

## Toxicological Screening of 'Gowri Chinthamani Chendooram'- A Siddha Metallic Preparation

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### ABSTRACT

'Gowri chinthamani chendooram', a siddha drug was evaluated for its acute and chronic toxicity studies in wistar albino rats with reference to haematological, bio-chemical and histopathological studies. Acute study revealed a maximum tolerated dose of 640 mg/100 gm b.w chronic toxicity study revealed a minimum toxic effect at a dose level of 40 mg/100 gm b.w. Where in, the changes observed were non-specific. The toxicity findings were dose specific, which had tissue damage in higher dosages.

**Keywords:** Gowri Chinthamani Chendooram, Siddha Metallic Preparation, Toxicological Screening

### INTRODUCTION

'Gowri chinthamani chendooram', (GCC)<sup>[1]</sup>, a metallic preparation, is one of the important drug widely used in siddha medicine. It is a compound drug prepared from mercury, sulphur and borax in specific ratios, used for many indications like cough, tuberculosis, asthma, piles, fistula etc. Since this formulation contains metallic preparation and is being used for a long duration clinically, the need for its safety has to be ascertained. Hence, this present work was carried out.

### MATERIALS AND METHOD

The raw materials, viz. Mercury, Sulphur and Borax used in this preparation, were procured from local market and authenticated by standard methods<sup>[2]</sup>. They were detoxified and purified as per standard methods<sup>[3]</sup>. GCC was prepared by calcination process (pudam) as per standard methods. The drug was first subjected for finished product analysis as detailed in siddha text<sup>[4]</sup>. The drug was subjected for physico-chemical analysis, which includes both

qualitative and quantitative estimation. Quantitative estimation for calcium, chloride and sulphate were done<sup>5</sup>. Identification and estimation for mercury, sulphur<sup>[2,5,6]</sup> and borax<sup>[7]</sup> were carried.

Toxicological studies were carried out on wistar albino rats of either sex, weighing 120-180 gm, procured from King Institute, Chennai and pelleted feed from Godrej pellets Pvt., Ltd, Bangalore. Food and water were given *ad libitum*. The animals were maintained in polypropylene cages in 12:12 day and night atmosphere. The study was approved by institutional ethical committee. Acute toxicity study was carried out as per Turner *et al.* (1965)<sup>[8]</sup>. 10 animals were divided into 5 groups with 2 animals in each group. Group 1 received 40 mg of drug with 2 ml of honey and 200 mg of gum acacia as adjuvant. Group 2 received 80 mg of drug with adjuvant. Group 3 received 160 mg of drug, group 4 received 320 mg of drug and group 5 received 640 mg of drug / 100 gm b.w. With adjuvant respectively. The

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drugs were given orally on the first day and the behavioral changes and mortality were observed for 7 consecutive days.

Chronic toxicity studies was carried out as per the methodology of turner *et al.*(1965)<sup>[8]</sup>. 20 wistar albino rats of either sex, weight 120-200 gm were divided into 4 groups. Group 1 served as control and received no medication, group 2 received 40 mg of drug with adjuvant. Group 3 received 160 mg of drug with adjuvant. Group 4 received 2 ml of honey alone. The study was conducted for 90 days continuously. Mortality, body weight and other changes were observed. After completion of this study, animals were sacrificed under chloroform anaesthesia and blood was collected by sinus puncture.

Haematological investigation like hemoglobin, Total WBC, Differential count (Neutrophil, Eosinophil, Basophil, Lymphocyte and Monocyte) were estimated<sup>[9]</sup>. Blood cell morphology was also noted<sup>[10]</sup>. Biochemical finding for Renal function test (RFT), viz., blood urea, creatinine and total protein and Liver function test (LFT)<sup>[11]</sup>, viz., serum bilirubin, SGOT, SGPT, serum alkaline phosphatase were carried out. Liver, kidney and heart were dissected out for histopathological studies. They were fixed in 10% formalin and paraffin sections were made. They were stained with haematoxylin and eosin for histopathological evaluation<sup>[12]</sup>.

## RESULTS

GCC is a dark black colored, fine powder, possessing burnt sulphur smell. The drug fulfills the basic text like solubility, floating test as described in siddha text. Qualitative analysis revealed traces of sulphate, nitrate, chloride and sulphide radicals. Quantitative analysis revealed 2.16%gm of Hg, 0.98%gm of S and 34.36%gm of borax. Acute toxicity study at various dose levels did not reveal either mortality or any adverse effects during the course of study. No behavioral changes were

observed. Study revealed a maximum tolerated dose of 640mg/100gm b.w. The body weight, in chronic toxicity studies revealed a steady increase. There were no marked variations among food and water intake.

Haematological parameters for chronic toxicity studies are tabulated Table 1, Biochemical parameters are tabulated in Table 2. The Haematological findings demonstrate some slight variations among each group on 0<sup>th</sup> day, 30<sup>th</sup> day, 60<sup>th</sup> day and 90<sup>th</sup> day. No remarkable variations have been observed, when compared with control group. Peripheral smear demonstrates normal blood cell morphology in all groups.

Biochemical findings at a dose level of 160mg revealed a reduction in total protein level, whereas, serum bilirubin, SGOT, SGPT, alkaline phosphatase, blood urea and creatinine levels though increased were within normal limits.

Histopathological findings revealed that, myocardial bundles of heart are normal. Liver of animals in Group 2 showed random necrosis and degeneration of the hepatocytes. The renal tissue show dilated tubules with irregular lumina and the lining cells shows, eosinophilic granular cytoplasm with mild interstitial nephritis.

In group 3 treated animals, liver illustrated inflammatory and degenerative changes of the hepatocytes, steatosis with necrosis with bile duct damage, renal tissue revealed focal segmental glomerulosclerosis with widened Bowman's space, swollen tubules with focal interstitial nephritis.

## DISCUSSION

GCC is an effective drug widely used for various conditions. The prescribed dose is 65 to 130 mg bid for 40 days. As the drug contains metallic compound, toxicity study revealed the toxic effect in acute and chronic studies which was dose related. Acute phase revealed maximum tolerated dose of 640mg/100 gm b.w. Chronic studies revealed minimum toxic effects with

non-specific changes at 40 mg. Long term administration produced renal and hepatic changes at the dose of 160 mg.

Moreover this study also shows that GCC has got toxicity in higher doses when given for a

longer duration. Though this study has been carried within small groups, a detailed study evaluate its toxic profile is needed, which is under progress.

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Sl no	Particulars	Group1				Group2				Group3				Group4			
		At 0 <sup>th</sup> day	At 30 <sup>th</sup> day	At 60 <sup>th</sup> day	At 90 <sup>th</sup> day	At 0 <sup>th</sup> day	At 30 <sup>th</sup> day	At 60 <sup>th</sup> day	At 90 <sup>th</sup> day	At 0 <sup>th</sup> day	At 30 <sup>th</sup> day	At 60 <sup>th</sup> day	At 90 <sup>th</sup> day	At 0 <sup>th</sup> day	At 30 <sup>th</sup> day	At 60 <sup>th</sup> day	At 90 <sup>th</sup> day
1	Total WBC count	6200	6200	6200	6100	4800	4600	4600	4400	4600	4600	4800	4800	5200	5200	5400	5600
2	Differential count in %																
	Neutrophil	55	56	54	54	60	57	56	55	50	52	48	46	54	50	50	52
	Eosinophil	3	2	4	4	2	3	2	3	4	2	-	-	3	5	5	4
	Basophil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lymphocyte	42	42	42	42	38	40	42	42	46	46	52	54	43	44	44	42
	Monocyte	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
3	Haemoglobin gm/dl	10.8	10.8	10.6	10.6	10.2	10.0	10.0	10.2	10.2	10.0	10.0	9.8	10.4	10.4	10.6	10.8
4	Body weight in gms	200	200	200	200	200	200	206	210	150	150	150	140	150	150	150	150

\*GCC- Gowri chindamani chendooram.

\*Results are mean of 5 values.

Sl no	Parameter	Group 1	Group2	Group3	Group4
1.	Total protein(gm/dl)	4.4	3.2	2.8	4.2
2.	Bilirubin(mg/dl)	0.4	0.4	0.8	0.4
3.	SGOT(IU)	9	10	28	8
4.	SGPT(IU)	8	9	26	6
5.	Serum alkaline phosphatase(K.Aunits/100ml)	3	5	10	3
6.	Urea(mg/dl)	14.2	12.6	18.8	12.2
7.	Creatine(mg/dl)	0.8	0.8	1	0.8

\*GCC- Gowri chindamani chendooram.

\*Results are mean of 5 values.

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