

SVARNA – VANGA – A SHORT DURATION TOXICITY STUDY**SHARMA *, GYANESHWAR*, JOSHI. D., ARYYA. N. C. ** and PANDEY. V. B. ******Institute of Medical Sciences, Banaras Hindu University, Varanasi – 221 005, India*** Dept. of Rasa Shastra**** Dept. of Pathology***** Dept. of Medicinal Chemistry***Received: February 04, 1985****Accepted: May 30, 1985**

ABSTRACT: *Swarna – Vanga, an Ayurvedic preparation, is used in the treatment mainly of Pramehas (genitor urinary and metabolic disorders), Sveta Pradara (Leucorrhoea), Kasa – Swasa (Respiratory disorders), etc. The drug contains tin and sulphur as major components along with traces of mercury, iron and aluminum. According to modern point of view certain metals have been claimed toxic to both human and animal. Since Svarna – Vanga contains these metals, it is essential to screen out its toxic effect, if any, although it is claimed in Ayurveda that when a metal is processed as prescribed, it become non – toxic or the least toxic. Considering the above facts, an animal experiment was carried out for short duration (14 days) to screen the toxic effects of Svarna – Vanga (SV) in increasing doses of the drug starting from the maximum therapeutic dose (12.5 mg / 100 gm b.wt / day). The drug was found to have no toxic effects in tissues of the animal at doses of 12.5 mg and 25 mg / 100 gm b.wt. / day. Fine fatty vacuolization in liver and focal superficial mucosal degeneration and necrosis of small intestine confined to one animal each at dose of 50 mg / 100gm b.wt. and 100 mg/ 100 gm. b.wt. / day were observed. Our study indicates that the drug has no toxic effect on tissues at therapeutic dose.*

INTRODUCTION

The drug Svarna – Vanga, an Ayurvedic preparation has been in use as a medicine since 14th century A. D. ¹ Svarna – Vanga (SV) is a metallic preparation which contains mainly Tin and Sulphur along with traces of Mercury, Iron and Aluminium². Metals particularly the heavy metals are known to have toxic effects and therefore having limited therapeutic uses. Salts of heavy metals (except Hg) are absorbed slowly from G.I.T., but the presence of gastrointestinal lesions and particularly when the salt itself induces irritation and

congestion, relatively more metal is absorbed than in normal epithelium. Slowly absorbed metals, if, excreted even more gradually may lead to tissue accumulation on repeated administration and thus to chronic toxicity³. Since SV contains Tin, Sulphur, mercury, iron and aluminum, evaluation of its toxic effects, if any, is essential for its safe use in medical practice. The present animal experimental study was carried out to screen the toxic effects of SV on various tissues of animals (albino rats) kept on increasing doses starting from

maximum therapeutic doses (12.5 mg / 100 gm b.wt./day)⁴ of Svarna – Vanga for a duration of 14 days.

MATERIALS AND METHODS

Svarna – Vanga was prepared as per Ayurvedic methods (Kupipaka method) The drug was administered in suspension form (gum acacia 20% suspension) at

using Tin (1 part), Mercury (1/2 part), Sulphur (1 part), Nausadara (1 part) and Kalmi – Shora (1/10 part). The finished product (SV) contains Tin (53.25%), Mercury (0.81%), Sulphur (24.50%) and Iron, Aluminum in traces⁵.

different doses to 4 groups (6 animals in each) of albino rats as follows:

Group	Dose of drug (per 100 gm of body weight / day)	Duration of drug administration
I	12.5 mg	14 days
II	25 mg	14 days
III	50 mg	14 days
IV	100 mg	14 days
Control	Only 20% gum acacia suspension, 1 ml / 100 gm	14 days

Animals, during the period of experiment were closely observed for any behavioural change. On 16th days all the animals including the control group were sacrificed by decapitation method, their viscera were dissected out and fixed in 10% formalin. Sections (2 – 4) from the tissues were processed for histopathologic examination by using standard laboratory technique (Culling, 1963). Haematoxylineosin stained sections and in some cases PAS and Reticulin preparations were available for light microscopic study.

Observation

None of the animals showed any behavioural change during the course of the experiment. Macroscopic examination of

the viscera and organs revealed no significant pathologic change. Microscopic findings of tissues in different groups of animals are as follows-

Animals treated with 12.5 mg and 25 mg / 100 gm b.wt. / day of Svarna – Vanga revealed no significant change in their organs and viscera. In almost all animals, non – specific changes in the form of mild cloudy swelling of the kidney tubules, and congestion of liver, spleen and lung were observed. Brain, heart, pancreas, adrenals, skin, bone marrow, G.I.T and big vessels of heart were quite normal in appearance.

Among the animals treated with 50 mg / 100 gm of b.wt/ day of Svarna – Vanga, no significant pathologic changes were

observed in heart, brain, bone – marrow, skin, pancreas, adrenals, and skeletal muscles. Congestion of mild degrees in liver, lung and spleen was noted. Liver tissue in one animal revealed congestion and dilatation of central vein and sinusoids along with fine fatty vacuoles in hepatocytes (Fig.1). Except mild degrees of cloudy swelling in tubules, kidney tissue revealed no other significant change. Extensive bronchial lymphoid hyperplasia, mucosal atrophy and focal squamous metaplasia of bronchial mucosa (Fig. 2) were noted in one animal. Small intestine in one animal revealed focal superficial mucosal degeneration and necrosis (Fig. 3).

Animals kept on Svarna – Vanga at a dose of 100 mg/ 100 gm b.wt / day showed certain changes in liver and intestine. Fine fatty vacuoles in hepatocytes in one animal and focal superficial mucosal degeneration and necrosis of small intestine in one animal were observed. Mild congestion in lung, liver and spleen and cloudy swelling in kidney tubules were also observed. Other organs and viscera of animals of this group like brain, heart, pancreas, bone – marrow and skeletal muscles were normal looking.

DISCUSSION

Certain salts of Tin (Stannous and Stannic chloride; dibutyl tin chloride; tin malate; tin sulphate, orthophosphate, oxalate and tartrate; sodium pentfluoro – stannite etc.)⁶ at different doses have been found toxic to animals and human beings. Evidences of

irritative effect of soluble tin salts on gastric mucosa⁷; homogenous cell cytoplasm, fatty changes and bile duct hyperplasia in liver⁸; degeneration and necrosis of renal tissues⁹ are available. But no salt of above studies resemble to our drug composition. In a study de Groot et al (1973) found no pathologic changes in liver, kidney, heart and spleen of the animals following tin sulphide at dietary level up to 10 gm / kg for 4 weeks. Though Svarna – Vanga contains tin, sulphur, mercury, iron and aluminum, it showed no toxic effects on various tissues of animals kept for 14 days up to dose of 25 mg / 100 gm of b.wt / days of the drug which is much higher than the therapeutic dose. Non – toxicity of Svarna – Vanga up to 25 mg dose may be due to different type of salt of tin present in the drug which is harmless to animal tissue or the method of Ayurvedic preparation of Svarna – Vanga which renders. Tin and other ingredients non – toxic.

Pathologic changes in liver, bronchial mucosa and small intestine may be related to the toxic effects of the ingredients (Sn, Hg, S, etc) of Svarna – Vanga at much higher doses or due to some other aetiology which escaped even after study of multiple sections of the tissues. In this regard further study on larger groups of animals, proper chemical analysis of the drug and changes that occur on chemical nature of metals following application of Ayurvedic method of preparation of metallic drug is of paramount importance for the safe use of the drug.

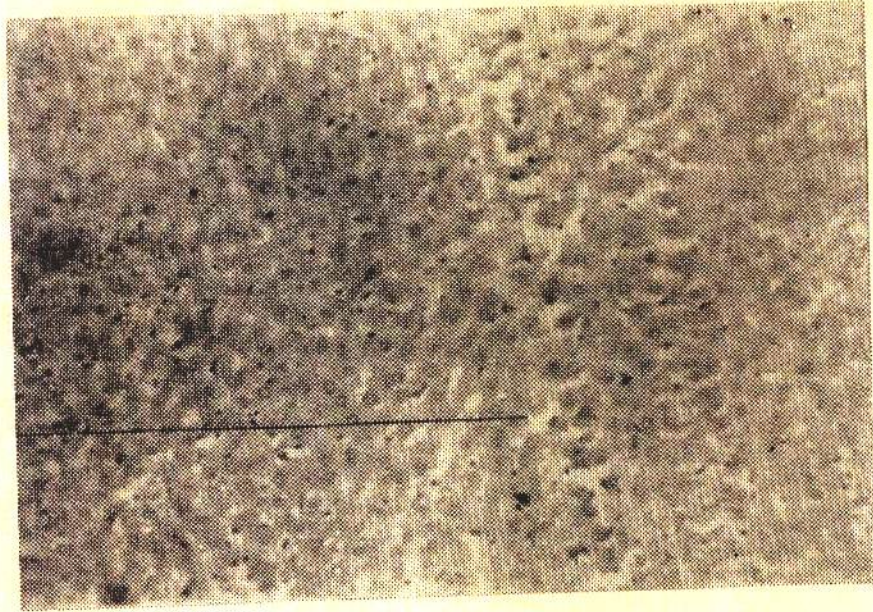


FIG. 1

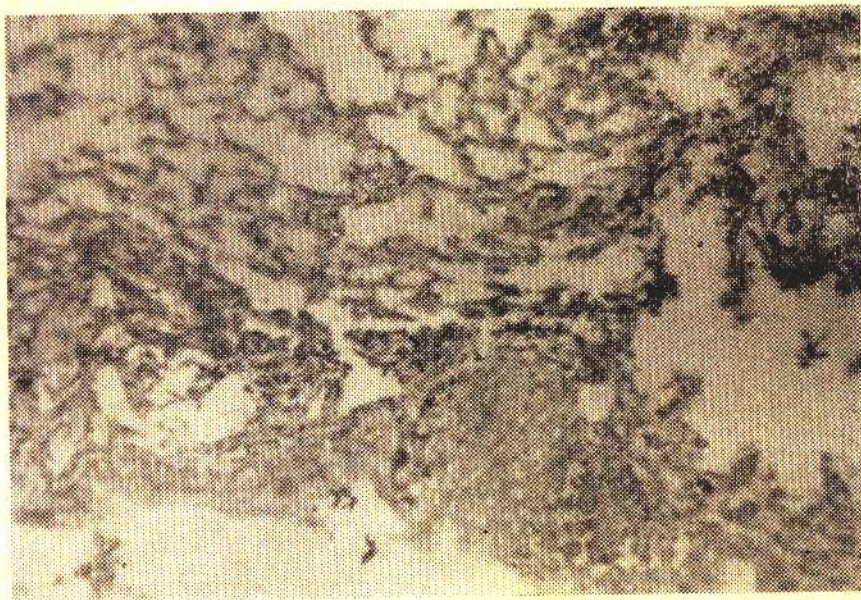


FIG. 2

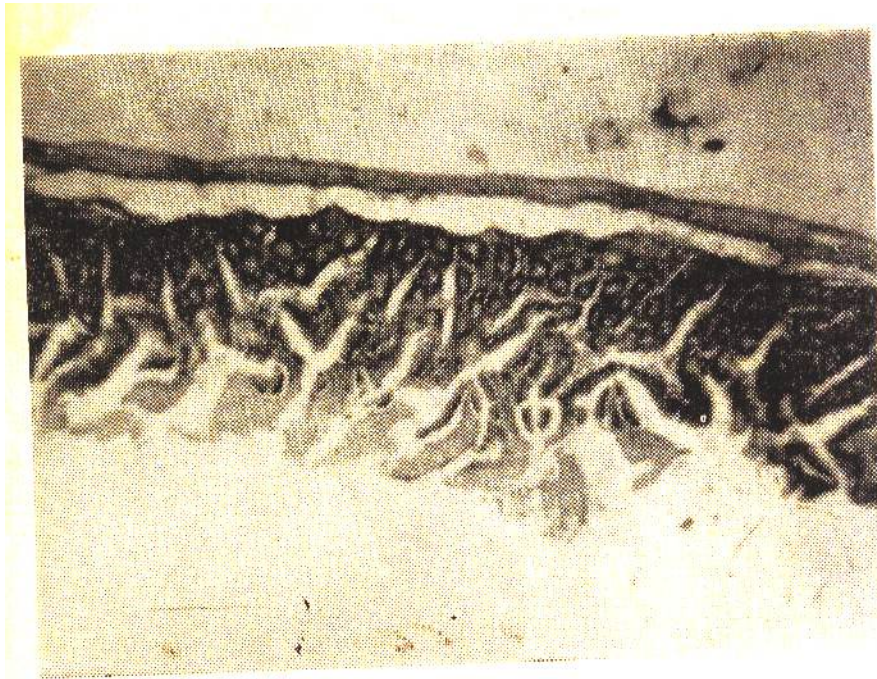


FIG. 3

CONCLUSIONS

From the observations of our experimental study conducted for a period of 14 days, it can be concluded that Svarna – Vanga has no toxic effect on various tissues of albino rats up to the dose of 25 mg / 100 gm b.wt. / day which is much higher than the maximum therapeutic dose (12.5 mg / 100 mg b.wt. / day) employed in Ayurvedic

practice. Thus Svarna – Vanga appears to be non – toxic at therapeutic dose. Pathologic changes observed in liver, bronchial mucosa and small intestine at 50 mg and 100 mg / 100 gm b.wt. / day doses need further confirmation by detailed experimental study conducted on larger groups of animals.

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Description of Photographs

- Fig. No.1 Photomicrograph showing fine fatty vacuoles in hepatocytes (H & E x 125).
- Fig. No.2 Photomicrograph showing squamous metaplasia of bronchial mucosa (H & E x 125).
- Fig. No. 3 Photomicrograph showing superficial mucosal degeneration and necrosis in small intestine (H & E. x 125)