

EFFECTIVENESS OF SOME HERBAL DRUGS ON THE STATIONARY ROD IN MICE

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ABSTRACT

Objective: The purpose of this study was to screen some plant medicine with psychotropic effects, which have high stimulating activity to CNS and behavior.

Material and Method: Herbal drugs Reserpine from *Rauwolfia serpentina*, *Strychnos nux-vomica*, *Anacardium occidentale* and Chlorpromazine with an extensive variety of pharmacological activities were used. In this clinical trial, we assessed the viability of these herbal drugs as psychotropic effectors and used stationary rod experiment for mice weighing (22-32g), either sex were utilized as a part of this study. One group was kept as control for medications. Mice were treated at room temperature. Tap water was allowed ad-libitum. Animals were observed during and after 21days. A tablet was

crushed in 10ml of water, 1cc was given by force feeding. Screening method used was stationary rod.

Results: Out of them, *Strychnos nux vomica* has been found with desirable activity on cholinergic framework. CNS movement revealed the drug as an antispasmodic. Reserpine, which is a dynamic alkaloid obtained from *Rauwolfia serpentina*, is used to treat hypertension and certain neuropsychiatry disorders. It has calming and sedating impacts as it drains catecholamine from the CNS. Based on the literature search and the therapeutic significance of these herbs, our present study was intended to screen these herbs with respect to their CNS action on Albino mice and rats.

Keywords: Herbal medicine, psychotropic drugs, mice and rats. Nobel Med 2017; 13(3): 29-33

STASYONER RODDAKİ FARELERDE BAZI BİTKİSEL İLAÇLARIN ETKİNLİĞİ

ÖZET

Amaç: Bu çalışmanın amacı Santral Sinir Sistemi (SSS) ve davranış aktivitelerine yüksek stimulan etkisi olan bazı bitkisel ilaçların psikotropik etkilerini incelemektir.

Materyal ve Metot: Çeşitli farmakolojik aktivitelere sahip bitkisel ilaçlar; Roauwolfia serpentina'dan Reserpine, Strychnos nux-vomica, Anacardium occidentale ve Chlorpromazine kullanılmıştır. Bu klinik çalışmada bitkisel ilaçların psikotropik efektör olarak canlılığını değerlendirdik ve her iki cinsten 22-32g ağırlığında farelerde yapılan stasyonere rod deneylerini kullandık. Bir grup fare kontrol grubu olarak tutuldu. Fareler oda sıcaklığında korundular. Sınırsız musluk

suyu verildi. Hayvanlar 21 gün boyunca ve sonrasında gözlemlendi. 10 ml suya bir tablet eritilerek hazırlanan besinden 1 cc alması sağlandı. Tarama metodu olarak stasyonere rod kullanıldı.

Sonuç: Kolinerjik çerçevede istenen aktivite Strychnos nux vomica'da görüldü. Santral sinir sistemi (SSS) hareketleri ilacı antispasmodik olduğuna işaret etti. Rauwolfia serpentina'dan elde edilen ve dinamik bir alkaloid olan Reserpine hipertansiyon ve bazı nöropsikiyatri bozukluklarının tedavisinde kullanılır. SSS'den katekolamin drene edildiğinde sakinleştirici ve sedatif etkisi görülmektedir. Literatür araştırmalarına ve terapötik önemlerine bakarak bu çalışmada bu bitkilerin albino fare ve sıçanlarda SSS üzerine etkilerini görümlenmeyi amaçladık.

Anahtar kelimeler: Bitkisel ilaçlar, psikotropik ilaçlar, fareler ve sıçanlar. *Nobel Med 2017; 13(3): 29-33*

INTRODUCTION

The principle contrasts between allopathic medicine and herbal medicines are attributed to findings and biomedicinal treatment depends on innovation, while herbal prescription relies largely upon traditional background, individual abilities, functional learning and perception of the physician. These are based upon the premise of medical hypothesis and practice, while in biomedicine; they depend on clinical trials and research. Greater part of Pakistani individuals that live in remote areas of Pakistan frequently practice alternatives for medical services which are accessible and utilized for major and minor ailments. Individuals regularly depend on herbal medicine physicians, specifically, but not limited to, for illnesses and chronic sickness. However, distinctive therapeutic customs exists in diverse parts of the nation and have their own particular fortes. In terms of restorative fixings, there are local contrasts in the events and distinguishing proof of plants and materia medica, as effective with the predominance of specific illness. This gives rise to differing methods for practices. For herbal physicians, it is crucial to have an open door where they can share their encounters and talk about particular maladies. The professionals, who will take an interest in these boards, will shrink their own therapeutic plants and restorative legacy. Products based on herbal medicine are one of the major frontiers of research. The apparent simplicity of herbal products after experimental studies proved to be deceptive. CNS effects have been studied more extensively due to availability of experimental models and their involvement in many symptoms such as

depression, catalepsy, convulsions and coma etc. Depression seems to be one of the most common public health problems of developing countries.¹

Depression is regarded as one of the major nervous system disorders in Pakistan. Majority of Pakistani people are hypertensive and most of them have certain neuropsychiatric disorders. Many new biologically active structural analogues are being developed in management of psychiatric illnesses which effect memory and those analogues help reverse the nervous condition. In our study, the effects of some herbal medicine have been evaluated for psychopharmacological profile. Chemical investigation of herbal drugs help us explore more profound use of these herbs/alkaloids and /or better understanding of adverse effects that may arise by the use of such herbal products.²

Strychnos nux vomica is the dried ripe seed of Strychnos nux vomica Linn and belongs to family Loganiaceae. Strychnos is the Greek name for a number of poisonous plants. Nux vomica derived from two Latin words that means a nut that causes vomiting, Nux vomica tree is about 12 meters tall, grows in Sri Lanka, India and North Australia.³⁻⁵ The seed bark and leaves of Strychnos nux vomica contain Strychnine, a highly poisonous substance that severely damages the nervous system.⁶

Strychnine in minute doses has a beneficial effect on body, supporting the digestive system and improves urination. In high doses, strychnine is extremely toxic as a CNS stimulant.⁷ The alkaloid produces excitation

of all parts of the CNS and blocks inhibitory spinal impulses at the post synaptic level. This results in toxic convulsions. Brucine is less toxic than strychnine and is used commercially as an alcohol denaturing agent.⁸

Rauwolfia serpentina is a well-known plant which belongs to the family Apocynaceae, called as Snake root in English, it is an evergreen shrub or tree. Extracts of *Rauwolfia serpentina* have been used primarily as Ayurvedic medicine for a variety of conditions including snakebite, hypertension, insomnia and insanity.⁹ The active constituent of *Rauwolfia serpentina* are indole alkaloids such as reserpine, rescinamine, yohimbine, ajmaline and serpentine. In 1970, Indian physicians had recognized two distinct properties of *Rauwolfia*; one as a hypotensive and other as a sedative. They began using the agent for clinical purposes.¹⁰ After the isolation of reserpine in 1952, it was used to lower high blood pressure. Additionally, since reserpine causes severe depression as a side effect, it is also useful in psychiatry as a tranquilizer in the control of agitated psychotic patients.¹¹

Reserpine produces its anti-hypertensive effects through depletion of catecholamine (adrenaline and nor-adrenaline) from peripheral sites. The hypotensive effect is mainly due to a reduction in cardiac output and peripheral resistance. Large doses cause hypothermia and respiratory depression. The cardiovascular effect of reserpine includes hypotension, reduced heart rate and cardiac output. The hypotensive response of the drug is due to impairment of adrenergic transmission and it results in increased parasympathomimetic effects including increased gastric acid secretions, G.I hyper-motility and miosis.^{12,13}

Anacardium is the marking nut of the *Semecarpus*, a small tree belonging to the Anacardiaceae. A tincture is prepared from the crushed seeds (marking nut). Patients who are indicated the natural drugs Anacardium are reported to suffer from a very peculiar and contradictory state of mind such as laughing at serious matters and serious over trifling things. They also suffer from fixed ideas as their mind and body is separate, they suspect everybody and everything around them. They also become subject to illusions of hearing and smell as such it is indicated that patients have a peculiar sensation of a pin on the surface of body also as a sensation of a plug causing a pressing penetrating pain. These sensations whenever present and in whatever ailment rate, it is the first choice as a remedy.¹⁴

Chlorpromazine is a classical neuroleptic. It acts on particular areas of brain to decrease dopaminergic neuronal firing. It is used as a standard psychotropic.¹⁵



Figure. Stationary rod.

MATERIAL AND METHOD

Study on Mice

Mice weighing (22-32g) either sex were used in this study. One group was kept as control for both drugs. Mice were kept at room temperature. Tap water was allowed ad-libitum. Following drugs and corresponding doses were used:

Animals

Mice were observed during and after 21 days. A tablet crushed in 10 ml of water 1 ml was given, screening method was used stationary rod apparatus (Table 1,2,3,4).

Ethical Approval

The prior consent was taken from Ethical Committee of Hamdard Univeristy. There was no violation of animal rights.

Handling

Animals were observed during 35 days or 5 weeks. Each tablet crushed in a mortar pestle and weighing required amount of active dissolved in 3 ml of water and administered orally to the mice by the oral feeding tube (P.O).

Study on Mice

In the present study, male mice weighing 32-35gm were use. Six mice used in each group that were kept at room temperature and water allow ad-Libitium.

Stationary Rod

Physical activity is the most effective way to maintain a healthy body and mind. There is evidence that exercise has profound benefits on brain function. Physical activity prevents or delay loss of cognitive

Table 1. Drugs with dosage	
Drug	Dosage
Reserpine	0.06 mg
Strychnos nux-vomica	0.07 mg
Semcearpus anacardium	0.08 mg
Chlorpromazine	100 mg/60 kg

Table 2. Table of behavioral pattern of animals (mice)					
Drug	Dosing				
	1	2	3	4	5
Control	-	-	-	-	-
Reserpine	0.06	0.06	0.07	0.08	0.09
Strychnos Nux vomica	0.06	0.06	0.07	0.08	0.09
Semcearpus anacardium	0.06	0.06	0.07	0.08	0.09
Chlorpromazine	0.06	0.06	0.07	0.08	0.09

Table 3. Effect of herbal drug on exploratory activity of mice	
Treatment	Stationary Rod Mean \pm S.E
Control	0.70 \pm 0.46
Reserpine	0.63 \pm 0.47
Strychnos nux vomica	5.2 \pm 5
Semcearpus anacardium	4.2 \pm 4.4
Chlorpromazine	2.62 \pm 1.7

Values are mean \pm S.E.M (n=5), significant differences by student t-test $p < 0.05$ as compared to control.

Table 4. Table of significant and non-significant effect of drugs	
Drug	Stationary Rod
Control	Inc
Reserpine	Dec
Strychnos nux vomica	No significant effect
Semcearpus anacardium	Dec
Chlorpromazine	Dec

functions or neurodegenerative disorders. For the assessment of learning ability and locomotor activity, the stationary rod test was used. Stationary rod is a thin steel wire tied on the two poles, six mice were taken (Figure). The control and the drug treated mice were allowed to hang on the wire with their forelimbs and the time was noted during which their grip is tight. They hold the wire during the times as noted while hanging on the wire. Control mice were kept on the main stationary rod on midpoint and they were given several trials (training), so that it reaches a safe platform built on the either side of the rod. When the mouse was trained, drug was given intraperitoneally. Then 30 min after the administration of the drug, the observation was noted.

Effect of Herbal Drug on Exploratory Activity

There was no effect on stationary rod. There was no effect on food and water intake.

Discussion

Herbal medicine is the utilization of plants to benefit or look after wellbeing of individual man or animal models. Phytomedicine is a term regularly used to mean a more exploratory way to deal with herbal medicine pharmaceutical, where for instance, items are institutionalized and thought to contain indicated measures of the distinguished dynamic substances in the home grown environment. More thorough exploration is likewise generally embraced.

Numerous individuals trust that herbal medication is fundamentally the same compared to other diverse customary drugs, as both frameworks hold all encompassing view and utilize characteristic natural materials. On the other hand, there are contrasts between these two frameworks, for in case, herbal pharmaceuticals depend on the comprehension of the dynamics of alkaloids development as indicated by its qualities. It has its one of the systems, like physiology or pharmacology, contained in a comparative structure as model medication and science. There has been an energizing open deliberation about the distinctions for restorative plants in the northern areas and other places of the country; which have been affected due to utilization of therapeutic plants in some particular cases.

Study undertaken will enhance the personal satisfaction of the general population and will bring enthusiasm for herbal solution treatments developing at an appreciable rate, effortlessly outpacing the examination directed into their security and adequacy. Individuals are regularly pulled in to the "common" and protected and delicate picture of these treatments, especially in treating perpetual restorative conditions, for which ordinary medicines are frequently not completely satisfactory.

This study is aimed to evaluate different behavioral changes produced by the healing properties of herbs that are at least being scientifically investigated. There are two main focuses of research. One is examination and the other was evaluation of the effectiveness of some herbal extracts using assessment tools for behavior. Research undertaken provides a scientific basis of herbal remedies. The other direction of research is the search for the newer drugs among known plants or in new plant species. To establish Herbalism on scientific grounds psychopharmacological screening is generally used

in order to indicate simply the presence or absence of a response. Thus, the fundamental elements of a drug discovery program are the bioassays used to detect substances with biological activities. The CNS screening generally includes open field activity, cage crossing, swimming induced depression, radial maze and stationary rod. There was a group in which 6 mice per group were used with one group kept as control. They were provided with food and water ad-libitum and different CNS screening tests were performed. During the course of present study herbs life Rauwolfia serpentina, Strychnos nux vomica and Anacardium were studied with relevant pharmacological screening Rauwolfia serpentina has been used since centuries in folk medicine in east India. Reserpine is now also used as antihypertensive.¹⁷ Chronic reserpine treatment showed a non-significant effect on water intake. Previously, it was reported that reserpine increased water intake in the light phase and the animal consumed less water in the dark phase. Other herbal drugs such as the nux vomica and anacardium did not produce any remarkable effect.¹⁸

In the present study, motor activity is significantly decreased in stationary rod. Reserpine treatment induced hypolocomotion mediated by nigral dopaminergic dysfunction.¹⁹ Producing few effects on peripheral movements reasoning, growing, immobility and defecation.²⁰ Nux vomica and anacardium did not show significant effects. In conclusion, the present results show that oral intake of Rauwolfia serpentina in mice brings about behavioral changes. Reserpine affects feeding behavior as well as the body weight.

CONCLUSION

On the basis of behavioral observations for which this study has been conducted, it is observed that all studied animals meet the standard criteria for psychopharmacological behavioral assessment during the study period.

*The authors declare that there are no conflicts of interest.



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