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Review Article

UNDERSTANDING PARKINSON'S DISEASE (PD) IN AYURVEDIC PROSPECTIVE

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ABSTRACT

Parkinson's disease (PD) known as *Kampavata* in Ayurveda, is a degenerative neurological disorder of central nervous system, mainly affecting the motor system. It is the major cause of disability in the aging society, which usually affects after the age of 50 years. This disease is increasing in its frequency with the world population showing an incidence of 1-2 per 1000 population and has equal sex distribution. Symptoms like *Kampa* (Tremor), *Stambha* (Rigidity), *Chestasanga* (Bradykinesia and Akinesia), *Vakvikriti* (disturbance in speech) etc were described in different contexts of *Charaka Samhita, Susruta Samhita and Basavarajeeyam*. There is no cure for Parkinson's disease, but medications, surgery and multidisciplinary management can provide relief and improve the quality of life of the individual. In the treatment aspect, the drug L-Dopa has shown better results similarly Ayurvedic drugs having the similar compounds are useful in this disorder. Based on the symptoms manifested, the disease can be correlated to *Kampavata* mentioned in Ayurveda classics. Despite of so many advances in the field of medicine, treatment of PD remains highly symptomatic. This instills the need for Ayurvedic management of *Kampavata.* The present article is intended to focus on the *Nidana, Lakshanas, Samprapthi* and the management principles of Parkinson's disease (*Kampavata).*

KEYWORDS: Parkinson's disease (PD), *Kampavata.* Understanding *Kampavata* in Ayurveda, *Vepathu*

INTRODUCTION

Parkinson's disease (PD) was first described by an English physician James Parkinson in 1817 under the term "the shaking palsy" [1] and later named to his honor. He described the disease as "involuntary tremulous motion, with lessened muscular power, in parts not in action and even when supported; with a propensity to bend the trunk forwards, and to pass from a walking to a running pace: the senses and intellects being uninjured".[2] Parkinson's disease (PD) is the second commonest neurodegenerative disorder after Alzheimer's disease (AD)[3]. It is more common in older people. It affects 1% of adults over the age of 60 years, with frequency in older age groups. Both sexes- male and female are affected equally.[4]

The incidence and prevalence of PD in European countries was estimated at approximately 108 to 257/100,000 and 11 to 19/100,000 per year, respectively, but it varied from country to country. The prevalence in Asia countries is slightly lower, all-age prevalence varied from 51.3 to 176.9/100,000 persons and the incidence from 6.7 to 8.7 per 100 000 persons per year.[5] The cardinal features of the disease includes rest tremor, rigidity, bradykinesia (slowing), and gait impairment. Features like freezing of gait, postrual instability, speech difficulty, autonomic disturbances, sensory alterations, mood disorders, sleep dysfunction, cognitive impairment and dementia can be included as the additional features.[6] The important physical symptoms of PD are also a blank stare (the so called "Parkinson's mask" and troubles with manual dexterity.[7] The basic pathology is the degeneration of neurotransmitter dopamine from the dopaminergic neurons of the substantia nigra. Normally, there is a equilibrium between acetylcholine and dopamine. With dopamine depletion, there results in the hyperactivity of acetylcholine which is the cause of Parkinsonism group of nerve cells deep within the centre of the brain in an area called substantia nigra.[8] In Ayurveda classics based on the clinical presentations, Parkinson's disease (PD) can be correlated to *Kampavata* having *Lakshanas* such as *Karapada tala kampa* (tremors in hands and legs), *Dehabhramana* (postural instability), *Matiksheena* (dementia), and *Nidrabhanga* (sleeplessness). *Vata*

being the motivator and controller of other two *Doshas*, is responsible for the manifestation of almost all the diseases. In *Charak Samhita* it is said that if *Vata dosha* becomes imbalance then it produces 80 types of *Vata nanatmaja vyadhis*, *Vepathu* is a one of them which is commonly known as *Kampavata*. *Vata vyadhis* includes major neurological problems. *Kamapavata* is one among them. The term *Kampavata* is comprised of two terms- *Kampa* + *Vata*. The word *Kampa* means 'to move' or 'to shake' ie, *"Gatradi chalanam"*[9] and *Vata* is one among the three humors of the body, can be understood as *"Va-gati gandhanayoho". Gati* and *Gandhana* are the two important functions of *Vata* i.e., all the motor and sensory functions in the body are governed by *Vata.*

In *Rigveda*, it is mentioned that the Lord Indra suffered from *Vepathu.*[10] It is also available in the literature of *Atharveda* in the name *Vepathu*.[11] Acharya Charaka has included *Vepathu* in the *Nanatmaja* disorders of *Vata*[12] *Acharaya Sushruta* has mentioned the symptoms like *Chestasanga, Stambha* and *Gurugatrata* in the condition of *Kaphavrita Vyana*[13]. *Sthamha* and *Kampa* are mentioned in *Snayugatavata.*[*13*]

As per *Astanga Hridaya*, *Kampa* is found as a symptom in *Vata prakopa* (vitiation of *Vata*) and *Sarwanga Vata*. *Kampa* is noted *in Raktkshaya, Pittakshaya* and *Kaphkshya* condition according to *Astanga Sangraha.* For the first time *Acharya Madhava* has mentioned the disease *Vepathu* in a separate chapter in his work "*Madhava Nidana*" in which he mentioned that *Vepathu* is characterized by *Sarvanga kampa* (tremor all over body) and *Shiro kampa* (tremor in hand).[14] In *Bhasajya Ratnavali, Chakradatta* and in *Vangasena* many medicines for the treatment of *Kampavata* are mentioned. *Sharangha Samhita* has mentioned the *Kampavata* in the *Nanatmaja vyadhi* of *Vata*. In *Basavarajeeyam*, more detailed diagnostic approach mentioning the symptoms of the disease has been mentioned.

Aetiology

The Parkinson's disease (PD) may be idiopathic or secondary to some definable cause e.g. drugs, toxins, hypoxic, post encephalitic, vascular (atherosclerotic) or metabolic. Familial clusters of autosomal dominant and autosomal recessive forms of PD comprise of 5% of cases.[15] All the *Samanya nidanas* explained for *Vata vyadhi* can be considered as *Dosha hetus* which are responsible for *Vataprakopa,* in turn leading to *Kampavata.*

Nidana Panchaka

Nidana

Kampavata is a *Vatika* disorder, so the causative factors which provoke *Vata* can be considered as the etiological factor. Use of *Alpa, Laghu, Rooksha, Sheetha, Katu, Kashaya, Tikta, Masoora, Mudga, Raktashali, Rajamasha, Shyama, Yavagu, Vishamashana, Atibhukta, Abhojana, Langhana, Adhovata Mutra Pureesha rodha, Ratri Jagarana* and *Manasika nidanas* like *Chinta, Bhaya, Dukha Krodha Shoka.*[16]

Purvarupa

Kampavata as one of the *Vatavyadhi* which does not have any *Purvarupa* as *Acharya Charaka* says *Avyakta Lakshana* is the *Purvarupa* of *Vata vyadhi.*[17] In Parkinson's disease (PD), about one third of the patients experience Vague and non-specific symptoms before the onset of actual cardinal features. Early complaints include fatigue, aches and pain, which may be restricted to one side of the body, feelings of tension and irresistible restlessness. Pain and needles on one hand, burning sensations, drenching sweats, blurred vision, internal feeling of tremulousness, cramps of thigh and calves and other are common experiences.

Rupa

Lakshanas of *Kampavata* such as *Karapada tala Kampa, Dehabhramana, Nidrabhanga, Maiksheena* are mentioned in *Basavarajeeyam.*[18]

Physical Abnormalities in Parkinsonism[19]

General • Expressionless face • Greasy skin • Soft, rapid, indistinct speech *(Vak Vikriti)* • Flexed posture • Impaired postural reflexes	**Gait** • Slow to start walking • Shortened stride • Rapid, small steps, tendency to run (festination) *(Avanamana)* • Reduced arm swing • Impaired balance on turning
Tremor *(Kampa)* Resting (4-6Hz) • Usually seen in fingers /thumbs • Coarse, complex movements, flexion/ extension of fingers.	Postural (8-10Hz) • Less obvious, faster, finer amplitude • Present on action or posture, persists with movement

• Abduction/adduction of thumb • Supination /pronation of forearm • May affect arms, legs, feet, jaw, and tongue. • Intermittent, present at rest and when distracted. • Diminished on action	*Kampa* (tremor) is found in many part of body like *Shirkampa* (tremor in head), *Hasta kampa* (tremor in hands), *Pada kampa* (tremor in legs).
Rigidity *(Sthambha)* • Cogwheel type, mostly upper limbs • Plastic (lead pipe) type, mostly legs	**Bradykinesia** *(Chestasanga)* • Slowness in initiating or repeating movements • Impaired fine movements, especially of fingers

Tremors *(Kampa)*

It is the main symptom associated with Parkinson disease. The involuntary rhythmical shaking normally occurs at rest and tends to reduce or stop when the affected part is used for some activity. Although the hands are often affected, some patients experience tremor of the jaw or foot. The tremor affecting the thumb and first finger produces the commonly called 'Pill rolling' effect.

Rigidity *(Sthambha)*

It is actually the hyper tonicity of the muscles. The muscles become continuously or intermittently firm and tense. All muscle groups can be affected. The increase in muscle resistance occurs when there is passive movement: unlike spasticity where sudden relaxation can occur after movement has begun.

Bradykinesia (*Chestasanga*)

The word *Chesta* means to move[20] and *Sanga* means obstruction. So here *Chestasanga* means obstructed movements or reduced movements. *Vyana vayu* carries out all the movements. Disturbance in the function of *Vyana vayu* leads to *Chestasanga.* Bradykinesia is defined as slowness or poverty of movement with loss of automatic stereotyped movements.

Flexed posture *(Avanamana)*

Avanamana means to bend down or flexed downwards.[21] *Acharya Vadbhatta* attributed *Avanamana* as a sign of aging and *Vata dosha* will be the dominant *Dosha* in old age. The patient of PD involves flexion of head, trunk and extremities ie, stooped posture.

Gait abnormalities *(Gatisanga)*

In addition to the postural abnormalities and loss of arm swing, the patient generally takes small shuffling steps, difficulty in beginning to walk and to stop –'Festinating' / 'Hurrying Gait'.

Monotonous Speech *(Vak vikriti)*

Vak (speech) is the function of *Udana vayu*, any disturbance in it interfere with the fluency of speech. *Rooksha guna* of *Vata* is responsible for low, broken, dry, and obstructed voice. The patients presents with reduced volume of voice, being unable to shout, or to speak above the whisper.

Depression *(Vishada)-*

Derangements in the function of *Udana vayu* leads to *Vishada.* Depression can further contribute to memory loss and confusion.

Impairment in Memory *(Smritihani)*

Smriti is dominating function of *Udana vayu*. Any impairment in its function leads to *Smritihani.* Some patients with PD suffer significantly with memory loss. The exact cause is unknown.

Constipation *(Vibandha)*

Apana vata dushti significantly contribute for the production of *Vibandha* in these patients. Constipation is very common symptom in these patients.

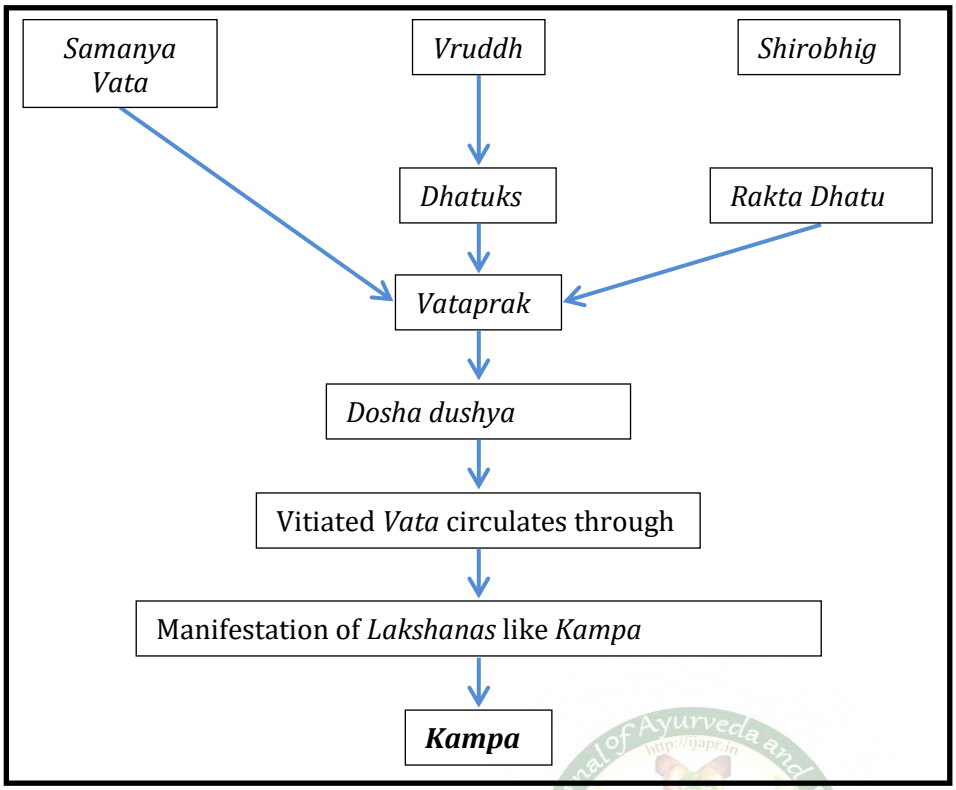
Lakshanas* of *Kampavata	**Symptoms of Parkinson's Disease**
Kampa	Tremor
Dehabhramana	Postural Changes
Nidrabhanga	Insomnia
Matiksheena	Dementia

Upashaya* and *Anupashaya

No reference regarding *Upashaya* and *Anupashaya* of *Kampavata* is mentioned in the classics, therefore all the factors that aggravate *Vata* can be considered as *Anupashaya* and that which pacifies *Vata* can be considered as *Upashaya.*

Samprapthi

According to Ayurveda



PD is a disorder of the extrapyramidal system, which includes motor structures of the basal ganglia, and is characterized by the loss of dopaminergic function and consequent diminished motor function, leading to clinical features of the disease.[22]

The control of the voluntary motor activity is the main function of basal ganglia. Basal ganglia are comprised of a group of subcortical nuclei that include striatum (putamen and caudate nucleus), subthalamic nucleus (STN), globus pallidus pars externa (GPe), globus pallidus pars interna (GPI), and the substantia nigra pars compacta (SNc).[23] Unlike most other components of the motor system, the basal ganglia do not make direct connections with the motor neurons in the spinal cord. Their influence on motor activity is exerted indirectly through their connections with the motor cortex. The prominent input to the basal ganglia comes from all parts of the cerebral cortex and terminates in the striatum. Cortical input to striatum excites two separate but parallel striatal pathways.

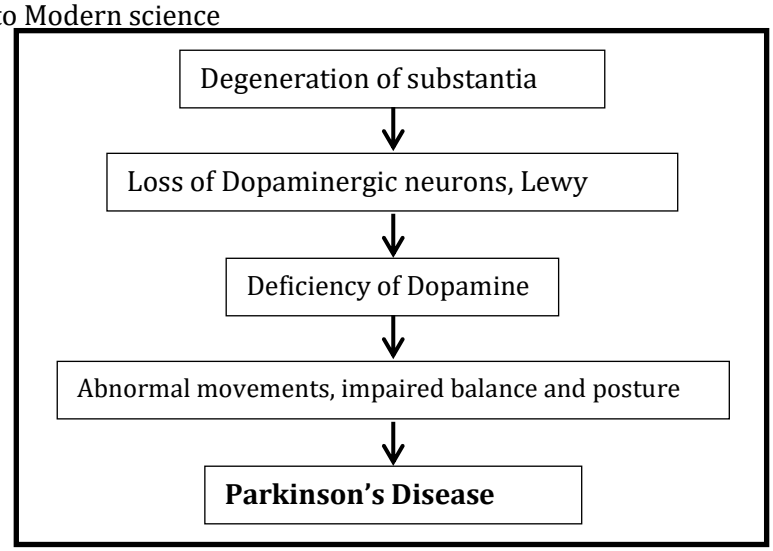
- Direct motor circuit through the basal ganglia leads to the Cortical activation of basal ganglia resulting in the facilitation of selected motor programs.
- Indirect motor circuit results in the Cortical activation of striatum, suppresses the unwanted motor programs.

The loss of dopamine in the striatum of PD patients results in increased activity in the GPi/SNpr circuits and subsequent gamma aminobutyric acid (GABA) dysfunction, leading to inhibition of the thalamus. The end result is the decreased ability of the thalamus to activate the frontal cortex, resulting in the decreased motor activity characteristic of PD leading to Bradykinesia *(Chestasanga).*

The gamma motor neuron of spinal cord is responsible for maintaining the tone of the muscles. The muscle tone is depended upon muscle spindle fibers, Basal ganglia especially the substantia nigra controls the gamma motor neurons and muscle spindle fibers lesions of this area will lead to increased tonicity leading to rigidity leading to rigidity *(Sthambha)*.

Control of the automatic associated movements, swinging of arms during walking, appropriate facial expressions and other movements associated with motor activities are called automatic associated movements, thus lesions of basal ganglia cause absence of these movements resulting in poverty of movements, face without appropriate expression leading to Masked face.

Pathology according to Modern science



Lewy bodies have been invariably recognized as the major pathological feature of PD. The diagnosis of PD is rarely confirmed without the presence of Lewy bodies in the substantia nigra.

Samprapti Ghataka

Dosha	*Vata* (especially *Prana, Udana* and *Vyana)*
Dushya	*Mastulunga majja, Snayu*
Srotas	*Vatavaha*
Srotodushti	*Atipravritti*
Udbhavasthana	*Pakvashaya*
Adhishgthana	*Mastishka*
Sancharasthana	*Rasayani*
Vyaktasthana	*Sarvashareera*
Vyadhi Marga	*Madhyama*

Differential Diagnosis

Idiopathic Parkinson's disease	Drug induced Parkinsonism
Essential tumor	Multisystem atrophy
Progressive supranecular palsy	Huntington's disease
Normal pressure hydrocephalus	Post traumatic Parkinsonism

DISCUSSION

Parkinson's disease known as *Kampavata* in *Ayurveda,* is a degenerative neurological disorder of central nervous system, mainly affecting the motor system commonly affecting the older age group. The pathology is due to the degeneration of a group of nerve cells deep within the centre of the brain in an area called substantia nigra which use Dopamine as their neurotransmitter to signal other nerve cells. As these cells degenerate and stop functioning, Dopamine fails to reach the areas of brain that affect motor functions. Therapy for Parkinson's disease is aimed at replacing dopamine and to prevent the degeneration which is caused due to impaired *Vata*. Since the blood brain barrier prevents dopamine from entering the brain from blood stream, a precursor of dopamine (L-dopa, Levodopa) that will enter the brain is given. *Kapikacchu* (Macuna pruriens) contains Levodopamine or L-dopa within its seeds which can be opted as natural Levadopa. *Kampavata* is correlated with Parkinson's disease which is *Dhatukshyaja, Vatavyadhi,* and *Apatarpana* in nature.

Hence the principle of treatment should aim at the general line of *Vatavyadhi chikitsa* based on the specific etiology, *Santarpana Chikitsa and Rasayana.*[24].

Acharya Vangasena has mentioned specific treatment for *Kampavata* such as *Abhyanga, Swedana, Virechana, Anuvasana basti, Niruha basti* and *Shirobasti.*[25]

***Snehana* (oleation)**

Acharya Charaka opines, *Snehana* is the first line of treatment for all *Vatavyadhis*.

Abhyantyara sneha (Internal)- Through *Bhojana* (food), *Pana* (drinks), *Nasya* and *Basti*.

Bahya Sneha (External)- *Abhyanga*, *Mardana*, *Lepa*, *Moordhini taila* etc.

Abhyanga

Help in ensuring softness and unctuousness of the skin. The *Veerya* of the *Abhyakta sneha* will reach the *Uttarottara dhatus* and gives the desired effect. It clears the *Srotas*, builds up stamina, increases blood circulation, prevents old age, removes tiredness and pain in the body, induces sleep, improves eyesight and complexion of the skin.

***Swedana* (Fomentation therapy)**

Helps in relieving from *Stambha*, *Guruta* and *Sheetata.*[26]

Virechana

Acharya Charaka has mentioned *Virechana as* a *Sodhana karma* for the treatment of *Vatavyadhis*. But in all *Vatavyadhis*, *Mridu virechana* with *Snehasamyukta oushadhis* are advised. It imparts *Bala* to *Indriyas*, does *Agnideepana* and *Koshtashuddhi*.

Basti karma

Basti is said to be the best treatment for vitiated *Vayu*, which is the chief cause of *Kampa Vata*. When *Vayu* is controlled by the action of *Basti* all the other disturbed body elements fall into rhythm and equilibrium.

Nasyakarma

Acharya Vagbhata has stated "*Nasa hi nshhiraso dwarram*" i.e., nose is the easiest and the closest opening for conveying the potency of medicines to the cranial cavity. Acharya Chakradatta and Acharya Vangasena have indicated *Nasya karma* for *Kampavata*.

Shiro Basti

It is the most potent form of *Moordhini taila.*[27] Helps to alleviate vitiated *Dosha* and does *Indriya shuddhi.* This is mainly indicated for *Shirakampa*. By doing *Shiro basti* and *Shirodhara* patient feels relaxation both physically and mentally. Relaxation decreases brain cortisone and adrenaline level, synchronizes the brain wave, strengthens the mind.

Parkinson's disease (PD) is an age-related neurodegenerative disease, characterized by relatively selective nigrostriatal dopaminergic degeneration. Current therapies have not proven effective to modify the disease progression in PD. Now a day's patients of Parkinson's disease are opting for Ayurveda management due to the long term complications of Levodopa and other medications. The herbal drug *Kapikacchu* is having *Dhatuvriddhikara, Vatashamaka* and *Sukraviddhikara* properties.[28] It helps against the process of degeneration and may be beneficial in the condition of *Dhatukshaya.* It also corrects the function of *Indriyas,* which are found impaired in *Kampavata* In addition, Zandopa (*Mucuna Pruriens*), having L-dopa which has anti-parkinsonism activity.[29]

CONCLUSION

Kampavata (Parkinson's disease) needs the *Rasayana* (rejuvenation therapy). Ayurvedic *Panchkarma* procedures can make life of the patients much easier and drastic increase in their life expectancy can be seen. Both *Samshodhana* and *Shamana Chikitsa* play an important role to improve the Activities of daily living of a PD patient.

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