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A CASE REPORT ON A HOLISTIC APPROACH OF AYURVEDIC MANAGEMENT TO IMPROVE THE QUALITY OF LIFE IN THE PATIENTS OF PARKINSON'S DISEASE

Vd. Payal Sahu[1]* and Vd. Dhananjay V. Patel[2]

[1]PG Scholar, Department of Kayachikitsa ITRA, Jamnagar, Gujarat, India.

[2]Reader, Department of Kayachikitsa ITRA, Jamnagar, Gujarat, India.

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***Corresponding Author**
Vd. Payal Sahu
PG Scholar, Department of Kayachikitsa ITRA, Jamnagar, Gujarat, India.

ABSTRACT

Parkinson's disease is a disease with an insidious onset and slow progression. It is a neurological condition that causes motor manifestations, namely bradykinesia, rigidity, resting tremor, and postural instability, and non-motor symptoms such as mood disorders, sleep disturbances, autonomic disturbances, orthostatic hypotension, gastrointestinal disturbances, and genitourinary disturbances. In ancient ayurvedic treaties, there is no direct reference that can be corelated exactly to Parkinson's disease, but it can be corelated with *Kaphavrita Vata* based on similar symptomatology. This present case is of a 46-year-old female patient who presented with complaints of tremors in both hands and legs, postural instability, bradykinesia, and some non-motor symptoms in the past 12 months, which were increasing progressively and were hindering her routine activities. She was given *Deepana*, *Paachana*, and *Koshtashodhana* to remove the *Avarana* of *Kapha Dosha* and *Matrabasti* with *Murcchita Tilataila*, followed by *Nasya* with *Apatyakara Ghrita* for the *Shamana* of *Vata Dosha*. The Patient reported mild relief in the symptoms after two months of treatment and was able to perform her routine activities. It was concluded from the study that Ayurvedic treatment is beneficial for improving quality of life of patients with Parkinson's disease.

KEYWORDS: Parkinson's disease, *Kaphavrita vata, Nasya, Apatyakara Ghrita.*

INTRODUCTION

Parkinson's disease (PD) is the second most common age-related neurodegenerative disease.[1] The frequency of PD increases with age. Clinically, PD is characterized by rest tremor, rigidity (stiffness), bradykinesia (slowing), and gait dysfunction with postural instability.[2] Tremor is known as the "cardinal" feature of the disease. Additional clinical features can include a series of nonmotor features that include mood disorders, sleep disturbances, autonomic disturbances, orthostatic hypotension, gastrointestinal disturbances, and genitourinary disturbances, etc.[3]

In Ayurveda due to similar disease presentation can be compared with *Kaphavrita Vata*. It has been described under *Vatvyadhichikitsa* by *Acharya Charka*. *Cheshtahani* as well as *Gatisanga* is the feature of *Kaphavritha Vyana*.[4] *Skhalanam Gatou* or postural instability is also the manifestation of *Kaphavrita Udana*.[5]

CASE REPORT: Patient name – xyz, Age/sex – 46/F.

COMPLAINTS

CHIEF COMPLAINTS	Mild B/L upper limb and B/L lower limb tremors Feeling/ fear of falling back while sitting or standing (not while walking) Decreased speed of activities Inability to wear footwear or roll chapati Aggravated since last 6 months
ASSOCIATED COMPLAINTS	Excess sweating Excessive daytime sleepiness Heaviness in body Lethargy Weight loss Cold sensation in B/L knee Since last 6 months
GYNAECOLOGICAL COMPLAINTS	Per vaginal white discharge with foul smell Since last 6 months
GASTROINTESTINAL COMPLAINTS	Constipation Anorexia Nausea Since last 6 months
PSYCHOLOGICAL COMPLAINTS	Excess anger Reduced motivation Excess thinking Since last 6 months

SIGNS

- B/L upper limb cogwheel rigidity
- B/L lower limb lead pipe rigidity
- Reduced facial expression.

H/O OF PRESENT ILLNESS

Patient was apparently healthy before 5 years. After second marriage she has complaint of sleep deprivation with difficulty in initiating sleep and was waking up earlier in morning than desired due to family conflicts. One day she had pain and swelling in B/L knee joint along with mild tremors in B/L hands and reduced speed of daily activities for which she has consulted allopathic doctor and continued treatment for 3 months. She discontinued treatment for 15 days as symptoms were relieved. But after discontinuation tremor was aggravated along with other symptoms generalized weakness, loss of appetite, nausea and giddiness and she came to ITRA OPD for which she had given *Deepana Paachana* treatment with *Hingwashataka Churna* but she was not regular on follow up and discontinued treatment for 6 months. During this 6-month period she had gone through more family conflicts and when she reported OPD she had all aggravated symptoms such as tremors in B/L upper limb and lower limb, cold sensation in B/L knee joint, mild swelling in B/L calf muscle, anorexia, loss of appetite, perspiration, DOE II, giddiness, fear of falling back, excess anger, excess thinking. She was unable to roll chapati and was unable to wear footwear, she had difficulty in button up clothes. Admission was advised so was admitted at ITRA for *Ayurvedic* management.

H/O OF PAST ILLNESS

Hypertension (controlled) since 1 year

- Tab Amlodipine 1-0-0
- Tab Propranolol 1-0-0

MEDICATION HISTORY

- Tab Amitriptyline 1-0-0

Pt has been taking above medications for a year.

FAMILY HISTORY

Mother- Hypertension.

Table 1: *ASHTAVIDH PARIKSHA*.

Nadi	*68/min, vatapradhanapitta*
Mutra	7-8 times/day, 1-2 times/night, *Shwetavarna, Durgandhyayukta*
Mala	1 time/day and unsatisfactory (hard and painful defecation sometimes, *Koshtha – Mridu)*
Jihva	*Saama +, Lipta, Peetavarna*
Shabda	*Ishat Ksheena*
Sparsha	*Ushna*
Drik	Blurr near vision
Aakriti	*Krusha*

DASHAVIDHA PARIKSHA

- *Prakruti – Sharira: Pittapradhana vatanubandhi, Manasa: Rajasika + Satvika*
- *Vikruti – Roga bala – Avara*
- *Sara – Alpa Rasasara*
- *Samhanana – Madhyama*
- *Satva – Avara*
- *Satmya – Dugdha Asatyma (Dravamala)*
- *Vaya – Madhyama (Premature agening- jara)*
- *Abhyavarana shakti- Avara*
- *Jarana Shakti– Avara (Kshudha– Mandya)*
- *Vyayama Shakti – Avara.*

PERSONAL HISTORY

- **Diet-** Breakfast (9:00 AM– 10:00 AM) (poha, upma, dahi)

Lunch (2:30 PM)– Roti (1) + Sabji + Dal- rice + Salad (beetroot, carrot, cucumber in the past 5-6 months).

Evening (5:00PM)–Tea+Gathiya/Biscuit.

Dinner (9:30PM)-paratha+Khichadi.

- **Temperament-** Angry+Anxious
- **Addiction-** No any
- **Exercise-** Walking for 15 min
- **Menstrual History-** Menopause in the last 1 year

Marriage- I - 13yr, II- 5yr

M/H- 4-5/28-30 days (Regular, + clot, 3-4 pads/day)

O/H- G^1 P^1 A^2 L^1 D^0

L^1 – 23-year male FTND 2.5kg

A^1 – 1.5M GA/D and C

A^2 - 2.5M GA/D and C

P/V, P/S- Uterine Prolapse II Degree,

Upper and Lower lip erosion

P/R- Pile mass at 3,7,11 o'clock (Unfit for *Niruha Basti* but fit for *Anuvasana Basti*)

- ***Nidra*** –11:30pm to 7:30am (excessive daytime sleepiness, *Diwaswapa*- 2 hours after meal)

GENERAL EXAMINATION	
Weight	49 Kg
Height	4.9 ft
BMI	22.07 g/m2
Respiratory rate	16/min
Pallor	Absent
Icterus	Absent
Cyanosis	Absent
Edema	Absent
Lymphadenopathy	Absent

Vitals	
Pulse rate	68/min
BP	140/90 mmHg
Temp	98.75 ^{o} F

SYSTEMIC EXAMINATION

- **Gastro intestinal system**– soft abdomen, no tenderness and organomegaly was found.
- **Respiratory system**- symmetrical chest, no added sound
- **Cardio vascular examination**- s1, s2 was normal, no murmur was found
- **Loco motor examination**- Patient was unable to walk properly without support. Shuffling/ Parkinson's gait with tremors in both upper and lower limb was found.

- **CNS Examination**

Higher mental function

Consciousness- Fully Conscious

Orientation- Oriented o time place and person

Memory- Intact, Behaviour- Well dressed

Intellectual- Normal, Speech- Normal.

Cranial Nerves

I- Intact, II- blur near vision, III- Intact, IV- Intact, V- Intact, VI- Intact, VII- Intact, VIII- Intact, IX- loss of sensation of spicy food, X- incontinence of urine while coughing, XI, XII- Intact.

Sensation of Pain, Touch, Temp., Vibration- Normal

Shape, Size and Nutrition of Muscle- Normal

Power- Upper limb- Rt-4, Lt-4; Lower limb- Rt-4, Lt-4; Sternocleidomastoid- Rt-4, Lt-4

Tone- Upper limb- Rt+ Lt- Cogwheel rigidity; Lower limb- Rt+ Lt- - Lead pipe rigidity,

Deep tendon reflexes- Upper limb- Rt+Lt=Biceps-2, Triceps-2, supinator-2;

Lower limb- Rt+Lt= Knee-2, Ankle-2, planter- negative.

Muscle movements Coordination – poor, Knee heel test – Slowed, Finger to nose test– Negative, patient was not able to do it perfectly due to tremors.

Involuntary movements – resting tremors in both upper & lower limb were found.

Dysdidokinesia present, Hypomimia present, Tandem walking – Positive, Romberg's sign – Positive, Pull test- positive, Micrographia- absent.

DIAGNOSIS

Kaphavrita Vata (Parkinson's disease stage- 4) Patient was examined based on Hoehn and Yahr scale, according to the scale the patient was at Stage 4.

STAGE 0 No sign of disease

STAGE 1 Unilateral disease

STAGE 2 Bilateral disease without impairment of balance

STAGE 3 Mild/Moderate bilateral disease, some postural instability, physically independent

STAGE 4 Severe disability, still able to walk/stand unassisted

STAGE 5 Wheel chair bound or bedridden.

DIFFERENTIAL DIAGNOSIS

- progressive supranuclear palsy (PSP)
- multiple system atrophy (MSA)
- dementia with Lewy bodies (DLB)
- corticobasal syndrome (CBS)

INTERVENTION

Table 2: *Shamana chikitsa* (26 Feb – 16 March).

NO.	CHIKITSA	OUTCOME
1.	*Hingwashtaka Churna* 2 gm TDS with *Takra (Bhuktamadhya)*	Appetite improved
2.	*Yograja guggulu* 2-tab TDS with 10ml *Dashmoola Kwatha*	Reduction in pain
3.	*Chandraprabha Vati* 2-tab BD after food with warm water	White discharge reduced
4.	*Saraswatarishta* 15 ml BD with 15ml water	Sleepiness reduced
5.	*Haritaki Churna* 1gm TDS *(Bhuktadau)* with warm water	Constipation reduced
6.	*Panchvalkala Kwath* Q.S.for *Yonidhavana*	White discharge reduced
7.	*Mushakadi taila* Q.S. for *Yonipichu*	Uterine prolapse reduced

Table 3: *Shodhana chikitsa* (26 Feb – 16 March).

NO.	PANCHAKARMA	OUTCOME
1.	*Sarvanga abhyanga* with *Balataila* and *Sarvanga baspa swedana* on the day of *Koshtashodhana*	Appetite improved *Kapha Avarana* Removed
2.	*Koshtashodhana* with *Aaragwadha Phalamajja Kashaya* 50ml + *Trivrita Churna* 10gm + *Draksha Kashaya* 200ml + *Abayadi Modaka* 1 Tab	10 *vegas*, *Udarlaghava*
3.	*Matra basti* with *Murchita Tilataila* 60ml	*Bala* improved
4.	Nasya with *Apatyakara Ghrita* (4-6-8-10-8-6-4 drops)	Anger and tremors reduced

RESULTS

The condition of the patient improved with gradual course of treatment. Before the onset of treatment there was difficulty in walking and turning and after the treatment course completed; she could walk easily without fear of falling. Speed of the daily activities was increased. Tandem walking, Romberg's sign, pull test were negative after the treatment.

Following is the improvement in the scale used for assessment

- WHOQOLBREF

Domain	Score	
	BT	AT
Physical	44	80
Psychological	52	68
Social Relationships	12	12
Environment	56	92

Hoehn and Yahr[6]	BT	AT
Stage	4	3

DISCUSSION

According to Ayurveda the disease *Kaphavrita Vata* is described under *Vatvyadhichikitsa* by *Acharya Charka*. Among three *Dosha*, *Vata* is the one with the property of movement *(Chalatwa)*.[7] The movement of *Vata* may be affected in many ways. *Avarana* is one among them. In any sort of *Avarana* pathology, there are two components. One is the *Avrita Dosha*, whose function gets affected, the second component, that is the *Avaaraka*, which causes the *Avarana* of a peculiar *Dosha*.[8] *Chalatva* is the property of *Vata*. It is being normally contributed by the normalcy in *Gunas* of *Vata* dosha such as *Rooksha, Sheeta, Laghu* etc.[9] Among subtypes of *Vata*, the *Cheshta* and *Gati* is the property of *Vyana Vata*.[10] The *Bala* is the contribution of *Udana Vata*.[11] In Parkinsonism, both the functions of *Udana Vata* and *Vyana Vata* seems to be deranged. While assessing the status of doshas, it is seen that for the symptoms of this disease to manifest, *Vata* is *Vridha* or *Kupita*, *Pitta* is *Ksheena* and *Kapha* is *Vridha* and *Kupita* again. Of the *Dhatus*, there is involvement of *Rasa* i.e., *Rasakshaya*. The *Updhatus* involved in the pathology are *Snayu* and to an extend *Sira*. Here, the *Avrita Dosha* is *kapha* and the *Avaaraka* are the *Udana Vata* and *Vyana Vata*. *Cheshtahani* as well as *Gatisanga* is the feature of *Kaphavritha Vyana*.[12] *Skhalanam Gatou* or postural instability is also the manifestation of *Kaphavrita Udana*.[13] *Vakgraha* or dysarthria is seen in both *Kaphavrita Vyana* and *Udana*.[14] In the later stages of the Parkinson's disease, higher mental functions, mainly memory is impaired. The aim of the management includes the two entities here, both the *Avrita* and the *Avaaraka* factors. The treatment should be of clearing the *Srotasa* and also alleviating to both the components. The treatment mentioned is *Anabhishyandi, Snigdha*, not opposite to *Pitta* and *Kapha*, and which brings *Anulomana* to *Vata*.[15] *Rasayana* and *Basti* is also mentioned to be done.[16] The protocol is designed by accepting the condition as *Kaphavrita Vyana* and *Udana*, in the initial stages. The other fractions of *Vata* including *Prana* also get involved in the later stages. Initially *Rookshana* is done with adding suitable *choornas* like *Hingwashtaka choorna, Vati* like *chandraprabha vati* till *Samyak Lakshanas* of *Rookshana* is attained. For *Snehana, Taila* is mainly used such as *Murcchita Tilataila* as they are mainly much more *Kaphavata Shamana* in nature compared to *Gritha*.[17] After performing *Abhyanga-swedana, Koshtashodhana* was done. *Aaragwadha Phalamajja Kashaya, Trivrita Churna, Draksha Kashaya, Abayadi Modaka* was used according to the *Avastha* of patient. *Peyadi karma* was done as per the extend of *shodhana*. Then *Matrabasti* was done. After *Basti Karma, Nasya* with *Apatyakara Ghrita* was done. After the inpatient management, *Rasayanas* was administered such as *Shamana Snehapana* with *Apatyakara Ghrita*.[18]

The main line of treatment was to pacify *Vata* by *Vatahara Chikitsa* and remove *Kapha Avarana* by *Deepana Pachana Chikitsa*. As *Hingwashtaka Choorna* contains *Hingu, Trikatu, Ajamoda, Saindhav, Jeeraka*, it will help for *deeapana* and *paachana.* As *Dashmool* is *Tridosha Nashaka* and *Ushna* in *Virya*; hence it helps in pacification of *Vata*.[19] In *Yograja Guggulu* the main ingredients are *Guggulu, Triphala, Chitraka, Vidanga*, etc. which makes it *Yogavahi, Vatahara* and *Aama Dosha Nashaka*.[20] *Guggulu* is *Vatahara Shodhak Rochaka* due to its *Ushna Guna*. It helped in calming *Vata* & removing *Kapha Avarana*.[21] In *Saraswatarista, Ashwagandha* has been known for its tranquilizing properties, *Ashwagandha* is also known as *kaphavata hara, Balya* and *Rasayana*. It helped in improving sleep and *Bala* of the patient.[22] *Sarvanga Abhyanga* with *Bala Taila* was used here due to its properties of *Vata Shamaka* by *Acharya Shushruta*.[23] Also, according to *Acharya Charka, Vayu* dominates *Sparshaendriya, Abhyanga* is extremely beneficial for *Vata vyadhi* as per charka.[24] Swedana is *Vata* hara, cures stiffness and heaviness. *Swedana* is *ushna, Tikshna* and *sukshma* in *guna* hence helps in pacifying *Vata dosha*.[25] *Matra Basti* has been described as *Vatarognashak. Tila* (sesamum indicum) being *ushna* in *virya* has been taken to pacify *Vata dosha. Nasya* is beneficial for the *Urdhavjatrugata vikarasa*.[26] And also, for the *vikriti* caused by disturbances of *Udana Vata* like *Vakgraha*. *Shamana Snehapana* with *Apatyakara Ghrita* was given after discharge of patient as a *Rasayana Chikitsa*. *Apatyakara Ghrita* Contains *Shatavari, Vidari, Masha, Atmagupta, Gokshura.*[27] All these contents are having *vatashamak* properties. *Atmagupta* is exclusively used in the patients of Parkinson's disease.[28] As Parkinson's disease is neurodegenerative disorder *Apatyakara Ghrita* was given for the regeneration of the cells.

CONCLUSION

The holistic approach of Ayurveda including *Deepana, Paachana, Koshtashodhana, Nasya* and *Matrabasti* is beneficial in the management of *Kaphavrita Vata* (PD) which can be concluded by the case study showing relief in signs and symptoms and improvement in quality of life. Although the prognosis is not so good but it can be a ray of hope for severely affected patients. The results attained were encouraging and were worth documenting.

REFERENCES

1. Kasper, Fauci, Hauser, Longo, Jameson, Loscalzo, Harrisons Principle of Internal Medicine, 21sh Edition, page no. 3386.

2. Kasper, Fauci, Hauser, Longo, Jameson, Loscalzo, Harrisons Principle of Internal Medicine, 21sh Edition, page no. 3386.
3. Kasper, Fauci, Hauser, Longo, Jameson, Loscalzo, Harrisons Principle of Internal Medicine, 21sh Edition, page no. 3386.
4. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 228,229. Reprint Edition 2017. Varanasi: Chaukhamba Surbharati Prakashan; p. 626.
5. Sastri HS, editor. Astangahrdaya of vagbhata, Nidana Sthana Ch. 16, Ver. 47. Reprint Edition 2020. Varanasi: Chaukhamba Surbharati Prakashan; p. 7.
6. Clarke CE, Patel S, Ives N, et al.; on behalf of the PD REHAB Collaborative Group. Clinical effectiveness and cost-effectiveness of physiotherapy and occupational therapy versus no therapy in mild to moderate Parkinson's disease: a large pragmatic randomised controlled trial (PD REHAB). Southampton (UK): NIHR Journals Library; Aug. Health, 2016.
7. Sastri HS, editor. Astangahrdaya of vagbhata, Sutra Sthana Ch. 1, Ver. 11. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2020; 9.
8. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 215. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 626.
9. Acharya YT, editor. Caraka-Samhita of Agnivesa, Sutra Sthana Ch. 11, Ver. 35. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 74.
10. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 9. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 616.
11. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 7. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 616.
12. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 228,229. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 626.
13. Sastri HS, editor. Astangahrdaya of vagbhata, Nidana Sthana Ch. 16, Ver. 47. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2020; 7.
14. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 224, 228, 229. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 626.
15. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 239. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 627.
16. Acharya YT, editor. Caraka-Samhita of Agnivesa, Chikitsa Sthana Ch. 28, Ver. 240,241. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 627.

17. Acharya YT, editor. Caraka-Samhita of Agnivesa, Sutra Sthana Ch. 28, Ver. 287. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 170.
18. Acharya YT, editor. Caraka-Samhita of Agnivesa, ChikitsaSthana Ch. 2/4, Ver. 28,29. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 396.
19. Sastri HS, editor. Astangahrdaya of vagbhata, Sutra Sthana Ch. 6, Ver. 167. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2020; 120.
20. Pt. Parashuram Shastri Vidyasagar, editor. Sarngadhara-Samhita of Sri Sarangadharacarya. Madhyakhand chapter 9 shloka 1, 2, 3, 6, 12 - 16. Varanasi: Chaukhamba Surbharati Prakashan, 2018; 212-214.
21. Acharya YT, editor. Susrutasamhita of Susruta, Chikitsa Sthana, Ch. 5, Ver. 41. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 430.
22. Bhaisajya Ratnavali of Shri Govind Das, edited by Shri Rajeshwardatta Shastri, Chaukhamba Bharat Academy 21/15-21, 2015; 499.
23. Acharya YT, editor. Susrutasamhita of Susruta, Chikitsa Sthana, Ch. 24, Ver. 30. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 488.
24. Acharya YT, editor. Caraka-Samhita of Agnivesa, Sutra Sthana Ch. 5, Ver.85, 86, 87, 88. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 42.
25. Acharya YT, editor. Caraka-Samhita of Agnivesa, Sutra Sthana Ch. 22, Ver. 11, 16. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 120.
26. Sastri HS, editor. Astangahrdaya of vagbhata, Sutra Sthana Ch. 20, Ver. 1. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2020; 287.
27. Acharya YT, editor. Caraka-Samhita of Agnivesa, ChikitsaSthana Ch. 2/4, Ver. 28,29. Reprint Edition. Varanasi: Chaukhamba Surbharati Prakashan, 2017; 396.
28. Katzenschlager R, Evans A, Manson A, et al *Mucuna pruriens* in Parkinson's disease: a double blind clinical and pharmacological study Journal of Neurology, Neurosurgery & Psychiatry, 2004; 75: 1672-1677.