

HEPATOPROTECTIVE ACTIVITY OF NAVAYASA CURNA AND HASAVA COMBINATION

MUZAFFER ALAM, K.K SHANMUGA DASAN, T. SUSAN and S. JOY

Captain Srinivasa Murti Drug Research Institute for Ayurveda, Arumbakkam,
Madras – 600 106

Received: 9 February, 1996

Accepted: 17 July, 1996

ABSTRACT : *Navayasa curna mixed in Lohasava was screened for hepatoprotective activity against carbon tetrachloride induced liver injury in albino rats at a dose of 100mg/kg body weight. The drug reduced liver weight, alkaline phosphatase and GOT activity in liver and chloesterol and GPT activity in serum. There was no effect on protein and liver glycogen.*

INTRODUCTION

Many of the metabolic activities of the body are centered in the liver. The liver undergoes rapid changes in size and in glycogen and protein content depending upon nutritional state. But a damaged liver invariably shows increased alkaline phosphatase and glutamate pyruvic transaminase (GPT) and glutamate ox-aloacetic (GOT) transaminase, A similar response may follow exposure to various chemicals and drugs, generally damage in liver takes place due to environmental factors, chemicals, drugs and contaminated food.

There are a number of herbs and formulations in the Indian system of medicine to repair liver damage, Lohasava and Navayasa curna are two such Ayurvedic drugs. In south India they are prescribed in comibation to treat a wide variety of Liver disease, these two drugs are screened against carbon tetrachloride in- duced liver injury in albino rats(1).

Materials and Methods

Navayasa curna and Lohasava were prepared in our pharmacy. Navayasa curna as suspended in Lohasava at a concentration

of 2 g/30ml. these drugs were administered orally at a dose of 100mg/kg body weight.

Male albino rats weighing 180 -200g from the Institute's animal house were used for the study. There were three groups each consisting of seven rats. The first group served as control and received appropriate quantity of olive oil subcutane-ously on the second and third day. The second group received carbon tetrachloride mixed in olive oil (1:1) a dose of 2 ml /kg body weight on second and third day. The third group received Navayasa curna mixed in Lohasava at a dose of 100 mg/kg body weight on all the four days. Carbon tetrachloride was administered on second and third day. The animals were maintained on Hindustan level rat feed, bengal gram and cabbage and water as libitum. All the animals were sacrificed on the fifty day and blood was drawn through glass syring by punturing the heart and serum was separated. The wet weight of liver was recorded and 10 % liver homogenate was prepared in cold double distilled water, serum and liver homogenate were used for the determination of GPT, GOT(2) protein(3) and alkaline phosphatase (4). Glycogen (5) and cholesterol (6)

were determined in liver and serum respectively. Student's 't' test was applied to analyse the results.

Results and Discussion:

The tested medicine protected the liver from carbon tetra-chloride induced injury. A significant reduction in the alkaline phosphatase activity was caused by the tested drug in both liver and serum (Table 1 & 2). Lohasava containing Navayasaurna reduced the liver weight and GOT activity in liver. Serum showed significant reduction in the alkaline phosphatase and GPT activities (Table 2). Serum cholesterol was also significantly reduced. The tested drugs did not affect liver and serum proteins and liver glycogen significantly.

The mechanism of carbon tetrachloride liver injury is through the production of toxic trichloro methyl free radicals (CC13) by the liver microsomes during the metabolism of carbon tetrachloride (CC14) the free radical is highly reactive and binds co-valently to proteins and lipids with the initiation of

endoplasmic reticulum leading to cell necrosis (7-19). Since the tested drugs have reduced the activity of alkaline phosphatase, GPT and GOT, it can be assumed that the leakage of enzymes is effectively controlled and that the integrity of cellular membrane is maintained.

Phyllanthus emblica and curcuma longa present in lohasava and navayasaurna are reported to possess antihepatotoxic properties. Gulati et al (11) have observed that the biflavanoid present in P. emblica prevents cytotoxicity in isolated hepatocytes caused by carbon tetrachloride and tertiary butyl hydroperoxide. There is also the report of using fruits of P. emblica in combination with iron in jaundice (Gulati et al (11) Kiso et al (12) found that antihepatotoxic effect of curcuma longa against carbon tetrachloride induced liver damage was due to curcuminoids and that some analogues of ferulic acid and p-coumaric acid, probable metabolites of curcuminoids, also have liver protective activity.

Table -1
Effect of Navayasa curna in Lohasava on Liver biochemical parameters
(Values are mean \pm SD)

Group	Liver weight g/100g body weight	Glycogen g/100g	Protein mg/g	Alkaline ¹ phosphatase	GPT ²	GOT ³
Normal	3.134 \pm 0.144	1.85 \pm 0.172	100.0 \pm 10.5	0.0030 \pm 0.0004	0.5879 \pm 0.097	0.1968 \pm 0.041
Carbon tetrachloride	3.670 \pm 0.025	1.56 \pm 0.147	119.0 \pm 20.2	0.0108 \pm 0.00093	0.5903 \pm 0.128	0.4966 \pm 0.069
Navayasa curna in Lohasava	3.400 ^a \pm 0.096	1.631 \pm 0.134	101.0 \pm 8.27	0.0042 ^b \pm 0.00014	0.5615 \pm 0.114	0.4245 ^a \pm 0.004

1. Expressed as mg phenol liberated /mg protein in 15min at 37°C.
 2. Expressed as mg Pyruvate /mg protein in 30min at 37°C.
 3. Expressed as mg Pyruvate /mg protein in 60min at 37°C.
- Values are significant when P<0.05
P values a:p<0.05, b:p<0.001

Table -2
Effect of Navayasa curna in Lohasava on serum biochemical parameters
(Values are mean \pm SD)

Group	Protein mg/g	Alkaline ¹ phosphatase	GPT ²	GOT ³	Cholesterol mg/100ml
Normal	10266 \pm 1331	32.65 \pm 6.32	14.33 \pm 9.01	8.2 \pm 0.645	16.62 \pm 0.197
Carbon tetrachloride	10350 \pm 1515	47.62 \pm 2.56	56.5 \pm 2.12	26.25 \pm 2.98	22.0 \pm 3.69
Navayasa curna in Lohasava	8840 \pm 1023	23.66 \pm 3.26 ^b	25.4 \pm 0.18 ^b	24.0 \pm 3.9	16.3 \pm 0.30 ^a

- 1 Expressed as mg phenol liberated /100ml Serum in 15min at 37°C.
- 2 Expressed as mg Pyruvate liberated /100ml Serum in 30min at 37°C.
- 3 Expressed as mg Pyruvate liberated /100ml Serum in 60min at 37°C.

Values are significant when P<0.05

P values a:p<0.05, b:p<0.001

There are 10 and 15 raw drugs in the formulations of Navayasaurna and Lohasava respectively (Anonymous) (13). All the ingredients of Navayasaurna are present in Lohasava. In Navayasaurna Agoraja (Lohabasma) is used whereas in Lohasava, lohaurna (iron filings) is used.

Navayasaurna is prescribed in Pandu, Kamala, Prameha Pidaka and hydroga, while Lohasava is given in Pandu, Jathara, gulma, svayathu and arasa 913). As per the literature, both the medicines are prescribed for ailments pertaining to liver.

The study reveals that Navayasaurna mixed in Lohasava has the potential to prevent carbon tetrachloride induced liver damage.

Acknowledgement

Thanks are due to officer in –charge for facilities, director, CCRS, New Delhi for financial support, Mr.B. Jayakumar for typing the manuscript and Mr. S Usman Ali for helpful discussion.

REFERENCES:

1. Chakraborti, K.K and Handa, S.S. Indian Drugs, 27(1), 19-24, (1989).
2. Reitman, AND Frankel, Am.J. Clin Path., 28,56, (1957).
3. Lowry, OH., rosebrough N.J., Farr, A.L. and Randall, R.J.J Biol chem., 193, 265, (1951).
4. Kind, P.R.N and King E.J., J Clin Path., 7,322, (1954).
5. Morales, M.A., Jabbagy, A.J and Teranzie, H.P Neurospora News Letter, 20,24, (1973).
6. Harold Varley, practical clinical biochemistry Arnold Heinemann Publishers (India) pvt Ltd, 4th Edn313,(1976).
7. Recknagel, R.O. and glende, E.A., C.R.C Crit.Rev Toxicol., 2,263, (1973).
8. Recknagel, R.O. and glende, E.A., Waller J.R.L and Lowrey, K Toxicology of the liver (Eds G.L Plea and W.R Hewitt) Raven press, New York 231 (1982)
9. Matsubara, T., Mori S., touch A., Masuda, Y and takeuchi Y Japanese J.Pharmacol 33, 35 (1983).
10. Recknagel, R.O. and glende, E.A., AZIO< G., Koch R.R and Srinivasan S., Isr Med Sci 10,301 (1974).
11. Gulati, R.K Agarwal, S and Agarwal S.S., Indian J Exp Biol 33, 261-268 (1995)

12. Kiso, Y., Suzuki, Y., Watanabe, N., Oshima, Y and Hikino, H Planta. Med., 49(3), 185-97 (1983)
13. Anonymous, The Ayurvedic formulary of India, part I, Ministry of Health and family planning New Delhi, 15 & 90 (1978).