



RECENT UPDATES ON MANAGEMENT OF EPILEPSY THROUGH AYURVEDA: A REVIEW

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ABSTRACT

Epilepsy (Apasmara) is a common neuropsychiatric disorder with major public health problem all over the world. Convulsive activities lead to neuronal cell loss, therefore timely treatment is essential. Present antiepileptic drugs control the epilepsy but long term use generates adverse effects at cognitive level, behavioural and affective disorders. An integrated approach is needed to concentrate on the burden of epilepsy care, prevention, and rehabilitation. Ayurveda has both palliative and curative protocols which recalibrates the body from the pathological to the physiological state. This review is aimed at summarizing the treatment modalities which includes purificatory measures such as therapeutic purgative, Pacificatory therapies like single herb, polyherbal formulations and Non-pharmacological therapies such as psychotherapy along with therapeutic intervention that have been used during the episode and between the episodes which are reviewed as recent developments on epilepsy in the field of Ayurveda that have been published in few databases.

Keywords: Epilepsy, Apasmara, Ayurveda, Rehabilitation, Antiepileptic drugs.

INTRODUCTION

Epilepsy is a condition with recurrent seizures having paroxysmal event due to chronic, abnormal, excessive, hypersynchronous discharges from central nervous system (CNS) neurons in the brain¹. Apasmara bears a striking similarity with the disease epilepsy which is defined as sudden abhorrent bodily activities accompanied by momentary blackouts or loss of consciousness owing to disturbance in mental faculties of intelligence, retention and memory². Approximately 50 million people worldwide have epilepsy making it one of the most common neurological diseases globally. Studies prove that 2.4 million people are diagnosed with epilepsy each year and in India the prevalence is between 5 and 40 per 1000 persons³.

Understanding of Epilepsy in Ayurveda: Apasmara is included under the group of disease affecting both the mind and body⁴. The aetiology of Apasmara is identified as intake of unwholesome and unclean food, practicing unhealthy behaviours, suppression of attribute of mind representing purity and disturbed equilibrium of Doshas (humours) plays a significant role in manifesting the disease⁵. Diagnosis of Apasmara is based on the observation of premonitory Symptoms as deviation eyes, auditory hallucinations, loss of interest in food, excessive salivation or nasal discharge, gurgling sound in stomach, feeling of darkness, giddiness and the main presenting features as loss of consciousness, feeling of entering into darkness, unstable clonic tonic movements of limbs, constriction of fingers, tremors, falling on ground, eye and head deviation to one side, teeth biting, dribbling of frothy saliva. On the basis of dominant Dosh (humour) involved in its pathogenesis and clinical manifestations of epilepsy, it classified as Vataja, Pittaja, Kaphaja and Sannipataja⁶. In Ayurveda, the general

management of epilepsy has dual approach, a) During the episode and b) After the episode. These approaches can be considered to have a palliative and curative action which rectifies the body from the pathological to the physiological state.

The present review is an attempt to list out the various research modalities hypothesized as the management of Epilepsy which were updated in various databases. To provide an overview of epilepsy, the recent developments and the role of Ayurveda in its management is been explored.

RECENT UPDATES

After careful examination of the subjects, by considering the disease, Dosha, host factors and stage of pathogenesis of the Apasmara, following outcomes of review are presented below.

Nidana parivarjana (avoiding causative factors): Prevention is better than cure- the general line of management holds good by giving first priority in avoiding the stressful events or psychological trauma caused due to negative emotions like worries, passion, fright, anger, grief, anxiety.

Deepana-Pachana (preparatory therapies): It Stimulates vagus nerve⁷ which reduces the seizures by about 20-40 percent⁸. Studies suggests that Deepana-Pachana (stomachic – secretagogue⁹) with 1 tablet of Aampachakavati (Haritaki- *Terminalia chebula*, Shunti- *Zingiber officinale*, Maricha- *Piper nigrum* Pippali- *Piper longum*, Suddhakaraskara- *Strychnus nuxvomica*, Suddhahingu- *Ferula foetida*, Cow's ghee, Rock salt) two times in a day before meal helps in the digestion of stagnant food material and prohibits adhesion of the channels

which is very important in preventing the manifestation of the disease¹⁰.

Shodhana Chikitsa (purificatory method): It allows the biological system to return into normalcy by eliminating toxins from the body and facilitating the pharmacokinetic effect of therapeutic remedies administered¹¹. These modalities have demonstrated significant effects on psychoneuroimmunologic parameters in studies of neuropsychiatric illness. Use of Teekshna (drastic) Shodhana clears the obstruction by eliminating the Doshas (humours) and Thus, it controls Apasmara. In Vataja Apasmara -Basti (medicated enemas), Pittaja Apasmara-Virechana (Purgation) and in Kaphaja Apasmara-Vamana (Emesis) - is administered¹².

Vamana (emesis): It is the process where vitiated Doshas are forcibly expelled through the oral route. It is very evident that Vamana is contraindicated in Vata dominant diseases, the diseases involving vital organs and which may further impair the condition. Active participation of the patient is important in case of administering Vamana as it may induce the stress, asphyxia, impaired cardiac function and further resulting in attack of epilepsy. Thus, only when there is an absolute indication of Vamana it is administered with necessary precautions.

Virechana (purgation): It is the process where elimination of morbid humors achieved through the downward track from the body¹³. Virechana is the process that leads to evacuation of toxins. Some of the research data correlated acetylcholine with Vata, catecholamine with Pitta, and histamine with Kapha. Studies observed that after Virechana, there was reduction in the plasma catecholamine contents in the patients to a significant level. When the Aggravated Manasika Dosh influences the Vata Dosh which results in repeated attack. Virechana eliminates all morbid Doshas from all micro to macro nourishing channels and regulates Vata Dosh, thus decreases the symptoms of Vata, Pitta and Kapha at Srotas level¹⁴. Virechana is less stressful procedure when compared with Vamana, which has less possibility of complications and easy to conduct.

Basti (medicated enema): It is the treatment modality where the medicine is administered through the anal canal having curative, preventive and promotive action. Epilepsy is chronic disease with aggravated Vata Dosh which results in repeated attack. Basti is considered as prime and complete treatment modality for Vata dosha. Yapan Basti namely Madhutaikika Basti is indicated in all seasons and all diseases which nourishes as well as serves the purpose of purification¹⁵.

Nasya (errhine therapy): It is a therapeutic measure where the medicated drugs are administered through the nose. Here lipid soluble small molecules result in direct movement of the drug from the sub-mucus space of the nose into the CSF, Following diffusion across the nasal mucosal barrier. The drug may cross the arachnoid membrane and enter into olfactory CSF and then to the blood via CSF absorption at the superior sagittal sinus. Formulations containing therapeutic agents and attached with receptor epitomes and antigens have been reported to provide a means for enhanced delivery to selective regions of the CNS after transnasal administration.

In Apasmara, regaining consciousness is achieved by irritative effect of Dhmapana Nasya (blowing of fine powder like Marica (*Piper nigrum*), Sigrum (*Moringa oleifera*), Damanaka (*Artemisia vulgaris*). Studies prove that ingredients administered through the nasal route reduce the frequency, duration and the severity of

attacks rapidly. This probably is due to the fact that Nasya is believed to be a therapy which delivers drugs directly to the head¹⁶.

Siravedha (venesection): It is the Procedure of removing the vitiated blood using surgical or parasurgical measures. The measure recommended in epilepsy is blood-letting from veins of temples (Sira Shankha Keshanthasandhi), middle vein adjacent to the joint of the jaw bones (Hanu Sandhi), tips of the eyes (Apanga)¹⁷.

Bahi Parimarjana Chikitsa (external therapy):

Anjana (collyrium): Collyrium is the application of medicines to the eye. Use of Anjana (collyrium) and Anjana Vartika (collyrium stick) to regain the consciousness has been mentioned. The prepared Gutika/Vataka of Sarshapa (*Brassica campestris*), Kanchanara (*Bauhinia variegata*), Ajamutra (Goats urine) is applied as Anjana to eye lids¹⁸.

Abhyanga (massage therapy): Anointing the body with simple or medicated oil by external manipulations. It is said to increase the blood amino acids like tryptophan, reduces the stress, stimulates nervous system, muscular system glands governed by the particular nerve¹⁹. Abhyanga can be done with Katabhyadi Taila (mustard oil cooked with four times of goat's urine)²⁰.

Shirodhara: The procedure where Particular pressure and vibration is created over the forehead by continuous dripping of the oil or any liquid media. Vibration along with considerable temperature results in activating the functions of thalamus thus brings the amount of serotonin and catecholamine to normal level in order to achieve the anticonvulsant effect²¹.

Udavartana (powder massage): Friction of the body with powdered medicine without mixing oil or other liquids. Studies reports that use of Yavatriphala Churna for Udavartana, induces friction of the drug to the skin thereby increases local temperature, opens the circulatory channels and facilitates the metabolic activity²².

Dhoopana (fumigation): Smoke produced at high temperatures is considered as a simple way of administering a drug, which exhibits rapid pharmacological activity when inhaled. Dhoopana has direct biochemical healing effect on CNS tissue diseases & complexities. Dhoopana seems to have multiple actions in preventing Apasmara (Seizure disorder/ Epilepsy) through scavenging of free radicals, increase in antioxidants, decrease in nitric oxide and other underlying mechanisms helpful in reducing the epileptic seizures²³.

Rasayana Chikitsa (rejuvenation therapy): The concept of Rasayana therapy is oriented to enhance quality of health in an individual. Rasayana drugs have antioxidant, anti-ageing and anti-stress effect act as scavengers helping to prevent cell and tissue damage. Rasayana drugs like Mandookaparni (*Centella asiatica*), Yashtimadhu (*Glycyrrhiza glabra*), Guduchi (*Tinospora cordifolia*), Shankhpushpi (*Convolvulus pluricaulis*), Brahmi (*Bacopa monnieri*), Kustha (*Saussurea lappa*) Swarasa or Vacha (*Acorus calamus*) with honey are beneficial in epilepsy²⁴.

Daivavyapashraya Chikitsa (divine therapy): In this category incantation, wearing sacred herbs, wearing precious gems, sacrifice is considered. Homa (Oblation) is the religious offering has been designed to fight against diseases related to brain. Most of the active components of Homa Samagri are abounded with

volatile oils which volatilize due to high temperature of the fire. Most of these components observed for its anticonvulsant activity with their mechanism. Most of the herbs used in Homa are having the action like benzodiazepines, Phenobarbital, valproate which enhances GABA-ergic inhibition. These herbs are also seeming to have a multiple action in preventing epilepsy through scavenging of free radicals, increasing the level of antioxidants, decreasing the level of nitric oxide and other underlying mechanisms²⁵.

Sattvavajaya Chikitsa (psychotherapy): It is the non-pharmacological approach for treating the mental disorder²⁶. It falls under Advaya-bhuta Chikitsa. Sattvavajaya Chikitsa is administered through Jnana (knowledge), Vijnana (analytical thinking), Dhairya (courage), Smrti (memory) and Samadhi (concentration). It is recommended, when epilepsy is associated with extrinsic factors. Apart from these, measures like calming the patient with assurances and words of religious and moral will be of greater benefit. It is also important to improve the emotional intelligence through positive training and programming of mind and brain to cope with the adverse situation by the cognitive behaviour therapy, rational emotive behaviour therapy. Epilepsy is known to have adverse effect on education, employment, marriage, and other essential social opportunities. Economic burden associated with epilepsy is very high with treatment and travel costs emerging as an important contributing factor. The huge treatment gap and poor quality of life is further worsened by the associated co-morbidities and conditions. Thus, a multidisciplinary response is needed to address the burden and impact of epilepsy which calls for an integrated and multipronged approach for epilepsy care, prevention, and rehabilitation. Service delivery, capacity building, integration into the existing program, mobilizing public support, and increasing public awareness will be the hallmarks of such an integrated approach in a public health model²⁷.

Avasthika Chikitsa: During Episodes, the primary aim is to bring back the consciousness of the patient. So different modalities are used in order to regain the consciousness. Treatment After episode or between the episodes is aimed at keeping the threshold value of the anti-seizure elements in the body & help in preventing Epilepsy.

Formulations used during the episodes are

- 1) fumigation through the root of Vacha (*Acorus calamus*) and fruit of Marica (*Piper nigrum*) to nose,
- 2) Anjana & Nasya from the equal parts of the powder of roots of Madhuyasti (*Glycyrrhiza glabra*) and Vaca (*Acorus calamus*), rhizome of Tagara (*Valeriana wallichii*), bark of Sirisa (*Albizia lebbek*) and bulb of Rasana (*Allium sativum*)
- 3) Abhyanga with Sarsapataila (oil of *Brassica campestris*) boiled in 4 times goat's urine and prepare taila by taila Paka method. Whole body of the patient is to be massaged with it and between the episodes of seizure
 - 1) Svarasa of whole plant of Brahmi (*Bacopa monnieri*) is to be taken in 14 to 28 ml. doses with 4 to 6 g. honey twice a day.
 - 2) Bulb of Rasana (*Allium sativum*) is to be taken in 1 g. dose with 5 ml. Tila taila twice a day. Powdered root of Madhuyasti (*Glycyrrhiza glabra*) is to be taken in 3 to 6 g. dose with 7 to 14 ml.
 - 3) Svarasa of fruits of Kusmanda (*Benincasa hispida*), twice a day for three days²⁸.

Shamana Chikitsa (pacification therapy): Oral use of different Herbo-mineral formulation is suggested after Shodhana Chikitsa. As shown in the table 1 & 2, following single and compound formulations can be used for the management of the Apasmara.

Phytomedicine consists of many organic chemical constituents with complex pharmacological effects on the body. These conclusions validate the traditional use of the plant in the control and treatment of convulsions in epilepsy. The link between herbal medicines and seizure activity are compelled below.

Table 1: Herbs having anticonvulsant activity for the management of Epilepsy described in Ayurveda^{29, 30}

SI	Botanical name	Sanskrit name	Active principle	Comments
1	<i>Mangifera indica</i>	Aamra	Polyphenolics, triterpenoids, mangiferin, catechin, iso-mangiferin, alanine, glycine, γ -aminobutyric acid, kinic acid,	Inhibit PTZ and MES induced convulsions, increases GABA levels, Anticonvulsant action.
2	<i>Crocus sativus</i>	Kunkuma	Crocin, picrocrocin, safranal, isophorone,	Increases seizure threshold, block PTZ induced convulsions, increases GABA-ergic neurotransmission, Inhibit absence seizure, Improve tonic clonic seizures.
3	<i>Nardostachys jatamansi</i>	Jatamansi	Valeranone, Calerene, patchouli, α -gurjunene, aristolone, β -maaliene, spathulenol	Increases seizure threshold, inhibit the electroshock convulsions Increases GABA, 5-HT, 5-HIAA.
4	<i>Cocos nucifera</i>	Narikela	Mono unsaturated fatty acids, Saponins.	Inhibit PTZ induced convulsions. Increase GABA level, serotonin level.
5	<i>Sesamum indicum</i>	Tila	Propanone, ethanone	Decrease ROS, MDA in epileptics
6	<i>Eugenia caryophyllus</i>	Lavanga	Eugenol, acetyleugenol, β -caryophyllene, vanillin, crategolic acid, tannins, gallotanic acid methylsalicylate, flavonoids, eugenin, kaempferol, rhamnetil, eugenitin & triterpenoidslike oleanolic acid.	Increases onset of convulsions. Reduce duration of convulsions. Delay onset on seizures. Increase GABAergic and glycinergic activity.
7	<i>Myristica fragrans</i>	Jatiphala	Myristicin and Macelignan	Inhibit seizures and uses the severity of seizures.
8	<i>Acorus tatarinowii Schott</i>	Vacha	Essential oils and asarone	Prevents convulsion related GABA -ergic neuron damage in the brain, Neuro protective against N-methyl-D-aspartate or Glu-induced excitotoxic neuronal cell, Recepting-binding assay act as specific binding to striatal dopamine D1 and D2 receptors
9	<i>Mesua ferra</i>	Nagkesara	Sesquiterpene, diterpenes,	Reduce HLTE. Inhibit MES induced convulsions.

			triterpenes, carboxylic acids and saturated hydrocarbons	Increases the onset time of seizures and decreases the duration of seizure.
10	<i>Valeriana wallichii</i>	Tagara	Valerian, valipotriates GABA sesquiterpene, diterpenes, triterpenes, carboxylic acids and saturated hydrocarbons	Sedative action. Decrease HLTE. Anticonvulsant activity.
11	<i>Cyperus rotundus</i>	Musta	Cyperone, selinene, cyperene, cyperotundone, patchulenone, sugeonol, kobusone and isokobusone, pinene (monoterpene) derivatives of sesquiterpenes such as cyperol, isocyperol and cyperone.	Anticonvulsant action.
12	<i>Zizphus jujube</i>	Karkandu	Flavonoids, saponins, tannins, vitamin A, vitamin B, sugars, mucilage, calcium, phosphate & iron.	Anticonvulsant action
13	<i>Nelumbo nucifera</i>	Kamala	N-nornuciferine, O-nornuciferine, nuciferine, and roemerine, protein, amino acids, unsaturated fatty acids, minerals, starch, and tannins.	Decrease tonic extensor convulsions. Anticonvulsant action
14	<i>Acorus calamus</i>	Vacha	Methanol and acetone extract of roots and rhizomes	Psychoactive substances which act as CNS depressant in nature prevent the development of FeCl ₃ -induced rat epileptogenesis by modulating antioxidant enzymes.
15	<i>Albizzia lebbek</i>	Shirisha	Saponins from leaves	Nootropic and anxiolytic activity
16	<i>Anacyclus pyrethrum</i>	Akarakarabha	Hydroalcoholic extract	Prevents seizure induced oxidative stress and cognitive impairment. Regulate the decrease in cholinesterase activity caused by seizures.
17	<i>Anisomelesmala barica</i>	Mahadrona	Ethyl acetate flavonoids fraction from leaves	Antiepileptic potential.
18	<i>Anthocephalus cadamba</i>	Kadamba	Ethanol extract from bark	Sedative and antiepileptic activity.
19	<i>Argyrea speciosa</i>	Vruddadaruka	Hydroalcoholic extract from root	Anti-stress activity and anticonvulsant effect.
20	<i>Asparagus racemosus</i>	Shatavari	Methanol extract and Aqueous extract	Anticonvulsant effect by decreasing the duration of hind limb extension (extensor phase), clonus and also the duration of stupor phase.
21	<i>Bacopa monnieri</i>	Brahmi	Bacoside A	Neuroprotective role in glutamate mediated excitotoxicity during seizures and cognitive damage occurring in association with pilocarpine-induced epilepsy.
22	<i>Benincasa hispida</i>	Kushmanda	Ethanol extract	Anticonvulsant effect.
23	<i>Berberis vulgaris</i>	Ddaruharidra	Isoquinoline alkaloid	Anticonvulsant activity by modulating neurotransmitter systems.
24	<i>Butea monosperma</i>	Palasha	Triterpene(TBM) present in the n-hexane ethyl acetate fraction of the petroleum ether	Anticonvulsant effect.
25	<i>Calotropis gigantean</i>	Arka	Alcoholic extract of peeled roots	Analgesic, anticonvulsant, anxiolytic and sedative effect.
26	<i>Cannabis sativa</i>	Bhanga	Cannabidiol	Block the release of K ⁺ from the hippocampus caused by afferent stimulation which act as anticonvulsant activity.
27	<i>Capparis zeylanica</i>	Vyaghranakha	Ethanol and alcoholic extract	Decreases the duration of tonic hind leg extension in maximal electroshock-induced seizures.
28	<i>Cedrus deodara</i>	Devadaru	Alcoholic extract of heart wood	Anxiolytic and anticonvulsant activity.
29	<i>Centella asiatica</i>	Mandookaparni	Asiatic acid	Anticonvulsant and neuroprotective activity.
30	<i>Cissus quadrangularis</i>	Ashthishrnkala	Aqueous extract from the stem.	Protection of mice against maximal electroshock, pentylenetetrazol, strychnine and n-methyl-d-aspartate induced seizures and delayed the onset time of seizures induced by isonicotinichydrazid acid.
31	<i>Convolvulus pluricaulis</i>	Shankha pushpi	Methanolic extract	Antioxidant activity (by using DPPH free radical scavenging model) and anticonvulsant activity (by using maximal electroshock seizure model) & reduces the mean recovery time from convulsion.
32	<i>Cyperus rotundus</i>	Mustaka	Flavonoids	Antioxidant properties and exerts a potent antiepileptic drug.
33	<i>Embllica officinalis</i>	Amalaki	Hydroalcoholic extract	Completely abolishes the generalized tonic seizures and improves the retention latency in passive avoidance task as well as ameliorated the oxidative stress.

34	<i>Erythrina variegata</i>	Paribhadra		Anxiolytic and anticonvulsant activity, also showed significant modulation of GABA levels in cerebellum and also in whole brain other than cerebellum
35	<i>Ficus sp</i>	Ashwatha	Methanol leaf extract	Methanolic extract of figs has anticonvulsant activity against MES and picrotoxin induced convulsions, with no neurotoxic effect.
36	<i>Glycyrrhiza glabra</i>	Yashtimadhu	Ethanol extract	Act as anticonvulsant when used in Pentylenetetrazole and Isoniazid induced convulsions.
37	<i>Hemidesmus indicus</i>	Ananathamoola	Ethanol extract	Reduces the duration of tonic extensor phase and postictal depression.
38	<i>Hypericum perforatum</i>	Aksha	Methanolic extract	Anticonvulsant effect which may be partially mediated by nitric oxide.
39	<i>Hyoscyamus niger</i>	Yavani	Ethanol extract	Useful in controlling lithium/ pilocarpine-induced status epilepticus.
40	<i>Mimosa pudica</i>	Lajjalu		Showed anticonvulsant activity in pentylenetetrazol and strychnine induced seizures.
41	<i>Moringa oleifera</i>	Shigru	Methanolic extract from leaves.	Helps to control grand mal and petit mal epilepsy.
42	<i>Mucuna pruriens</i>	Kapikacchu		Antiepileptic activity in haloperidol-induced, MES, pilocarpine-induced status epilepticus.
43	<i>Myristica fragrans</i>	Jatiphala		Effective against grand mal and partial seizures.
44	<i>Acalypha indica</i>	Haritha manjari	methanolic extract.	Anticonvulsant activity anti-oxidant. Fecl3 induced epilepsy, decrease in the duration of tonic hind limb extension.
45	<i>Nerium oleander</i>	Karaveera		Anticonvulsant activity in MES and PTZ induced convulsions.
46	<i>Nigella sativa</i>	Upakunchika		Anticonvulsant activity in MES and PTZ induced convulsions.
47	<i>Nilumbo nucifera</i>	Pankaja		Mild to moderate anticonvulsant property due to involvement of GABA.
48	<i>Ocimum tenuiflorum</i>	Tulasi	Extracts of stem, leaf and stem callus	Anticonvulsant activity in MES induced convulsions .
49	<i>Pongamia pinnata</i>	Karanja	Leaf extract, Petroleum ether extract	Anticonvulsant action.
50	<i>Pueraria tuberosa</i>	Vidarikanda	Alcoholic extract of tubers	Anticonvulsant activity in MES, PTZ, and strychnine induced convulsions.
51	<i>Ricinus communis</i>	Eranda		Significantly (p < 0.05) reduction of convulsion by MES-induced seizures in albino mice when compared with the standard drug diazepam.
52	<i>Rubia cordifolia</i>	Manjishta	Triterpene (isolated from the acetone soluble part of petroleum ether extract.	Elevates the seizure threshold through GABAergic the mechanism.
53	<i>Sesbania grandiflora</i>	Agasthya	Triterpene	Anticonvulsant profile and anxiolytic activity.
54	<i>Withania somnifera</i>	Ashwagandha	root extract	Enhances the antiepileptic effect of diazepam and clonazepam & anticonvulsant activity in a lithium-pilocarpine model of status epilepticus in rats.
55	<i>Solanum surattense</i>	Kantakari	Methanolic and aqueous extracts	Anticonvulsant activity when used against MES and PTZ induced seizure.
56	<i>Sphaeranthus indicus</i>	Gorakmundi	hydroalcoholic extract	Anticonvulsant as well as anxiolytic and central nervous depressant activities in trail rodents.
57	<i>Tephrosia purpurea</i>	Sharapunkha	ethanol extract	Controls lithium pilocarpine induced status epilepticus in albino rats.
58	<i>Terminalia chebula</i>	Haritaki	ethanol extracts	Anticonvulsant activity against MES and PTZ induced seizures in rats.
59	<i>Vitex negundo</i>	Nirgundi	alcoholic extract of root	Anticonvulsant activity when used against MES and PTZ induced seizure.

Table-2: Ayurvedic Formulations used for the management of Epilepsy^{31, 32}.

Formulation	Name of formulation	Reference	Comments
Churna	Saraswata	Sahasra yoga	Nootropic and cognition enhancer.
	Jatamansi	Sahasra Yoga	Sedative and anxiolytic effect.
	Aswagandha	Sahasra yoga	1 to 2 grams with milk.
	Sarpagandha		Used in hysterical fits, insomnia
Taila	BalaTaila	Sahasra yoga	For external application, Apasmarampranashayet..
	Shatavari		It predominantly Vata Shamaka, have Anulomana (carminative) property. The drug as a whole is Medhya & Rasayana. Considering all these properties, the drug acts on the mind and exhibits anticonvulsive activities.
	Shirisha		Apasmaramhanyat.

Ghrita	Panchagavya	C.S.Ci.10/17	Controls the frequency of convulsions and Duration of convulsions. It can be given for a long duration of time in therapeutic dosage without the fear of any side-effects ³³ .
	Kushmanda	A.H.U.7/27-28	Increases memory and reduces stress.
	Brahmi	C.S.Ci.10/26	Reduces the extensor tonus phase of convulsion in their standard doses, as a Shamana Sneha provided significant relief in severity, frequency of attack, salivation, pre and post ictal features in comparison to other groups. Brahmi Ghrita in the form of Brumhana Sneha shown better relief in duration of attack and impaired higher mental functions.
	Mahapancha gavya	A.H.U.7/19-22	Especially for epilepsy and it controls the frequency of convulsions.
	Mahachaitasa		Contents are Jeevaniya Dravyas which plays Rasayana effect on body and also effective for cognitive development of patient. Specially for insanity & epilepsy.
Kwatha	Manasyadi	Siddhayoga Sangraha	Used in hysterical fits.
	DasamulaKashaya	Siddhayoga Sangraha	Used as anupana in Apasmara along with Kalyanaka Ghrita.
Aasava-Arista	Aswagandharista	B.R moorchadhikara 13-17	Antipsychotic drug Especially for epilepsy.
	Saraswatarista	B.R rasayanadhikara AFI, Part I,1:36	Intellect promoting & Antipsychotic drug.
Rasausadhi	Chaturbhujara	Rasendra Sara Sangraha, Unmada Chikitsa	Anticonvulsant effect.
	Smritisagara rasa	Yoga Ratnakara	Intellect promoting, reduces the stress.
	Unmada Gajakesari Rasa		Antiepileptic activity after prolonged administration and also balances the excitatory and inhibitory neurotransmitters in CNS, the main action being GABAergic action and additional antioxidant activity of herbs ³⁴ .
	Tantupashana		Tantupashana is affective against MES seizures in animals and it may be useful in generalized tonic clonic seizures/grandma epilepsy in human beings ³⁵ .
	Kausheyashma Bhasma		Useful in Epilepsy ³⁶ .
	Apasmara rasa		Act as an anti-convulsant drug, on MES animal model of convulsion preceded by LD 50 determination. It also has some significant result when compared to other drugs like Phenytoin and Samritisagar rasa ³⁷ .
Avaleha	Chandravaleha	YadavaJi TrikamJi	
Arka	Rasonadi Arka		As adjuvant drug.

C.S.Ci.-Charaka Samhita Chikitsasthana, A.H.U.- Ashtanga Hrudaya Uttaratanta, B.R-Bhaishajya Ratnavali

Pathyapathya (do's and don'ts)

Pathya (diet): Rice, wheat, milk, ash gourd, leafy vegetables, snake gourd, pomegranate, cow's ghee, cow's milk, green gram soup, drumstick, grapes, figs, gooseberry etc.

Ketogenic Diet: The ketogenic diet is the therapy in patients with deficiencies in the GLUT-1 glucose transport, where glucose cannot be transported into the cerebrospinal fluid for use by the brain; it also useful in those with pyruvate dehydrogenase (E1) deficiency for the treatment of seizures due to glucose transporter protein deficiency. The ketogenic diet provides nutrition with 1 g/kg protein and 5–10 g of carbohydrate per day, with the remainder of calories (usually 75% of the recommended daily allowance) as long-chain triglycerides. Meal plans are carefully tailored. The ratio of fat to carbohydrate and protein ranges from 2:1 to 4:1, with higher ratios seen as more restrictive and possibly more effective. Meals can be quite palatable, including bacon, eggs, tuna, shrimp, vegetables, mayonnaise, and sausages. ketogenic diet which covers the seizures along with the dense energy provider for the brain during seizures (hypoxic conditions) preventing the brain/CNS (Majjadhatu) damage³⁸.

Atkins diet: In general, the ketogenic diet is 80% fat, 15% protein, and 5% carbohydrate; whereas the Atkins diet is 60% fat, 30% protein, and 10% carbohydrate³⁹.

Apathya (contra indications): Incompatible, dirty, contaminated food, Spicy, deep fried food items, fish, excessive meat, canned-processed food items, excessive intake of alcohol, irregular, unaccustomed adventurous, strenuous activities and pouring hot water on head should be avoided.

Yoga: Studies have shown that the practice of yoga stimulates the central nervous system to release endorphins, monoamines and brain derived neurotrophic factor (BDNF) in the hippocampus. It also decreases cortisol levels by increasing melatonin production and improves physical and mental health through down regulation of the hypo-thalamo-pituitary-adrenal axis and the sympathetic nervous system⁴⁰. These poses are Balasana, Kapotanasana, Uttanasana, Matsyasana, Pavanamuktasana, Halasana, Savasana.

Pranayama (deep diaphragmatic breathing): In this technique person who slips into a seizure will be trained to catch reflexively and hold their breath as if startled or frightened. This causes changes in metabolism, blood flow, and oxygen levels in the blood. The practice of Nadi shodana Pranayama helps to

restore normal respiration, which can reduce the chances of going into a seizure or stop the seizure before it becomes full blown⁴¹.

Dhyana (meditation): Stress is a well-recognized trigger of seizure activity. Meditation improves blood flow to the brain and regulates the production of stress hormones. It also increases the levels of neurotransmitter, like serotonin, which act as definitive aid in seizure control⁴².

CONCLUSION

Epilepsy is a clinical syndrome chiefly affecting the central nervous system. It influences the physical, psychological, familial and occupational spheres of life. Hence apart from focusing on understanding the aetiology of the condition and managing it through anti-epileptic drugs it is also important to focus on other issues related such as social stigma, wide socioeconomic inequity. It is important to counsel not only the individuals suffering from epilepsy but also people associated with the patients. Prompt stress management, yoga, meditation, diet etc can reduce the severity and duration of the attack and also improve the quality of life. Treatment of epilepsy in Ayurveda aimed at the time of attack and in between the attack which includes pharmacological and non-pharmacological measures with many herbal, herbo-mineral formulations in different dosage forms with variety of techniques is reviewed to provide good control of seizures for most people with epilepsy. Though several single herbs and compound formulations combined with various measures of Ayurveda have been tested to get desired and optimum results, still a comprehensive and integrated research designs and outcome are still awaited to get a potential area in the future research to stimulate national and international collaborative researches to gain more impact and recognition.

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