Journal Of Harmonized Research (JOHR)

Journal Of Harmonized Research in Pharmacy
6(3), 2017, 41-45

ISSN 2321 – 0958

Original Research Article

EVALUATION OF ANTICONVULSANT ACTIVITY OF LEAF EXTRACTS OF *SECURINEGA LEUCOPYRUS* IN SWISS ALBINO MICE

S. Amreen Sultana*, A. Laly Steven, B. Mounica, N. Rama Lakshmi, D. Eswar Tony, N. Rama Rao

Department of Pharmacology, Chalapathi Institute of Pharmaceutical Sciences, Guntur (A.P).

Abstract: Objective: In the present study Anti convulsant activity of Methanolic and aqueous extracts of leaves of *Securinega leucopyrus* were evaluated.**Materials & Methods:** Anti convulsant activity of Methanolic and Aqueous extracts of leaves of *Securinega leucopyrus* were evaluated by Strychnine-induced seizure in mice. The Methanolic and Aqueous extracts of leaves of *Securinega leucopyrus* (200mg/kg) treat the convulsions and produced significant reductions in severity and frequency of seizures. Standard drug Diazepam (2mg/kg, i.p) has shown significant reduction in frequency of seizures whereas methanolic extract of leaves of *Securinega leucopyrus* (MESL) and aqueous extract of leaves of *Securinega leucopyrus* (AESL) at a dose of 200 mg/kg, oral significantly ($P<0.05$) reduced frequency of Strychnine induced convulsion.**Conclusion:** Both MESL and AESL showed marked reductionin the frequency of seizuresbut the efficiency of MESL is more when compared to AESL. The results suggest that the MESL and AESL have the ability to control the extent and severity of seizures in mice.

Keywords: *Securinega leucopyrus*, Anti convulsant, Strychnine, Mice, Seizure

Introduction: Convulsion is a pathological body condition characterized by abnormal, violent and uncontrolled spasmodic contractions and relaxations of the voluntary muscles. Convulsion is often interchangeable with seizure. Epilepsy is the second most common neurological disorder after stroke, effecting at least 50 million persons worldwide and approximately 40% of them are women. Convulsion arises due to sudden excessive and rapid discharge of cerebral neurons in the grey matter of the brain. About 1% of people are born with epilepsy and approximately 10% of the population will experience seizure[1]. About 75%-80% of epileptic patients may be provided with adequate seizure control with the help of conventional antiepileptic drugs. However, 30% of people with epilepsy do not have seizures

For Correspondence:
amreensultana5185@gmail.com.
Received on: March 2017
Accepted after revision: July 2017
Downloaded from: www.johronline.com

control even with best available medications. Almost all the currently available antiepileptic drugs are associated with drug interaction making it difficult to attain easy seizure control. There is an urgent need for the development of newer antiepileptic agents with better safety and efficacy profile. So, there is a reawakening interest in traditional medicine in the management of epilepsy[2]. Herbal medicines are found to be effective in several cases as the secondary metabolites has been attributed for most plant's therapeutic activities and this forms an important part of complementary and alternative medicines. There are several herbal medicines that have been proven individually for its effect on seizure[3].

Securinega leucopyrus (Willd.) Muell. (Euphorbiaceae) is common in India, Srilanka and Burma. It is known as Humari in India, Katupila in Sri Lanka, Spinous fluggea in English, Mudbulanji in Tamil[4-5]. It is commonly called as Bushweed, Indian snow berry. It is a thorny, large shrub or small tree[6]. It is a desert climatic plant having a number of pharmacological actions. It is used topically in paste form for healing of chronic and non-healing wounds[7]. The leaves of the plant contain germicidal properties. The decoction of leaves is used to dress the cancerous wounds and also used externally in the treatment of piles. The juice or paste of the leaves along with tobacco used to destroy worms in sores. It is used as popular veterinary medicine. The leaves are used to extract the extraneous materials from body tissues without surgery. Leaves are boiled and taken twice a day for stomach aches. The roots are used in the treatment of testicular enlargement and in the cure of edema. The whole plant is used for the cure of cancer in the sole of the foot. It is also used in the treatment of abdominal lumps and liver hypertrophy and portal hypertension. The bark of stem is used for tooth ache. The methanol extract has inhibition effect on the growth of total 25 bacterial species, 56strains of 24 bacterial species which are Acinetobacter calcoaceticus, Bacillus amyloliquefaciens, Bacillusatrophaeus, Bacillus cereus, Bacillus lentimorbus, Bacillus licheniformis, Bacillus macerans, Bacillus megaterium, Bacillus pumilus, Bacillus sphaericus, Bacillus substilis, Brevundimonas diminuta, Brucella abortus, Enterobacteragglomerans, Enterobacter pyrinus, Escherichia coli, Kocuria varians, Leclercia adecarboxylata, Pseudomonas aeruginosa, Pseudomonas putida, Pseudomonas syringae, Salmonella typhimurium, Staphylococcus aureus, Staphylococcus epidermis, Xanthomonas campestris[8]. The plant has been used in preparations in traditional medicine for the treatment of cough, hay asthma, bowel complaints, disinfections, laxatives, for diarrhea, gonorrhea, constipation and mental illness and kidney stones. It is also used as fish poison. Recently the plant has been attracted interest as complementary and alternative medicine for cancer, especially in Sri Lanka[9]. The other uses are sweet, cooling, diuretic, aphrodisiac, tonic and are useful in vitiated conditions of pitta, burning sensation, strangury, seminal weakness, general debility, larvicide, paralysis, paresis, pesticide, insecticide. Even though *Securinega leucopyrus*has lot of potential medicinal uses, the study on this plant is very less. Considering the importance of this plant, the present study was undertaken.

Materials and Methods:

Collection, Identification and Authentication of plant: The leaves of the plant, *Securinega leucopyrus (Willd.) Muell.* were collected from the medicinal garden of Chalapathi Institute of Pharmaceutical Sciences, Guntur, during the month of July, 2016. The plant material was identified and authenticated by Dr. M. Raghu Ram, Department of Botany, Acharya Nagarjuna University, Guntur, Andhra Pradesh.

Collection and maintenance of experimental animals: Swiss albino mice of either sex

weighing between 20-25 gm were used. Institutional Animal Ethics Committee of Chalapathi Institute of Pharmaceutical Sciences, Guntur, approved the experimental protocol (21/IAEC/CLPT/2016-17); animals were maintained under standard conditions in an animal house approved by Committee for the Control and Supervision on Experiments on Animals (CPCSEA Reg.No. - 1048/a/07/CPCSEA). The animals were housed in Poly propylene cages and maintained at 25±2ºC under 12hlight / dark cycle and were fed with standard animal pellet feed (Hindustan lever limited) and water *ad libitum.*

Acute Toxicity Studies: The acute oral toxicity study was carried out as per the guidelines set by Organization for Economic Co-operation and Development (OECD) received from Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). One tenth of the median lethal dose (LD_{50}) was taken as an effective dose. Acute toxicity study was done as per OECD, 2006 guidelines. Acute oral toxicity tests found the LD_{50} of the plant to be >2,000 mg/kg. The animals were observed for signs of toxicity such as hyperactivity, grooming, convulsions, sedation, and hypothermia continuously for 2 hours, and for mortality up to 24 hours, after the administration of the doses.

Extraction Method: The leaves of *Securinega leucopyrus* were shade dried and reduced to coarse powder with the help of mortar and pestle. The powdered material obtained was then subjected for extraction by Maceration Method using Methanol and Water as solvents. The different extracts obtained were evaporated at 45ºC to get a semisolid mass. The percentage yield of Methanolic and Aqueous Extracts of *Securinega leucopyrus* (MESL & AESL) was found to be 13.3W/W%.

Chemicals and drugs: Methanolic extract, Aqueous extract, Strychnine, Diazepam, Tween 80, Saline solution.

Evaluation of Anti convulsant activity of *Securinega leucopyrus:* The anti convulsant activity of *Securinega leucopyrus* was evaluated according to the method described by Porter *et al*., (1984).Mice were divided into four groups, each containing 6 animals. The first group was administered with Strychnine (2 mg/kg, I.P) alone, which is a Negative Control. The second group was administered with Diazepam (2 mg/kg, S.C), which is used as a Standard drug. Whereas the third and fourth group received MESL (200 mg/kg, P.O) and AESL (200 mg/kg, P.O) respectively which are used as Test-I and Test-II. Thirty minutes post treatment Strychnine was given through intraperitonial route to all the groups of animals to induce convulsions. The proportion of mice presenting convulsions as well as the onset of clonic convulsions was recorded. Abolition of jerks of the hind limbs within 30 min after strychnine administration was considered an indicator that the testing material could prevent Strychnine-induced convulsions.

Statistical analysis: Results are expressed as mean ± SEM; n=6 in each group. Data was analyzed by one-way ANOVA followed by using Dennett's t-test. The P value was considered to be 0.05 and the outcomes with P value below 0.05 were considered to be significant.

Results: Strychnine (2 mg/kg) was used toproduce seizures in the animals and it showed onset of convulsions within 5 min. Diazepam (2 mg/kg) showed significant protection against seizures by causing delay in the onset time as well as decrease in duration of each seizure when compared to negative control. Test-I and Test-II exhibited significant protection against onset time of seizures. Thus, highly significant reduction in mean seizure duration for Test-I & Test-II in comparison to negative control.

Table 1: Effect of Diazepam, MESL, and AESL on Strychnine-induced seizures

Treatment	Onset of Clonic Convulsions (min)	Duration of Convulsions (min)	Mortality/Used (%)
Negative Control (0.1ml)	5	10	3/6 (50%)
Diazepam(0.2ml) + Strychnine (0.1ml)	25	8	0/6 (0%)
Methanolic Extract (0.5ml)+ Strychnine (0.1ml)	35	6	0/6 (0%)
Aqueous Extract (0.5ml)+ Strychnine (0.1ml)	30	7	0/6 (0%)

Fig 1: Effect of Diazepam, MESL, and AESL on mean seizure onset time in Strychnine-induced seizures method

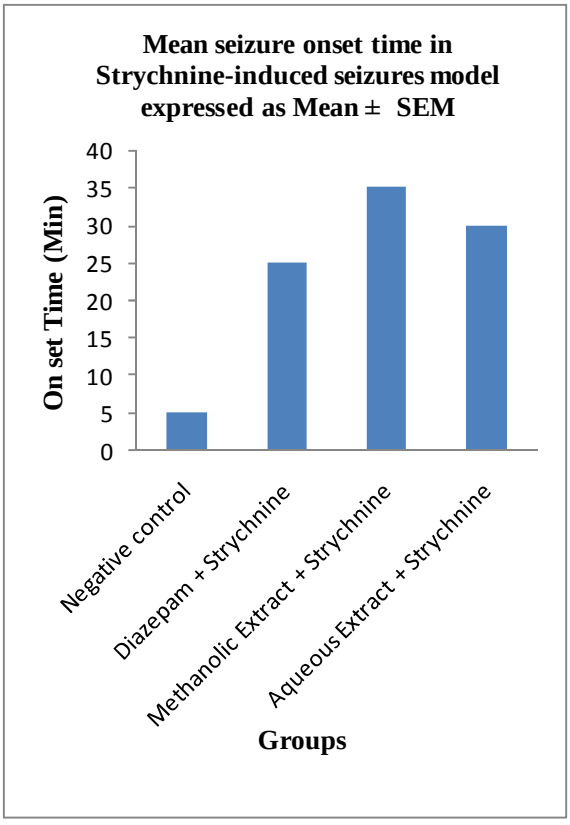
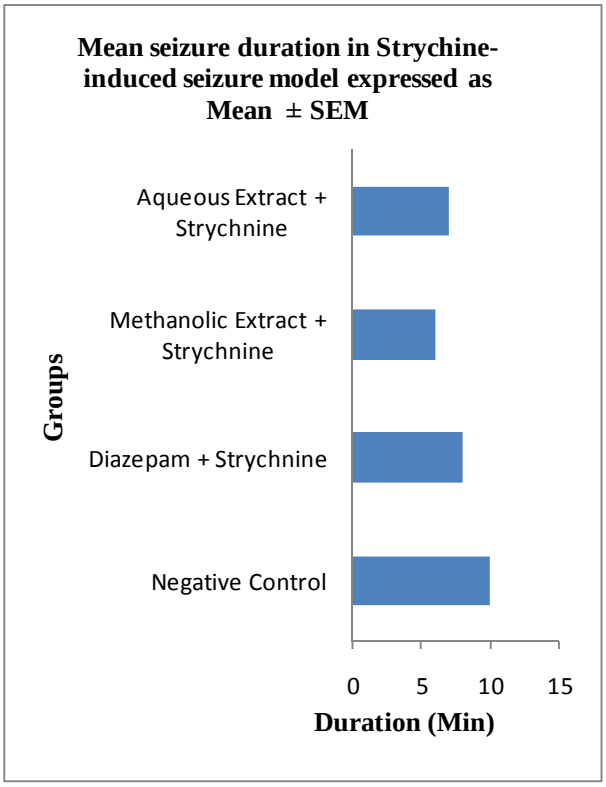


Fig 2: Effect of Diazepam, MESL, AESL on Mean seizure duration in Strychnine-induced seizures model



Discussion: From the experimental data obtained, the study suggests that the Methanolic and Aqueous extracts of leaves of *Securinega leucopyrus* possesses Anti convulsant activity at the dose of 200 mg/kg. The results indicated that MESL has more efficiency to inhibit the duration and frequency of convulsions when compared to AESL. The present study provided a scientific support for the utilization of the plant as anti convulsant. Further research has to be carried out to find out the phytochemicals responsible for the anti convulsant activity.

Acknowledgement: The authors are thankful to the faculty and the management of Chalapathi Institute of Pharmaceutical Sciences, Guntur, for providing the facilities required to carry out the study.

References:

1. Tanko. Y, Eze. E. D, Jimoh. A, Yusuf. M, Mohammed. K.A., Balarbe.F, M.G.Magaji and Mohammed.A; Anticonvulsant activity of Methanol Stem Bark Extract of Securinega virosa (Euphobiaceae) in Mice; IOSR Journal of Pharmacy and Biological sciences (IOSR-JPPS); ISSN: 2278-300, Volume 4, Issue 1 (Nov-Dec.2012), PP 44-47.
2. Musa Mumammad Alivu, Abdullahi Isma'il Musa, Muhammad Ja'afar Kamal and Magaji Garba Mohammed; Phytochemical Screening and Anticonvulsant Studies of Ethyl Acetate Fraction of Globimetula braunii on Laboratory Animals; Asian Pacific journal of Tropical Biomedicine, 2014 Apr; 4(4): 285-289.
3. Foram Parikh and Kedar Prabhavalkar; Anticonvulsant profile of combination of Annona Sqamosa,Nardostachys Jatamansi and Bacopa Monnieri and EPI Caps in mice; Journal of Harmonized Research (JOHR); 4(2), 2015, 140-147.
4. Tukaram Sambhaji Dudhamal and Ahmed Shahan Ajmeer; Diabetic wound treated with herbal paste of *Securinega leucopyrus (Willd.) Muell* - Case Report; International Journal of Advanced Ayurvedic and Herbal Medicine; Volume 1, Issue 1, PP. 1-5, Article ID Med-234.
5. NU Ellepola, SA Deraniyagala, WD Ratnasooriya and K Perera; aqueous extract of *Fluggea leucopyrus* increases urine output in rats; Tropical Journal of Pharmaceutical Research; January 2015, 14 (1): 95-10.
6. T.K. Gopal, T.Sheela, D.Chamundeeswari, C.Umamaheswara Reddy; Investigation of In-vitro Anti-Oxidant, Anti-inflammatory and Anti-Arthritic Activity of Aerial Parts of *Securinega leucopyrus*; Indian Journal of Research in Pharmacy and Biotechnology; ISSN: 2321-5674; ISSN: 2320-3471.
7. Ahamed Shahan Ajmeer, Tukaram S Dudhamal, Sanjay Kumar Gupta and Vyasadeva Mahanta; Topical application of Katupila (*Securinega leucopyrus*) in DushtaVrana (Chronic wound) showing excellent healing effect: A case study; An International Quarterly Journal of Research in Ayurveda; 2014 Apr-Jun, 35(2): 175-178.
8. Trimurti L. Lambat, Sevik B. Gurubaxani, Kalpana P, Ghoshal, Sanjay M. Meshram, Ashish S. Gadwe, Sudhir V. Bhandarkar and Kamalesh B. Bahekar; Antimicrobial Evaluation of Methanolic Extract From Flowers of Securinega leucopyrus (AEFSL) :A Medicinal Approach; Journal of Chemical and Pharmaceutical Research, 2016, 8(8): 938-942.
9. J K. Alphonsa Juliet Helina, G.Dayana Jeya Leela, V. AlexRamani T.Francis Xavier and A. Auxilia;Phytochemical Screening and Anti microbial studies on the medicinal plant Fluggea leucopyrus (Willd.); World Journal of Pharmacy and Pharmaceutical Sciences; Volume 4, Issue 09: 717-726.
10. M.G. Magaji, A.H. Yaro, A.M. Musa, J.A. Anuka, I. Abdu-Aguye and I.M.Hussaini; Anti Convulsant activity of butanol fraction of methanol root bark extract of Securinega virosa Roxb (ex Willd) Baill. In laboratory Animals; Journal of Medicinal Plant Research; Vol.7 (28), PP. 2128-2135, 25 July, 2013.