

Radioimmunoassay of Serum α -Fetoprotein in Various Liver Disease

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α -fetoprotein (A.F.P.) is a unique fetal α -1 globulin in the serums of most patients with carcinoma of the liver and has been shown to be diagnostic of this malignancy in the adult.

Using radioimmunoassay method, we have detected A.F.P. in serum from twenty-six patients with primary liver cancer. (confirmed by biopsy or necropsy), eight patients with metastatic liver cancer, other various liver disease and pregnancy woman.

Result

A.F.P. values of controls is 0–10 ng/ml, in acute hepatitis the values is below 40 ng/ml except two cases, one of the two is subacute

hepatitis. In three cases of twenty-five chronic active hepatitis, the values is over 40 ng/ml. In cirrhosis of the liver, the values is almost below 40 ng/ml, in only three cases is over 100 ng/ml.

In eleven cases of primary hepatoma the values is over 10000 ng/ml, seven cases is 1000–10000 ng/ml, five cases is below 40 ng/ml.

In metastatic liver cancer, the values is all below 500 ng/ml and two cases is 0–40 ng/ml.

In pregnancy woman the values is 0–500 ng/ml.

In only primary hepatoma, the values of A.F.P. is over 1000 ng/ml. In other liver disease and pregnancy woman is below 500 ng/ml.

The Clinical Application of Radioimmunoassay of α -Fetoprotein

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α -Fetoprotein has been measured by radioimmunoassay method in our institute and it was proved to be able to measure accurately in the range of 10 ng/ml to 1,000 ng/ml by dilution tests and reappearance tests.

As the levels of α -Fetoprotein of 73 healthy adults were below 15 ng/ml in all, the values above 15 ng/ml were considered as positive.

Hepatoma: All of the sera of 15 hepatoma patients with the positive Ouchterlony test showed above 1,000 ng/ml and among the Ouchterlony negative group 6 out of 12 were positive (45–660 ng/ml) by radioimmunoassay method.

Cholangioma: All of 3 were negative.

Gastric cancer: 14 out of 65 were positive (23–above 1,000 ng/ml).

Embryonal cell carcinoma: All of 5 were positive (30–above 1,000 ng/ml).

Acute hepatitis: 5 out of 10 were positive (31–920 ng/ml).

Chronic hepatitis: 4 out of 19 were positive (17–95 ng/ml).

Liver-cirrhosis: 7 out of 20 were positive (30–175 ng/ml).

Infants under 5 months old were positive (maximum 170 ng/ml).

Pregnant women 25 out of 34 were positive (maximum 600 ng/ml) and the highest values were at 8 months of pregnancy.

α -Fetoprotein levels of hepatoma might not be influenced by the size of tumors, but by histology.

We have been followed up two cases with α -

Fetoprotein positive hepatoma, by radioimmunoassay. Their levels rised immediately and after 3-5 months they changed positive by single radial immunodiffusion.

Levels in acute hepatitis with jaundice were very high within one month after the appearance

of jaundice. But they fell in parallel with the levels of the transaminase and the bilirubin.

Levels in the active type of acute hepatitis were higher than the inactive type.

Levels in the hepatitis and liver cirrhosis were changed in parallel with the transaminase.

Study of Scintiphotos of Liver Cancer

Part 1. About α -Fetoprotein

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Frontal and right lateral scintiphotos of 26 pathologically confirmed liver cancers, including 15 primary liver cancers (P.L.C.) and 11 metastatic liver cancers (M.L.C.), were analyzed, and correlated with their α -fetoprotein contents in blood. The scintiphotos were made by a gamma camera after intravenous injection of ^{198}Au -colloid. P.L.C. seemed likely to develop in contracted livers, and M.L.C. in enlarged livers. The contracted livers, in which P.L.C. developed, was disposed to produce small space-occupying lesions (S.O.L.), while the enlarged liver of the M.L.C. tended to produce large S.O.L. S.O.L. of the P.L.C. was inclined to develop in the posterosuperior portion of the

right lobe of the liver. The S.O.L. of M.L.C. was likely to develop in any part of the liver. The number of S.O.L. of P.L.C. was almost always limited to one, while those of M.L.C. numbered 2 or more. Visualization of the spleen was about 64% in P.L.C., and 40% in M.L.C. The α -fetoprotein determination was positive in 9 cases of 15 in P.L.C., and it was negative in all cases of M.L.C. .

In 15 cases of P.L.C. there were 9 cases of pathologically confirmed liver cirrhosis, and 3 cases presented pathologically no cirrhosis and the rest were not confirmed.

Serum Alpha-fetoprotein and Hepatic Scintigram in Patients with Liver Diseases

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Radioimmunoassay of serum alpha-fetoprotein and camera images of the liver were evaluated for the early diagnosis of hepatoma.

Among 20 patients with histologically diagnosed hepatoma, serum alpha-fetoprotein were positive in 100%, 53%, and 55% using radioimmunoassay, single radial diffusion, and double diffusion, respectively.

Alpha-fetoprotein was found in about 50% of active chronic liver diseases by radioimmunoassay, most of these values were less than 320 nanograms per ml. of serum, whereas in 95% of hepatoma showed alpha-fetoprotein higher than 320 nanograms per ml. of serum.

In hepatic scintiphotos, definite cold area was demonstrated in 70% of patients, whose serum