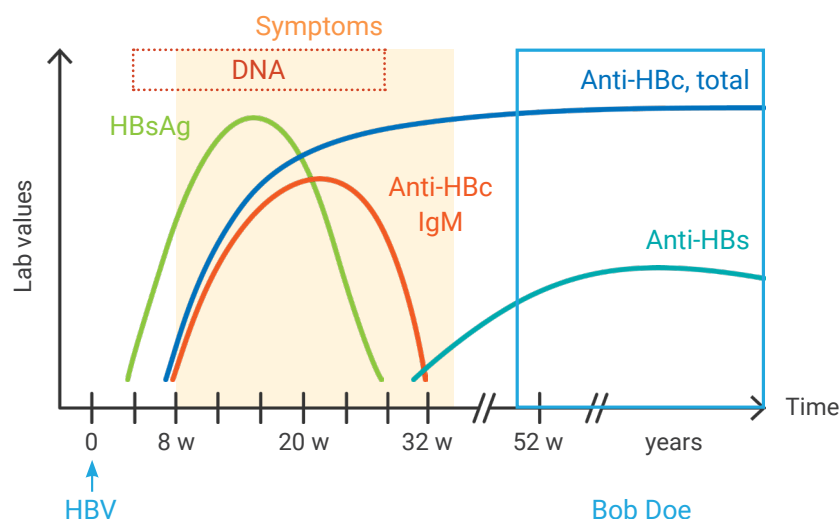
Laboratory report

ALT	30 (5–35 IU/L)
Hepatitis B:	
HBsAg	–
Anti-HBc IgM	–
Anti-HBc, total	+
Anti-HBs	+
HBV DNA	Not detectable

Interpretation

Although we might initially suspect an acute heart condition, based on Bob's symptoms, we should also test for hepatitis B. Bob's lab results indicate that his ALT activity is within the reference range. Negative HBsAg and anti-HBc IgM levels, as well as the absence of detectable HBV DNA, indicate that

Bob has no active HBV infection. However, total anti-HBc antibodies and anti-HBs antibodies are positive. This combination tells us that Bob must have been infected with HBV in the past, but the infection has since resolved.



Patient 2

Case history

- Fatigue
- Dizziness
- Onset two weeks ago
- No medical history
- Works as a nurse



Bree Doe,
20-years-old

Laboratory report

ALT	6 (5–35 IU/L)
Hepatitis B:	
HBsAg	–
Anti-HBc IgM	–
Anti-HBc total	–
Anti-HBs	+
HBV DNA	Not detectable

Interpretation

The only positive parameter in Bree's lab report is anti-HBs. There is no state of infection in which only anti-HBs is positive. Bree's result is typical in patients who have received hepatitis B vaccination. The HBV vaccine contains synthetic HB surface antigen. The recipient's immune system reacts to this antigen

by producing antibodies against it—so anti-HBs rises. In high levels, anti-HBs conveys immunity. HBV vaccine does not contain the core antigen. Consequently, anti-HBc antibodies are not produced and therefore anti-core antibodies cannot be found in vaccinated people.



DIAGNOSIS

Bob Doe must have had an infection in the past. Whatever the reason for his current symptoms, it is not hepatitis B.

Bree Doe previously received an HBV vaccination. Therefore, hepatitis B is not the reason for Bree's symptoms.

Additional fact on vaccination

In the first 2–3 weeks after vaccination, HB surface antigen from the vaccine, can be found in the recipient's blood. This can be tricky, since it is only the synthetic antigen and not a sign of active

infection. The patient's lab results will only show positive HBs antigen, but all the other parameters will be negative.



***2–3 weeks after vaccination: HBsAg positive!
No viral infection!***

Further Reading

Rysgaard, CD, Morris, CS, Drees, D, et al. 2012. Positive hepatitis B surface antigen tests due to recent vaccination: a persistent problem. *BMC Clin Pathol*. **12**: 15.