Review Article

A Review of Herbal Drugs Used in the Treatment of Epilepsy

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ABSTRACT

Convulsion is the second most common neurologic disorder after stroke. It is a condition where the patient suffers from recurrent seizures. To make control over repeated seizures conventional drugs came into existence. Most of the epileptic patient needs polytherapy of conventional anticonvulsants still not 100% cured.This article has been made to review of following plants which are used in/as antiepileptic agent. Different herbs have a vital role in the prevention and treatment of convulsion. The phytochemical exploration of these herbs has contributed to some extent this role for the development of new anticonvulsant drug.This conventional anticonvulsant has a major drawback that due to these agents there is chronic side effect and drug interactions which restrict its use.

Keywords: Epilepsy, anti-epileptic drugs.

INTRODUCTION

Epilepsy called " Farfadiya" in Hausa has changed from the old belief that was through to be a curse or caused by goods and then treated by incantation herbs rituals and magic to a modern scientific concept once a person is diagnosed and known to be epileptic his carrier and employment ever in government agencies may be adversely affected[1]

The herbal medicines principles are relatively simple although they are quite distinct from conventional medicine. India is a rich source of medicine such as Ayurveda, Unani and Siddha only a few of them have been scientifically explored.[2]

In modern medicine,epilepsy is considered to be a chronic brain syndrome of various etiology characterized by recurrent seizures and usually associated with loss or disturbance of consciousness. There may be a characteristics body contraction (conclusion). The seizure is due to excessive electrical discharged in the brain and the seizure pattern depends not only on the cause but the origin extent, Intensity and type of epileptic discharged in the brain. Drugs used in treatment of epilepsy are collectively termed "Anticonvulsants". The mechanism of seizures suggests abolish or attenuate them.[3]

The term epilepsy is collectively designated for a group of chronic central nervous system (CNS) disorder (Neurological disorder) characterizedby spontaneous occurrence of seizures generally associated with the loss of consciousness and body movements (Convulsion)[4] there annual incidence of50/100000 per year. [5] Epilepsy is defined as recurrent seizures that are not the immediate result of an acute cerebral insult.[6]

Classification of Epileptic Seizures

Type Of Seizures	Symptoms / Key features
Focal Seizure without Altered mental status	Symptoms vary depending on location Of abnormal activity in the brain:Involuntary repetitivemovement, (motor cortex) parenthesis (Sensory cortex), flashing light (Visual cortex) etc. **Consciousness is preserved**. Spread to ipsilateral region within cortex (e.g. "Jackson Ian march")
With altered mental status	Symptoms typically result from abnormal activity in the temporal Labe (amygdala,hippocampus) frontal Labe. **Altered consciousness** (Cessation of activity , loss of contact with reality)often associated wi involuntary "automatism" ranging from simple repetitive movements (lip smackinghand wringing highly skilled activity (driving, playing musical instrument) Impaired memory of ictal phase classically preceded by an aura.

Focal Seizures with secondary generalization	Initially manifests with symptoms of focal Seizures with or without altered mental status. Evolves into a tonic- colonic with sustained contraction (tonic) followed by rhythmic movements (colonic) of all limbs. Loss of consciousness proceeded by aura.

Primary Generalized Seizures

Absence seizure (petit mal)	Sudden, brief interruption of consciousness Blank store Occasional motor symptoms such as lip smacking, rapid blinking Not preceded by an aura.
Plyoclonic seizure	Brief (1 second or less) muscle contraction: Symptoms may occur in individual muscle or genera to all muscle groups of the body (the latter can result in falling) Associated with syst disease states such as uremia, hepatic failure, hereditary degenerative conditions, Creutzfeldt-Ja disease.
Tonic- colonic (grand mal) Seizure	Symptoms as described above but onset is abrupt and not preceded by symptoms of focal seizu

Antiepileptic plants

Traditional herbs are very useful and indispensable in the struggle for seizure management and future Anti-Epileptic Drug (AED) development. Therefore alternative therapy including herbal drugs and complementary medicine is becoming increasing popular.[8]

Fig. 1: Datura metal

There are a new plant which are *Datura Metal limn (Solanaceae)* which are used in traditional medicine for several years to treat epilepsy and other problems, Medicinal plants have contributed a rich health to human beings plant extract and their bioactive compounds present in them which are responsible for antiepileptic activity have to be screened for their valuable information rather than using a whole plant , pharmacologists identify isolate extract and synthesize individual components thus capturing the active properties or constituents. Herbal medicines are very cheap in comparison to the conventional form of medication. It's something which every pocket can afford unlike other forms of medication which can afford, unlike other forms of medication which can create a big hole in your wallet. One of the greatest benefits associated with herbal medicine is the non-existence of side effects. Although herbal medicine has the potential to curve many ailments, the curing period is usually longer in comparison to conventional medication.[9]

In Africa and in Cameroon particularly, polytherapy in traditional medicine still plays an important role in the management of diseases mainly among populations with very low income (Geoflrg & Kirby ,1996) and polytherapy relies on the use of a wide variety of plant species. These plants shows antiepileptic activity, *Ricinus communis* linn (Euphorbiaceous), *Citrus sinenis* (linn), Osbeck (Rutaceae) and several other plants which are described below-.[10]

Sr. No.	Medicinal Plant	Family	Chemical Constituents	Parts	Used
1.	Cannabis Sativa	Urticaceae	Cannabinoids'	Leaves	Anti-convulsont
2.	Canscora Decussata	Gentianaceae	1,3,5- tri & 1,3,5, 6,7-penta-oxy-xamthones	Entire plant	Anti-convulsont
3.	Cinchona Officinalis	Rubiaceae	Quinine	Bark, root	Anti-convulsont
4.	Mognolia Officinalis	Magnoliaceae	Magnlod and honokiol	Bark	Anti-convulsont
5.	Nardastachys Jatamansi	Valerianaceae	Jatamansinone	Root, rhizome	Anti-convulsont
6.	Panax ginseng	Araliaceae	Saponins	Root	Anti-convulsont
7.	Rauwolfia Serpentine	Apocynaceae	Reserpine	Whole Herbs	Anti-convulsont
8.	Vaeriana Officinalis	Valerianaceae	Valepotriates, Valtrates, Valeridine, Valechlorine	Root	Anti-convulsont
9.	Ergot (clavicepsperpu	Clavicipitacea	Ergot Alkaloids, Ergotamine Bromocriptine	Ergot Exfact	Anti-convulsont

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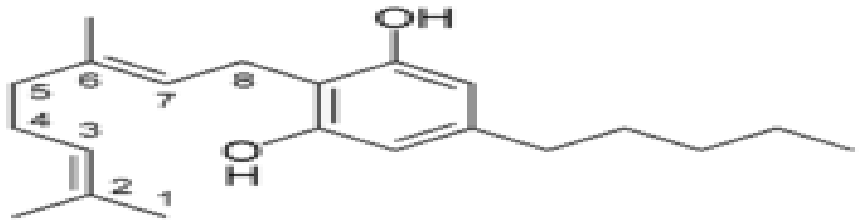
The alternative drug therapy for the management of this disease can be by the use of medicinal plants and their active principles. In the present study plant from India with a traditional claim of antiepileptic activity and neuroprotective properties has been selected and a Datura metel extract is prepared in different medium.[11]

2. Cannabis Sativa

Fig. 2: Cannabis Sativa

Cannabis consists of dried flowering tops of the cultivated female plants of *Cannabis sativa*Linn.belonging to family Urticaceae / Cannabinaceae.
It's indigenous to India;it is cultivated in Maharashtra, West-Bengal and Madhya Pradesh.
Cannabis comprises is to 20% of resin (present in glandular trichomes) which contains the major active euphoric principle 1-3-4 Trans tera-hydrocannabinal (Commonly known as Δ^1 THC).



Structure of Cannabinoids

It contains volatile oil, trigonelline and choline. The resin also contains cannabinol, cannabidiol, cannabidiolic acid, connabichromene and cannabigerol. [12]

3. Canscoradecussata

Fig. 3: Canscoradecussata

Canscoradecussatais famous with name Shankhpushpi. This consists of the aerial parts of the plant known as Conscora decussate, family Gentianaceae. Shankhpushpi is found thought India up to an attitude of 1300m. It is also grown in Sri Lanka and Myanmar. Two crystalline compounds have been isolated from the aqueous and alcoholic extract of the plant. Shankhpushpi is found to contain triterpenes, alkaloids and Xanthene's like 1, 3, 5-tri and 1, 3,5,6,7-penta-oxy-Xanthones.
The fresh juice of the plant is prescribed in insanity, epilepsy and nervous debility. [12]
Cinchona is famous with synonyms like Jesuits bark, Peruvian bark. It is the dried bark of the cultivated trees of Cinchona officinal is belongs to family Rubiaceae.
In India it is cultivated in Annamalai hills (Coimbatore district) and Nilgiri hills (Nilgiri district) in Tamilnadu and in Darjeeling area of West Bengal.

Extraction of Quinine
For extraction of quinine, the bark is powdered and extracted with benzene or toluene in presence of alkali. Further the alkaloids are extracted with dil-sulphuric acid. By bringing the acid extract to neutrally quinine Sulphate separates as it is sparingly soluble.

Chemical constituent
Cinchona bark contains about 25 alkaloids, which belong to quinoline group. The important alkaloids are quinine, quinidine, cinchonime and cinchonidine.Quinine and Quinidine are stereoisomers of each other.[12]

4. Nardostachys jatamansi

Fig. 4: Nardostachysjatamansi

Synonyms: Nard, Indian spike hard.

Biological Source: Jatamansi consist of dried rhizomes of *Nardostachysjatamansi D.C*. family Valerianaaceae.
These plants are found in the Alpine Himalayas at an attitude of 3000-5000m; it is grown from Punjab to Skim and in Bhutan.

Chemical constituent: Jatamansi contains 1 to 2% of pale yellow volative oil, resin, sugar, starch& bitter principle, an alcohol and its isovaleric ester. It also contains jatamsic acid & ketones jatamansone and nardostachone Jatamansinone.
Nardostachys jatamansi is stimulant in small doses and also useful in epilepsy, hysteria and palpitation of heart.[12]

5. Panax ginseng

Fig. 5: Panax ginseng

Synonyms: Ninjin, Pannag,Panax.

Biological Source: Ginseng is the dried root of various species of Panax like *Panax ginseng , Panax japonica* etc. belonging to family Araliaceae presently , ginseng is commercially cultivated in Korea, China, Japan, Russia, Canada, United Sates of America.

Chemical constituent
Ginseng contains a mixture of saponin glycosides belonging to triterpeniod group. They are grouped as Ginsenosides, Panaxosides and Chikusetsusaponin. The Chikusetsusaponinsaponin from panax ginseng used as anticonvulsant.[12]

6. Rauwolfia Serpentine

Fig. 6: Rauwolfia Serpentine

Synonym: Serpgandha, Rauwolfiaroot,chhota chand

Source: Rauwolfia consist of dried roots of the plant known as ***Rauwolfia serpentine*** Benth belonging to family Apocynaceae.
Several species of Rauwolfia are found distributed in the tropical regions of Rauwolfia are found distributed in the tropical regions of Asia, America and Africa commercially it is produced in India, Sri Lanka ,Myanmar, Thailand and America. In India it is cultivated in Uttar Pradesh, Bihar, Orissa, Tamilnadu, West Bengal, Karnataka, Maharashtra and Gujarat.

Chemical Constituent
About 30 indole alkaloids have been reported in drug and total alkaloidal content of rauwolfia root ranges from 0.7 to 3% depending upon the source.
The important alkaloid of rauwolfia is reserpine. The major alkaloids reserpine and rescinnamine are ester derived from methyl reserpate and trimethoereybenoic acid in reserpine and trimethoxybenzoic acid in case of rescinnamine.
Reserpine lowers the blood pressure by depending stores of catecholamines at nerve ending.

7. Valerinaofficinalis

Fig. 7: Valerinaofficinalis

Synonym: European Valerian

Source: It consist of thick dried rhizomes and roots of *Valerian officinals* family Valerianaceae collected in autumn.It is obtained from wild and cultivated plants in England, Holland, Germany, Belgium, France and Japan.

Chemical Constituent

It yield 0.5 to1% of volatile oil. This contains ester (bomyl acetate, bomyl formte, bomyl isovalerinate), terpenes, alcohols and a Sequiterpene alcohol (Valerianol)

The main active principle wich shows anticonvulsant properties arevalepotriates, valtrate, valeridine, valechlorin.

8. Ergot:

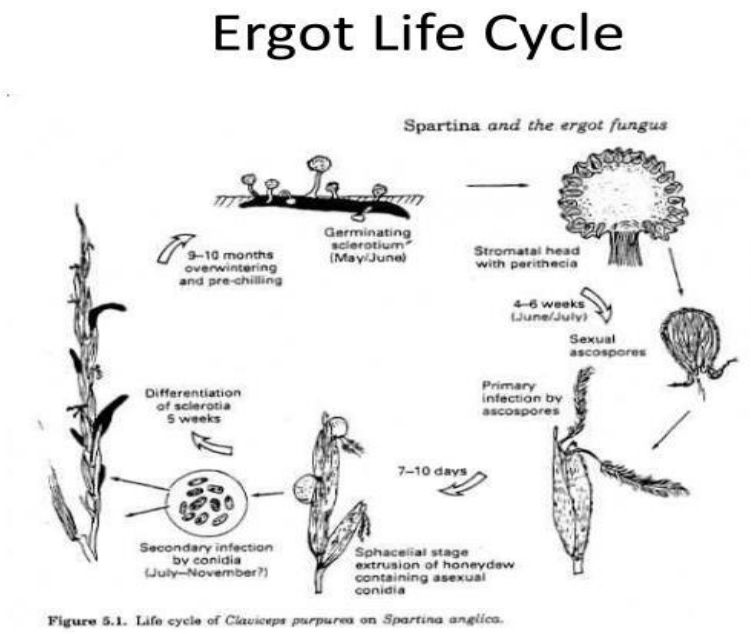


Figure 5.1. Life cycle of *Claviceps purpurea* on *Spartina anglica*.

Fig. 8: Life cycle of Ergot

Synonym: Ergot of Rye, Ergota.

Source: Ergot is the dried sclerotium of a fungus, claviceps purpure. Tulasne (Clavicipitaceae) developed in ovary of rye plant secale cereal linne (Graminae). It contains notless than 0.19 per ceng of the total alkaloids of ergot calculated as ergotoxine of wich not less than is per cent consist of water soluble alkaloids of ergot calculated as ergometrine.
It occurs in Switzerland, Yugoslavia, Hungary and Czechoslovakia.

Chemical Constituent
Ergot contains large number of potentinodle alkaloids (0.1 to 0.25%), which are derivatives of lysergic acid. Lysergic acid is present in its peptide derivative form and hence the alkaloids are also called as peptide alkaloids.

Table: Ergot Alkaloids

(-) Laevorotatory Alkaloids		(+) Dextrorotatory Alkaloids
Ergometrine	Water Soluble	Ergometrinine
Ergotamine		Ergotaminine
Ergosine		Ergosinine
Ergocristine	Water insoluble	Ergocristinine
Ergocryptine		Ergocryptinine
ErgocornineErgocorninine		

Dose of Ergotamine
Ergotamine tartara → 1-2 mg Sublingual, 250-500mg intramuscular / Subcutaneous[12]
Traditional medicinal pacties have remains as a component of health care system of many societies in spite of the availability of well established alternatives (Oyeka 1981; Ndoye 2005). But focus has shifted to te use of herbal remedies in the management of epileptic seizures probably because these measure fit into the cultures of people and are not usually as expensive and do not possess many side effects, contraindications and possible interaction with drugs used simultaneously. The alternative drug therapy for the management of this disease can be by the use of medicinal plants and their active principle. [8] The medicinal plants for the study are selecting in such a way that their availability is maximized in many parts of the word. [11]

GENERAL MODELS USED IN EPILEPSY
The search for therapeutic approaches to epilepsy has been based an animal seizures.[13]

IN VIVO MODELS USED IN EPILEPSY

1. Maximum electroshock in mice.
2. PTZ induced convulsion in mice and rat.
3. Strychine induced convulsion in mice.
4. Picrotoxin induced convulsion in mice.
5. Bicuculline induced convulsion in rat.
6. Pilocarpine induced convulsion in rat.

IN VITRO MODELS

1. ^{3}H GABA receptor binding.
2. $GABA_A$ receptor binding.
3. $GABA_B$ receptor binding.
4. ^{3}H GABA uptake in rat cerebral cortex synepto some.
5. GABA uptake and release in rat hippocampal slices.

CONCLUSION
This study is undertaken to evaluate the anticonvulsant and sedative properties of few medicinal plants used in the treatment of epilepsy. The present study revealed anticonvulsant potential of some medicinal plants. These remedies can make anticonvulsant treatment more rationale and patient friendly.

In conclusion the medicinally important plant species, listed in the present paper appear to be promissory sources of anticonvulsant agents.

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