IMPROVED EARLY DETECTION OF HEPATOCELLULAR CARCINOMA

AFP-L3 • DCP • GALAD
WHAT ARE AFP-L3 AND DCP?

AFP-L3 is an isoform of AFP with an additional fucose residue. This isoform interacts with the lectin Lens culinaris agglutinin (LCA). AFP-L3% is the ratio of AFP-L3 to total AFP as a percentage.

DCP (des-gamma-carboxy prothrombin) is an immature form of the coagulation protein, prothrombin. In normal liver, the prothrombin precursor undergoes post-translational vitamin K dependent carboxylation. In the case of Hepatocellular Carcinoma (HCC) this reaction is impaired, resulting in secretion of non-carboxylated forms. DCP is also known as „Protein Induced by Vitamin K Absence or Antagonist II“ (PIVKA-II).

AFP, AFP-L3 and DCP are measured with high sensitivity using the µTASWako™ i30 instrument distributed by the company FUJIFILM Wako Chemicals Europe GmbH. In this system, several biochemical analyses are carried out in a single microfluidic chip.

HOW TO USE AFP-L3 AND DCP?

AFP-L3 and DCP, are intended for in vitro diagnostic use as an aid in the risk assessment for the development of HCC in conjunction with imaging studies, clinical assessment and other laboratory findings. Patients with elevated AFP-L3 values (≥ 10%) have been shown to have an increase in the risk of developing HCC within the next 21 months and should be more intensely evaluated for evidence of HCC according to existing HCC practice guidelines.

The determination of the markers enables the serum based detection of tumors in early stages even if the AFP shows negative results. In a German single center investigation of 276 HCC patients, the use of AFP-L3 and DCP in combination detected 53% of all early stage tumors (BCLC 0/A) with AFP < 20 ng/ml (n=37).

SUPERIOR DIAGNOSTIC PERFORMANCE - THE GALAD SCORE

In a new approach, investigators around Prof. Dr. P. J. Johnson from the UK established an algorithm, in which Gender, Age, AFP-L3, AFP and DCP are calculated. This GALAD score can detect early stages of HCC at a sensitivity of at least 75% and a specificity of 89%.

The GALAD model was validated in an international setting by analysing nearly 7,000 datasets from the UK, Germany, Japan and Hong Kong. AUROC analysis in all cohorts showed better values for GALAD compared to individual or combined markers. The model performance did not vary between the aetiologies HBV, HCV and “others”. It even performed well in small and early HCC with AUC values of at least 0.85 and could successfully discriminate between HCC and other hepatobiliary cancers.

LITERATURE

3 Best et al. The GALAD scoring algorithm based on AFP, AFP-L3, and DCP significantly improves detection of BCLC early stage hepatocellular carcinoma. Z Gastroenterol. 2016 Dec;54 (12): 1296-1305
5 Berhane S et al. Role of the GALAD and BALAD-2 Serologic Models in Diagnosis of Hepatocellular Carcinoma and Prediction of Survival in Patients. Clin Gastroenterol Hepatol. 2016 Jan 13; Epub ahead of print

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