LEUCINE AMINO PEPTIDASE A BETTER INDICATOR OF DISSEMINATED MALIGNANT DISEASE

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ABSTRACT

Leucine amino peptidase (LAP) activity was studied in serum and urine samples of 25 healthy ambulant subjects, 20 patients with localised and 41 patients with malignant disseminated disease. Serum levels of the enzyme were elevated but not significantly in both localised and disseminated disease whereas the urinary activity of the enzyme was markedly elevated in disseminated disease ($p < 0.001$) as compared to localised disease. This quantitative method used for determination is reliable, accurate, simple, rapid and cost effective and therefore has better application as an indicator of disseminated disease in a clinical setting.

INTRODUCTION

Leucine amino peptidase (LAP) a proteolytic enzyme is widely distributed in bacteria, plants and animals with high activity in duodenum, kidney and liver. LAP has sensitivity and diagnostic significance. Elevated LAP activity in serum usually indicates diseases of liver and bile ducts (1-5) and this elevation is less affected by damage of liver parenchyma than by active participation of biliary tract in the process (6). LAP can also be used as a marker in testicular tumors (7).

OBJECTIVE

The objective of the present communication is to determine whether a correlation exists between the enzyme LAP and the clinical findings in patients with malignant disease, and if it fulfils the general agreement of clinicians on the need for more specific biochemical aid in diagnosis and evaluation of malignant disease as the activity of the enzyme is closely related to the pathologic tumor growth.

MATERIALS AND METHODS

Serum and random urine samples of 25 healthy ambulant subjects, 20 patients with localised neoplasm and 41 patients with disseminated disease with histologically proven carcinoma of different sites like head and neck, gastrointestinal tract, lung were included in the study. All cases

studied belonged to the age group of 25-60 years. Age and sex distribution were similar between control and study group.

Care was taken to see that none of the cases studied has :

- hemolytic disorder, renal infarct or renal disease.
- samples collected were analyzed on the same day.
- none of the samples were haemolysed.

Quality control sera were run during analysis to check precision and accuracy of the estimation.

LAP was determined by the optimized kinetic method (8) using p-nitroanilide as substrate according to the recommendations of the German Society of Clinical Chemistry. Measurement of creatinine was carried out by the kinetic method without deproteinization (9). Measurement of creatinine and LAP were carried out on a fully automated, discrete, random access analyzer Hitachi 705. Urinary activity of the enzyme was expressed as U/g of creatinine. Student 't' test for unpaired numbers was used for statistical analysis after confirming homogeneity of variances.

RESULTS AND DISCUSSION

The results of the experiment are tabulated in Table 1 and 2.

On comparing the mean levels of serum LAP activity of the normals with patients with localised and disseminated tumors it was found that the activity of the enzyme was elevated but not

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Table 1. Serum and urinary levels of leucine amino peptidase (LAP) in normals, localised tumors and disseminated tumors

Group	No. of cases		Serum LAP (U/L)	Urine LAP (Random) (U/gm of creatinine)
Normals	25	Mean	37.22	52.11
		± SD	4.42	11.11
		Range	28-42	31.3 - 70.3
Localised tumors	20	Mean	56.75	58.74
		± SD	30.81	14.8
		Range	28-171	29.4 - 77.16
Disseminated tumors	41	Mean	53.8	236.32*
		± SD	22.1	148.84
		Range	35-170	101.73 - 701.96
* p < 0.001				

Table 2. Frequency of elevation of serum LAP and urine LAP in localised and disseminated malignant tumors

Group	Serum LAP (U/L)	Urine LAP (U/gm of creatinine)
Localised	15/20 (75)	5/20 (25)
Disseminated	31/41 (75.6)	41/41 (100)
Figures in parentheses denote percentages. Values above 42 U/L for serum LAP and 70.3 U/L for urine LAP were considered as elevated.		

significantly. The activity of the enzyme in random urine samples of normals when compared with patients with localised and disseminated tumors it was found that localised tumors did not show any increase whereas disseminated tumors showed a significant increase ($p < 0.001$) Table 1.

Localised tumors when compared with disseminated disease it was found that serum levels of the enzyme did not show any increase but the urinary

activity of the enzyme in the disseminated disease was significantly elevated ($p < 0.001$) 4.023 times which is in confirmation with the findings of Phillips *et al.* (10).

Table 2 gives the frequency of elevation of serum LAP and urinary LAP in patients with localised and disseminated tumors. In localised tumors, serum LAP showed a rise in 15 of the 20 cases (75%) whereas the urinary LAP was raised in 5 of the 20 cases (25%). In disseminated tumors, serum LAP showed a rise in 31 of the 41 cases (75.6%) whereas the urinary LAP was elevated in all the 41 cases (100%).

Rise in the urinary activity of LAP was found in disseminated diseases and not in localised disease which could be due to glomerular filtration or by renal tubular secretion. The value of determining urine LAP in malignant disease would seem to be an aid in estimating the extent of tumor (10). Rutenberg *et al.* (11) observed significantly elevated levels of urinary and serum LAP in patients with malignant lymphoma or leukemia had increased urinary activity but normal or slightly elevated serum levels. Hoffman (12) observed serum activity in patients with benign diseases and normal in patients with carcinoma.

CONCLUSION

Thus our study reveals that this simple, reliable, quick and cost effective analysis of urinary LAP is a better indicator of disseminated diseases.

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