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Effect of Liv.52 on Biochemical and Functional Abnormalities of the Liver

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There is much clinical and experimental evidence in literature about the utility of Liv.52 in liver disorders. There is great paucity of knowledge about the normal functional requirements and the effects of disease on liver metabolism. In cases of liver cirrhosis and acute liver failure we do not know the cause and in most liver disorders the treatment is entirely empirical. In fact there are no drugs in modern medicine which could be called specific agents for the treatment of liver disorders. The so-called lipotropic factors and the essential amino acids have given disappointing results. The success of Liv.52 in the treatment of liver disorders is, therefore, highly interesting. Since the drug has now been on the market for over five years and is very widely used the utility of the drug cannot be questioned. However the mode of action of the drug is not known mainly because the basic pathological effects of the liver diseases are poorly understood. In most cases the exact prototype of the human disease cannot be produced in experimental animals, and therefore, animal studies with this drug, though useful in themselves, give indirect evidence of the utility of the drug in the treatment of human disorders. An attempt was therefore made to study the effect of Liv.52 on the biochemical effects of injury of liver in animals and also to correlate the effect of injury and the functional incapacitation caused by the chemical agents.

MATERIALS AND METHODS

(I) All experiments were conducted on male white laboratory rats. The rats weighed 150 and 200 gms. The rats were divided into four groups of six rats each. One group acted as control and received two injections of carbon tetrachloride intraperitoneally in the dose of 0.7 ml per kg per animal, on two successive days. The second group received carbon tetrachloride in the same way but also received Liv.52 orally in the dose of 50 mg per rat twice a day starting on the day following the second injection of carbon tetrachloride. The third group received carbon tetrachloride in the same way but also received Liv.52, 50 mg per animal, twice a day, the treatment commencing two days before the carbon tetrachloride injections. The fourth group was given carbon tetrachloride in the same way but was given choline orally in the dose of 50 mg per animal twice a day starting two days before the carbon tetrachloride injections. Twelve normal rats were sacrificed at the beginning of the experiment and the serum enzyme estimations were done.

The animals from the experimental groups were sacrificed at the end of 48 hours after the carbon tetrachloride injection and serum glutamic oxallotransaminase and serum pyruvic oxalotransaminase (SGOT and SGPT respectively) were estimated. On the remaining half of the animals the bromsulphthalein test was performed at the same time in the following way.

RESULTS

Animals were given bromsulphthalein intravenously in the dose of 1 mg per kg. The rats were sacrificed half an hour after the injection and the blood collected from the carotid arteries. The serum was separated and the concentration of the dye estimated by comparing visually against the standard concentrations with a blank serum obtained from normal rats.

Twelve normal rats were given bromsulphthalein in the same way and were sacrificed 2 minutes after the injection to get the initial maximum concentration in the serum, which was determined as above.

(II) In another set of experiments rats were divided into three groups of 18 each. These groups corresponded to groups I, III and IV of the previous set in the matter of treatment with carbon tetrachloride and the drugs. From each group three rats were sacrificed, 6 hours, 12 hours and 24 hours after the second carbon tetrachloride injection for SGOT and SGPT estimation and at the same time three rats from each group were used for bromsulphthalein excretion test.

Table 1: Showing the SGOT and SGPT levels in the serum of rats 48 hours after carbon tetrachloride injection in first set of experiments

Group	Control	Group I CCl_4	Group II CCl_4 + Liv.52*	Group III CCl_4 + Liv.52**	Group IV CCl_4 + Choline
SGOT units mean	40-90 units	130	128	112	146
SGPT units mean	40-90 units	156	98	103	143

Note: (i) The mean of twelve rats not treated with carbon tetrachloride is 43 and 48 units of SGOT and SGPT respectively.
* Liv.52 administration commenced 24 hours after CCl_4 administration
**Liv.52 administration commenced 48 hours before CCl_4 administration.

Table 2: Showing percentage retention of bromsulphthalein and SGOT, SGPT levels 6,12, 24 hours after CCl_4

Group	Hours	Group I Control	Group II CCl_4	Group III CCl_4 + Liv.52	Group IV CCl_4 + Choline
Bromsulphthalein 30 mt. retention	6	35%	70%	40%	72%
	12	38%	76%	40%	68%
	24	38%	78%	36%	78%
SGOT	6	43 units (mean)	93	74	102
	12		102	74	98
	24		106	68	111
SGPT	6	48 units (mean)	88	73	79
	12		102	88	112
	24		112	100	96

DISCUSSION

In experimental animals there are certain difficulties in studying histologically the protective action of drugs against hepatotoxic agents. For example, certain factors in the diet give rise to spurious histological changes in the liver. In many instances histological damage and functional incapacitation of the liver do not go hand in hand. It is also not possible to study the effects of protective agents when the damage is not sufficient to produce gross structural abnormalities. It was therefore considered better to study the effect of protective agents on the biochemical and functional abnormalities induced in the liver by injurious agents.

The serum glutamic oxallotransaminase (SGOT) and serum pyruvic oxallotransaminase (SGPT) levels in the blood give a fairly good index to the extent of cellular injury to the liver parenchyma.

The serum glutamic oxallotransaminase (SGOT) and serum pyruvic oxallotransaminase (SGPT) are two enzymes, which are normally present inside the cells. When the cell is damaged these enzymes leak out and when a large number of cells are damaged their level in the blood will rise. It has been shown to rise clinically in myocardial infarction and in cases of liver damage. Experimentally it has been shown to rise when carbon tetrachloride injections are given to rats. Carbon tetrachloride causes damage to liver cells and necrosis of liver, in adequate doses. Using this very sensitive index it was decided to test the protective activity of Liv.52 on the damage to liver cells caused by carbon tetrachloride.

The bromsulphthalein excretion test has today superceded other liver function tests like Thymol turbidity, Takata Ara tests. To test the functional integrity of the liver it is generally agreed that the bromsulphthalein retention test is the most accurate and reliable.

CONCLUSIONS

Using these two extremely sensitive indices in the present study it is observed that the administration of Liv.52 significantly protects the liver against damaging agents.

The administration of Liv.52 gives significantly lower levels of SGOT and SGPT in the blood.

The administration of the drug after the carbon tetrachloride treatment or before it makes a much smaller difference than expected. This suggests that the drug probably acts by assisting the process of regeneration in addition to acting as a protective agent.

The result of the bromsulphthalein retention test indicates that the functional incapacitation of the liver caused by carbon tetrachloride treatment is very much less in the Liv.52 treated group than in the untreated group. Recovery also is more rapid.

Choline which was used as another protective agent for comparison did not have any influence on SGOT, SGPT levels or on bromsulphthalein retention.