Evaluation of Anti-Convulsant Activity of Methanolic Extract of Seeds of Cassia Fistula against Pentylenetetrazole induced convulsions in mice

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1. Introduction

Epilepsy is a group of disorder of central nervous system which is characterized by paroxysmal cerebral dysrhythmia manifesting a brief episode (seizures) of loss or disturbance of consciousness with or without characteristic body movement (convulsions), sensory or psychiatric phenomenon and having tendency of recurrent seizures that originate in the brain. Approximately 1% of the world’s population has epilepsy. It is the result of uncontrolled discharge from an area of abnormally functioning CNS tissue, termed the focal lesion or seizure focus. This type of abnormal neuronal functions may have a deleterious effect on normal cognitive functions and behavior of the individual.

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 the herbal drugs are widely used due to their applicability and least side effect. According to literature survey, a plant named Cassia fistula Linn (Family: Fabaceae) has been used for treatment of various condition in Ayurvedic 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.

The present research work was undertaken to evaluate the anti-epileptic activity of Cassia fistula in various experimental models.

2. Materials and Methods

2.1 Plant material

Seeds of Cassia fistula were collected from local area of Chikhli, Buldhana district (M.S.) India. The seeds were authenticated by Department of Pharmacognosy, Anuradha College of Pharmacy, Chikhli. Dist-Buldhana.

2.2 Preparation of Extract

Seeds of Cassia fistula were dried and powdered. The powder was extracted with methanol. The extract was stored in vacuum desiccator for further use.

2.3 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- Buldana.
2.4 Chemicals
Pentylenetetrazole (PTZ) (Ozon International Mumbai), Gabapentin was used for the study.

2.5 Assessment of anticonvulsant activity
Swiss albino mice weighing 20-30g were randomly divided into four groups. Group I was served as toxic control, Group II was pretreated with Pentylenetetrazole and Gabapentin. Group III was pretreated with PTZ and methanolic extract of Cassia Fistula (100mg/kg P.O.) for seven days. Group IV was pretreated with PTZ and methanolic extract of Cassia Fistula (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 recorded6.

3. 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 seeds of Cassia fistula against PTZ induced seizures.

The PTZ test represent a valid model for human generalized myoclonic seizures. The Cassia fistula significantly delayed the onset and antagonized the PTZ induced seizures, which are comparable with toxicant and reference drug gabapentin, thus our present result suggested that the methanolic extract of seeds of Cassia fistula may be effective against human generalized myoclonic seizures6.

It has been shown that PTZ enhances the basal activity and the sensitivity of dopaminergic neurons to PTZ in rat brain and the nigrostriatal dopaminergic neurons contribute to the central alteration associated with experimental epilepsy1. Methanolic extract of seeds of Cassia fistula 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 GABAergic and less importantly, transmission, since PTZ is a selective GABA receptor antagonist5. From such information it may be stated primarily that the methanolic extract of seeds of Cassia fistula may contain some biomolecules (s) that produce CNS depression and anticonvulsant action after blocking D1 and D2 receptors or facilitating GABA transmission6.

In conclusion the data of our study suggests that Methanolic extract of seeds of Cassia fistula 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 Aqueous Extract of Seeds of Cassia Fistula against Pentylenetetrazole induced Convulsions in Mice.

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Group</th>
<th>Treatment</th>
<th>Dose</th>
<th>Onset of Jerks (sec)</th>
<th>Duration of convulsion (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Toxicant</td>
<td>PTZ</td>
<td>60 mg/kg I.P.</td>
<td>57 sec. ±5.33</td>
<td>181 sec. ±9.88</td>
</tr>
<tr>
<td>II</td>
<td>Standard</td>
<td>PTZ + Gabapentin</td>
<td>200 mg/kg P.O.</td>
<td>210 sec. ±17.10</td>
<td>122 sec. ±10.32</td>
</tr>
<tr>
<td>III</td>
<td>Test 1</td>
<td>PTZ + Cassia fistula</td>
<td>100 mg/kg P.O.</td>
<td>175 sec. ±11.70</td>
<td>147 sec. ±7.30</td>
</tr>
<tr>
<td>IV</td>
<td>Test 2</td>
<td>PTZ + Cassia fistula</td>
<td>200 mg/kg P.O.</td>
<td>189 sec. ±14.18</td>
<td>146 sec. ±10.33</td>
</tr>
</tbody>
</table>

Values are mean ± SEM (n=6). p<0.05 was consider to be statistically significant.

References