

**Research Article**

Anti-convulsant activity of *Kushmandagira swarasa* (juice of seed containing part of *Benincasa hispida* (Thunb.)Cogn.) *bhavitha Yashtimadhu choorna* (*Glycyrrhiza glabra* Linn.) in Wistar Albino rats

Authors

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Epilepsy is a group of neurological disease, characterized by epileptic seizures. On analysing the symptoms, epilepsy can be correlated with Apasmara mentioned in Ayurveda. Kushmandagira swarasa (juice of seed containing part of Benincasa hispida (Thunb.)Cogn.) bhavitha Yashtimadhu choorna (Glycyrrhiza glabra Linn.) is mentioned in the context of Apasmara chikitsa in an Ayurvedic classic, Yogaratnakaram. So the present study was done the evaluation of the anti-convulsant activity of Kushmandagira swarasa bhavitha Yashtimadhu choorna in Wistar Albino rats using MES (Maximal Electro- Shock Seizure) model. Test drug was given in three doses (calculated effective dose, half the calculated effective dose and double the calculated effective dose) for seven days continuously in the suspension form. The assessment was done on the 8th day. Hind limb extension time in seconds is considered as the assessment criteria and the value obtained were compared with that of control group. The anti convulsant activity was proved in all the three test groups and the results were analysed using Mann- Whitney test and Kruskal-Wallis test. The study showed statistically significant results in all the test groups. Thus it confirms the anti convulsant activity of Kushmandagira swarasa bhavitha Yashtimadhu choorna.

Keywords: *Kushmandagira swarasa, Yashtimadhu choorna, Anti convulsant activity.*

Introduction

Apasmara is a disease which affects the *smrithi* (memory), *budhi* (intelligence) and *satwa* (behaviour) of a person. The prime feature of *apasmara* is *bheebatsa cheshta* (convulsions). By analysing the symptoms, *Apasmara* can be co related with Epilepsy. Epilepsy is a group of neurological diseases characterised by epileptic seizures. These are the result of excessive and abnormal neuronal activity in the brain cortex. Epilepsy certainly affects one's personal and social life.

Kushmandagira swarasa (juice of seed containing part of *Benincasa hispida* (Thunb.)Cogn.) *bhavitha Yashtimadhu choorna* (*Glycyrrhiza glabra* Linn.) is explained by an Ayurvedic classic *Yogaratnakaram* in the *apasmara chikitsa* as course of three days medication. *Yashtimadhu*, *Glycyrrhiza glabra* Linn is considered as one among the *medhya dravya* by *Acharya Charaka*. *Kushmanda* (*Benincasa hispida* (Thunb.)Cogn.) is recognised as a drug which has the property to destroy the *vikara* (diseases) of *chetas* (mind). Till now, no scientific validation is done on the combination of these two drugs on anti

convulsant activity. So a reverse pharmacological study has been undertaken to provide an experimental validation for same.

Materials and Methods

Materials used

Wistar Albino rats of each sex weighing 150 to 200gm, Test drug (Kushmandagira swarasa (juice of seed containing part of *Benincasa hispida* (Thunb.)Cogn.) bhavitha *Yashtimadhu choorna* (*Glycyrrhiza glabra* Linn.) , Electro-convulso-meter with ear electrodes, Stop watch, Cotton, Xylocaine gel, Distilled water, Feeding cannula, Gloves, Weighing machine.

Preparation of the Test Drug

Dried roots of *Yashtimadhu* (*Glycyrrhiza glabra* Linn.) were powdered and sieved properly using 120 mesh size. *Kushmandagira* (Seed containing part of *Benincasa hispida* (Thunb.)Cogn) was crushed and juice was extracted using a mixer without adding water. After that sufficient amount of *Yashtimadhu Choorna* (*Glycyrrhiza glabra* Linn.) was taken and did *bhavana* (trituration) with adequate amount of *swarasa* of *Kushmandagira* (seed containing part of *Benincasa hispida* (Thunb.)Cogn.). The trituration was done continuously for three hours and the entire process was repeated for seven times. After the trituration, the powder was again dried, powdered and sieved properly. The prepared drug was preserved in an air tight container.

Dose of the Test Drug

Dose of *Yashtimadhu* in the API Vol 1 is taken as the dose of test drug since it is the main ingredient. In API, Dose is documented in between 2 to 4gm per day. Test drug is prepared after seven consecutive *bhavana*. So that the dose can be reduced in the concept that *bhavana* will increase the potency of the drug. In the present study, dose of test drug in human being is taken as 2gm. As per the Paget and Barnes table, animal dose is calculated using the rat conversion factor.

Animal dose = Human dose \times 0.018 for 200 gm of animal.

$$= 2 \text{ g} \times 0.018 = 0.04 \text{ g/200 gm of animal.}$$

For the anti- convulsant study, doses are taken as $\frac{1}{2}$ X, X, 2X where X represents the effective test dose.

Procedure

The test drug was administered continuously for seven days and the assessment was done on 8th day. Each day, after giving the test drug, animal was restricted from food for first 2 hours. There was no restriction for the water supply during this period. On 8th day, each one of the groups was studied. The animal was restrained by hand and subjected to electric shock (150 mA for 0.2seconds) through Trans auricular electrodes (ECT- Electro convulsant unit). The rat was released immediately following the electrical stimulation to permit maximal seizures. Phases of convulsion were recorded with a stop watch in each rat for first two minutes. After that, animal was kept under the observation till the recovery period (normally 3 hours).



Figure 1 Wistar Albino rat with trans-auricular electrodes

The maximal seizure typically consists of a short period of initial tonic flexion of hind limb and prolonged period of tonic extension followed by clonic convulsion, stupor and recovery. Reduction of duration of Tonic Hind Limb Extension time (THLE) in seconds was taken as the assessment criteria. The Tonic Hind Limb Extension time of test groups was compared to that of control group.



Figure 2 Wistar Albino rat during hind limb extension

Table 1: Groupings of Animals

Group	Dose
Group A	Standard diet
Test Group 1	0.02gm/200gm body weight
Test Group 2	0.04gm/200 gm body weight
Test Group 3	0.08gm/200 gm body weight

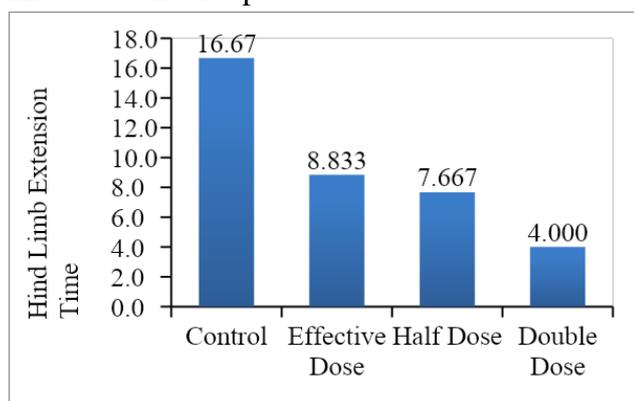
Result

Table 2 Hind Limb Extension time of different groups

Group	Mean
Group A	16.67
TG1-1/2X	8.833
TG2-X	7.667
TG3-2X	4.000

Values are expressed as mean, n=6

Graph 1. Comparison of Hind Limb Extension Time between Groups



Analysis and interpretation of data

Table 3 Table showing the statistical difference between the groups.

Group	Mean	SEM	Rank	p-Value
Group A	16.67	0.558	21.33	0.002
TG1:1/2X	7.667	2.565	11.3	
TG2-X	8.833	0.401	11.00	
TG3-2X	4.000	1.862	6.333	

Here the p-value is less than the significance level 0.05; the difference in hind limb extension time between groups is significant. That is, there is a significant difference in hind limb extension time between groups. The table reveals that the hind limb extension time is significantly lower in effective dose (8.833 ± 0.401), half dose (7.667 ± 5.565) and double dose (4.000 ± 1.862) compared to control (16.67 ± 0.558). The mean rank also confirms that hind limb extension time is lower in effective dose (11.00), half dose (11.33) and double dose (6.333) compared to control (21.33).

Discussion

Complete abolition or reduction of tonic hind limb extension time in seconds was the assessment criteria. Tonic hind limb extension was reduced in the test drug treated groups compared to control group. Both the drugs in the formulation are having action on preventing the seizures on the basis of phytochemicals present in it. *Glycyrrhiza glabra* Linn is having glycyrrhizin as the main chemical constituent. It is the derivative of glycyrrhinic acid. It has the capacity to alter the activity of ion transport processes including ion channels and inhibition of $Na^+ -K^+ -ATPase$.^[1] This will block the voltage gated Na^+ channels that remain open due to repetitive neuronal firing and prolong the duration of inactivated phase of the neurons and delay its reversion to the resting phase. The seeds of *Benincasa hispida* (Thunb.)Cogn contains GABA abundantly.^[2] GABA is the inhibitory neurotransmitter in the central nervous system. Trituration with the juice of seed containing part of the *Benincasa hispida* (Thunb.)Cogn may increase the GABAergic content in the combination. So through this synergistic action of both the drugs, seizure can be controlled and prevent the further attacks. It may increase the ability of neuronal structures to withstand the seizure assault. It will improve the overall physical and mental development of the affected and will prevent from further seizure attacks.

Conclusion

The results confirm that Kushmandagira swarasa (juice of seed containing part of *Benincasa hispida* (Thunb.) Cogn) bhavitha Yashtimadhu choorna (*Glycyrrhiza glabra* Linn.) possess anti convulsant activity.

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