A STUDY OF SERUM α-FETOPROTEIN AND PLASMA DES- Y-CARBOXY PROTHROMBIN IN HEPATOCELLULAR CARCINOMA

Dr. Javed Bakas Mulla

Department of Biochemistry, Faculty of Medicine, Naraina Medical College & Research Centre, Kanpur.

INTRODUCTION

Hepatocellular carcinoma (HCC), one of the most common cancers in the world, is especially prevalent in Asian countries, where cirrhosis that develops from viral hepatitis is endemic. Although the prognosis is relatively favorable in comparison with other cancers of the alimentary system, it is still unsatisfactory in that its overall 5-year survival rate is no more than 50%.[1]

The most potent diagnostic tools for HCC are imaging studies, including ultrasonography, computed tomography (CT), magnetic resonance imaging, and celiac angiography. Tumor markers are also an indispensable way of diagnosing the disease. Y-Fetoprotein (AFP) has served as a representative tumor marker of HCC for more than 30 years, and des-γ-carboxy prothrombin (DCP) has been found to be another useful marker.[2] Although 50–80% of HCC patients show elevated AFP levels, these levels are also found in cirrhotic patients without HCC, suggesting that AFP elevation is not specific to HCC.[3]

In contrast, DCP is a less sensitive but more specific marker for HCC. DCP is abnormal prothrombin that lacks γ-carboxylation of its glutamin residue. It is unable to bind the calcium ion that is essential for conformational transition and functional activity. Because the γ-carboxylation is vitamin K dependent, this protein appears when a patient is in a vitamin K deficient state.[4] The HCC-related elevation of this protein was initially reported in 91% of HCC patients with elevated levels.[5] Recent studies showed that elevated levels of DCP were found in less than 50% of patients, because HCC is diagnosed at earlier stages. In contrast to that elevated levels of DCP were found in less than 50% of patients, because HCC is diagnosed at earlier stages. In contrast to that elevated levels of DCP were found in less than 50% of patients, because HCC is diagnosed at earlier stages.

Diagnosis of HCC

All of the patients underwent contrast-enhanced dynamic CT and ultrasound studies. Of 237 patients, 231 had a histopathologically confirmed diagnosis based on a specimen obtained by percutaneous fine-needle biopsy under ultrasonographic guidance. Specimens were independently reviewed by two pathologists on a blinded basis. We adopted a higher histologic grade when the diagnoses differed between the two pathologists. Diagnostic criteria was based on previous reports.[10] Diagnosis of the remaining six patients was made by a typical imaging pattern of HCC, such as contrast-enhanced area in the early phase and washout of contrast in the late phase on dynamic CT.

Serum AFP and Plasma DCP Determinations

The serum AFP concentration was determined by latex agglutination immunoassay (AIA-PACK AFL, Tosoh Co., Yamaguchi, Japan). Plasma concentration of DCP was tested by monoclonal antibody against DCP according to the manufacturer's instructions (El-test mono-P-II kit E-1023, Eisai Laboratory, Tokyo, Japan)

RESULTS AND DISCUSSION:

The clinical backgrounds of HCC patients in this study. The median value for AFP was 29 ng/mL, whereas that of DCP was 0.0625 arbitrary units (AU)/mL. Cutoff values determining high or low levels of AFP and DCP were set at 100 ng/mL and 0.0625 AU/mL, respectively, according to receiver operating characteristic curves. AFP levels were high in 60 of 237 patients (25.3%), and DCP levels were high in 33 patients (13.9%). The sensitivity and specificity gauged by the cutoff value for AFP were 25.3% and 90.5%, and those for DCP were 13.5% and 100%, respectively.

To evaluate clinical characteristics of HCC patients, the patients were categorized into the four following groups, according to the levels of AFP and DCP values: those with high levels of AFP and low levels of DCP (“AFP single high”), those with high levels of DCP and low levels of AFP (“DCP single high”), those with low levels of both AFP and DCP (“both low”), and those with high levels of both AFP and DCP (“both high”). The group with high levels of DCP and low levels of AFP (n = 48) was designated as the group showing high serum AFP levels and low plasma DCP. The group with high levels of DCP with low levels of AFP (n = 22) was defined to include those with elevated DCP, whereas AFP stayed under the cutoff value. Neither AFP nor DCP were elevated in the “both low” group (n = 155), whereas both AFP and DCP were high in the “both high” group (n = 12).

We focused our interest on the clinical features of HCC lesions and HCC patients. We have long been impressed the few patients we have observed who had a curious pattern of tumor markers, in which the AFP level remained below the cutoff value of 100 ng/mL but DCP exceeded 1.0 AU/mL, and in whom disease seemed highly
progressive. We have also been impressed by the observation that they tended to have only one or a few large-sized HCC nodules. As far as we know, there are no previously published reports that comment on these HCC characteristics. In this study, “DCP single high” populations were preponderantly male and characterized by a large-sized tumor with only a few nodules. For these reasons, DCP measurement is important for patients with “DCP single high” characteristics, as they would otherwise be overlooked because of low AFP levels. Finally, the significance of the markers in relation to the biologic grade of malignancy was analyzed. Based on these results, AFP and DCP tumor markers seem to aid greatly in the characterization of HCC.

CONCLUSION
Patients with high levels of DCP but low levels of AFP were predominantly male and had large lesions but few nodules. Patients with high levels of both tumor markers had the most discouraging outcome observed in this study (death within 3 years).

Conclusions of the study is a patients with high levels of DCP and low levels of AFP exhibited the unique clinical characteristic of large HCC nodules that were few in number. In addition, it was observed that measurement of both AFP and DCP can predict the survival of patients.

REFERENCES