



“COMPARATIVE EXPERIMENTAL STUDY TO EVALUATE THE EFFICACY OF MAAHISHA KSHEERA AND MAAHISHA GRITHA IN BHASMAKA ROGA W.S.R.TO HYPERTHYROIDISM”

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Abstract:

The stress filled lifestyle and unwholesome food and regimen followed by human beings has led to alterations in the activities of psycho-neuro-endocrine systems causing newer health challenges like hyperthyroidism. Hyperthyroidism is the grievous condition characterized by hyper metabolism of the body that needs attention with respects to proper management as it hampers the quality of life. There is no exact explanation of the hyperthyroidism in Ayurvedic classics but it can be correlated to *Bhasmaka roga*.

Acharya Sushruta has mentioned the usage of *Mahisha ksheera* and *gritha* in *bhasmaka roga*. The scientific evidence behind this are not yet accomplished. Hence this experimental study has been designed to evaluate its preclinical efficacy in the disease.

Objectives: To evaluate and compare the efficacy of *Mahisha ksheera* in *Bhasmaka roga* and *Mahisha gritha* in *Bhasmaka roga* w.s.r to Hyperthyroidism in Wister albino rats

Methodology: Twenty-four albino rats of either sex were selected and assigned to 4 groups of 6 each. The 1st group served as normal rats. 2ND group are the positive control group where hyperthyroidism is induced by administration of thyroxin without trial drug. 3rd group is the test group where Rats induced with thyroxin are administered with *Mahisha ksheera*. 4th group is the test group where Rats induced with thyroxin are administered with *Mahisha gritha*. Drugs are administered for the duration of 30 days. Later the efficacy of the drugs is assessed by various Psycho-neuro-

pharmacological and Endocrine activity profile by certain well known Neuropsychological tests and Blood investigations. At the end of the study hematological parameters and histopathological study of thyroid gland were assessed.

Results and conclusion : Study concludes that both the test drugs Mahisha Ksheera and Mahisha gritha has a good effect on reversing the increased thyroid hormone secretion in hyperthyroidism as it helps to mitigate the sign and symptoms of the disease form remarkable to moderate level in experimental study. When compared to both the test drugs Mahisha ksheera has the remarkable effect than Mahisha gritha in the management of Bhasmaka roga w.s.r. to Hyperthyroidism.

Key words –*Atyagni*; Hyperthyroidism; Thyroxin induced Hyperthyroidism; Buffalo milk; Buffalo ghee; thyrotoxicosis

INTRODUCTION

The use of animals in scientific research has made wonderful improvement in the understanding of human beings as animals plays a very important role in the field of research. The mere objective of the experimental research and pharmacology is to lay down a strong scientific foundation for the therapeutics explained in classics and to increase the availability of powerful resources for the art of healing

Ayurveda being the ancient system of medicine with plenty of options to treat numerous non-communicable disease of current era including hyperthyroidism. Diseases of thyroid have emerged as one of the major health issue even in the developing countries. According to the epidemiological studies, it is estimated that about 200 million individuals are diagnosed with a thyroid disorder, and more than half of the individuals remain undiagnosed¹. There is no exact explanation of Hyperthyroidism in the classics however; it is a condition which is characterised by hyper metabolism in body due to excessive production of thyroid hormone.

The *Bhasmaka roga* has *kapha Kshaya* and *Vata Pitta prakopa in Agni stana*². The *samparapti* of disease has *Agni vrudhi*, *Dhatu ksheenata* along with various *Pitta prakopa Lakshanas with atyanta teeksnagni*. And it is considered as *Maraka roga*³. The *lakshanas* explained in the classics for *Bhasmaka roga* matches with the symptoms of hyperthyroidism hence both can be correlated.

Samparapti vighatana of bhasmaka roga is achieved by administering *Dravyas* having properties like *Guru, Snigdha, Madhura, Pichila, Abhishanda Dravyas*⁴ *Maahisha Ksheera* and *Maahisha gritha* are 2 such drugs having the above said properties and can be used as *Agni sadaka* in *bhasmaka roga*. Also *Acharya sushruta* has mentioned the usage of *both the drug* in treating the *Bhasmaka roga*⁵. The scientific evidence behind this are not yet accomplished. Hence an experimental study has been designed entitled COMPARATIVE EXPERIMENTAL STUDY TO EVALUATE THE EFFICACY OF MAAHISHA KSHEERA AND MAAHISHA GRITHA IN BHASMAKA ROGA W.S.R.TO HYPERTHYROIDISM.

AIMS AND OBJECTIVES

- To evaluate the efficacy of *Mahisha ksheera* in *Bhasmaka roga* w.s.r to Hyperthyroidism in Wister albino rats
- To evaluate the efficacy of *Mahisha gritha* in *Bhasmaka roga* w.s.r to Hyperthyroidism in Wister albino rats
- To compare the efficacy of *Mahisha ksheera* and *Mahisha gritha* in *Bhasmaka roga* w.s.r to Hyperthyroidism in Wister albino rats

MATERIALS AND METHODS

Animals:

26 Wister albino rats of either sex were selected and divided in to 4 groups with 6 rats in each.

Inclusion Criteria:

Healthy Wister albino rats of either sex weighing about 150-250g will be taken for the study.

Exclusion Criteria:

- Rats which are subjected to other experiments.
- Rats which are diseased and pregnant.
- Rats which are below 150g and above 250g.

Animal Grouping:

Each group had 6 Wister albino rats which were grouped randomly and was kept in separate cages

- Group 1 – Normal control group.
- Group 2 – Positive control group – Rats induced with thyroxin.
- Group 3- Test group –Rats induced with thyroxin administered with *Mahisha ksheera*.
- Group 4- Test group – Rats induced with thyroxin administered with *Mahisha gritha*.

Drug Used:

Tab Thyronorm 100mcg for induction of Hyperthyroidism, Batch No. : AEF2474, Manufactured by: Acme Generics LLP, Himalchalpradesh, India.

Dose Fixation:

The dose of the formulation was calculated by extrapolating the human dose to rat dose on the basis of Body surface area ratio (conversion factor 0.018 for rats) by referring to the table of "PAGET & BARNES" (1969) i.e.

Humans dose x 0.018 = X g / 200g. Rat (X x 5 - Yg /kg. Of Rat)

Induction of hyperthyroidism:

Thyroxin is given to Control group and Test group for inducing Hyperthyroidism. It was induced by the administration of Thyroxin (2 micro gram/ml) in 100ml in the drinking water. Thyroxin exposure via drinking water is maintained for 30 days

Duration and Route of Drug Administration:

Both the test drug is administered along with the thyroxin for the period of 30 days orally once a day

Assessment Parameters

- Assessment of Food and fecal analysis -weekly
- Measurement of Body weight of rats –weekly
- Measurements of urine output – weekly
- Assessment of muscle tone by Rota rod - weekly
- Gross Behavior Study-weekly
- Anthropometry Measurements - weekly
- Hematology -T3 T4 TSH Levels & lipid profile at the end of the study.
- Histopathology of thyroid gland done at the end of the study

RESULTS AND DISCUSSION

This study was designed for the experimental evaluation of efficacy of test drug Mahisha ksheera and Mahisha gritha in the management of Bhasmaka roga w.s.r.to Hyperthyroidism.

For this purpose experimental hyperthyroidism was induced by allowing the rats to consume drinking water mixed with thyroxin in above mentioned dose for a period of 30 days.

Thyroxin induces hyperthyroidism by serving as false substrate to the enzyme thyroid peroxidase. This results in reduced iodination of tyrosine moieties in thyroglobulin and conversion of iodothyrosines into iodothyronine. This

results in drastic increase in the serum levels of T3 and T4 to some extent. The activity of the thyroid gland is finely controlled by hypothalamo-pituitary-thyroid axis. Therefore monitoring the serum level of these hormones provides information about the status of thyroid activity.

The impact of hyperthyroidism on various Psycho-neuro-pharmacological and endocrine activity profile by certain well known Neuropsychological tests and hematological parameters was assessed and the results obtained have been provided in the form of consolidated statement to facilitate easy analysis of the data generated to draw inference about the efficacy of the test drug in reversing the changes observed.

Table No 01: Consolidated Statement of Body weight, Food, Water, Fecal, Urine Analysis and BMI:

Changes in		Food intake	Water intake	Body weight	Fecal wet wt.	Fecal dry wt.	Fecal water	Food conversion ratio	Urine output	BMI
Compared Thyroxin control with normal control	7 th day	NSI	SI	SD	SD	NSD	NSI	VSI	NSI	VSI
	14 th day	VSI	VSD	NSD	VSI	VSI	VSI	VSD	NSD	VSI
	21 st day	NSD	VSD	NSD	VSD	NSD	VSD	VSD	NSD	VSI
	28 th day	NSD	VSD	NSD	NSI	NSD	SI	VSD	NSI	VSI
Compared test drug Mahisha ksheera with Thyroxin control	7 th day	VSI	VSI	VSI	VSI	VSI	SD	VSI	SD	VSD
	14 th day	VSI	VSI	VSI	VSD	NSD	VSD	VSI	NSD	NSD
	21 st day	VSI	VSI	VSI	NSD	VSD	VSD	VSI	NSD	NSI
	28 th day	VSI	VSD	VSI	VSD	VSD	VSD	VSI	NSD	NSI
Compared test drug Mahisha gritha with Thyroxin control	7 th day	VSD	VSD	VSD	NSD	NSD	NSI	VSD	NSI	NSI
	14 th day	VSD	VSI	VSD	VSD	VSD	VSD	VSD	NSI	NSD
	21 st day	VSD	NSD	SD	VSD	VSD	NSD	VSD	NSD	NSD
	28 th day	VSD	VSD	SD	VSD	SD	VSD	VSD	NSI	NSD

Table No 02: Consolidated Statement of anthropometry measurements:

Changes in		Head to tail length	Tail length	Neck circumference	Chest circumference	Abdomen circumference	Forelimb circumference	Hindlimb circumference
Compared Thyroxin control with normal control	7 th day	NSD	NSD	NSD	NSI	NSI	NSI	NSD
	14 th day	NSI	NSD	NSI	NSI	NSI	NSI	NSI
	21 st day	NSD	NSI	NSI	NSD	NSI	NSD	NSI
	28 th day	NSI	NSD	NSI	NSD	NSD	NSI	NSI
Compared test drug	7 th day	NSI	NSI	NSD	NSI	NSD	NSD	NSD

Mahisha ksheera with Thyroxin control	14 th day	NSI	NSI	NSI	NSI	NSI	NSD	NSD
	21 st day	NSI	VSI	NSI	NSI	NSI	NSI	NSD
	28 th day	VSI	VSI	NSI	VSI	VSI	NSI	NSI
Compared test drug Mahisha gritha with Thyroxin control	7 th day	NSI	NSD	NSD	NSI	NSI	NSI	NSD
	14 th day	NSI	NSD	NSD	NSD	NSI	NSI	NSD
	21 st day	NSI	NSD	NSD	NSD	NSD	NSI	NSD
	28 th day	NSI	NSI	NSD	NSI	NSD	NSI	NSI

Table No 03: Consolidated statement of time spent on Rotorod apparatus:

	Compared with normal control	Compared test drug Mahisha ksheera with Thyroxin control	Compared test drug Mahisha gritha with Thyroxin control
Parameters	Thyroxin control	Test group 1	Test group 2
Week 1	SD	NSI	NSI
Week 2	NSD	NSI	NSI
Week 3	NSD	NSD	NSD
Week 4	NSD	NSD	NSD

Table No 04: Consolidated statement of Thyroid hormone estimation:

	Compared with normal control	Compared test drug Mahisha ksheera with Thyroxin control	Compared test drug Mahisha gritha with Thyroxin control
Parameters	Thyroxin control	Test group 1	Test group 2
T3	NSD	NSI	NSI
T4	VSI	VSD	NSD
TSH	NSD	NSD	NSI

Table No 05: Consolidated statement of Lipid profile estimation:

	Compared with normal control	Compared test drug Mahisha ksheera with Thyroxin control	Compared test drug Mahisha gritha with Thyroxin control
Parameters	Thyroxin control	Test group 1	Test group 2
Serum cholesterol	NSD	NSD	NSI
Triglycerides	NSD	NSD	NSI
HDL	NSD	NSD	VSI
LDL	NSD	NSD	VSI
VLDL	NSD	NSD	VSI

Table 06 : Effect of Mahisha Ksheera and Mahisha Gritha On Rats - histopathological examination of thyroid gland

Group	Changes observed
Normal control	No changes observed
Thyroxin control	Diffuse dilatation of follicles with flattened epithelium. Few follicles are degenerated, coalescing with adjacent follicles and reduced intensity of colloid staining. Desquamated cells seen in the lumen.
Test drug group 1- Mahisha ksheera group	Rat 1-Diffuse dilatation of follicles with flattened epithelium. Few follicles are degenerated, coalescing with adjacent follicles and reduced intensity of colloid staining.
	Rat 2- No dilatation, degeneration of follicles. No reduced intensity of colloid staining.
Test drug group 2- Mahisha gritha group	Rat 1- Very few follicles dilated with flattened epithelium. No degenerated or disorganized follicles
	Rat 2- Diffuse dilatation of follicles with flattened epithelium. No degenerated or disorganized follicles

Probable mode of action :

The *Mahisha ksheera* being *Mahabhisya* has *Nidra janaka*⁶ property which may be acting as a tranquilizer and their by reducing the symptoms like anxiety, insomnia and promoting the stable psychological status. The *Bhasmaka roga* is condition where there will be *Ksheena kapha avasta* and *Vata Pitta vrudhi avasta* and there will be *atyanta tikshna Agni* such that it will digest all the food ingested in very short period of time. After digesting the food the *Bhasmakagni* will start to digest *Dhatu* resulting in serious health condition⁷. The *Mahisha ksheera* having properties like *Madhura rasa*, *Gurutara*, *Snigdha*, *Shlakshna gunas*, *Sheeta Veerya*, properties have the capacity to do *Agni Shamana* and their by the *atyagni* is reduced in *Bhasmaka roga*⁸. The food conversion ratio is very significantly increased in rats given with *Mahisha Ksheera* which may be indicating the *Pachana* effect and good absorption and assimilation of food, there by promoting the weight of the rat. Similarly *Mahisha gritha* is having the *guna karma* like *Madhura rasa*, *Guru Snigdha guna*, *Atyanta sheetala Veerya*, *madhura Vipaka*, which also have the property to reduce the *Atyagni*⁹. The Buffalo ghee is rich in Calcium, Magnesium, Phosphorus and also very high smoke point with 100 percent fat and lipids¹⁰, this may be the reason for significant decrease in food conversion ratio of the rats administered with *Mahisha gritha*. Both *Mahisha ksheera* and *Mahisha gritha* having the *doshagna* property as *Vata Pitta hara* and *kapha karaka* there by helping the *Samparapti vighatana* of the *bhasmaka roga*. These two drugs not only does *Agni Shamana* but also helps in *Bala vardana*, *Pushi karaka*, *Vrishya*, thereby reducing all the complications and hyper metabolism related to the disease.

Conclusion

- The detailed Literature review of the disease *Bhasmaka roga* and hyperthyroidism revealed that *Lakshanas* of *Bhasmaka roga* and the signs and symptoms of Hyperthyroidism if we compare almost all the symptoms match hence both can be correlated.
- In present study after analysis of all the parameters, the results showed significant increase in the serum T3, T4, TSH level validating the protocol employed in the present study to induce Hyperthyroidism using thyroxin. The induction of hyperthyroidism was further confirmed by histopathological changes in the thyroid gland.
- The lipid profile parameters were found to be decreased in thyroxin control group, which may be indicating the high grade lipid metabolism due to hyperthyroidism induction.
- After administering the test drugs to thyroxin induced rats the T3 level was increased, T4 and TSH level was decreased when compared to Thyroxin control validating the remarkable effect of both the test drugs in reversing the induced Hyperthyroidism.
- Histopathological examination of thyroid gland further provides equivocal evidence for the efficacy of the test drugs *Mahisha ksheera* and *Mahisha gritha*. The thyroxin consumption leads to drastic degenerative changes in cytoarchitecture of the thyroid gland which was found to be significantly restored in rats administered by *Mahisha Ksheera* and *Mahisha gritha*.

- The parameters like HDL, LDL and VLDL was very significantly and highly increased in test drug 2 group that is Mahisha gritha group when compared to Thyroxin control group. Result may be because of the high fat, lipid and cholesterol content of the gritha
- Study concludes that both the test drugs Mahisha Ksheera and Mahisha gritha has a good effect on reversing the increased thyroid hormone secretion in hyperthyroidism as it helps to mitigate the sign and symptoms of the disease form remarkable to moderate level in experimental study.
- When compared to both the test drugs Mahisha ksheera has the remarkable effect than Mahisha gritha in the management of Bhasmaka roga w.s.r. to Hyperthyroidism.

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