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Research Article

A Scientific Study on Pharmacological Action of *Peristrophe bicalyculata* Nees (Chaksini) in Convulsion Disorder

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A B S T R A C T

The aqueous extract of "Chaksini" *Peristrophe bicalyculata* Nees (Acanthaceae) has been used for anti-convulsant activity by the method of Swaziland and Goodman, 1946. The preliminary neuropharmacological screening of the drug was done and Gross Behavior Test, and spontaneous motor tests were carried out.

Keywords: Chaksini, *Peristrophe Bicalyculata* Nees, Neuropharmacological Screening

Introduction

Peristrophe bicalyculata Nees is known as "Chaksini". It belongs to the family Acanthaceae. This weed is used commonly in and around Aligarh, UP, India, or sub-tropic species of Asia and Africa and is also available throughout India.[2,5,7,8,11-13]

Gross Behaviour Test

Irwin's profile is a very comprehensive inventory of a large number of central actions. The effect of the test drug i.e., aqueous extract of "Chaksini" *P. bicalyculata* Nees. was studied on Gross Behaviour according to the behavioural profile of *Irwin*, (1962). The Profile is divided into four sets of observations viz, General observations, Behavioural profile, Neurological profile and Autonomic profile.[1-4]

- General observations include data such as gender, bodyweight of the animal, route of drug administration, solvent used and doses
- Behavioural profile includes parameters that can detect alteration
- Neurological profile includes parameters that detect alteration in motor and sensory functions as well as the state of CNS
- Autonomic profile comprises salivation, mydriasis, myosis etc. that indicates autonomic actions like Para sympathomimetic and sympathomimetic activity

The test involves direct inspection and palpation (as needed); therefore, it has a subjective element in the measurement of various parameters. The observation of gross behaviour according to Irwin's Profile is a simple and inexpensive

test that can detect the presence of a large number of neuropharmacological actions, therefore, it is very suitable for preliminary testing of neuropharmacological actions.

Supra Maximal Electric-Shock Seizure Test

It is used to determine the anti-convulsant activity and is followed according to the method of (Toman, Swinyard and Goodman, 1946). It is a good model of grand model epilepsy in man. The abolition or reduction of the direction of the extensor phase of the tonic convulsions produced by an electro-shock indicates the anti-convulsant activity. It is likely to be reproducible in case of grand mal epilepsy. The abolition or reduction of the duration to extensor phase to the tonic convulsions produced by administering an electro-shock indicates anti-convulsant activity. Convulsometer is used to deliver electric shocks of various amplitudes and duration as set by means of the testing knob to the required magnitude. The shock is delivered by means of serrated stainless steel to pinna electrode and then connected to the convulsometer by electric wires. The switch is reset and put on the electrode clamped to each pinna of rat. The shock is delivered only for the fixed duration earlier and was cut off automatically.

The present study has been undertaken to evaluate the neuro-pharmacological efficacy of the test drug by using a specified method for neuro-pharmacological screening.

Materials and Methods

Collection and Extraction of Herbs

The test drug being wild and available in the local area, was originally collected from the wasteland around Aligarh, (U.P., India) (Figure 1). The drug was properly identified with the help of the Department of Botany, AMU, Aligarh. The herbarium sheet was prepared of the sample (Voucher specimen No. 390) and deposited in the Department of Ilmul Advia, Aligarh Muslim University, Aligarh.

Figure 1.“Chaksini” *P. bicalyculata* Nees

Figure 2.Dried Extract Crystals of “Chaksini” *P. bicalyculata* Nees

The dried herb (1 kg) was extracted with distilled water and the extract was dried at low temperature and pressure. The total yield of water extract was 14.2% (Figure 2).[3]

Bio-assay of Behavioural Profile, Neurological Profile, Autonomic Profile and General Observations

Gross Behaviour Test

Albino rats of either sex weighing 100-120 grams were used for the study. The animals were divided into two groups of 6 animals each. The animals in Group I were administered the test drug, “Chaksini” in the form of aqueous extract orally in a dose of 25 mg/ 100 gm of body weight. The animals in Group II were fed distilled water in the same volume and served as control. The animals were placed singly in Perspex cadge and were observed continuously for the period of 6 hours and then at the end of 24 hours for gross behaviour and mortality. For quantification of the effect, scoring was done to calculate the group index. The scores obtained in the two groups were compared to see whether the test drug produced any effect.[5-7]

Supra Maximal Electric-shock Seizure Test

The albino rats of either sex weighing 150-200 gms were selected and divided into 2 groups of 6 animals in each. Animals were kept on fasting overnight and on the day of the experiment, the animals in the test group were treated with the test drug in a dose of 25 mg/ 100 gm body weight. The animals were administered with distilled water in the same volume as the control. After 60 minutes of administration of the test drug, the animals were given electric shock 150 m.a for 0.2 seconds by means of a pair of stainless-steel pinna electrodes.

Different phases (Flexor and extensor) of the convulsive process were observed and their duration was measured in seconds by means of stopwatch. The abolition or significant reduction in the duration of the extensor phase being taken by the index for protection against electro-shock induced seizure.[8-11]

Pentobarbitone Sodium Induced Narcosis Test

Healthy mice weighing 90-100 gm each were chosen for the study and divided into two groups of six mice each. They were faster overweight. The test group was administered the aqueous extract of "Chaksini" P-bicalyculata Nees. 25 mg/ 100 gm b.w. orally one hour prior to administration of pentobarbitone sodium. Both the groups, control and test, were administered pentobarbitone sodium 250 mg/ intraperitoneally. The mice laid on either back undisturbed. The time of the change in their posture was recorded. The mean value of the test drug group was compared with the mean value of the control group. The significant result is found by the value.

Results

Gross Behaviour Test

The reaction time was found to be increased by applying pain stimulate mechanical pressure in Albino rats. It was observed that in this preliminary test aqueous extract of "Chaksini" P. bicalyculata Nees. (25 mg/ 100 gm b.w. dose). Turner (1965) reported that such observation indicates that the drug may possess anti-convulsant action. Electric-shock seizure test has been carried out by the method of Toman, Swinyard and Goodman (1946). Electrodes were applied on pinna of both ears simultaneously in each albino rat. As a result of shock, the animals have developed convulsions as tonic phase followed by clonic phase. The tonic phase has 2 components. All these phases were observed in the hind limbs of the animals. The extensor phase of the convulsions proved to be a good indicator for measurement.

Table 1.Anti-convulsant Effect of "Chaksini" P. bicalyculata Nees. by Supramaximal Electro Shock Seizure Test [Duration of Extensor Phase in Seconds (Mean ± SE)]

Control		Chaksini Aqueous Extract 25 mg/ 100 gm
Mean	10.2	6.95
SD	0.419	00.96
SE	0.171	0.39
P		< 0.001

Supra Maximal Electric-Shock Seizure Test

In control group, the duration of extensor phase was found to be 10.2 ± 0.17 seconds. Animals treated with the dose of 250 mg/100 gm b.w showed a decrease in the duration of extensor (6.95 ± 0.37) (Table 1 and Figure 3).[12-14]

Pentobarbitone Sodium induced Sleeping Testing Mice

Twelve albinos of either sex were divided into two groups of six animals each. The aqueous extract of Chaksini *P. bicalyculata* Nees. was administered to the test group in the dose of 25 mg/100 gm b.w. one hour later all the animals were administered with 25 mg/100 gm of pentobarbitone sodium injection intraperitoneal early. Then the animals were tested for righting reflex every 5 minutes (Table 2 and Figure 4).

Table 2.Effect of "Chaksini" P. bicalyculata Nees. by Pentobarbitone Sodium induced Narcosis in Mice [Duration of Extensor Phase in Seconds (Mean ± SE)]

S. No.	Time in Minutes	
	Control group - pentobarbitone sodium	Test group - pentobarbitone sodium Chaksini
Mean	191.666	287.50
SD	6.8313	10.839
SE	2.788	4.425
P		< 0.02

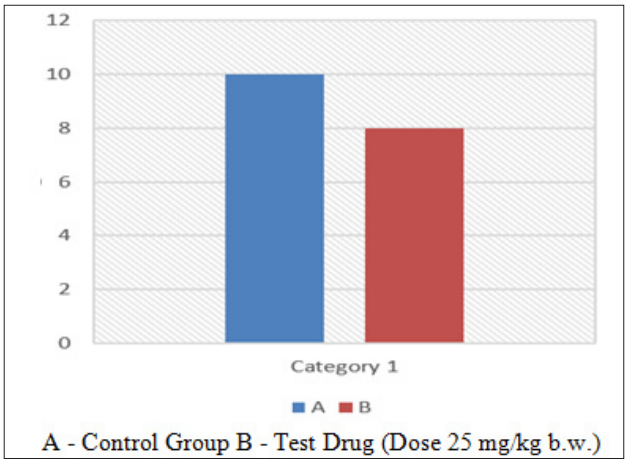

Figure 3.Supramaximal Electric Shock Seizure Test

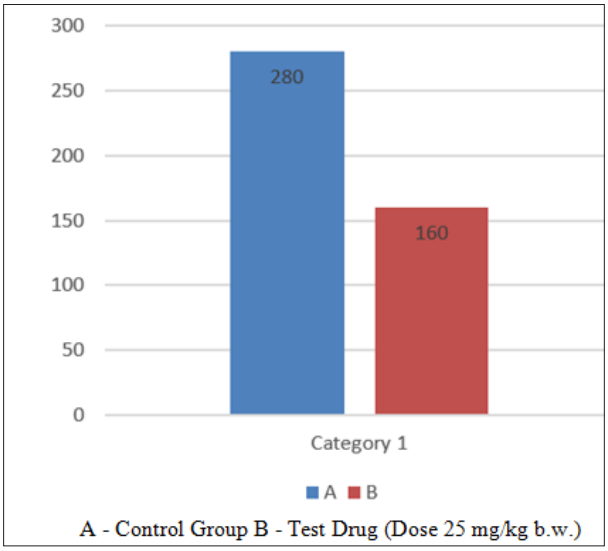

Figure 4.Pentobarbitone Sodium induced Narcosis Test

Table 3.Effect of "Chaksini" (*Peristrophe bicalyculata* Nees.) on Gross Behaviour in Rats

S. No.	Parameter	Group Index			
		Control		Aqueous extract of Chaksini (25 mg/ 100 gm) b.w.	
	Time of first s/s	Base response	%	Response after 30 minutes	%
1.	Movements	Normal	0	Decreased	80
2.	Co-ordination	Normal	0	Normal	0
3.	Palpebral aperture	Normal	0	Narrow	90
4.	Growing	Normal	0	Present	20
5.	Restlessness	Absent	0	Absent	0
6.	Tremors	Absent	0	Absent	0
7.	Convulsions	Absent	0	Absent	0
8.	Respiration (Rate)	Normal	0	Decreased	30
9.	Respiration (Depth)	Normal	0	Decreased	30
10.	Body Temperature	Normal	0	Decreased	30
11.	Piloerection	Normal	0	Normal	0
12.	Body Tone	Normal	0	Decreased	90
13.	Pinna Reflex	Normal	0	Decreased	80
14.	Corneal Reflex	Normal	0	Decreased	70
15.	Lacrimation	Absent	0	Absent	0
16.	Salivation	Absent	0	Absent	0
17.	Urination	Normal	0	Normal	0
18.	Defaecation	Normal	0	Normal	0
19.	Startle Response	Normal	0	Absent	0
20.	Straub's Response	Absent	0	Absent	0
21.	Analgesia (Mechanical)	Absent	0	Present	60
22.	Analgesis (Thermal)	Absent	0	Present	60
23.	Mortality	Absent	0	Absent	0

* Number of Animals (Rats) = 6 in each group
* Percentage in animal = 1%

Discussion

Gross Behaviour Test

In gross behaviour test, moments were found to be decreased, respiration rate was decreased respiratory depth were decreased. The prominent decreased in the response was found as Palpebral aperture 90%, body tone 90%, Pinna reflex 80%, moments 80%, corneal reflex 70%, analgesia by mechanical stimuli the response were decreased 60%; similarly, the thermal response of the analgesia was found to be decreased by 60%. The results were found to be significant as depicted in Table 3.

Supra Maximal Electric-Shock Seizure Test

A significant reduction or total abolition of the extensor phase indicates anti-convulsant action and it was found that the duration of the extensor phase of the convulsions in the control group was 10.2 ± 0.17 seconds while in the test drug group, the duration of extensor phase was drastically reduced to 6.95 ± 0.39 seconds. There was a significant decrease ($P < 0.01$) in the extensor phase. The results were found to be significant as depicted in Table 1.

Thus, the present study indicates that the drug possesses anti-convulsing action in the animal model, it may be used in human psycho-somatic disorders also. The efficacy of the test drug was found to be more after other tests were done for the same.[3]

Pentobarbitone Sodium induced Sleeping Time

Another test was done to confirm the central depressant action of the test drug at the same dose as the effect on pentobarbitone sodium induced narcosis in rats. The effect

of the aqueous extract of "Chaksini" P. bicalyculata Nees was observed on the pentobarbitone Sodium induced sleeping time in mice. The mean sleeping time in the control group was 191.66 ± 4.42 ($P < 0.02$) in minutes. The result has been tabulated and depicted in Table 2 and Figure 4.

Conclusion

"Chaksini" *P. bicalyculata* Nees. has been reported to be used in various nervine disorders in classical literature. The present study was done to scientifically screen the drug in animal model and it was found that in supramaximal electric seizure test, the results were significant as in grand mal epilepsy produced in animals. The result of narcosis test induced pentobarbitone sodium were also found to be significant. It indicates the confirmatory central depressant action of the test drug in the animal model. It also affirms the anti-psychiatric efficacy and a prompt anticonvulsant activity of the test drug.

The bioavailability of the molecule is good in the animal model, which shows the prompt action of the drug, but this significant efficacy of the test drug is required to be assessed for further pharmacokinetics activity and neuro-pharmacological screening in clinical studies before its use in Clinics to help the mankind from the heavy burden of the disease, it may be helpful to combat the psychiatric problem.

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Conflict of Interest: None

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