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CRITICAL VIEW ON THE NIDANA AND SAMPRAPTI OF KAMPAVATA-PARKINSON'S DISEASE

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ABSTRACT
Kampavata is one among the vataja nanatmaja vyadhis. Basavarajeeyam text gives the explanation about this disease with the symptoms like karapaadatale kampa, nidrabhanga, deha bhramana and kshinamati. *Parkinson's disease*, a progressive neurodegenerative disease is characterized by tremor, bradykinesia, rigidity along with, motor manifestations. Most people develop *Parkinson's Disease* after the age of 60. *Nidana* plays a major role in manifestation of a disease. *Samprapti* is the complete procedure of manifestation of a disease. Though *Nidana* and *Samprapti* of *Kampavata* is not separately mentioned, the general *nidana* and *samprapti* of vata vyadhi can be considered in *Kampavata*.

KEYWORDS: Kampavata, Parkinson's Disease, Nidana, Samprapti.

INTRODUCTION

Parkinson's disease is the mostly common form of a group of progressive neurodegenerative disorders characterized by bradykinesia, tremor, increased tone (rigidity), shuffling gait and loss of postural reflexes.[1] Most of these features match with the ayurvedic description of the disease *kampavata* or *vepathu* as per *Madhavakara*[2] and this disease is explained in detail in *Basavarajeeyam*.[3] *Kampavata* is slow progressive disorder of late adult life and is one of the most prevalent and common neurological disorder with more or less equal frequency in all countries around the world.

Parkinson's Disease is described by James Parkinson in an essay on "Shaking Palsy". It is recognized as an extra pyramidal disorder by Kinnier Wilson.[4] It is a syndrome consisting of classical triad of resting tremor, bradykinesia and rigidity. The gait and postural stability problems also equally constitutes the syndrome.

According to Ayurveda, *Kampavata* is a *Nanatmaja vyadhi* of *Vata*.[5] *Acharya Charaka* mentioned *Kampavata* as separate disease among 80 types of *vataja nanatmaja vyadhi*, besides this *kampa* (tremor) is found as symptoms of many disease like *vataja jwara*, *vataja unmanda*, *vatika kustha*, vatic *pandu urustambha* etc. Unlike *Acharya Charaka*, *Acharya Sushruta* has not mentioned *Vepathu* as a separate disease. But he mentioned it as a symptom of many disease conditions and also complication of *Ardita* (facial paralysis). As per *Astanga Hridaya*, *kampa* is found as a symptom in *vata prakopa*[6] (vitiation of *vata*).

It was the *Basavarajiyam* who for the first time gave a detail description by explaining the clinical picture of *Kampavata* and all these clinical features are similar to that of Parkinson's disease. He explained the features like *karapaadatale kampa(*tremor in hands and legs*), deha bhramana* (whirling sensation), *nidrabhanga* (sleeplessness) and *kshinamati* (loss of intellect) and thus he denitely provided some new ideas in understanding of the disease.[7]

Vyutpatti and *Paribhasha*

According to Ayurveda, *Kampavata* is a *Nanatmaja vyadhi* of *Vata*. "*Na kampo vayuna vina*."
Kampa:-The word *Kampa* is derived from the root *Kapi* and suffixed by *Ghan* which gives the meaning 'to move' or 'to shake'.*Gatradi chalanam* means shaking or movement in the body. The word *Kampa* conveys the meaning of shaking or tremor. *Vata*:-The term *Vata* is derived from root *Va* and suffixed by *Ktha* "*Va-gatigandhanayaho*". *Vata* is one of the three *doshas* of body. The word *Kampavata* means the disorder of impaired *Vata*, in which the prime clinical manifestation is *Kampa*.

NIDANA

"Vyadhi utpatti hetu nidanam".

Nidana refers to all the causative factors which are responsible for the initiation and progress of the disease process. General aetiology of the *vatavyadhi* can be considered for *Kampavata* also.

- ***Aaharaja nidanas*** (Diet factors)- like *rooksha,seeta, laghu ahara, upavasa* etc
- ***Vihraja nidanas*** (life style) like *ratrijagarana, vegadharana, atichankramana* etc
- ***Manasaja nidanas*** (psychological) like *kama, krodha, bhaya, chinta* etc
- ***Abhighata*:** Trauma to the *Marma* has been convicted as an important etiological factor. *Shirobhighata*[8] leads to *Ardita*, *Cheshtanasa*, *chakshuvibrama*, *Swarahani*, *Gadgada* etc.
- ***Vegavarodha*:** Suppression of yawning causes *Kampa* (tremor), *Pravepana* (shaking), *Vinama* (flexion posture), *Samkocha* (contraction) and *Akshepa*[9] (convulsions) *Charaka* mentions, Suppression of *udgara* causes tremor, hiccough, dyspnoea etc.[10]
- ***Visha-*** *Vepathu* is the symptom of second *Vishavega*.[11]

Etiological factors of Parkinsons disease

The aetiopathogenesis of Parkinsonism is not precisely known in conventional medicine. Combinations of several factors are involved in development of Parkinsonism. These factors include free radicals, accelerated aging, environmental toxins and genetic predisposition.

Exposure to environmental chemicals may cause damage to basal ganglia and brain stem.

Causative Factors may include :

1. Environmental Risk Factor

Pesticides, consumption of contaminated well water.
Exposure to herbicides and proximity to industrial plants or quarries.

2. Occupational Hazards

A Review of occupational history showed that 9 occupations accounted for 91.1% of the cases of exposure, which are as follows[12]:
1) Petroleum, Plastic, Rubbers, workers
2) Painters, Lacquers, Furniture
3) Typographers, lithographs,
4) Chemists
6) Farmer
9) Leather workers etc
Carbon monoxide poisoning, manganese poisoning can also lead to Parkinson's disease.

3. Drugs

Drugs that deplete the presynaptic store of dopamine such as reserpine, tetrabenzine, zinc and drug that block the dopamine receptor such as phenothazine, butyrophenone, thioxanthene or benzamide class and antiemetic drugs such as metaclopramide, prochlorparazine and various antidepressant anxiolytic neuroleptic combination may cause Parkinsonism syndrome clinical indistinguishable from idiopathic Parkinsonism.[13]

4. Heriditory- Some patients may present with the family history.
5. Gene mutations

A genetic predisposition is likely, at least in some cases of Parkinson disease. About 10% of patients have a family history of Parkinson disease. Several abnormal genes have been identified. Inheritance is autosomal dominant for some genes and autosomal recessive for others.[14]

6. Other probable causes include head injury, tumor, infarct, Normal-pressure hydrocephalus etc.

SAMPRAPTI

In *Ayurveda*, no specific structural pathology of *Kampavata* is described other than its identification as a *Vata dosha* disease. *Samprapti* of *vata vyadhi* is a complex procedure to understand. *Acharya Madhavakara* while stating the *vata vyadhi*, has explained, *vikrita vata janito asadharana vyadhi vata vyadhi*. It has also mentioned that the provocation of *Vata* may take place either due to diminution of body element (*Dhatukshaya*) or due to obstruction in the body channels (*Avarana*).[15]

Hence samprapti of *Kampavata* is not described separately; the general *samprapti* of *vata vyadhi* has to be considered.

Avarana of Vata

The process of Avarana:- In *Charaka Samhita* it is mentioned that, when the *Vata* is provoked, it agitates the other *Dosas* i.e. *Pitta* and *Kapha* and throwing them about here and there, which it turn causes obstruction to the subtle channels of the body leading to *Avarana* of *Vata*, which leads to the diminution of Rasa and other body element too, thus *Avarana* of *Vata* is produced leading to specific group of *Vata Vyadhi*.[16]

In another instance also the hindrances to the *Gati*, is the sole cause of *Avarana* of *Vata* is highlighted by *Chakrapani*. Therefore, in *Avarana*, *Samprapti*, the vitiation of *Vata* is the pivot importance while other aspects such as involvement of *Kapha* and *Pitta*.

Avarana is evident in Kampavata particularly following *Avarana* may be responsible for *Kampavata*.

1) ***Kaphavritta Vyana*:-** Its symptom are *Gatisanga* that *Adhikam*, *Gurugatrata*[17] *Chestastambha*, *Stambhanam*[18], *Skhalita* aati and *Asthi parva*[19] some of these are also observed in *Kampavata*.
2) ***Kaphavritta Udana*:-** *Vaksvara Graha, Dourbalya, Gurugatrata, Vaivarnya, Aruci*[20] *Mandagni Shita*

Stambha[21] *Bala*, *Kampanam* are its symptoms some of which are also found in *Kampavata*.

3) ***Udanavritta Vyana***:- Its symptoms are *Alpagni*, *Asveda*, *Stabhata*, *Chestahani* and *Nimilana*[22] and few of which are also seen in *Kampavata*.
4) ***Majjavritta Vata***:- *Udveshtanam*, *Vinamana*, *Jrimbha* and *Shula.*[23]

Majority of the symptoms of *Kampavata* are included in the above mentioned *Avarana*.

Gatatva

Gatatva means *Ashrita*, and in case of *Vata* it is related to the vitiated *Vata*, which has name in fusion with particular *Dhatu*. Due to etiological factors responsible in the vitiation of *Dosha* shall ought to be utilized in the vitiation of *Dusya* and thus the innumerable disorders shall be the outcome explained by *Acharya Charaka* in *Vimanasthana* 6th Chapter(sloka 7).

We can trace related features of *Gatatva*, which may be responsible for *Kampavata* like *Snayu gatavata*, *Siragata Vata*, *Amasaya gatavata*, *Pakvasaya Vata*, *Sandhi gatavata* and *Dhatu gatavata.*

Symptomatology of different *Avaranas* involved in *Kampavata* has already been discussed other process seem to be implicated in *Samprapti* of *Kampavata* are *Shira*, *Majja* and *Snayu* and *Kshaya* condition of *Rasa Dhatu*, *Sukra Dhatu* and *Ojas*. So these important factors *Samprapti* of *Kampavata* are being discussed here in brief.

Shira (Head)

In living beings, the head is the organ of all the sense faculties. So it occupies the first place amongst all the vital organs of the body and also opines as the seat of *Prana*.

If there is any partial damage, or disturbance of *shira* then most of serious disorders may take place in the body. *Shiroabhighata* has been considered as one of the important causes of *Kampavata*. *Acaraya Charaka* has listed many neurological disorders occurring to *Shiroabhighata* including *Spandana*/*Kampa.*[24]

Thus the involvement of *Shira* in pathogenesis of *Kampavata* seems to be evident.

Majja Dusti

Mastulunga situated in *shira* is also correlated with *Majja*. Important functions of *Majja* are *Sukraposhana*, *Preeti*, and maintains of the *Sneha* of the body. Its pathological states are *Majja Vrittavata*, *Majja Virddhi*, *Majjakshaya* and *Majja Gatavata*, *Majja Vritta Vata* is evident in *Kampavata*, which manifests as *Pariveshtanam* (cramps), *Vinamana* (flexed posture of the body) *Jrimbhanam* (yawning) and *Shula* (pain) which ceases by pressing with hand.[25] In addition the impairment in function of *Majja* can also lead to sexual dysfunction and *Bhrama*, so it may be stated that impairment of *Shirastha Majja* may occur in *Kampavata*.

Snayu Dusti

Kasayapa has mentioned that *Snayu Pratana* are originated from the *Mastulunga Mula* (Kasayapa. Sha) Trauma to *Snayu* can also lead to the poverty of movements[26], pathological state of *Snayu* is *Snayugata vata* which is manifested as *Bahyayama*, *Antarayam*, *khalli*, *Kubhjata*, *Sarvangavata and Ek Angagata Vata*. In these pathological conditions sometimes *Snayu Sosa* is also found. So in *Kampavata* involvement of *Snayu* by vitiated *Vata* is an important pathological factor which is characterized by *Stambha* (rigidity), *Kampa* (tremor) *Shula* (pain), and *Akshepaka.*[27]

Rasakshaya

Rasa provides the nutrition to all the organs of the body. *Rasakshaya* either due to its etiological factor or due to old age itself is characterized by *Kampa*, *Hritapida* and *Shunyata.*[28] Old age is the common age of occurrence of *Kampavata* and during this age physiological *Rasakshaya* is evident consequently other *Dhatu* also get decreased and hence *Rasayana* is strongly indicated for all such patients.

Sukra Kshaya

Sukra is closely related with *Rasa* and *Majja Dhatu* as it gets nutrition from these *Dhatus Sukrakshaya* is characterized by *Dourbalya* (Weakness), *Mukhasosa* (dryness of mouth). *Pandu* (pallor), *Sada* (depression) *Shrama* (fatigue), *Klaibya*(impotency) and *Sukra Avisarga* (non-ejaculations of semen).

Ojas

It is called as "*Sarva Dhatu Sara"*[29] and is of two types the *Para Oja* and *Apara Oja* Heart is the dwelling for *Para Ojas*. The vessels attached to the heart are the site of other type of the *Ojas*. Any diminution in volume of Para Ojas (i.e. 8 drops) would amount to instantaneous death. Diminution is however possible in other type of the *Ojas.* All the actions performed without hindrances (*Sarvadcheshta Apratighata*) are also the function of *Ojas*. Symptom of diminution of *Ojas* are disorientation.[30] Fear complex constant weakness. Worry cheerlessness, roughness, affliction of sense organs with loss of complexion, and emaciations. If *Ojas* is destroyed human being will also perish.

On the basis of the above mentioned guidelines the *Samprapti* (Pathogenesis) of *Kampavata* can be explained as follows: -

Due to already mentioned etiological factor, its *Chala*, *Ruksha* and *shita* properties provoke *vata*. All the five *Vatas* are involved but *Prana*, *Udana* and *Vyana* are most frequent and the same time due to *Guru* and *Viruddha* diet *Kapha* provokes by its *Guru* and *Manda guna*. *Udana* is important because of its *Prayatna* mediated *Chesta*. So all *Cheshta* which need *Prayatna* are diminished, due to *Avarana* of *Vyana* and *Udana* by

Kapha resulting in *Chestasanga* i.e. slowness of the movement which is the first and foremost symptom of *Kampavata*.

Due to excessive use of *Kashaya* and *Tikta Rasa* and *Margavarana Vayu* gets more prorogated especially by its *Chala* and *Ruksha* properties and reaches *Shira* (*Marma*) consequently impairs the *Shirasthamajja* and causes *Kshaya* (degeneration) the specific *Indriya Pranavaha Srotas* which are concerned with the function *Vak*, *Pani* and *Pada* However *Marmaghata* directly may lead to the Similar pathology (Ca.Si– 9/6) As *Snayu* is closely connected with *Mastulunga* which is its *Mula* (Kasayapa Sha.) therefore incited *Vata* gets settled in *Snayu* also (*Snayuprapta Vata).* This vitiated *Vayu* in other way lead to *Rasa Kshaya.* On the other side *Kapha* by its *Manda* and *Sheeta* properties is already in existence. These collective phenomenons result in *Kampa* and *Stambha*. Due *Chala* properties of *Vata* produce *Kampa*. Increased *Vata* at one site and decreased at other site may be considered as hallmark of process of *Avarana*.

Rasakshaya may further lead to impairment in other *Dhatus*. *Shirasthamajja* is already impaired, hence *Sharirasthamajja* also gets defaced and creates the obstruction in the *Gati* of *Vayu*. Thus producing symptoms of *Majjavritta Vata* persistent *Snayugata Vata,* which are found in *Kampavata*.

Kaphavritta Udana is already under the process, if by any mean the *Gati* of *Samana Vayu* is hampered by *Prana (Pranavritta Samana)* then these both pathological conditions *Kaphavritta Udana* and *Pranavritta Samana* can produce the symptom like *Vak Svaragraha* i.e. disorder of speech and phonation.

Impairment in *Mashtishka*, which is the known as seat of *Manas* has already been contemplated, consequently harm the function of *Manas*. *Manas* perform its function with the support of *Pranavayu* and *Sadhaka Pitta*.

Due to disturbance in *Shira Tarpaka Kapha*, *Prana Vayu* and *Sadhaka Pitta* also get deranged as these all are located in *Shira* probably *Prana Vayu* gets impeded by *Tarpaka Kapha (Kaphavritta Prana*) and deranged *Sadhaka Pitta* hinders the function of *Udana Vayu (Pittavritta Udana*). *Dhatukshaya* is already in process which consequently lead to *Sukrakshaya* and *Ojokshaya*, Presumably all these pathological events are collectively responsible for the exhibition of the symptoms like *Visada* (depression), *Smritihani* (impairment in memory) and *Kshinamati* (dementia) Influence of etiologic factors and spread of *Dusti* may be important in enraging *Apana* and *Samana* resulting in *Vibandha* (Constipation), *Kshudhamandya* (loss of appetite) which are also evident in majority of the patient of *Kampavata*.

Pathology of Parkinson's disease

Parkinson's disease (PD) is a multifactorial neurodegenerative disorder, the etiology of which remains largely unknown. Progressive impairment of voluntary motor control, which represents the primary clinical feature of the disease, is caused by a loss of midbrain substantia nigra dopamine (DA) neurons.

In Parkinson's disease, pigmented neurons of the substantia nigra, locus ceruleus, and other brain stem dopaminergic cell groups degenerate. Loss of substantia nigra neurons results in depletion of dopamine in the dorsal aspect of the putamen (part of the basal ganglia) thus it leads to the less stimulation of Basal gangalia and causes many of the motor manifestations of Parkinson disease.

- Synuclein(soluble proteins in neural tissues)-filled Lewy bodies in the nigrostriatal system will block the pathway of dopamine and thus less dopamine is supplied to Basal Gangalia and again the motor manifestations occur. (Synuclein is a protein in brain helps nerve cells communicate, abnormally deposits in sustantia nigra. These deposits are called as Lewy Bodies.)
- Basal Ganglia is a collection of nerve cells, they transmit impulse in muscle movement and coordinate changes in posture in Parkinsons disease BG is less stimulated and thus neurotransmitters are not released.

The pathophysiology of Parkinson's diseaseis death of dopaminergic neurons as a result of changes in biological activity in the brain with respect to Parkinson's disease (PD). There are several proposed mechanisms for neuronal death in PD; however, not all of them are well understood. The progressive deterioration of vulnerable SN- DA neurons may arise from cellular disturbances produced by misfolding and aggregation of the synaptic protein alpha synuclein (a-syn), disruption of the autophagy-lysosome system, mitochondrial dysfunction, endoplasmic reticulum (ER) stress, or dysregulation of calcium homeostasis.[31]

Synucleinopathyand aggregation of Synuclein- The protein alpha-synuclein has increased presence in the brains of Parkinson's Disease patients and, as α-synuclein is insoluble, it aggregates to form Lewy bodies in neurons. Lewy bodies first appear in the olfactory bulb, medulla oblongata, and pontine tegmentum; patients at this stage are asymptomatic. As the disease progresses, Lewy bodies develop in the substantia nigra, areas of the midbrainand basal forebrain, and in the neocortex.

Dysfunction of the Autophagy Lysosome Pathway- Macroautophagy or autophagy, is a self-destructive process whereby double-membrane-bound structures called autophagosomes engulf cytosolic cargo (e.g., damaged organelles, aggregates, or lipid droplets) before delivery to the hydrolytic milieu of lysosomes for

degradation. The resulting metabolites are transported into the cytoplasm and used either for the synthesis of new macromolecules or as a source of energy. In SN DA neurons from PD patients, autophagosomes and lysosomal marker proteins are increased and decreased, respectively, suggesting that the autophagic flux is profoundly disrupted in these patients. Interestingly, several PD-related genes have been linked to dysfunctional autophagy.

DISCUSSION

Parkinson's disease is the mostly common form of a group of progressive neurodegenerative disorders characterized by bradykinesia, tremor, increased tone (rigidity), shuffling gait and loss of postural reflexes. Most of these features match with the ayurvedic description of the disease *kampavata* or *vepathu* as per *Madhavakara* and this disease is explained in detail in *Basavarajeeyam.* According to Ayurveda, *Kampavata* is a *Nanatmaja vyadhi* of *Vata. Nidana* refers to all the causative factors which are responsible for the initiation and progress of the disease process. General aetiology of the *vatavyadhi* can be considered for *Kampavata* also, like *vegavarodha, ratrijagarana, laghu rooksha ahara,*. The aetiopathogenesis of Parkinsonism is not precisely known in conventional medicine. The *samprapti* is most important parameter of diagnosis the diseases and management. *Samprapti* means the complete procedure of manifestation of disease. Involvement of rasa, majja, ojas, shira, snayu should be taken into consideration. The pathophysiology of Parkinson's diseaseis death of dopaminergic neurons as a result of changes in biological activity in the brain with respect to Parkinson's disease (PD).

CONCLUSION

Parkinson's disease is the mostly common form of a group of progressive neurodegenerative disorders characterized by bradykinesia, tremor, increased tone (rigidity), shuffling gait and loss of postural reflexes. According to Ayurveda, *Kampavata* is a *Nanatmaja vyadhi* of *Vata*. As a separate clinical entity, *Kampavata* is first narrated by *Acharaya Madhavakara* under the name of "*Vepathu*" However, it was the *Basavarajiyam* who for the first time gave a detail description by explaining the clinical picture of *Kampavata.* As *Kampavata* is one of *the nanatmaja Vyadhi* of *Vata dosha*, the general *nidanas* of *vata vyadhi* can be considered. The exact cause of Parkinson Disease is still remaining unknown but the probable causes like certain drugs, poison, environmental factors has to be noted. The general *sampratpi* of *vata vyadhi* should be considered for *Kampavata* also, along with the involvement of *rasa dhatu, majja dhatu, sukra dhatu, ojas* and the *avrita vatas.*

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