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Case Study

ELECTROPHYSIOLOGICAL EFFECT OF *KOOSHMANDA SWARASA GHRITA* IN RIGHT CENTRAL PARIETAL EPILEPSY IN A CHILD ON ANTI EPILEPTIC DRUG

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ABSTRACT

Seizures are abnormal excessive neuronal activity in the brain and is a major indicator of an underlying brain pathology. This is termed as epilepsy, if the brain has a predisposition to generate these seizures leading to further neurobiological and cognitive consequences. The effects of each seizure activity vary depending on its type, area of brain involved and the pathogenesis. Incidence of seizures is high in childhood and this itself reflects the variety of underlying brain disorders. This in turn may be associated with comorbidities of varying extent. This can range from minor learning disabilities to intellectual disability and even more severe complications like deterioration in gait, movement disorders, sleep and intestinal disorders. 60% of these seizures respond to management and the remaining 40% remain refractory or intractable. This is a case study of a child with focal epilepsy on anti-epileptic drug managed with *Kooshmanda swarasa ghrita* for a period of 90 days. The child was assessed before and after study with Hague Seizure Severity Scale, frequency of seizure, electroencephalogram and quality of life in childhood epilepsy. The results showed a considerable improvement is the scores.

INTRODUCTION

Seizure is a transient phenomenon which results from abnormal excessive synchronous neuronal activity in the brain. Epilepsy is a disorder of brain characterised by an enduring predisposition to generate seizures and by the neurobiologic, cognitive, psychologic, and social consequences of this condition. Epilepsy is a diverse family of disorders having in common an abnormally increased predisposition to seizures.

For defining an epilepsy, there needs the occurrence of at least one seizure, along with an enduring alteration in the brain. Along with this enduring alteration, the brain should have an enduring disturbance which is capable of giving rise to other seizures. Different other disturbances like cognitive problems in inter ictal and post ictal period and the resultant psychological consequences for patient and family. [1]

Ayurveda has explained epilepsy under the spectrum of *Apasmara*. Ayurveda has clearly explained it as a disease which affects both the body and mind. Different etiological factors and pathogenesis involving both *Sareerika* (*Vata*, *Pitta* and *Kapha*- the bioregulatory principles) and *Manasikadosas* (*Tamas* and *Rajas*) have been explained. An elaboration of the types of epilepsies based on the *Dosa* (bio entities- *Vata*, *Pitta* and *Kapha)* and its management during the attack (*Vegaavastha*) and after an attack (*Avegaavastha*) are also explained. Extended implications can be seen with respect to *Akshepakavyadhi* (convulsion) and the intractable nature signifies the role of *Leenadosa* (residual dormant *Dosa*) and emphasises other concepts from diseases like *Punaravarthakajwara* (recurrent fever).

Treatment of epilepsy (*Apasmarachikitsa*) has been described based on the *Dosa* predominance considering both the body and mind. Methods to pacify the *Dosa* (bio entities- *Vata*, *Pitta* and *Kapha*), clearing the *Srotas* (channels) and use of special formulations with specific action on brain are mentioned. Other

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methods of remedial therapies (*Satwavajaya chikitsa*) should also be adopted.

Kooshmanda Swarasa Ghrita is a commonly used formulation with specific indication in epilepsy (*Apasmara*). The ingredients also have proven anti-convulsant activity and thus is benefited in epilepsy. The ability of the formulation to act on intellect (*Medha*) makes it a capable drug of choice in addressing other comorbidities associated with epilepsy and hence improving the quality of life of these children.

Patient information

5-year old male child presented with recurrent seizures and reduced speech clarity. Child is the first child of non-consanguineous parents, LSCS at 36 weeks (gestational hypertension), Bt wt 2.1kg. Admitted in NICU for 9 days for poor feeding and hypoglycemic episodes. All milestones attained with delay. Child had first episode of seizure at 3½ years with tonic movements of limbs and uprolling of eyes. Started AED, seizures started to recur in a frequency of 4-5 episodes per month. Child gradually attained all motor milestones and could now walk in tip toes. Child could speak sentences but with reduced clarity.

METHODOLOGY

Kooshmanda Swarasa Ghrita mentioned in *Ashtangahridaya Uttarastana Apasmara prathishedham adhyaya* was selected as the trial drug. 10 ml of the formulation was given twice daily before food for 90 days. The child was assessed before and after treatment using the following parameters.

(i) Hague Seizure Severity Scale: This is a subjective scale which is specifically used for childhood epilepsy. 13 possible ictal and postictal problems are measured based on parent's perspective. As doctor's rarely witness a seizure, parents are considered the best judges of seizure severity and its impact. All items have 4 or 5 subjective response categories (e.g. always, usually, sometimes, never). Scoring for each item: 1 point for the most unfavourable answer to 4 or 5 points for the most favourable answer. Total score ranges from 13 (highest frequency) to 54 (lowest seizure frequency).

(ii) Electroencephalogram

The electrical activity of brain is studied and the abnormal epileptiform discharges are quantitatively assessed. This is done by Spike–wave percentage (SWP): Spike–wave percentage (SWP) provide measures of the percentage of the duration of EEG tracings occupied by EDs.

(iii) Quality of life in childhood epilepsy questionnaire

This is a subjective scale specifically developed to measure the quality of life in childhood epilepsy. Here parent's opinion about child's daily activity is measured. It addresses child's development in cognitive functions, emotional functioning, social functioning and child's physical function. These are scored from 0-100 as 0- very often, 25- fairly often, 50- sometimes, 75- almost never and 100- never. The mean value of the items in each subscale is calculated and the denominator is adjusted to include only the items answered. The total score is calculated by taking the unweighted mean of the four subscales.

OBSERVATION

Table 1: Hague seizure severity scale

Sl.No.	Items	Before treatment	After treatment
1.	Frequency of impairment of consciousness		
2.	Duration of impairment of consciousness	3	4
3.	Overall seizure severity	2	3
4.	Frequency of jerks or cramps	2	3
5.	Duration of jerks or cramps	2	3
6.	Noticeability of altered behaviour during seizure	2	3
7.	Frequency of altered behaviour during seizure	2	4
8.	Frequency of urinary incontinence during seizure	2	3
9.	Frequency of tongue or cheek biting	4	4
10.	Frequency of other injury related to attack	3	4
11.	Frequency of post ictal sleepiness	4	3
12.	Frequency of post ictal nausea, headache or muscle pain	4	3

13.	Time to normal function after attack	4	3
Total Score		35	43

Table 2: Quality of life in childhood epilepsy questionnaire

Sl.No	Item	Before treatment	After treatment
1	Cognitive functioning	16.66	81.66
2	Emotional Functioning	50	78.57
3	Social Functioning	43.75	68.75
4	Physical Functioning	19.31	37.26
	Quality of Life	40	20

EEG- spike wave percentage

Item	Before treatment	After treatment
Spike wave percentage	40	20

DISCUSSION

The inability to control the seizures in spite of using a combination of AEDs and the resultant cognitive and psychological derangements makes intractable epilepsy one of the main areas of research among paediatric neurological conditions. Timely administration of all possible methods is essential for the management of the condition. Ayurveda has explained epilepsy under the broad title of *Apasmara*. Different clinical types based on *Dosa* predominance have been explained by *Acharya*. Certain references from *Akshepaka* details the further pathophysiology of the condition. The intractable nature of *Apasmara* can be linked to the localisation of *Dosa* in deeper *dhatu*. Considering the chronicity of the condition and its long terms consequences, Ayurvedic management along with AED was framed. The intractable nature indicated the involvement of deeper *Dhatus* and hence demanded the need of a formulation containing oleaginous substances (*Sneha kalpana)* with specific capacity to alleviate epilepsy. Considering the nature of the condition and the ease of the administration a formulation based on ghee (*Ghrita yoga*), *Kooshmanda swarasa ghrita* was selected owing to its ability to alleviate epilepsy.

Formulations based on ghee hold an important role in the treatment of *Unmada* (insanity) and *Apasmara* (epilepsy). Ghee being the promoter of *Dhee* (intellect), *Smriti* (memory) and *Medha* (discriminative capacity), alleviates *Vata* and *Pitta* and hence has a role in *Apasmara*. Fat soluble constituents will be assimilated in the ghee when processed with appropriate medicines. Lipophilic substances have the ability to cross blood brain barrier and act on central nervous system. The cell membrane being made of lipids allows the transportation of lipophilic substances through it. Hence the lipid soluble active principles are easily assimilated into the cell and transported to target areas. Because of the capacity of ghee to deliver the medicines to neurons, most nootropics mentioned in Ayurveda are ghee based. Hence these acts on the specific epileptic focus and help to revert the pathology of seizures.

The formulation *Kooshmanda Swarasa Ghrita* contains *Kooshmanda* (*Benincasa hispida* (Thunb.) Cogn.) and *Yashti* (*Glycyrrhiza glabra* Linn). *B. hispida* having *Madhurarasa* and *Madhura vipaka* alleviates *Vata* and *Pitta*. It is alkaline (*Kshara*) in nature and cleanses the bladder (*Vasti suddhikara*). Thus the formulation normalizes the body fluids (*Kleda*) and in turn normalizes the *Agni* (digestive fire). Special mention of the drug in diseases related to mind (*Chethovikara*) also makes it suitable to use it in diseases like *Apasmara* (epilepsy). [2]

Glycyrrhiza glabra with its *Madhura rasa* and *Madhura vipaka*, alleviates *Vata* and *Pitta*. The drug being a nootropic enhances the resistance to brain aggressions and to impairing agents.[3] The drug also has the capacity to reduce the inflammation in the brain. This gives an added advantage to the formulation by reducing the impact of a seizure activity. This being a proven nootropic has the ability to increase the neuroplasticity, activating other areas of brain and improve the overall brain activity. Thus the formulation is a drug of choice especially in intractable epilepsy.[4] In addition to this the drug is used in breast milk vitiated by *Kapha dosa* and thus maintains the equilibrium of *Kapha dosa* and guarantees its safety even in a neonate. [5] So these two drugs in the medium of ghee act on the higher centers and thus have an impact on epilepsy.

The ability of formulation to alleviate *Vata* and *Pitta* makes it suitable to control the frequency of seizures. The episodic nature of seizures, just like the pathogenesis of *Akshepaka* is directed by *Vata dosa* and hence the formulation has a role in controlling the intractability. The ability to alleviate pitta helps in reducing the severity of seizures. The *Kshara* (alkaline) property of B. hispida alleviates *Kapha* and thus makes the formulation capable of alleviating all the three *Dosa.* [6]

Modern pharmacological studies have also proved the anticonvulsant activities of the drugs included in the formulation. Al-Snafi AE has proved the anticonvulsant activity of *B. hispida* in electro shock induced convulsion in albino rats. This not only protected the rats, but also reduced the recovery time from convulsion.[7] Anti-convulsant activity of *Glycyrrhiza glabra* in pentylenetetrazole (PTZ)-induced seizure in *Rathas* also been proved. [8] [9]

The fact that the use of a ghee-based formulation in epilepsy has to be extended to the emerging concept of Ketogenic diet in modern medicine. This refers to the diet rich in fat, deficient in protein and carbohydrate is advocated in intractable epilepsy. The basic concept of the method is that, most of the energy is derived from fat and this induces ketosis formed by the conversion of dietary fat to ketone bodies from liver. This acts as an alternative source of energy and produces a metabolic shift. The neuronal excitability reduces due to this shift. The enhanced GABA-mediated inhibition is the cause for reduction in seizures. The ghee-based formulation could also be thought to create a similar metabolic shift and contribute to reduction in seizures. [10]

Hague seizure severity scale is a widely accepted scale which scores the parental perception of seizures. The significant effect of the trial drug on Hague seizure severity scale and frequency of seizures hence proved the effect of intervention not only in acting on specific epileptic foci but also in addressing the pathogenesis of seizures and the further spread of epileptic activity especially to the motor cortex. A reduction in post ictal features also proved the ability of the drug in reverting the pathogenesis of seizure and bringing back the physiological equilibrium of central nervous system at a much better pace than with AED alone.

The ability of the drug to reduce the spike wave percentage proved empirically the action of the drug on the specific epileptic focus and substantiated the ability of the drug in controlling the pathogenesis of seizures. These findings were in consistent with the reduction in seizure frequency, severity and other associated features as evident in Hague seizure severity scale.

CONCLUSION

Intractable epilepsy, owing to the vast cognitive and psychological decline, is a matter of grave concern among the paediatric population. The entire scientific community are working hand in hand to find better options to reduce the frequency of seizures and improve the quality of life of affected children. Newer AEDs are being administered, other methods like surgical intervention, ketogenic diet etc. are also now being experimented to tackle this progressive condition. These different methods have varying success rates depending on the type of the seizure disorder and condition of the patient. In this scenario, Ayurvedic management along with AED has an important role to play in controlling the seizures and in improving the quality of life of the affected children.

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