salmon calcitonin is unlikely to produce symptomatic relief of the RSDS but might prevent bone mineral loss.

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Gamma-glutamyltransferase levels in ascitic fluid and liver tissue from patients with primary hepatoma

The diagnosis of primary hepatoma, particularly in patients with underlying liver disease, may be difficult and delayed. The most sensitive test—measuring serum α-foetoprotein—may yield both false-negative and false-positive results, depending on the method of estimation and the age or ethnic group of the patients.[1]

We report here observations that show that the estimation of γ-glutamyltransferase levels in ascitic fluid may be a useful adjunct in the diagnosis of primary hepatoma.

Patients and results

Ascitic fluids from 31 patients were studied. Five patients had hepatoma; nine had cirrhosis; five had chronic liver disease (three chronic active hepatitis, one alcoholic hepatitis, one Budd-Chiari syndrome); five had secondary carcinoma (two stomach, one pancreas, one bronchus, one carcinoid); three had chronic serositis due to systemic lupus erythematosus; and four had miscellaneous diagnoses (one acute pancreatitis; one intestinal lymphangiectasia; one congestive cardiac failure; one nephrotic syndrome). Ascitic fluid was collected during routine diagnostic peritoneal tap and a portion was frozen at −20 C until assay. γ-Glutamyltransferase activity was estimated fluorimetrically[2] and protein was assayed by the Lowry procedure.[3]

The table shows the levels of γ-glutamyltransferase in ascitic fluid from the 31 patients. The five patients with hepatoma had highly significantly raised levels of enzyme activity compared with all the other groups and there was no overlap of the range of values. These patients all had circulating α-fetoprotein detectable by immunodiffusion and the liver biopsies showed hepatoma with cirrhosis. The patients with cirrhosis could be subdivided, clinically and histologically, into two subgroups: those with inactive cirrhosis and those with cirrhosis associated with considerable macronodular regeneration and nuclear dysplasia. Patients in the latter group had significantly higher levels of the enzyme in the ascitic fluid than those with inactive cirrhosis (table I). The levels of γ-glutamyltransferase activity (mean (±SE) mU/mg protein) in liver tissue from nine controls (2·93±1·1), 16 patients with cirrhosis (15·2±2·1), and five patients with cirrhosis in whom part of the biopsy specimen was infiltrated with hepatoma (35·5±5·1) indicated a correlation between liver and ascitic fluid enzyme levels.

γ-Glutamyltransferase levels in ascitic fluid in seven groups of patients

Diagnosis	No of patients	Enzyme activity (mU/ml)	
		Mean ± SE	Range
Primary hepatoma	5	33·5 ± 5·0	17 – 56
Inactive cirrhosis	5	0·86 ± 0·40	0·46 – 1·4
Cirrhosis and dysplasia	4	6·29 ± 2·4	3·5 – 8·5
Secondary carcinoma	5	2·44 ± 2·1	1·2 – 3·5
Serositis (SLE)	3	1·04 ± 1·1	0·66 – 1·48
Chronic hepatitis	5	3·2 ± 2·1	0·21 – 3·5
Miscellaneous	4	2·72 ± 1·1	0·57 – 4·8

Comment

Our findings indicate that assay of γ-glutamyltransferase in ascitic fluid may be a useful investigation in diagnosing hepatoma. The enzyme is probably released into the ascitic fluid from hepatic tissue. Patients with cirrhotic livers in which there was evidence of active cellular regeneration had raised enzyme activities in both ascites and liver tissue, which suggests that the increased enzyme activity is related to cellular proliferation.

Studies in experimental animals have shown raised levels of γ-glutamyltransferase in a wide variety of liver tumours.[4] Study of γ-glutamyltransferase, as well as having diagnostic implications, may therefore throw light on the fundamental processes occurring in cellular proliferation and the development of malignancy.[5]

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