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ResearchArticle

EFFECT OF PANCHAGAVYA GHRITA ON SOME NEUROLOGICAL PARAMETERS IN ALBINO RATS

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ABSTRACT

Introduction: Sushrut samhita, an authentic ayurvedic text mentions the use of Panchagavya Ghrita (PG) in the treatment of mania, epilepsy, fever and hepatitis.
In an effort to correlate the ancient knowledge with the modern concepts of research in the pharmacology, we decided to study the effects of Panchagavya Ghrita on some neuropharmacological parameters including anticonvulsant activity in rats.
Material and methods: For all the experiments, the animals were divided into four groups of 10 rats each. First three groups received Panchagavya Ghrita in the dose of 1(PG1), 2 (PG2), 4 (PG4) ml per Kg of body weight respectively and the fourth group received normal saline 2 ml per Kg orally twice daily (9am-9pm) for 30 days
1. Effect on general behavior: 2.Maximal electroshock induced convulsions: After screening convulsions were induced by maximal electroshock method. A current of 150 mA was delivered for 0.2 sec using Techno convulsiometer.3. Spontaneous motor activity (SMA): animals were screened for SMA using Actophotometer. Animals were allowed to adjust to the test chamber of the instrument for 30 minutes and then activity was counted using the digital counter for 5 minutes.4.Pentobarbitone induced sleep time:. Test and control animals both were injected with injection Pentobarbitone in the dose of 45-mg/Kg body weight. The animals were observed for loss and recovery of righting reflex for the calculation of duration of sleep
Results: 1) PG protected rats from maximal electroshock induced convulsions 2) increased the spontaneous motor activity as measured by Actophotometer. 3) Inhibited the pentobarbitone induced sleep time in rats. There was no effect on the general behavioral profile of the rats except that there was increase in the locomotor activity in the cages.
Conclusion: PG appears to be possessing anticonvulsant properties but the degree of protection is not sufficient to use it as single antiepileptic agent. This action of PG appears to be not mediated through GABA receptors.

Key words: Panchagavya Ghrita , Pentobarbitone, Maximal electroshock, GABA

INTRODUCTION

Cow is described as Kamdhenu (one which fulfills all the wishes) since Vedic times in Indian civilization. According to ayurveda various cow products like cow's urine, cow's dung, cow's milk, ghee and curd are used to treat various disease conditions in human beings. These five products are called as Panchagavya. Its ghee based preparation is called as Panchagavya Ghrita (PG). Tremendous interest is generated in the therapeutic value of cow products due to the patent awarded by USFDA (patent no.6.410.059B1). This was awarded for the synergistic activity of Cow urine distillate with some antibiotics and anticancer agents.

Sushrutsamhita an authentic ayurvedic text mentions the use of Panchagavya Ghrita in the treatment of mania, epilepsy, fever and hepatitis[1].Although PG is routinely used in the traditional medicine there is no authentic modern medicine literature on the same. There are reports on some preparations which use PG as a base.[2, 3, 4, and 5]

In an effort to correlate the ancient knowledge with the modern concepts of research in the pharmacology, we decided to study the effects of Panchagavya Ghrita on some neuropharmacological parameters including anticonvulsant activity in rats.

MATERIAL AND METHODS

Drugs used

1. Panchagavya Ghrita was obtained from the Govigyan Anusandhan kendra ,Devlapar, Nagpur and stored in the normal room temperature in the departmental laboratory.
2. Inj. Pentobarbitone: it was prepared by dissolving 500 mg in 10 ml of warm distilled water.

Animals

In this experiment male albino rats weighing between 100-200 gm with free access to standard diet and water were taken. The animals were housed in the departmental animal house with adequate exposure to the light and maintained on 12 hour light cycle.

Groups

For all the experiments the animals were divided into four groups of 10 rats each. First three groups received Panchagavya Ghrita in the dose of 1(PG1), 2(PG2) and 4(PG4) ml per kg of body weight respectively and the fourth group received normal saline 2 ml/kg body weight orally twice daily (9am-9pm) for 30 days.

Dose

The human dose of Panchagavya Ghrita in human beings is 10-20 ml per day,(for approximately 50 Kg person).It was extrapolated on the rats as six times the human dose taking 15 ml as average dose. The dose came out to be 2 ml per Kg body weight of rats.

General behavioral profile

General behavioral profile was evaluated by the method used by Irwin et al(1968).[6] The animals were observed for every 30 minutes for the first 2 hours and then at 1 hour interval for the next 4 hours.

Alertness

Awareness and spontaneous activity: Animals were placed in bell shaped glass jar and observed for their inquisitive behavior.

Gait

It was observed with the animal on the tabletop while moving

Touch response

This was observed with pencil or the forceps touching the side of the neck, abdomen and groin.

Pain response

This was studied with small artery clamp applied to the base of the tail.

Righting reflex

This was studied with animals kept on their back on the smooth undulated surface and their ability to regain the normal position observed.Any other finding like convulsions, tremors, bulging of eyeballs, erection of tail, lacrimation etc was also observed.

Maximal electroshock induced convulsions

After screening convulsions were induced by maximal electroshock method. A current of 150 mA was delivered for 0.2 sec using Techno convulsiometer. Pinnal electrodes were used to deliver this current. Animals were observed for various phases of convulsions and their duration for control and test groups was noted. Abolition of tonic extension phase was considered to be the indicator of anti convulsant action.

Pentobarbitone induced sleep time

One animal was used only once. Test and control animals both were injected with injection Pentobarbitone in the dose of 45-mg/Kg body weight. The animals were observed for loss and recovery of righting reflex for the calculation of duration of sleep.

Spontaneous motor activity (SMA)

Animals were screened for SMA using Actophotometer. Animals were allowed to adjust to the test chamber of the instrument for 30 minutes and then activity was counted using the digital counter for 5 minutes. This was repeated three times and mean of three counts was taken as an individual score.

Motor coordination:

This was assessed by Rota rod apparatus.[7]The animals were trained to remain for three minutes on the rod at 25 rpm. After drug administration the motor coordination was assessed by their ability to remain on the rotating rod.

Statistics

Statistics was done by using one way ANOVA test followed by students unpaired 't' test. P value of < 0.05 was considered to be statistically significant.

RESULTS

Effect on general behavior in rats

The animals showed no change in gait, posture, no convulsions, no change in food and water habits. Touch and pain response were also normal. The righting reflex was also not affected. Only positive observation was that there was increase in the locomotor activity in the cages.

Effect on MES induced convulsions

PG abolished the tonic extension phase of the maximal electroshock induced convulsions in rats in the dose of 2 &4 ml/ kg. It accorded 50% protection in this case. The duration of tonic extension phase was significantly decreased in both the test groups. . Also there was erection of tail in the post ictal phase. All these findings were seen on or after the 14 th day of drug administration.

Effect of PG on pentobarbitone induced sleep time

PG reduced the Pentobarbitone induced sleep time in significantly 14 th day onwards in the dose of 2 &4 ml/ kg

Effect on motor coordination

There was no effect on the motor coordination in rats.

Spontaneous motor activity

PG increased the spontaneous motor activity 14th day onwards as measured by Actophotometer. This was seen mainly in the PG 2and PG4 groups.

Table 1 : Table showing the effect of PG on percent protection of PG on MES induced convulsions.

Days	0	7	14	21	28
control	0	0	0	0	0
PG1	0	0	0	20	10
PG2	10	20	50	50	50
PG4	0	10	50	50	50

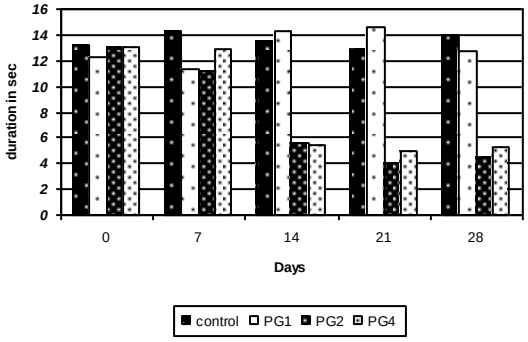

Figure 1: Graph showing the effect of PG on tonic extension phase of MES induced convulsions.

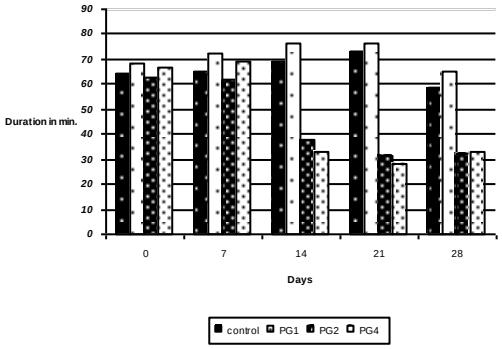

Figure 2: Graph showing the effects of PG on pentobarbitone induced sleep time in rat

Table 2: Table showing the effect of PG on Spontaneous Motor Activity

Day	0	7	14	21	28
control	70±7.6	74.4±6.6	72.3±6.8	80.3±9.9	75.5±5.7
PG1	78.2±6.6	72.5±6.8	64±6.8	64.3±8.7	66.6±7.8
PG2	73±10	98.4±11.2	114±8.8**	128.4±7.8**	125±13.4**
PG4	71±7.8	115±11.1*	110.2±12.2*	135.8±13.2**	132.1±15.6**

DISCUSSION

In our study to study the effect of Panchagavya Ghrita(PG)on some neurological parameters in rats we found that, 1) PG protected rats from maximal electroshock induced convulsions 2)increased the spontaneous motor activity as measured by actophotometer. 3) Inhibited the pentobarbitone induced sleep time in rats. while 4) there was no effect on the general behavior of the rats except increase in the general activity.

Panchagavya Ghrita contains cow milk, cow ghee, cow urine, cow dung, and curd milk. Out of these five contents cow milk and the cow urine are extensively analyzed. cow milk contains carbohydrate, calcium, phosphorus, iron ,vitamins A and riboflavin etc. on the other hand cow urine contains sulphur, ammonia, copper, iron urea, uric acid , sodium potassium, Magnesium, Calcium, vitamins A, B ,C, D, E; lactose enzymes, creatine. Out of these which component is responsible for its action is really difficult to comment upon.

Cow products especially Cow's urine is rich in volatile free acids which are very potent antioxidant agents[8,9]. Also there are enough evidences to suggest the role of oxidants in the causation of epilepsy.[10, 11] If these two facts are considered together then it can be said that PG offers protection in MES induced convulsions by virtue of its antioxidant action.

Drugs currently used in the epilepsy act through various mechanisms.[11]They are

a. potentiation of GABA mediated inhibition of neurotransmission

b. decreasing excitability of the neurons through the blockade of sodium channels

c. NMDA receptor antagonism.

In our study we also found that PG failed to potentiate the pentobarbitone induced sleep time and also it had no inhibitory action on spontaneous motor activity.(in fact exactly opposite action was observed) . Hence we can safely conclude that Panchagavya Ghrita probably does not act through potentiation of GABA mediated inhibition of neurotransmission

Erection of tail in the post ictal phase was a very interesting observation that points towards a possible Straub's test like tail in rats. Exact significance of this finding will only be clear only after Panchagavya Ghrita is screened for analgesic action which we have planned for the near future.

It will be really interesting to study the effect of combination of PG and already established drugs like Phenytoin sodium and Carbamazepine on various parameters.

To conclude it can be said that PG offers protections against the MES induced convulsions without producing any sedation in rats and also does not affect the normal behavior of the animals.

CONCLUSION

PG appears to be possessing anti convulsant properties but the degree of protection might not be sufficient to use it as single antiepileptic agent. This action of PG appears to be not mediated through GABA receptors.

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