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Short Communication

Evaluation of anti-convulsant activity of methanolic extract of leaves of Leonurus cardiaca against pentylenetetrazole induced convulsions in Mice

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ABSTRACT

Leonurus cardiaca is a popular Indian herb which is used in the treatment of weaknesses and disorders, allaying nervous irritability, anti-pyretic, inducing quiet and passivity of the whole nervous system. It is also seen as a remedy for heart palpitations,it has a strengthening effect, especially on weak heart. Antispasmodic and sedative effects promote relaxation rather than the drowsiness. The aim of present study was to evaluate anticonvulsant activity of methanolic extract of leaves of *leonurus cardiaca* against pentylenetetrazol (PTZ) induced convulsions in mice. All the animals were divided into four groups of six mice each and were injected PTZ (65mg/kg intraperitonially). Group I was served as toxic control PTZ (65mg/kg i.p.). Group II was pretreated with diazepam (4mg/kg p.o.),Group III was pretreated with methanolic extract of leave of *leonurus cardiaca* (100 mg/kg p.o.) for 7 days. Group IV was pretreated with methanolic extract of leaves of *leonurus cardiaca* (200mg/kg p.o.) for 7 days. The result shows that methanolic extract of leaves of *leonurus cardiaca* significantly reduced duration of clonic convulsions and also delayed the onset of convulsions induced by pentylenetetrazole. The results were expressed as mean ±SEM and were statistically analyzed by one way ANOVA. It is concluded that methanolic extract of leaves *Leonurus Cardiaca* can show anticonvulsant activity against pentylenetetrazol induced convulsions in mice.

Keywords: PTZ, Anticonvulsant, diazepam, *Leonurus Cardiaca*.

INTRODUCTION

Epilepsy is one of the most common serious disorders of the brain, affecting 0.4-0.8%of the population and up to 50 million people worldwide, whereas affecting 0.5-1.0% of population and may be 5 - 10 million people in India accounting for almost one fifth of the global figure. Epilepsy accounts for 1%of the global burden of disease and among primary the primary disorders of the brain this burden rank with depression and other affective disorders , Alzheimers disease and other dementias , and substances abuse among all medical conditions, it rank with the breast cancer in women and lung cancer in men. Eighty percent of the burden of epilepsy is in the developing world. Worldwide mortality among people with epilepsy is two to three time higher than in general population[1].

According to International league against epilepsy, Epilepsy is defined as "a condition characterized by recurrent (two or more) seizures, unprovoked by any immediate identified cause". Multiple seizures occurring in a 24 hr. period or an episode of status epileptics are consider a single event. Individual who have had only febrile seizures or only neonatal seizures (seizure in the first 30 days of life), and people with acute symptomatic seizures (seizures associate with acute systemic illness, intoxication, substance abuse or withdrawal, or acute neurological insults), and individual with a single unprovoked seizer, are excluded from this category. Whereas, an epileptic seizures is defined as a clinical manifestation presumed to result from an abnormal and excessive discharge of a set of neurons in the brain .The clinical manifestation consists of sudden and transitory abnormal phenomenon which may include alterations of consciousness ,motor sensory ,autonomic ,or psychic events ,perceived by the patient or an observer[2].

A number of synthetic drugs are available as anti-epileptic agents but to have control over the seizures is very difficult because of their side effects and large number of interactions. therefore herbal drugs are widely used due to their

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applicability and least side effect. According to literature survey, a plant named *Leonurus Cardiaca* (Family: *lamiaceae*) has been used for treatment of various condition in Ayurveda system of medicine. Traditionally the various parts of this plant used as tonic, laxative, anti-pyretic, astringent, febrifuge and strong purgative and also useful in heart diseases, migraine, skin problem, jaundice, piles, rheumatism, ulcers, asthma, diabetes, inflammation, chest complaint and liver complaints[3].

The present research work was undertaken to evaluate the anti-epileptic activity of *Leonurus Cardiaca* against PTZ induced convulsions.

MATERIALS AND METHODS

Plant material: Leaves of *Leonurus Cardiaca* were collected from local area of Chikhli, Buldhana district (M.S.) India. The leaves were authenticated by department of Pharmacognosy Anuradha College of Pharmacy, Chikhli. Dist.-Buldhana.

Preparation of Extract: Leaves of *Leonurus Cardiaca* were dried and powdered. The powder was extracted with methanol. The extract was stored in vacuum desiccator for further use.

Animal used: Swiss albino mice weighing (20-30g) were maintained in identical laboratory condition and fed with commercial pellet diet (Hindustan Lever Kolkata, India) and water *ad libitum*. All procedures described were reviewed and approved by the IAEC, Anuradha College of Pharmacy Chikhli. Dist. - Buldhana.

Chemicals: Pentylenetetrazole (PTZ) (Ozone International Mumbai), diazepam(Lupin) was used for the study.

Assessment of anticonvulsant activity: Swiss albino mice weighing 20-30g were randomly divided into four groups. Group I was served as toxic control (PTZ), Group II was pretreated with diazepam. Group III was pretreated with Methanolic extract of *Leonurus Cardiaca* (100mg/kg p.o.) for seven days. Group IV was pretreated with Methanolic extract of *Leonurus Cardiaca* (200mg/kg p.o.) for seven days. 30 min prior to the administration of PTZ. The animals were observed for onset of clonus and duration of convulsions up to 10 min after PTZ injection. Onset of clonus and duration of convulsion were observed and recorded[10].

RESULT AND DISCUSSION

Since many anticonvulsant agent induced CNS depression, motor incoordination and ataxia, we therefore assessed the spectrum of anticonvulsant activity of methanolic extract of leaves *Leonurus Cardiaca* against PTZ induced seizures. The PTZ test represent a valid model for human generalized myoclonic seizures. The Methanolic Extract of leaves *Leonurus Cardiaca* significantly delayed the onset and antagonized the PTZ induced seizures, which are comparable with toxicant and reference drug diazepam, thus our present result suggested that the methanolic extract of leaves *Leonurus Cardiaca* may be effective against human generalized myoclonic seizures[5]. It has been shown that PTZ enhances the basal activity and the sensitivity of dopaminergic neurons to PTZ in rat brain and the nigrostraitaul dopaminergic neurons contribute to the central alteration associated with experimental epilepsy. Methanolic extract of Leaves *Leonurus Cardiaca* was however more efficacious against PTZ induced seizure where protection was observed in all of the mice. An effect which indicates that the extract produce its central nervous system depressant action as consequence of its $GABA_{Aergic}$ and less importantly, transmission, since PTZ is a selective GABA receptor antagonist. From such information it may be stated primarily that the Methanolic extract of Leaves *Leonurus Cardiaca* may contain some biomolecules (s) that produce CNS depression and anticonvulsant action after blocking D1 and D2 receptors or facilitating GABA transmission[6]. In conclusion the data of our study suggests that Methanolic extract of Leaves of *Leonurus Cardiaca* may have beneficial effects in epilepsy that holds the hope of new generation of anticonvulsant drugs however, comprehensive chemical and pharmacological research is required to find out exact mechanism of these extract for its anticonvulsant effect and to identify the active constituents responsible for this effect.

Table 1: Effect of Methanolic Extract of Leaves of *Leonurus Cardiaca* against Pentylenetetrazole induced Convulsions in mice.

Group	Treatment	Dose	Onset of clonic convulsion (sec)	Duration of clonus (sec)
Toxic control	PTZ	65mg/kg; i.p.	78 ± 3.7	359±19.00
Standard	Diazepam	4mg/kg; i.p.	0.00 ± 0.0	0.00 ± 00
Test 1	Methanolic Extract of Leaves of *Leonurus Cardiaca*	100mg/kg; p.o.	98.66 ± 3.91	202 ±12.00
Test2	Methanolic Extract of Leaves of *Leonurus Cardiaca*	200mg/kg; p.o.	202.5 ± 27	158 ± 7.50

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