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Influence of Liv.52 on Carbon Tetrachloride-induced Hepatotoxicity: A Biochemical Study

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ABSTRACT

The present study was designed to evaluate the role of Liv.52 in carbon tetrachloride-induced liver toxicity.

Three groups of 10 rats each were subjected to experimental study. Animals in Groups 2 and 3 were injected s.c. with 0.2 ml of CCl_4 mixed in 0.2 ml of groundnut oil twice a week for 6 weeks. Animals in Group 3 also received 0.5 ml of Liv.52 syrup every day in addition to CCl_4 treatment. Group 1 animals were injected only with 0.2ml of groundnut oil, twice a week.

Serum acid alkaline phosphatase, AST and ALT activities were significantly increased in CCl_4-treated rats. Pretreatment with Liv.52 prevented the rise in the enzyme levels.

Key phrases: Serum enzymes, CCl;$_4$, Liv.52 Hepatotoxicity

INTRODUCTION

Liv.52, an indigenous multiherbal hepatotonic, has been widely used as a hepatoprotective agent in various liver disorders[1-3] and also it has shown protective effects in hepatotoxicity induced by radiations[2]. Oral administration of Liv.52 to experimental animals has been reported to provide considerable protection against liver damage by carbon tetrachloride (CCl_4)[1].

The present study has been undertaken to evaluate the role of Liv.52 as a function of time on the toxic effects induced by CCl_4 on serum enzymes.

MATERIAL AND METHODS

Male albino rats (Swiss Porton Strain) weighing 140-180 g were fed *ad lib* standard pelleted diet (Hindustan Lever Ltd., Bombay) and were allowed free access to water. The rats were divided into three groups of 10 each. Group 1 rats were administered 0.2 ml of groundnut oil biweekly for six weeks and served as control, while rats in Groups 2 and 3 were administered 0.2 ml of CCl_4 mixed with 0.2 ml groundnut oil in a similar schedule. Animals in Group 3 were in addition fed orally, 0.5 ml of Liv.52 syrup daily. Blood was collected at day 0 (before commencement of any treatment) and after 1,3 and 6 weeks. Serum was separated and acid alkaline phosphatase[4] and AST (Aspartate amino transaminase) and ALT (Alanine amino transaminase) were estimated[5]. Statistical analysis was done using paired student's 't' test.

Composition of Liv.52: Each 5 ml of Liv.52 syrup contains: *Capparis spinosa* (34 mg), *Cichorium intybus* (34 mg), *Solanum nigrum* (16 mg), *Cassia occidentalis* (8 mg), *Terminalia arjuna* (16 mg), *Achillea millefolium* (8 mg) and *Tamarix gallica* (8 mg).

OBSERVATIONS

Serum alkaline phosphatase and acid phosphatase activity were significantly increased in CCl_4 – treated rats (Group 2) after one week's treatment (Table 1). However, in Liv.52 – treated animals (Group 3), CCl_4 failed to raise the enzyme levels.

Table: Alterations in the enzyme activities of serum alkaline phosphatase, acid phosphatase, AST and ALT following treatment with Liv.52 to rats intoxicated with carbon tetrachloride

Enzyme	Group	Time period (in weeks)			
		Day 0	1	3	6
Serum alkaline phosphatase (K.A.U./100 ml of serum)	A	10.75 ± 0.62	11.18 ± 1.10	11.49 ± 1.13	12.93 ± 1.94
	B	11.21 ± 1.05	14.06 ± 3.05*	18.30 ± 2.89**	30.89 ± 4.75***
	C	10.99 ± 0.96	11.82 ± 0.71	12.91 ± 2.22	14.55 ± 1.73
Serum acid phosphatase (K.A.U./100ml of serum)	A	2.64 ± 0.54	2.56 ± 0.60	2.37 ± 0.54	2.33 ± 0.42
	B	2.35 ± 0.79	3.13 ± 0.49	2.71 ± 0.46	3.18 ± 0.33
	C	3.09 ± 0.71	2.97 ± 0.55	2.50 ± 0.67	2.65 ± 0.25
AST (I.U./L of serum)	A	11.42 ± 2.20	13.12 ± 3.60	12.71 ± 1.11	13.00 ± 2.91
	B	12.37 ± 3.06	14.32 ± 2.50	25.77 ± 5.38**	41.57 ± 4.59***
	C	12.09 ± 2.81	13.98 ± 2.92	15.57 ± 3.28*	17.71 ± 4.07*
ALT (I.U./L of serum)	A	9.07 ± 1.95	11.12 ± 1.78	13.57 ± 3.29	12.00 ± 2.68
	B	8.68 ± 2.03	14.25 ± 1.91**	32.14 ± 5.44***	46.50 ± 10.39***
	C	9.86 ± 146	13.21 ± 2.31	18.00 ± 3.81*	15.16 ± 2.80*

Values are mean ± SD of 10 determinations. A=Control; B=CCl_4 –treated; C=CCl_4 + Liv.52.
*p<0.05; **p<0.01; ***p<0.001.

AST and ALT levels of CCl_4 – treated animals registered an increasing trend after 1 week, which continued upto 6 weeks. Simultaneous treatment with Liv.52 demonstrated a beneficial effect and the animals showed a marginal rise in AST and ALT activities.

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