[*Indian Drugs* (1992): (29), 4, 149]

Further Studies on the Protective effect of Liv.52 against CD-Toxicity in Mammalian System*

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[*Paper presented by Dr. H.S. Rathore at the 12th Annual International Conference of the European Society of Biochemistry and Comparative Physiology at Utrecht (Netherlands) in August, 1990]

ABSTRACT

The effect of Liv.52 treatment on cadmium-induced liver, spleen and kidney damage was studied in rabbits. In the first group no treatment was given (controls). In the second group each rabbit received 1 mg $CdCl_2$/week for 6 weeks, while in the third, each received 2 ml Liv.52 orally daily in addition to 1 mg $CdCl_2$/week for 6 weeks. The Cd-treated group showed structural and functional disturbances in the liver, kidney and spleen. Liv.52 treatment significantly reduced both histological and biochemical abnormalities as compared to the Cd-treated group. The results confirm the protective role of Liv.52 against Cd-induced toxicity.

INTRODUCTION

Liv.52 protects mammalian liver against various hepatotoxins[1,2]. Cadmium (Cd) is a heavy metal pollutant, which accumulates in mammalian organs[3]. High concentrations of Cd have been detected in common Indian food items as well as in the kidney cortex and blood of Indians. Earlier trials with Liv.52 have shown that Liv.52 could check Cd-induced histopathological changes in mice liver, kidney, spleen and gut[5,6,7]. These findings deserve further investigation and hence this study was undertaken.

METHODS

Adult albino rabbits of both sexes weighing between 1.4 to 1.6 kg were divided into three groups. They were fed on jowar grains and green vegetables. Tap water was provided for drinking. $CdCl_2$ (BDH) salt was dissolved in de-ionized distilled water and injected intraperitoneally. Liv.52 syrup provided by The Himalaya Drug Company, was administered orally through a rubber tube.

Group I: Controls (C): Consisted of 6

Table 1: Liver, kidney and haematological tests in the blood of rabbits intoxicated with cadmium chloride following Liv.52 therapy (Mean ± S.E.)

Parameter	Group I Control (C) (n=6)	Group II Cadmium chloride treated (P) (n=8)	Group III Cadmium chloride + Liv.52 (P+D) (n=8)
Urea (mg%)	34.37 ± 1.35	58.25 ± 4.58*	43.50 ± 1.72*
Creatinine (mg%)	1.10 ± 0.028	2.97 ± 0.075*	1.99 ± 0.10*
SGOT (Units/ml)	39.37 ± 4.15	98.00 ± 2.64*	60.87 ± 6.09
SGPT (Units/ml)	56.75 ± 1.84	65.25 ± 1.90*	58.75 ± 1.70*
Alk. Phosphatase (KA Units)	2.36 ± 0.049	6.92 ± 0.79*	2.65 ± 0.20*
S. Protein (gm/100 ml)	5.90 ± 0.18	8.00 ± 0.12*	3.77 ± 0.88*
S. Albumin (gm/100 ml)	2.83 ± 0.07	3.31 ± 0.04*	3.66 ± 0.15*
S. Globulin (gm/100 ml)	2.90 ± 0.11	4.64 ± 0.22*	3.84 ± 0.15*
MCV (cubic microns)	99.20 ± 1.60	127.50 ± 2.66*	101.42 ± 6.42*
% MCH	26.17 ± 1.89	22.25 ± 0.56*	28.59 ± 1.33*

Numbers in parenthesis indicate number of animals in the group.
* = significant based on 'students' 't' test at 5% level of significance, when groups 'C' versus 'P' and groups 'P' versus 'P + D' were compared.

rabbits. No treatment was given to them.

Group II: $CdCl_2$ (Poison) treatment (P): Consisted of 8 rabbits. Each rabbit was injected 0.1 ml of 10 mg/ml of $CdCl_2$ solution, once a week for six weeks.

Group III: $CdCl_2$ plus Liv.52 (Poison + drug) (P+D) treatment: Consisted of 8 rabbits. Each rabbit was injected 0.1 ml of 10 mg/ml $CdCl_2$ per week and also administered 2 ml of Liv.52 orally daily.

Blood was collected from the heart of the anaesthetized animals for biochemical tests using Span Diagnostic kits. Microtome sections of Bouin's fixed material were stained in Delafield hematoxylin and eosin for histopathological study.

RESULTS AND DISCUSSION

It is clear from the figures that Cd-treatment causes histopathological changes in the liver, kidney and spleen, while Liv.52 therapy almost nullified these effects (for details see explanation of figures).

The results of liver function tests, kidney function tests and haematological parameters in the blood of all three groups of rabbits are shown in the Table. Cd-treatment disturbs biochemical parameters, while Liv.52 therapy restores normal values.

Cd-induced histopathological and biochemical changes are already known[3,4]. Liv.52, which corrects liver dysfunction and hematological disturbances in clinical and non-clinical trials[8], was found to protect rabbit liver against Cd-toxicity.

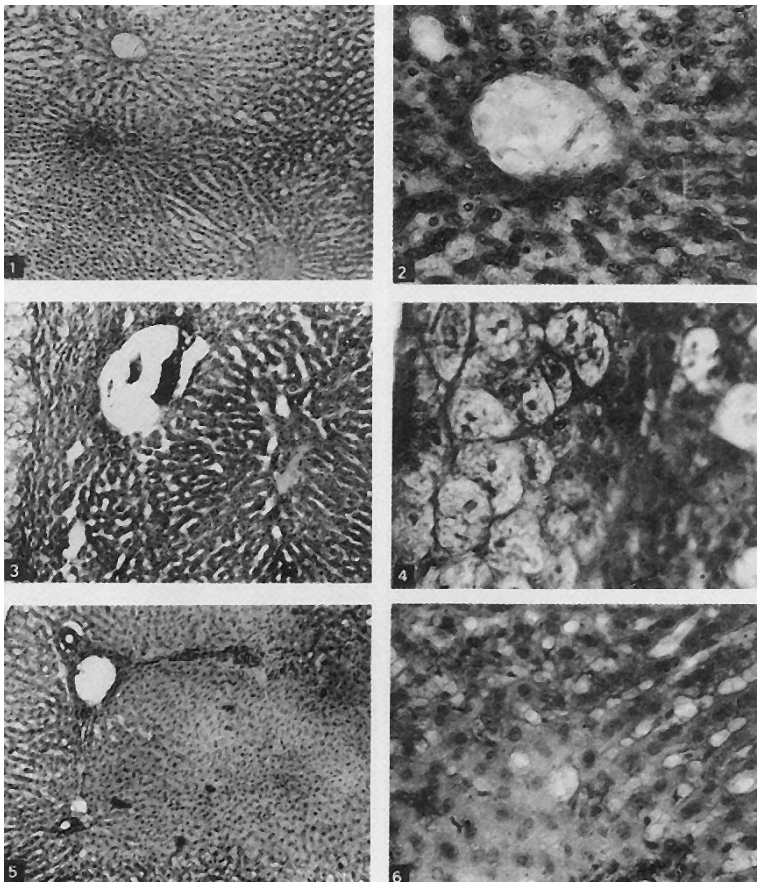

Plate I: Photomicrographs of rabbit liver transverse section (T.S.) Bouin's haematoxylin eosin preparation.
Fig. 1: Controls showing normal histology (100 x). **Fig. 2:** Magnified view of the same (400 x). **Fig. 3:** $CdCl_2$-treated, showing swollen peripheral hepatocytes, neighbouring necrosed hepatocytes and infiltration (100 x). **Fig. 4:** Magnified view of the same (400 x). **Fig. 5:** P + D treatment showing normal histology (100 x). **Fig. 6:** Magnified view of the same (400 x).

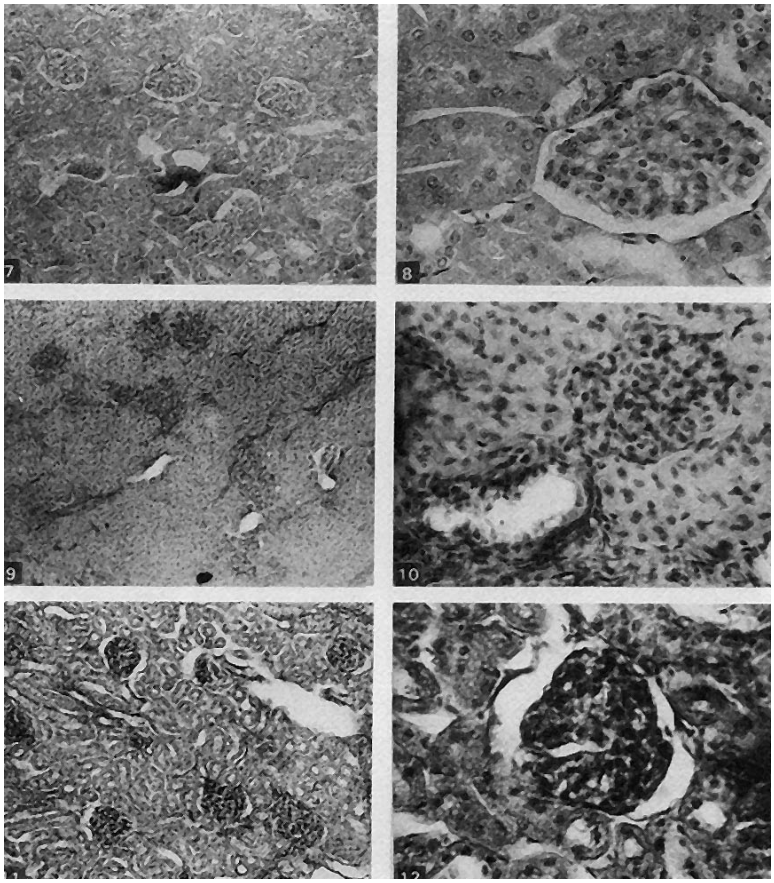

Plate II: Photomicrographs of rabbit kidney (T.S.) Bouin's hematoxylin eosin preparation.

Fig. 7: Controls showing distinct tubules and glomeruli (100 x). **Fig. 8:** Magnified view of the same (400 x). **Fig. 9:** $CdCl_2$-treated, showing dilation and disintegration of tubules; glomeruli are ill differentiated (100 x). **Fig. 10:** Magnified view of the same (400 x). **Fig. 11:** P + D treatment; tubules are mostly normal except only a few dilated ones; glomeruli normal (100 x). **Fig. 12:** Magnified view of the same (400 x)

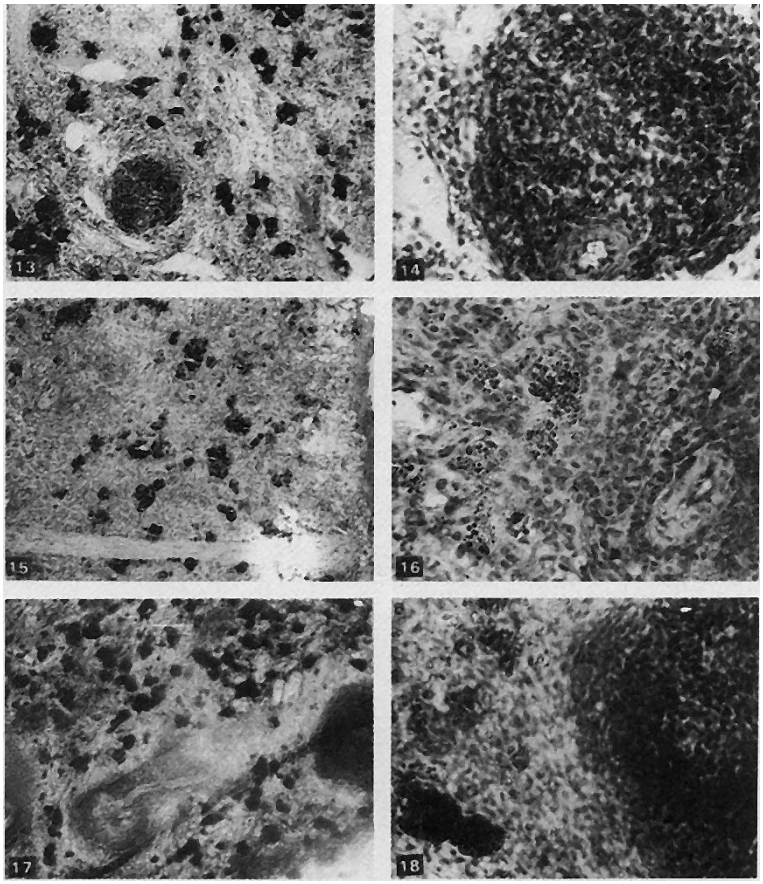

Plate III: Photomicrographs of rabbit spleen (T.S.) Bouin's haematoxylin eosin preparation.

Fig. 13: Controls showing normal histology, i.e. organized pulp and clear sinuses (100 x). **Fig. 14:** Magnified view of the same (400 x). **Fig. 15:** $CdCl_2$-treated, showing disorganization of sinuses and red pulp in diffluent (100 x). **Fig. 16:** Magnified view of the same (400 x). **Fig. 17:** P + D treatment showing almost normal histology (100 x). **Fig. 18:** Magnified view of the same (400 x).

ACKNOWLEDGEMENTS

The Himalaya Drug Company, Bombay gave grants for this investigation in the form of a research project to the first named author. The Head of S.S. in Zoology gave us departmental facilities.

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