oncimmune®

Leading early cancer detection

*Early*CDT®–Liver

Test Name: *Early***CDT®-Liver**
CPT Codes: 83520 x 7 units + 82105 x 1 unit
LOINC® Code: in-process

Clinical Utility:
*Early***CDT-Liver** is a blood test that complements imaging for the early detection and confirmation of hepatocellular carcinoma (HCC) in high-risk patients with a liver lesion of any size[a].

- A positive "Moderate Level" or "High Level" *Early***CDT-Liver** result indicates a much higher risk of a lesion being HCC.
- For a lesion with an indeterminate diagnosis after imaging or for a lesion smaller than 1 cm, a positive *Early***CDT-Liver** result helps identify those patients most likely to have HCC, thereby accelerating follow-up or clinical intervention.
- A "No Significant Level of Biomarkers Detected" *Early***CDT-Liver** result does not rule out a lesion being HCC.

The clinical sensitivity and specificity of *Early***CDT-Liver** is 54% and 90%, respectively, with specificity increasing to 97% for a High Level result[a]. The high specificity makes the test a rule in test where a Moderate or High Level result indicates that the patient's lesion is at increased risk of being HCC, while a No Significant Level of Biomarkers Detected result should not be used to rule out the presence of liver cancer now or in the future.

This test is not recommended for patients who are currently pregnant or who have previously had cancer (exception: basal cell carcinoma).

Background for Test Application:
Cancer antigens are different to normal antigens, so the body's immune system reacts to these antigens by producing autoantibodies. These autoantibodies, which can rise in the earliest stages of HCC are produced in sufficient quantities to be measured in a patient's blood using a simple blood test, *Early***CDT-Liver**[a].

In addition to the seven autoantibodies, *Early***CDT-Liver** also measures alpha-fetoprotein (AFP) antigen but note that the *Early***CDT-Liver** cutoff applied for AFP is higher than the standard cutoff applied when AFP is used as a single biomarker test to monitor for HCC disease progress/recurrence or to predict risk of recurrence after liver transplant.

It is recommended that patients with an elevated level of any one or more of these biomarkers be triaged for accelerated follow-up or clinical intervention. This is not a genetic test for predisposition; a positive test may indicate the presence of HCC.

Specimen Requirements:
- Blood may be collected by venipuncture or finger stick
- At least 0.5 mL serum (venipuncture) or 400 µL blood (finger stick) is required.
- Specimens can be shipped overnight at ambient temperature (U.S.) or with frozen ice packs (outside U.S.).
- Contact Oncimmune® for a free *Early***CDT-Liver** specimen collection kit (U.S.).

Method:
The *Early***CDT-Liver** method includes an enzyme-linked immunosorbent assay (ELISA) with 7 liver-cancer associated proteins as the capture antigens, plus an AFP immunoassay. Relative biomarker levels are compared to fixed cutoffs and reported accordingly[a].

The test was developed and its performance characteristics were determined by Oncimmune. It has not been cleared by the FDA. Oncimmune is a COLA-accredited, high-complexity laboratory and is in compliance with all CLIA regulations.

For more information, contact
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[a]Data on file with Oncimmune.

Understanding the *Early*CDT®-Liver Result

*Early***CDT®-Liver** test results are reported as High Level, Moderate Level or No Significant Level of Biomarkers Detected, depending on the level of biomarkers in the blood compared to the high and low cutoff values for each biomarker. Answers to some frequently asked questions are given below. The patient should discuss the results with his/her physician for a clinical interpretation and recommendations for next steps.

What do I do if the result is "High Level"?

A positive "High Level" result means that one or more biomarkers were detected above the high cutoff, which suggests that the likelihood of liver cancer in a lesion is substantially increased; however, this result does not definitively mean that liver cancer is present. A physician may recommend additional testing. If liver cancer is not found, other age- and gender-specific screenings for other cancers (for example, breast and colon), as recommended by the American Cancer Society (www.cancer.org), should also be considered.

What do I do if the result is "Moderate Level"?

A positive "Moderate Level" result means that one or more biomarkers were detected between the low and high cutoff, which suggests that the likelihood of liver cancer in a lesion is increased; however, this result does not definitively mean that liver cancer is present. A physician may recommend additional testing. If liver cancer is not found, other age- and gender-specific screenings for other cancers, as recommended by the American Cancer Society (www.cancer.org), should also be considered.

What do I do if the result is "No Significant Level of Biomarkers Detected"?

A "No Significant Level of Biomarkers Detected" result suggests the risk of having a liver cancer is unchanged. It does not rule out the possibility of liver cancer now or in the future. A physician may recommend that the patient continue a schedule of testing and examination based on the patient's personal history and/or clinical symptoms.

What do these biomarker levels have to do with liver cancer?

Some individuals with liver cancer have been found to have elevated levels of one or more of these biomarkers[a-f]. Autoantibodies have been shown to be present in the blood up to four years prior to cancer diagnosis by imaging[g-j]. Early detection of liver cancer has been shown to increase the potential for an improved outcome[k].

References:

a) Middleton CH, et al. *PLoS ONE* 2014; 9(8):e103867.
b) Hong Y, et al. *World J Hepatol* 2015; 7(11):1581-1585.
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d) Liu H, et al. *Cancer Epidemiol* 2012; 36(1):82-88.
e) Tatarinov IS. *Vopr Med Khim* 1964; 10:90-91.
f) Hu B, et al. *Int J Mol Sci* 2013; 14(12):23559-23580.
g) Trivers GE, et al. *Clin Cancer Res* 1996; 2:1767-1775.
h) Li Y, et al. *Int J Cancer* 2005; 114:157-160.
i) Zhong L, et al. *J Thor Oncol* 2006; 1:513-519.
j) Jett J, et al. *J Thor Oncol* 2017; 12(11 Supp 2):S2170.
k) Zhang, et al. *J Cancer Res Clin Oncol* 2004; 130(7):417-422.