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लाभानां श्रेय आरोग्यम्

Of all the gifts,
the most precious is health

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FROM THE PAGES OF VĀGBHAṬA - LXXIII

P. Madhavikutty*

Abstract: Aṅgavibhāga of Śārīrasthāna concludes with this chapter. Here, the features of inborn constitutions (pṛakṛtis) of human being are explained. The features indicating auspicious and in-auspicious long life; and a group of activities that increase a virtuous and healthy long life are also dealt with.

प्रायोऽत एव पवनाध्युषिता मनुष्या
दोषात्मका: स्फुटितधूसरकेशगात्रा: ।
शीतद्विषश्चलधृतिस्मृतिबुद्धिचेष्टा–
सौहार्ददृष्टिगतयोऽतिबहुप्रलापा: ।। ८५ ।।
अल्पपित्तबलजीवितनिद्रा:
सन्नसक्तचलजर्जरवाच: ।
नास्तिका बहुभुज: सविलासा
गीतहासमृगयाकलिलोला: ।। ८६ ।।
मधुराम्ळपटूष्णसात्म्यकाङ्क्षा:
कृशदीर्घाकृतय: सशब्दयाता: ।
न दृढा न जितेन्द्रिया न चार्या
न च कान्तादयिता बहुप्रजा वा ।। ८७ ।।
नेत्राणि चैषां खरधूसराणि
वृत्तान्यचारुणि मृतोपमानि ।
उन्मीलितानीव भवन्ति सुप्ते
शैलद्रुमांस्ते गगनं च यान्ति ।। ८८ ।।
अधन्या मत्सराध्माता: स्तेना: प्रोद्बद्धपिण्डिका: ।
श्वशृगालोष्ट्रगृध्राखुकाकानूकाश्च वातिका: ।। ७९ ।।

(Prāyoऽta eva pavanādhyuṣitā manuṣyā
doṣātmakā: sphuṭitadhūsarakeśagātrā: ।
śītadviṣaścaladhṛtismṛtibuddhiceṣṭā-
sauhārdadṛṣṭigatayoऽtibahupralāpā: 85
Alpapittabalajīvitanidrā:
sannasaktacalajarjaravāca: ।
nāstikā bahubhuja: savilāsā
gītahāsamṛgayākalilolā: ।। 86 ।।
Madhurāmḷapaṭūṣṇasātmyakāṅkṣā:
kṛśadīrghākṛtaya: saśabdayātā: ।
na dṛḍhā na jitendriyā na cāryā
na ca kāntādayitā bahuprajā vā ।। 87 ।।
Netrāṇi caiṣāṁ kharadhūsarāṇi
vṛttānyacāruṇi mṛtopamāni ।
unmīlitānīva bhavanti supte
śailadrumāṁste gaganaṁ ca yānti ।। 88 ।।
Adhanyā matsarādhmātā:
stenā: prodbaddhapiṇḍikā: ।
śvaśṛgāloṣṭragṛdhrā-
khukākānūkāśca vātikā: ।। 79 ।।)

Hence most of the persons with vāyu predomi-

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nant constitution possess the properties of vātadoṣa (dry, light, cold, rough, etc). They are with torn and dusty hair and body. They do not like cold, and their courage, memory, intelligence, actions, friendship, vision and movements are of wavering nature (not steady). They talk excessively and irrelevantly, do not possess much wealth, strength and lifespan and do not enjoy sound sleep. Their words are feeble, obstructed, unsteady and crumpled. They are atheists, gluttons, pleasure seeking, interested in music, humours, hunting and quarrel; desirous of sweet, sour, salty and hot foods, lean and tall in feature, walking with a crackling sound, always unsteady, having no control over senses, not noble, not liked by their wives, or having many children; their eyes are dry and grayish, round and not beautiful, and resemble the eyes of a dead person. Eyelids remain slightly open even in sleep. They dream of going to the mountains, climbing on trees or moving in the sky.

People with vāta constitution are unfortunate, full of jealousy with tendency to steal and with bulged calves. In habits and behaviours the resemble animals as fox, camel, vulture and crow.

पित्तं वह्निर्वह्निजं वा यदस्मा–
त्पित्तोद्रिक्तस्तीक्ष्णतृष्णाबुभुक्षः ।
गौरोष्णाङ्गस्ताम्रहस्ताङ्घ्रिवक्त्रः
शूरो मानी पिङ्गकेशोऽल्परोमा ।। ९० ।।
दयितमाल्यविलेपनमण्डनः
सुचरितः शुचिराश्रितवत्सलः ।
विभवसाहसबुद्धिबलान्वितो
भवति भीषु गतिर्द्विषतामपि ।। ९१ ।।
मेधावी प्रशिथिलसन्धिबन्धमांसो
नारीणामनभिमतोऽल्पशुक्रकामः ।
आवासः पलिततरङ्गनीलिकानां
भुङ्क्तेऽन्नं मधुरकषायतिक्तशीतम् ।। ९२ ।।
घर्मद्वेषी स्वेदनः पूतिगन्धि–
भूर्युच्चारक्रोधपानाशनेर्ष्यः ।
सुप्तः पश्येत्कर्णिकारान्पलाशान्
दिग्दाहोल्काविद्युदर्कानलांश्च ।। ९३ ।।
तनूनि पिङ्गानि चलानि चैषां
तन्वल्पपक्ष्माणि हिमप्रियाणि ।
क्रोधेन मद्येन रवेश्च भासा
रागं व्रजन्त्याशु विलोचनानि ।। ९४ ।।
मध्यायुषो मध्यबलाः पण्डिताः क्ळेशभीरवः ।
व्याघ्रर्क्षकपिमार्जारयक्षानूकाश्च पैत्तिकाः ।। ९५ ।।

(Pittaṁ vahnirvahnijaṁ vā yadasmā-
tpittodriktastīkṣṇatṛṣṇābubhukṣaḥ ।
gauroṣṇāṅgastāmrahastāṅghrivaktraḥ
śūro mānī piṅgakeśo'lparomā ।। 90 ।।
Dayitamālyavilepanamaṇḍanaḥ
sucaritaḥ śucirāśritavatsalaḥ ।
vibhavasāhasabuddhibalānvito
bhavati bhīṣu gatirdviṣatāmapi ।। 91 ।।
Medhāvī praśithilasandhibandhamāṁso
nārīṇāmanabhimato'lpaśukrakāmaḥ ।
āvāsaḥ palitataraṅganīlikānāṁ
bhuṅkte'nnaṁ madhurakaṣāya-
tiktaśītam ।। 92 ।।
Gharmadveṣī svedanaḥ pūtigandhi-
bhūryuccārakrodhapānāśanerṣyaḥ ।
suptaḥ paśyetkarṇikārānpalāśān
digdāholkāvidyudarkānalāṁśca ।। 93 ।।
Tanūni piṅgāni calāni caiṣāṁ
tanvalpapakṣmāṇi himapriyāṇi ।
krodhena madyena raveśca bhāsā
rāgaṁ vrajantyāśu vilocanāni ।। 94 ।।

Madhyāyuṣo madhyabalā:
paṇḍitā: kḷeśabhīrava: ।
vyāghrarkṣakapimārjāra-
yakṣānūkāśca paittikā: ।। 95 ।।)

As pitta is fire itself, or derived from fire, people with pitta predominant nature are with acute thirst and hunger. Their body is pale yellow in colour and hot in touch. Their palms, soles and face are coppery red. They are brave and honourable, with tawny and scanty hair, fond of garlands perfumes and ornamenting; they are virtuous, clean and affectionate to dependents, possess wealth boldness and intelligence, give support in calamities even to enemies and are highly intelligent. Their joins and muscles are very loose. They are not liked by women, have less semen and sexual desire; they are abode of grayness, wrinkles and blue spots on the skin. They take cold food of sweet, astringent and bitter tastes. They do not like hot climate, perspire profusely, emit bad smell from the body; excreta much feces, easily got angry, eat and drink plenty and are very jealous. While sleeping they dream of karṇikāra (*Cassia fistula*) and palāśa (*Butea monosperma*), digdha (extra ordinary redness of the horizon) ulkka (meteor), lightening, sun and fire. Their eyes are small, tawny coloured, unsteady with thin and sandy eyelashes and always liking cold contact, and become red very easily by anger, alcohol drinking and exposure to sunlight.

People with pitta prakṛti have medium life span, and medium strength. They are wise, but afraid of distress. In habits and behaviour they resemble animals as tiger, bear, monkey and cat, and yakṣas (members of the yakṣa tribe).

श्लेष्मा सोम: श्लेष्मळस्तेन सौम्यो
गूढस्निग्धश्लिष्टसन्ध्यस्थिमांस: ।
क्षुत्तृड्दु:खक्लेशघर्मैरतप्तो
बुद्ध्या युक्त: सात्विक: सत्यसन्ध: ।। ९६ ।।
प्रियङ्गुदूर्वाशरकाण्डशस्त्र–
गोरोचनापद्मसुवर्णवर्ण: ।
प्रलम्बबाहु: पृथुपीनवक्षा
महाललाटो घननीलकेश: ।। ९७ ।।
मृद्वङ्ग: समसुविभक्तचारुवर्ष्मा
बह्वोजोरतिरसशुक्रपुत्रभृत्य: ।
धर्मात्मा वदति न निष्ठुरं च जातु
प्रच्छन्नं वहति दृढं चिरं च वैरम् ।। ९८ ।।
समदद्विरदेन्द्रतुल्ययातो
जलदाम्भोधिमृदङ्गसिंहघोष: ।
स्मृतिमानभियोगवान् विनीतो
न च बाल्येऽप्यतिरोदनो न लोल: ।। ९९ ।।
तिक्तं कषायं कटुकोष्णरूक्ष–
मल्पं स भुङ्क्ते बलवांस्तथाऽपि ।
रक्तान्तसुस्निग्धविशालदीर्घ–
सुव्यक्तशुक्ळासितपक्ष्मळाक्ष: ।। १०० ।।
अल्पव्याहारक्रोधपानाशनेर्ष्य:
प्राज्ञायुर्वित्तो दीर्घदर्शी वदान्य: ।
श्राद्धो गम्भीर: स्थूललक्ष: क्षमावा–
नार्यो निद्रालुदीर्घसूत्र: कृतज्ञ: ।। १०१ ।।
ऋजुर्विपश्चित्सुभग: सुलज्जो
भक्तो गुरुणां स्थिरसौहृदश्च ।
स्वप्ने सपद्मान्सविहङ्गमालां–
स्तोयाशयान् पश्यति तोयदांश्च ।। १०२ ।।
ब्रह्मरुद्रेन्द्रवरुणतार्क्ष्यहंसगजाधिपै: ।
श्लेष्मप्रकृतयस्तुल्यास्तथा सिंहाश्वगोवृषै: ।। १०३ ।।

(Śḷeṣmā soma: śḷeṣmaḷastena saumyo
gūḍhasnigdhaśḷiṣṭasandhyasthimāṁsa: ।
kṣuttṛṇdu:khakḷeśagharmairatapto
buddhyā yukta: sātvika: satyasandha: 96

Priyaṅgudūrvāśarakāṇḍaśastra-
gorocanāpadmasuvarṇavarṇa: ।
pralambabāhu: pṛthupīnavakṣā
mahālalāṭo ghananīlakeśa: ॥ 97 ॥
Mṛdvaṅga: samasuvibhaktacāruvarṣmā
bahvojoratirasaśukraputrabhṛtya: ।
dharmātmā vadati na niṣṭhuraṁ ca jātu
pracchannaṁ vahati dṛḍhaṁ
ciraṁ ca vairam ॥ 98 ॥
Samadadviradendratulyayāto
jaladāmbhodhimṛdaṅgasiṁhaghoṣa: ।
smṛtimānabhiyogavān vinīto
na ca bālyeऽpyatirodano na lola: ॥ 99 ॥
Tiktaṁ kaṣāyaṁ kaṭukoṣṇarūkṣa-
malpaṁ sa bhuṅkte balavāṁstathāऽpi ।
raktāntasusnigdhaviśāladīrgha-
suvyaktaśukḷāsitapakṣmaḷākṣa: ॥ 100 ॥
Alpavyāhārakrodhapānāśanerṣya:
prājyāyurvitto dīrghadarśī vadānya: ।
śrāddho gambhīra: sthūlalakṣa: kṣamāvā-
nāryo nidrāludīrghasūtra: kṛtajña: ॥ 101 ॥
Rajurvipaścitsubhaga: sulajjo
bhakto guruṇāṁ sthirasauhṛdaśca ।
svapne sapadmānsavihaṅgamālāṁ-
stoyāśayān paśyati toyadāṁśca ॥ 102 ॥
Brahmarudrendravaruṇa-
tārkṣyahaṁsagajādhipai: ।
śḷeṣmaprakṛtayastulyā-
stathā siṁhāśvagovṛṣai: ॥ 103 ॥)

Śḷeṣma is soma (moon) itself. So the people with śḷeṣma constitution are saumya (possessing properties of moon as pleasant, mild, cool, unctuous, stern, etc.). They are with deeply hidden well-knit joints, bones and muscles. They are not easily affected by hunger, thirst, distress and heat; are very intelligent and with predominance of satvaguṇa; truthful and possess colour like that of pṛiyaṅgu, dūṛva, śarakanda, sharp instruments of iron, gorocana, padma or suvaṛṇa. They have long hands, large and stout chest, wide forehead, thick and black hair, soft and well-defined beautiful body, plenty of vigour, sexual enjoyment, semen, children and attendants. They are of a spiritual nature, never speak harshly, carry on enmity concealed for a long time. They walk just like a rutted elephant. Their sound is like thundering of clouds, or roaring of the sea, or the sound of mṛdaṅga (a kind of drum) or the roaring of a lion. They have good memory power and perseverance, are humble, do not cry much even in childhood, and are not unsteady. They like food, which is bitter, astringent, pungent, hot, dry, and less in quantity, but still remain strong. Their eyes are red in the corners, unctuous, wide, long and with well-defined white and black circles and with beautiful eyelashes. They talk less and rarely become angry. Take less of drinks and foods and are very active. They have long lifespan and plenty of wealth, are endowed with farsightedness. They are eloquent, confident, majestic, generous, clam and noble. They sleep well; are slowly working, grateful, straightforward, handsome, and bashful; devoted to elders and are with firm friendship. While sleeping they dream of water reservoirs with lotus flowers and rows of birds, and sometime clouds also.

In habits and behaviours, they resemble Brahma, Rudra, Indra, Varuna, Tarkshya (Garuda), hamsa (swan), the king elephant, the lion, horse and the bull.

प्रकृतीर्द्वयसर्वोत्था द्वन्द्वसर्वगुणोदये ।
शौचास्तिक्यादिभिश्चैवं गुणैर्गुणमयीर्वदेत् ॥ १०४ ॥

(prakṛtīrdvayasarvotthā

dvandvsarvaguṇodaye ।
śaucāstikyādibhiścaivaṁ
guṇairguṇamayīrvadet ।। 104 ।।)

If the body constitutions show the characteristic features of two doṣas or all doṣas, they should be recognized as derived from the combination of two doṣas or all doṣas. Similarly, by the characteristic features of the three guṇas (satva, raja and tamas*), these constitutions should be recognized as to which category of guṇas they belong.

वयस्त्वाषोडशाद्बालं तत्र धात्विन्द्रियौजसाम् ।
वृद्धिरासप्ततेर्मध्यं तत्रावृद्धि: परं क्षय: ।। १०५ ।।

(Vayastvāṣoḍaśādbālaṁ
tatra dhātvindriyaujasām ।
vṛddhirāsaptatermadhyaṁ
tatrāvṛddhi: paraṁ kṣaya: ।। 105 ।।)

The age up to sixteen years is termed as bālya. This is the period of growth, of all dhātus, indriyas (sense organs) and ojas (the vital essence of dhātus). The age up to seventy years is madhya. In this period there does not occur any growth of dhātus, etc. After seventy it is the time of gradual depletion (kṣaya) of all vital forces.

स्वं स्वं हस्तत्रयं सार्द्धं वपु: पात्रं सुखायुषो: ।
न च यद्युक्तमुद्रिक्तैरष्टाभिर्निन्दितैर्निजै: ।। १०६ ।।
अरोमशासितस्थूलदीर्घत्वै: सविपर्ययै: ।

(Svaṁ svaṁ hastatrayaṁ sārddhe
vapu: pātraṁ sukhāyuṣo: ।
na ca yadyuktamudriktai-
raṣṭābhirninditairnijai: ।। 106 ।।
aromaśāsitasthūla-
dīrghatvai: saviparyayai: ।)

The persons having the body height of one's own three and half hands, are worthy to get a happy long life. But this rule is not applicable to those whose bodies belong to the group of eight in-auspicious types as hairless (aromaśa), too black (asita), obese (sthūla) and too tall (dīrgha) with their just opposites as too hairy, too white, too lean and too short.

सुस्निग्धा मृदव: सूक्ष्मा नैकमूला: स्थिरा: कचा: ।।
ललाटमुन्नतं श्लिष्टशङ्खमर्धेन्दुसन्निभम् ।
कर्णौ नीचोन्नतौ पश्चान्महान्तौ श्लिष्टमांसळौ १०८
नेत्रे व्यक्तासितसिते सुबद्धघनपक्ष्मणी ।
उन्नताग्रा महोच्छ्वासा पीनर्जुर्नासिका समा ।। १०९ ।।
ओष्ठौ रक्तावनुद्वृत्तौ, महत्यौ नोल्बणे हनू ।
महदास्यं, घना दन्ता: स्निग्ध: श्लक्ष्णा: सिता: समा:
जिह्वा रक्तऽऽयता तन्वी, मांसळं चिबुकं महत् ।
ग्रीवा ह्रस्वा घना वृत्ता, स्कन्धावुन्नतपीवरौ १११
उदरं दक्षिणावर्तगूढनाभि समुन्नतम् ।
तनुरक्तोन्नतनखं स्निग्धमाताम्रमांसळम् ।। ११२ ।।
दीर्घाच्छिद्राङ्गुलि महत्पाणिपादं प्रतिष्ठितम् ।
गूढवंशं बृहत्पृष्ठं, निगूढा: सन्धयो दृढा: ।। ११३ ।।
धीर: स्वरोऽनुनादी च, वर्ण: स्निग्ध: स्थिरप्रभ: ।
स्वभावजं स्थिरं सत्वमविकारि विपत्स्वपि ११४ ।।

(susnigdhā mṛdava: sūkṣmā
naikamūlā: sthirā: kacā: ।। 107 ।।
Lalāṭamunnataṁ śliṣṭa-
śaṅkhamardhendusannibham ।
karṇau nīconnatau paścān-
mahāntau śliṣṭamāṁsaḷau ।। 108 ।।
Netre vyaktāsitasite
subaddhaghanapakṣmaṇī ।
unnatāgrā mahocchvāsā
pīnarjurnāsikā samā ।। 109 ।।

* "सात्विकं शौचमास्तिक्यम्, राजसं बहुभाषित्वम्, तामसं भयमज्ञानम्"

Oṣṭhau raktāvanudvṛttau,
mahatyau nolbaṇe hanū ।
mahadāsyaṁ, ghanā dantā:
snigdha: śḷakṣṇā: sitā: samā: ।। 110 ।।
Jihvā raktऽऽyatā tanvī,
māṁsaḷaṁ cibukaṁ mahat ।
grīvā hrasvā ghanā vṛttā,
skandhāvunnatapīvarau ।। 111 ।।
Udaraṁ dakṣiṇāvarta-
gūḍhanābhisamunnatam ।
tanuraktonnatanakhaṁ
snigdhamātāmramāṁsaḷam ।। 112 ।।
Dīrghācchidrāṅguli
mahatpāṇipādaṁ pratiṣṭhitam ।
gūḍhavaṁśaṁ bṛhatpṛṣṭhaṁ,
nigūḍhā: sandhayo drḍhā: ।। 113 ।।
Dhīra: svaroऽnunādī ca,
varṇa: snigdha: sthiraprabha: ।
svabhāvajaṁ sthiraṁ
satvamavikāri vipatsvapi ।। 114 ।।)

Now all the necessary features indicating an auspicious long life, are being explained here:

The hair on the head should be smooth, soft, having many roots and firm; the forehead high; with well joined temples and similar to the half moon; the ears short at the bottom, elevated at the top, broad at backsides, well joined and fleshy; eyes with well defined white and black circles and well joined thick eyelashes; the nose with elevated tip and deep breathing, stout straight and even; the lips red and not bulging; the jaws big but not protruding; the mouth big; the teeth dense (hard), unctuous, smooth, white and even. The tongue is long and thin; the chin fleshy and big; the neck short thick and round. The shoulders high and flat; the abdomen with a right whirling deep umbilicus and well elevated; the hands and feet big, unctuous, slightly reddish, and fleshy; the fingers long and well joined each other, and with thin red and elevated nails. The back large and with concealed vertebral column; all the joints deeply concealed and strong; the voice, bold and resonant; the colour unctuous and with steady luster; the sattva (one's inborn entity) natural, stable and remaining steady even in calamities.

उत्तरोत्तरसुक्षेत्रं वपुगर्भादिनीरुजम् ।
आयामज्ञानविज्ञानैवर्द्धमानं शनैः, शुभम् ।। ११५ ।।

(Uttarottarasukṣetraṁ
vapugarbhādinīrujam ।
āyāmajñānavijñānai-
varddhamānaṁ śanai:, śubham ।। 115 ।।)

A person with a body which has all these features in a successively better state, which has remained disease-free from its embryo state itself, and which is growing slowly with expansion of body, knowledge and wisdom will possess an auspicious future.

इति सर्वगुणोपेते शरीरे शरदां शतम् ।
आयुरैश्वर्यमिष्टाश्च सर्वे भावाः प्रतिष्ठिताः ।। ११६ ।।

(Iti sarvaguṇopete
śarīre śaradāṁ śatam ।
āyuraiśvaryamiṣṭāśca
sarve bhāvā: pratiṣṭhitā: ।। 116 ।।)

In a body endowed with all these above said features, lifespan, wealth and all other desired aspects are well established for a full period of one hundred years.

त्वग्रक्तादीनि सत्वान्तान्यग्र्याण्यष्टौ यतोत्तरम् ।
बलप्रमाणज्ञानार्थे साराण्युक्तानि देहिनाम् ।। ११७ ।।
सारैरुपेतः सर्वैः स्यात्परं गौरवसंयुतः ।
सर्वारम्भेषु चाशावान्सहिष्णुः सन्मतिः स्थिरः ११८

(Tvagraktādīni satvāntā-
nyagyrāṇyaṣṭhau yatottaram ।
balapramāṇajñānārthe
sārāṇyuktāni dehinām ॥ 117 ॥
Sārairupeta: sarvai:
syātparaṁ gauravasaṁyuta: ।
sarvārambheṣu cāśāvān-
sahiṣṇu: sanmati: sthira: ॥ 118 ॥)

To determine the quantity of the strength of the body, eight types of sāras (essence) are described related to skin, blood, muscle, fat, bone, marrow, semen and sattva. Each of these is of better quality than its preceding one*. The study of sāra is essential for the exact assessment of the body strength. A person possessing all these sāras, will be very honourable, hopeful of success in all endeavours, able to withstand all troubles, wise and steady.

अनुत्सेकमदैन्यं च सुखं दु:खं च सेवते ।
सत्ववांत्सभ्यमानस्तु राजसो नैव तामस: ॥ ११९ ॥

(Anutsekamadainyaṁ ca
sukhaṁ du:khaṁ ca sevate ।
satvavāntsabhyamānastu
rājaso naiva tāmasa: ॥ 119 ॥)

A person of sattvaguṇa predominance, enjoys happiness without arrogance, and faces miseries without much dejection. But a person of rajoguṇa, becomes egotist in happiness, and deeply dejected in miseries. And a person of tamoguṇa does not experience both these states clearly.

दानशीलदयासत्यब्रह्मचर्यकृतज्ञता: ।
रसायनानि मैत्री च पुण्यायुर्वृद्धिकृद्गण: ॥ १२० ॥

(Dānaśīladayāsatya-
brahmacaryakṛtajñatā: ।
rasāyanāni maitrī ca
puṇyāyurvṛddhikṛdgaṇa: ॥ 120 ॥)

Habitual generosity, compassion, truthfulness, celibacy, gratitude, rejuvenating substances and friendship with all; these form the group of activities which help to increase a virtuous and healthy long life.

इति श्रीवैद्यपतिसिंहगुप्तसूनुश्रीमन्वाग्भटविरचिता-
यामष्टाङ्गहृदयसंहितायां द्वितीये शारीरस्था-
नेऽङ्गविभागो नाम तृतीयोऽध्याय: ॥३॥

(iti śrīvaidyapatisiṁhaguptasūnuśrīmanvāg-
bhaṭaviracitāyāmaṣṭāṅgahṛdayasaṁhitāyāṁ
dvitīye śārīrasthāneऽṅgavibhāgo nāma
tṛtīyoऽdhyāya: ॥ 3 ॥)

The chapter called Aṅgavibhāgaśārīra, the third in Śārīrasthāna of Aṣṭāṅgahṛdayasamhita, composed by Śrīmad Vāgbhaṭa, son of Śrī Vaidyapati Simhagupta.

*These sāras and their characteristic features are explained in detail in Carakam, Vimānam, Chapter 8.

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PHARMACOGNOSTIC STUDIES ON PADMACĀRIṆĪ

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Abstract: Padmacāriṇī is a less known drug plant in āyuṛveda. Both *Nervilia aragoana* Gaud. and *Habenaria grandifloriformis* Blatt. are used as padmacāriṇī. Tribal people of Melghat (Amravati Dist., Maharashtra) use these drug plants almost in the same way as is prescribed in āyuṛveda. Phytochemistry and Pharmacoanatomy of both the drug plants are presented here.

Introduction

Padmacāriṇī (known as padmacāriṇī in Sanskrit; sthalapdura and sthalakamal in Hindi) is a drug plant that is reported to be hot, bitter and astringent[1]. It is cooling, galactogogue, diuretic and tonic; useful in uropathy, lithiasis, colic, agalactia, mental instability, epileptic fits, haemoptysis, diarrhoea, asthma, cough, vomiting and vitiated condition of pitta.[2]

Botanical source of padmacāriṇī is highly controversial. Kirtikar & Basu[3], Nadkarni[4], and Chopra *et al*[5] have identified it as *Hybanthus ennaeaspermus* (L.f.) Muell. Leaves of this plant do not resemble lotus, and also does not have underground tuber. Kerala physicians have considered species of *Nervilia* viz. *N. plicata, N. aragoana* and *N. prainiana* as padmacāriṇi (locally called ōrilattāmara i.e. single leaved lotus-like plant.). However, *N. aragoana* is most commonly used padmacāriṇī. Vaidya[6] and Moos[7] adopted *H. grandiflora* as padmacāriṇī. Here, *Nervilia aragoana* and *Habenaria grandifloriformis* (syn. *H. grandiflora*) from Melghat region of Amravati district, Maharashtra was studied. During ethno-botanical survey of Korkus of Melghat Tiger Reserve, it was found that tribes use both the species as medicine.

Materials and methods

The plant material was collected from Melghat forest of Amravati District (M.S.) and identification was confirmed using standard floras[8,9]. Herbarium specimens were prepared and deposited in herbarium of Department of Botany, Govt. Vidarbha Institute of Science and Humanities, Amravati. Anatomical studies were carried out by taking hand sections of fresh material. Sketches were drawn with the help of camera lucida. Preliminary phytochemical screening was done for bioactive compounds. Amino acid composition was determined by two-dimensional paper chromatography.

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Qualitative ash analysis was done for the presence of inorganic components.[10-14].

Habenaria grandifloriformis

Observation: - Blatt and Mc C. in J. Bombay Nat. Hist. Soc. 36:17,17932 syn. *H.grandiflora* Lindl. ex Dalz and Gibs.Bombay Fl. 267, 1861 non Torr. ex Beck., *H. grandifloriformis v*ar. *aequiloba* Blatt. and McC. *op.cit.* (Mar. - 'Chickurkanda', Kor. – (Chhota Ghodatap)

Tribal use: - Tuber powder with milk given in weakness.

Occurrence: - Common in all parts of Maharashtra. In Amravati District occurs at higher elevations of Melghat in Chikhaldara and Dhakna ranges. July - August (VDD.306).

Morphology

An erect perennial herb with underground tubers 1-2, fusiform white; leaf solitary, radical, broadly ovate or suborbicular, 4-6 cm long and nearly as broad, cordate at base, acute, apiculate; sheaths very short. Inflorescence 1-4 flowered, lax raceme; scape 8-20 cm tall, covered with 1-2 sheathing bracts; floral bracts ovate, 1-1.2 cm long, acuminate. Pedicel 2-2.5 cm; lateral sepals obliquely ovate, 1x 0.5 cm acute, 7-nerved; dorsal sepal ovate, 0.8x0.5 cm., obtuse, apiculate. Petals white, 2-partite; segments unequal, upper one ovate-orbicular, 0.5-0.6 x 0.5 cm, lower filiform, 1x 0.5 cm long. Lip 1-1.2 cm long, 3-partite, segments filiform to lanceolate. Spur 2 cm long, curved, clavate at the tip. Ovary inferior 1-1.5 cm long, spirally twisted. Capsules oblong, 2-3 cm long, ribbed; seeds numerous. (Fig. I. h).

Pharmacoanatomy

Root

The root is six-seven arc; pith small. Epiblema cells thin walled, irregular; root hairs many. Cortex 6-8 layered, cells loosely placed. Endodermis and pericycle illdefined.

Tuber

Epidermis thin walled with unicellular and multicellular uniseriate trichomes. Cork cambium hypodermal; cork 2-3 layered. Single layered exodermis consisting of barrel shaped cells. Cortex 7-8 layered, cells compactly placed; microbial colonies and raphide bundles scattered. Endodermis and pericycle illdefined. Vascular bundles 5-6,conjoint, collateral. Pith large.

Nervilia aragoana

Observation: - Gaud. in Freyc. Voy. Bot. 422 1829. syn *Pogonia flabelliformis* Lindl.Gen.Sp. Orchid. 415 1840. *N. carinata* (Roxb) Schltr. in Bot. Jahrb. 45:406,1911. (Mar. –Duduki, Kor. – Bada Ghodatap).

Tribal use :- Fresh tubers boiled and eaten; it is believed to control the hunger. Tubers therefore are extensively exploited during food scarcity. Tuber powder with milk used as aphrodisiac, galactogogue and to increase sperm count.

Occurrence: - Widely distributed in Maharashtra except Marathwada.

Distribution: - In Amravati District rare, found in Semadoh core area of Melghat Tiger Project and valleys along Khamla road. June-August. (PYB-299).

Morphology

Herbs perennating by underground tubers; tubers subglobose white. Leaf erect, petiolate, appearing after flowers; petiole 8-20 cm long; lamina 9-12 x 8-11 cm, cordate, broadly ovate to orbicular, acute, apiculate; 15-18 nerved. Inflorescence few to many flowered lax raceme.

Flowers yellowish-green, drooping, shortly pedicelate; bracts small, decurved. Sepals oblanceolate, subacute; petals similar to sepals, narrowed down to the base. Leaf 17-24 mm long, subsaccate, 3-lobed; lateral lobes erect. Ovary 2-5 mm long, drooping, winged on ridges.(Fig II. i-n)

Pharmacoanatomy

Root

The root is pentarch. Pith comparatively large. Epiblema single layered, cells large; cortex parenchymatous few layered, cells large with small intercellular spaces. Endodermis and pericycle ill-defined (Fig II).

Tuber

Epidermis single layered with thin cuticle and unicellular trichomes. Ground tissue parenchymatous, cells polygonal, thin walled, harbouring microbial colonies. Vascular bundles small, few and scattered.

Pharmaco-chemical profile

	*H.g**	*N.a**
A. Tests:		
1. Acubins & Iridoids	-	-
2. Alkaloids		
a. Mayer's reagent	+	++
b. Dragendorff's reagent	+	++
c. Wagner's reagent	+	++
3. Anthraquinones	-	-
4. Cardenolide Test		
Test - a	-	-
Test - b	-	-
5. Flavonoids		
a. Shinoda Test	+++	+++
b. Flavanonol Test	-	-
c. Flavonol Test	-	+
d. Flavone, Flavonol and Flavanone Test	-	-
6. Leucoanthocyanin	-	-
7. Simple Phenolics		
Test - a Catechol	+++	-
Test - b Hydroquinone	-	-
Test - c Naphthol	-	-
Test - d Pyrogallol	-	++
8. Steroids / Triterpenoids		
Test - a (Steroid nucleus)	-	+++
Test - b (Unsaturated lactone ring)	+++	+++
9. Tannins		
Test - a True tannins	-	-
Test - b Pseudo tannins	-	-
10. Test for Mineral elements		
a. Sulphur	+++	+++
b. Calcium	+++	++
c. Magnesium	+++	+++
d. Iron	+++	+++
e. Chlorine	++	+++
f. Phosphorus	+++	+++
g. Sodium	-	++
B. Amino Acids:		
DL-Alanine	+	+
Citruline	-	+
Valine	+	+
Iso-leucine	+	+
Glutamic acid	-	+
Aspartic acid	+	+
Proline	+	-

C. Unknown:

	Rf (PhW/BAW)	Colour		
1.	0.578/0.177	Purple	+	-
2,	0.096/0.154	Purple	-	+
3.	0.01/0.608	Brown-yellow	-	+
4.	0.488/0.096	Orange	+	-
5.	0.578/0.177	Orange	+	+

Concentration of compound is denoted by strong (+++) , moderate (++), weak (+) absent (-).
**H.g. - Habenaria grandifloriformis; N.a. - Nervilia aragoana.*

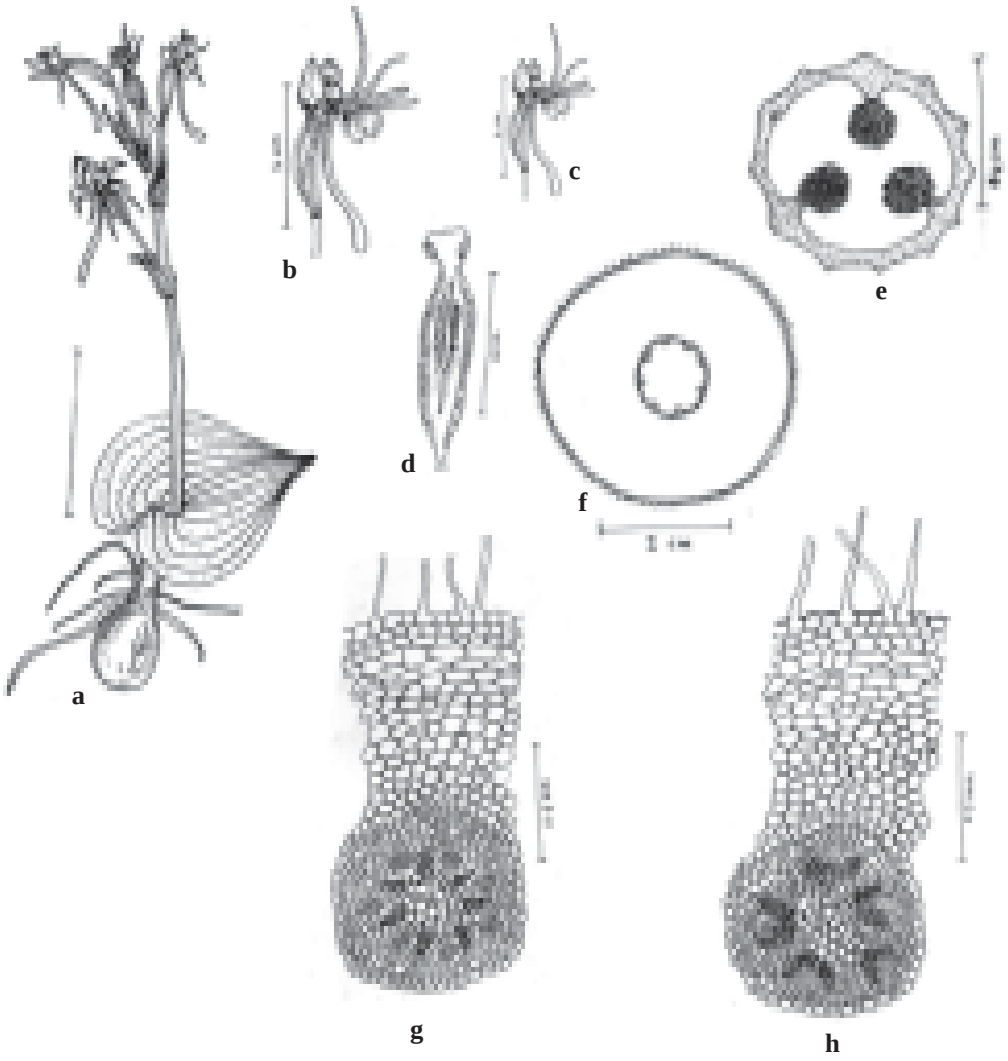

Fig: I. **a - h** *Habenaria grandifloriformis*

a Habit **b** Single flower **c** Androecium **d** Ovary L.S. **e** T.S. Ovary
f TS Tuber (diagramatic) **g** TS root (sector magnified) **h** TS Tuber (sector magnified)

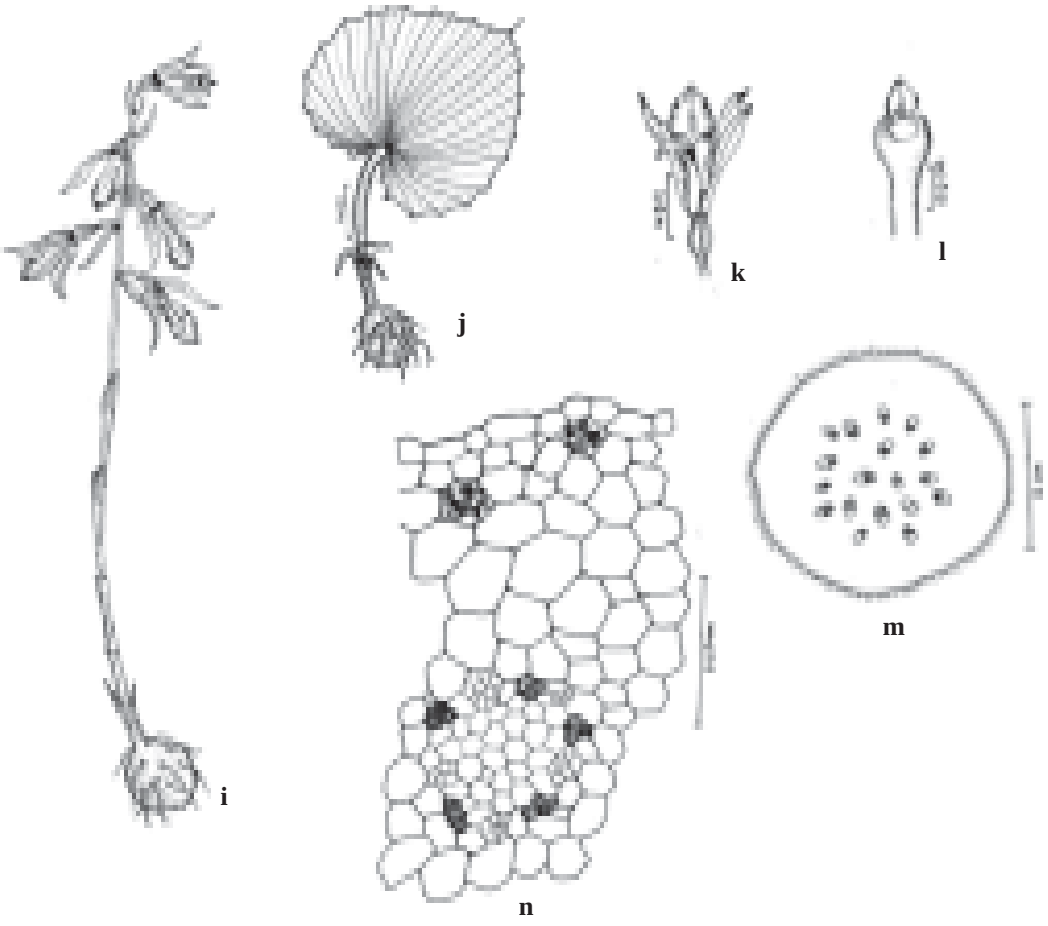

Fig: II. **i - n** *Nervilia aragoana*

i Flowering scape **j** Vegetative stage **k** Androecium **l** Androecium (Magnified)
m T.S. Root (diagramatic) **n** TS Tuber (sector magnified)

Conclusion

Padmacāriṇī is a less known controversial drug plant in āyuṛveda. Tribals of Melghat region are found to use these drug plants in their traditional practices. Little or nothing is known about their chemistry. Some information is available regarding chemistry of *Nervilia aragoana* Gaud. It is known to contain Phytol, Cycloleucalenol, Stigmasterol, Linoleic acid, Linolenic acid, L - Norleucine and Glycerine esters (Rastogi Mehrotra).[15] However, information about mineral contents, amino acids and other bioactive molecules for *N. aragoana* Gaud and *H. grandifloriformis* Blatt. has been worked out for the first time.

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THE ROLE OF THE VARIOUS INGREDIENTS IN NAVAKAGUGGULU IN MEDOROGA

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Abstract: The role of each of the plant parts of the ten ingredients in the formulation Navakaguggulu in the management of medoroga has been examined based on their āyuṛvedic characters along with their action and phytochemical constituents. It was found that the differentials of rasa, guṇa, vīrya, vipāka together with doṣakaṛma and kaṛma contribute towards the depletion of medas in the body. It was seen that the various phytochemical constituents affirm their role in fat reduction. The rationale behind using the relevant plant parts of each of the ingredients in the traditional formulation Navakaguggulu in medoroga given in the classical texts has been explained.

Introduction

In āyuṛveda, medoroga is given to mean 'excess fat deposition' and in modem parlance is correlated to overweight/obesity, the conditions that are prevalent all over the world for which as yet no effective and safe allopathic medicines are available. For the treatment of medoroga a number of single herb medicines as also polyherbal formulations are given in the āyuṛvedic texts. Literature survey has shown that Navakaguggulu (NG) or Vyoṣādi guggulu, a polyherbal formulation, has been documented for its efficacy in the management of medoroga[1].

NG is a popular medicine traditionally prescribed by practitioners to patients of medoroga. With the help of the information available about the ingredients[2] used in NG regarding their āyuṛvedic characters and related kaṛmas it was thought that it would be of interest to examine and understand their significance in contributing to depletion of medas in the body, also to understand the benefits of the various identified phytochemical constituents[3] in the ingredients of NG in fat reduction.

This work forms a part of the programme conducted in Sodhana Trust for testing and evidence-based validation of āyuṛvedic medicines in general. In particular, a study of medoroga using NG as a part of an āyuṛvedic treatment regimen was planned by the Trust. Contextually, the details of this paper provide evidence as to the role of the ingredients of NG in medoroga considering the āyuṛvedic characters along with their action as also the phytochemical constituents.

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Medodhātu

Medas (fat) is the fourth dhātu (tissue) of the saptadhātus of the body. It has predominantly kapha-like characteristics[4]. So, medas has snigdha (unctuous), śḷakṣṇa (smooth/greasy) and sāndra-drava (jelly-like) properties. It confers the body with snehana (unctuousness, lubrication, greasiness, softness) and dṛḍhatva (strength, steadiness, elasticity, resistance).

Medas is seen as a thick layer underneath the tvak (skin), inside the udara (abdomen), attached to its kalās (peritoneum and omentum), uras (chest) and śiras (head). All these are together known as medodhātu (adipose tissue).

Medoroga

In the āyuṛvedic system, an individual is regarded as healthy "when the tṛidoṣas, the bio-regulating principles, are in equilibrium; and the seven dhātus (the tissues of the body), are normal; agni, the digestive fire, is functioning properly; and the malas, the excretory products, are correctly formed and functional"[5] Also in health, the sṛotas (the channels and the innumerable small pores) are open and clear for their function in circulatory processes. Medoroga is understood as the disease/ condition related to medodhātu.

Sampṛāpti (aetiopathogenesis)

According to Caraka, apart from the genetic factors i.e. diet (like śḷeṣmakara, adhyaśana) and lifestyle (like avyāyāma, divāsvapna) are the main contributing factors in the aetio-pathogenesis of medoroga[6],

According to Mādhavakāra, the above diet and lifestyle factors lead to impairment of the jaṭharāgni (digestive fire) that in turn vititates the food essence (āhārarasa), resulting in undigested (āma) condition. The vitiated jaṭharāgni increases the madhuratarabhāva of rasa that circulates and spreads all over the body. This produces medas with excessive snehaguṇa. In this manner, direct conversion of madhura dravyas to sneha dravyas in the āhārarasa during the metabolic changes leads to medoroga[7].

Further, according to Mādhavakāra, if one continues the same diet and lifestyle, dhātvagni-kṣaya (decreased functioning of dhātvagni) occurs resulting in increase of medodhātu. In the process of circulation, medas accumulates in the body and blocks the sṛotas that leads to avarodha (obstruction) in the movement of vāta. Due to the obstruction of the sṛotas by medas, the movement of vāta gets especially confined to koṣṭha (alimentary tract) and aggravates samānavāta resulting in stimulation of the digestive power and increasing absorption of the food. So the patient of medoroga whoes food digests quickly, feels hungry and eats frequently thus becoming a voracious eater. A vicious cycle is then built up compounding medoroga[8].

In medoroga, the medas blocks the sṛotas related to the other dhātus that results in those dhātus not growing to the extent they would have grown normally. If unattended to, the excess fat deposition in the body leads to diseases/conditions like CVDs, CKDs, diabetes and arthritis.

Management

In āyuṛveda, karśana/langhana cikitsa (sliming therapy) is advised in medoroga[9]. As a matter of fact medoroga, which is a kapha-based disease, requires a medicinal therapy that is primarily of kaṭurasa followed by tiktarasa and kaṣāyarasa[10], and has laghu, rūkṣa, tīkṣṇa, uṣṇa,

sūkṣma and viśada as also khara, drava, mṛdu and sāra guṇas (qualities)[11], uṣṇa, vīrya[12] and amḷa and kaṭu vipāka[13] as indicated in the kaṛśana cikitsa.

Considering the above factors, the significance of the various ingredients of NG was delineated with reference to their āyuṛvedic characters and action (Table 1a&b)[2].

Significance of ingredients of NG

Based on ayurvedic characters

In accordance with āyuṛvedic understanding, the characters rasa (taste), guṇa (quality), vīrya (affecting digestion) and vipāka (post digestive state) of the ingredients of NG have been looked into. The details of significance of these characters are given below.

As said earlier, in medoroga (which has kapha-like characteristics), kaṭurasa pṛadhāna substances are very effective; tiktarasa pṛadhāna substances are effective; and kaṣāyarasa pṛadhāna substances are somewhat effective. Consequently, the understanding of the role of the various ingredients in NG given below is based on the descending hierarchy of kaṭurasa, tiktarasa and kaṣāyarasa. The laghu, rūkṣa, tīkṣṇa, uṣṇa, sūkṣma and viśada guṇas are considered as also uṣṇavīrya and kaṭuvipāka.

- The triad kaṭurasa, uṣṇavīrya and kaṭuvipāka in marica, viḍaṅga, citṛaka and guggulu eliminates the āma and corrects the impaired agni (increases the rasa dhātvagni and medodhātvagni).
- The kaṭurasa, laghuguṇa and uṣṇavīrya properties in harītaki, viḍaṅga, citṛaka, guggulu, śuṇṭhi and pippali correct the impaired agni and reduce medas.
- The kaṭurasa, tīkṣṇaguṇa and uṣṇavīrya properties in marica, pippali, viḍaṅga, citṛaka and guggulu clear the sṛotas obstructed by medas.
- The kaṭurasa, rūkṣaguṇa and uṣṇavīrya properties in harītaki, viḍaṅga, citṛaka and guggulu reduce medas.
- The tiktarasa, rūkṣaguṇa, laghuguṇa and uṣṇavīrya properties of harītaki and guggulu help in depletion of increased medas.
- The tiktarasa, kaṣāyarasa and śītavīrya properties in āmalaki and mustā help in pacifying the aggravated jaṭharāgni.
- The kaṣāyarasa, rūkṣaguṇa, laghuguṇa and uṣṇavīrya properties in harītaki and viḍaṅga help in reduction of medas.
- The kaṣāyarasa, tīkṣṇaguṇa and uṣṇavīrya of viḍaṅga possibly help in reduction of medas.
- The viśada and sūkṣma guṇas of guggulu help in clearing the sṛotas obstructed by medas.
- The snigdha guṇa in śuṇṭhi and pippali helps in countering excessive rūkṣatva, if any.
- The madhura and amla rasas in harītaki and āmalaki; and the madhuravipāka of harītaki, vibhītaki, āmalaki, śuṇṭhi and pippali help in the rejuvenation of the body as a whole.

Action-based interpretation

The details of significance of the ingredients of NG based on their action are presented below.

Doṣakaṛma (physiological action): - The etiological factors for medoroga are known to be vāta and kapha. The ingredients of NG have

TABLE 1a

Ayurvedic characters and action of constituents of Navakaguggulu

Sanskrit Name	Scientific Name	Part used	Rasa (taste)	Guṇa (quality)	Vīrya (effect during digestion)	Vipāka (post digestive state)
Harītaki	*Terminalia chebula*	Fruit, seed	Pañcarasa (except lavaṇa)	Rūkṣa, laghu	Uṣṇa	Madhura
Vibhītaki	*Terminalia bellerica*	Fruit, seed	Kaṣāya	Rūkṣa, laghu	Uṣṇa	Madhura
Āmalaki	*Emblica officinalis*	Fruit, seed	Pañcarasa (except lavaṇa)	Rūkṣa, guru, śīta	Śīta	Madhura
Śuṇṭhi	*Zingiber officinale*	Rhizome	Kaṭu	Snigdha, laghu	Uṣṇa	Madhura
Maricam	*Piper nigrum*	Fruit	Katu	Uṣṇa, tīkṣṇa	Uṣṇa	Kaṭu
Pippali	*Piper longum*	Fruit	Kaṭu	Snigdha, laghu, tīkṣṇa	Uṣṇa	Madhura
Musta	*Cyperus rotundus*	Root nodules	Tikta, kaṣāya, kaṭu	Rūkṣa, laghu	Śīta	Kaṭu
Viḍaṅga	*Embelia ribes*	Seed	Kaṭu, kaṣāya	Rūkṣa,laghu, tīkṣṇa	Uṣṇa	Kaṭu
Citṛaka	*Plumbago zeylanica*	Root	Kaṭu	Rūkṣa, laghu, tīkṣṇa	Uṣṇa	Kaṭu
Guggulu	*Commiphora mukul*	Resin from bark	Kaṭu, tikta	Rūkṣa, laghu, tīkṣṇa, viśada, sūkṣma	Uṣṇa	Kaṭu

vāta and/or kapha alleviating properties. The tṛidoṣahara property of harītaki and āmalaki brings the vitiated doṣas back to normalcy.

Kaṛma (principal biological action): - The ingredients citṛaka[l4], mustā and guggulu have lekhanīya property, which helps in scraping the medas. Marica has sṛoto-śodhana[15] (channel clearing) property thereby removing the blockage of the channels by medas. Viḍaṅga[l6], harītaki, āmalaki, pippali, citṛaka and guggulu are given to have rasāyana property that helps in nourishing the rasadhātu and thereby the other dhātus, and restores dhātupariṇāmakṛama by correcting the dhātvagni.

Rogaghnata (therapeutic action): - Śuṇṭhi, marica, pippali (known as tṛikaṭu) have sthaulyahara property[17], leading to reduction in the increased size of the body and so to leanness. Harītaki, due to its śophahara property[2], helps in reduction of kapha-like characteristics of medas. In addition, guggulu is given to have therapeutic action in medoroga[2].

Based on phytochemical constituents

The details of the identified phytochemical constituents (Table 2)[3] in each of the plant parts of the ingredients of NG and their significance are given.

Plants contain several phytochemicals that can be grouped into primary and secondary metabolites. The primary metabolites are largely used by the plant itself for its own nourishment and sustenance. The stored portion of the primary metabolites and the stored secondary metabolites, which are in minute quantities, contribute to the therapeutic effect.

TABLE 1b

Āyuṛvedic characters and action of constituents of Navakaguggulu

Name	Doṣakarma (Physiological effect)	Karma (Principal biological action)
Harītaki	Tṛidoṣaharam	Anulomanam, dīpanam, medhyam, rasāyanam, cakṣuṣyam, bṛmhaṇam, pṛajasthāpanam
Vibhītaki	Kaphapittaharam	Bhedanam, cakṣuṣyam, kesyam, madakari
Āmalaki	Tṛidoṣaharam, raktapittaghnam	Cakṣuṣyam, vṛṣyam, rasāyanam, vaya:sthāpanam
Śuṇṭhi	Vātakaphaharam	Dīpanam, bhedanam
Maricam	Kaphavātaharam, pittakaram	Dīpanam, sṛoto-śodhanam[1]
Pippali	Vātaśḷeṣmaharam	Dīpanam, rasāyanam, vṛṣyam, recanam
Musta	Kaphapittaśāmakam	Dīpanam, pācanam, grāhi, lekhanam, stanyaśodhanam
Viḍaṅga	Vātakaphaharam	Dīpanam, viṣaharam, kṛmighnam, rasāyanam[2]
Citṛaka	Vātaśḷeṣmaharam	Dīpanam, pacanam, grāhi, rasāyanam, lekhanam[3]
Guggulu	Tṛidoṣaharam	Dīpanam, bṛmhaṇam, rasāyanam, vṛṣyam (nava guggulu), lekhanam (purāṇa guggulu)

1. Ref No.15; 2. Ref No.16; 3. Ref No. 14

Primary metabolites

Carbohydrates, proteins and fats are known as primary metabolites. Carbohydrates are present in seven of the ingredients of NG; proteins in two ingredients and fats in two. These metabolites act as energy sources to provide relief from fatigue in medoroga.

Secondary metabolites

Gums, tannins, volatile oils, resins, alkaloids, fixed oils and flavonoids are the secondary metabolites.

Gums:- Gums are present in all the ten ingredients of NG and these could help reduce the amount of fat as also toxins re-circulated into the liver and so have antihypercholesterolemic property[18].

Tannins:- Tannins are present in nine of the ingredients of NG. They are antioxidants and help to lower cholesterol levels and reduce LDL formation.

Volatile oils:- Volatile oils are present in seven of the ingredients of NG. They inhibit synthesis of cholesterol in the liver[19].

Resins: - Resins are present in five of the ingredients of NG. They are antioxidants and help to reduce the toxic effects of free radicals in the biological system. Resins in guggulu regulate a gene receptor called farenosoid X (FSX) receptor, which controls the rate of cholesterol pump through the gall bladder, helping to maintain HDL while assisting the body to clear LDL and triglycerides[20].

Alkaloids:- Alkaloids are present in five of the ingredients of NG. The alkaloid piperine, present in the ingredients *Piper nigrum* (marica) and *Piper longum* (pippali), decreases lipid

TABLE 2

Phytochemical constituents in th eingredients of Navaka Guggulu

Name	Ch	P	F	G	T	Vo	R	Al	Fo	F	A	Alc	Ald	K
Harītaki	+			+	+						+			
Vibhītaki	+			+	+		+				+			
Āmalaki	+			+	+						+			
Śuṇdhi	+			+	+	+						+	+	+
Maricam	+	+	+	+	+	+	+	+						
Pippali	+			+	+	+	+	+	+					
Musta	+	+	+	+	+	+		+	+	+				
Viḍaṅga				+	+	+	+	+	+		+			
Citṛaka				+	+	+		+		+				
Guggulu				+		+	+							

Ch - Carbohydrates, P - Protein, F - Fats, G - Gums, T - Tannins, Vo - Volatile oils, R - Resins, Al - Alkaloids, Fo - Fixed oils, F - Flavonoids, A - Acids, Alc - Alcohols, Ald - Aldehydes, K - Ketones.

peroxidation[21] and facilitates bio-availability of chemical constituents[22] including the phytochemical constituents. Plumbagin, an alkaloid from *Plumbago zeylanica* (citṛaka), in an experimental study in rabbits[23], was found to reduce serum cholesterol, prevent accumulation of cholesterol in liver and aorta and help in the excretion of cholesterol through feaces.

Fixed oils: - Fixed oils are present in three of the ingredients of NG. They are known to lower the cholesterol levels[24].

Flavonoids:- Flavonoids are present in two of the ingredients of NG. They are antioxidants[25] and therefore reduce the cholesterol levels.

In addition to the above phytochemical constituents, acids in four, alcohols in one, aldehydes in one and ketones in one of the ingredients have been found.

Zingiber officinalis (śuṇṭhi) and *Piper nigrum* (marica) contain the trace element chromium[26]. Chromium decreases food craving, promotes fat loss and increases lean tissue mass [27]. One of the ingredients *Emblica officinalis* (āmalaki) contains large amounts of vitamin C, which is a well known antioxidant which lowers cholesterol levels.

Conclusion

In sum, the ayurvedic characters of the ten ingredients of Navakaguggulu viz. kaṭu, tikta and kaṣāya rasas; laghu, rūkṣa, tīkṣṇa, uṣṇa, sūkṣma and viśada guṇas; uṣṇa vīrya; and kaṭu vipāka; along with their karmas; and the various phytochemical constituents found in the plant parts help in reducing the excess medas accumulated in the body. It also provides the rationale behind using the respective plant parts for the traditional preparation of Navaka-guggulu.

Acknowledgements

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ANALYTICAL STUDY OF A HERBAL COMPOUND - ŚUṆṬHYĀDI YOGA

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Abstract: Śuṇṭhyādi yoga is a herbal formulation used in the management āmavāta (rheumatoid arthritis). It is a combination of four drugs viz śuṇṭhi cūṛṇa (2 parts), śodhit guggulu (2 parts), guḍūci satva (2 parts) and eraṇḍabīja majja (4 parts). The formulation was prepared and subjected for certain physico-chemical studies like pH, ash value, extractive values, disintigration time, TLC, HPTLC, etc. for standardization of the drug.

Introduction

The concept of standardization and quality control of drugs can be found even in the ancient āyuṛvedic texts. In those days, the physician himself would check the raw drugs by their typical taste, colour, smell, shape and texture, and prepare the medicines. But in the modern time these tests are not sufficient to give scientific explanation and quality control.

In recent years the plant materials and herbal remedies derived from them represent a sustained proportion of global market and has gained place in the health management. This is because of its holistic approach, cost effectiveness and lesser side effects. The W.H.O. also has been encouraging and promoting the traditional herbal medicines in health care programmes. Hence the standardization of the raw drugs, processing, finished products, verification of the claims, mechanism of action and purity from metallic and microbial contamination are some of the major issues which have to be taken in to consideration for increasing the world wide acceptability of herbal products and also to achieve clinical success and maximum therapeutic effect.

Due to the advancement of science and sophisticated instrumentation, it is possible to give a complete and accurate physico-chemical value of any herb, mineral or metal. These will not only provide a scientific basis and credibility to āyuṛvedic drugs but will also help in the globalization of āyuṛveda.

Material and methods

In this study, the formulation Śuṇṭhyādi yoga (combination of śuṇṭhi (*Zingiber officinale*), guggulu (*Commiphora mukul*), guḍūci

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(*Tinospora cordifolia*), and eraṇḍa (*Ricinus communis*) was prepared in tablet (vaṭi) form at the Department of Rasaśāstṛa and Bhaiṣajya-kalpana, Shri Ayurveda Mahavidyalaya, Nagpur by adopting classical cooking method. These vaṭis were studied for standardization through organoleptic characters and physico-chemical properties viz colour, odour, taste, texture, pH value, loss on drying at 110^{0}C, total ash, acid insoluble ash, water soluble, alcohol soluble and ether soluble extractives, thin layer chromatography (TLC) and high performance thin layer chromatography (HPTLC) finger prints. Apart from these, the compound Śuṇṭhyādi yoga in vaṭi form has been studied for uniformity of weight and disintegration time. All these tests were conducted at Baidyanath Research Foundation Nagpur, the details of observation and results of the study is as follows.

Observation and results

Descriptions

Colour	-	Greyish black
Shape	-	Spherical
Texture	-	Hard
Odour	-	Pungent
Taste	-	Pungent, Bitter
Uniformity of weight	-	Complies as per I.P. reference
Average weight of vati	-	0.509g

Determination pH value

The drugs of Śuṇṭhyādi yoga were made as a 10% solution in water, and the pH of the liquid was determined with the help of pH meter and electrode system. The pH value of Śuṇṭhyādi yoga is 4.31

Loss on drying

2g of drug was accurately weighed and put in a porcelain crucible. It was heated on a hot plate at 110^{0}C for 3 hours. After considerable heating, the crucible was allowed to cool in a dessicator. It was then weighed. Heating, cooling and weighing was continued till a constant weight was achieved. The difference in the weight of the porcelain crucible was calculated for loss on drying. The loss on drying of the sample was 8.34%.

Total ash

5g of drug taken in the already ignited and weighed porcelain crucible was subjected to heat at 500^{0}C until free from carbon, and cooled and weighed. The heating, cooling and weighing were repeated until the weight of the crucible comes constant. The percentage of the ash calculated with reference to the air-dried drug (i.e. 5g) and the above same process was repeated with 3 g of the drug. Total ash value observed was 6.25%.

Acid insoluble ash

The ash was collected and boiled with 25 ml of diluted HCl for 5 minutes. This solution was filtered with the Whatman's (No. 40) filter paper. Along with insoluble ash, the filter paper was burnt in a gooch crucible. Heating, cooling and weighing of the crucible was done until the weight of the crucible comes constant. The percentage of acid insoluble ash calculated with reference to the air-dried drug i.e. 5g. The same process was repeated with 3 gm of the drug. The acid insoluble ash value observed was 1.24%.

Extraction values

Water soluble extractive: - 5g of sample was mixed with 100 ml of chloroform water, shaken frequently for 6 hours and kept for 18 hours without disturbing and filtered rapidly taking

precautions against loss of solvent. 25 ml filtrate was taken with pipette, and evaporated in a tared shallow bottom dish and dried on water bath up to constant weight. The percentage of water-soluble extractive calculated with reference to the moisture free drug. The water-soluble extractive value observed was 44.40%.

Alcohol soluble extractive: - 5 g of sample was mixed with 100 ml of 90% alcohol and shaken frequently for 6 hours and kept for 18 hours without disturbing. Followed the above procedure and calculated the percentage of alcohol soluble extractive with reference to the moisture free drug. The alcohol soluble extractive value so obtained was 37.20%.

Ether Soluble extractive (fixed oil content): - Transferred an accurately weighed air-dried and crushed drug to an extraction thimble, extracted with solvent ether in a continuous extraction apparatus (soxhlet extractor) for 6 hours. Filtered the extract quantitatively in to a tared evaporating dish, and evaporated the solvent on a water bath. Dried the residue at 105^0C to constant weight and calculated the percentage of ether soluble extractive with reference to the air-dried drug. The ether soluble extractive value so obtained was 31.02%.

Uniformity of weight

20 vaṭis of Śuṇṭhyādi yoga were weighed individually and their average weight was calculated. The weight of 20 vatis is 10.180 g, and the average weight of vatis is 0.509g. The vatis were complied as per I. P. reference.

Disintegration time

The vaṭis containing guggulu are very often passed by the fecal matter as such and does not disintegrate in the digestive system. Hence the Śuṇṭhyādi vaṭis were studied to record their disintegration time.

Method: - The disintegration test was carried out using water. The vessel filled with water, and then six weighed pills were placed in the basket assembly keeping one pill in each tube for the test and the tablet disintegration machine was operated at a constant temperature 37^0C ± 2. The time for the pills to disintegrate and pass through the sieve was noted. The pills were tested repeatedly three times in the same manner and its mean value was taken for the final result. The pills disintegrated in the water completely in 98 minutes.

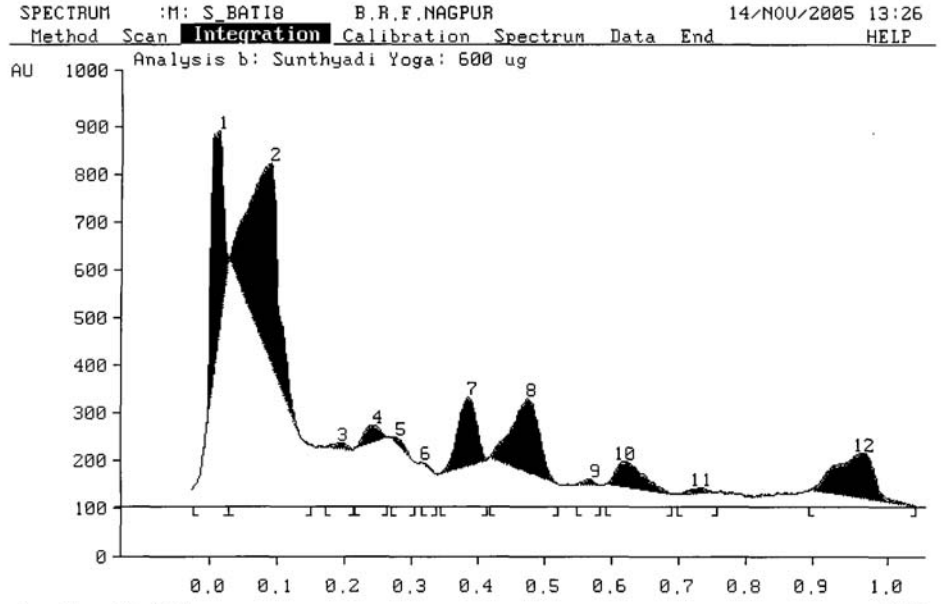
TLC/HPTLC

Sample preparation: - 0.5 g sample was mixed in 15 ml methanol and sonicated (shake well). Boiled for 2 minutes on water bath, filtered through filter paper, and evaporated the filtrate on water bath up to dryness and it was reconstituted with 5 ml methanol.

Application: - The prepared sample was applied over pre coated TLC aluminum sheet (Silica gel 60 F_{254}) with the help of sample applicator Camag Linmat IV.

Development: - The sample plate was developed with the help of mobile phase n-hexane di-ethyl ether 3:7.

Scanning: - The scanning was done with the help of Camag scanner III using software cats IV at various wave lengths i.e. Śuṇṭhyādi yoga UV 254 nm, fluorescent 366 nm. After derivitization with vaniline sulphuric acid reagent 570 nm and Śuṇṭhyādi cūṛṇa visible 425 nm UV-254 nm fluorescent 366 nm; after derivization with vanillin Sulphuric acid 570 nm.

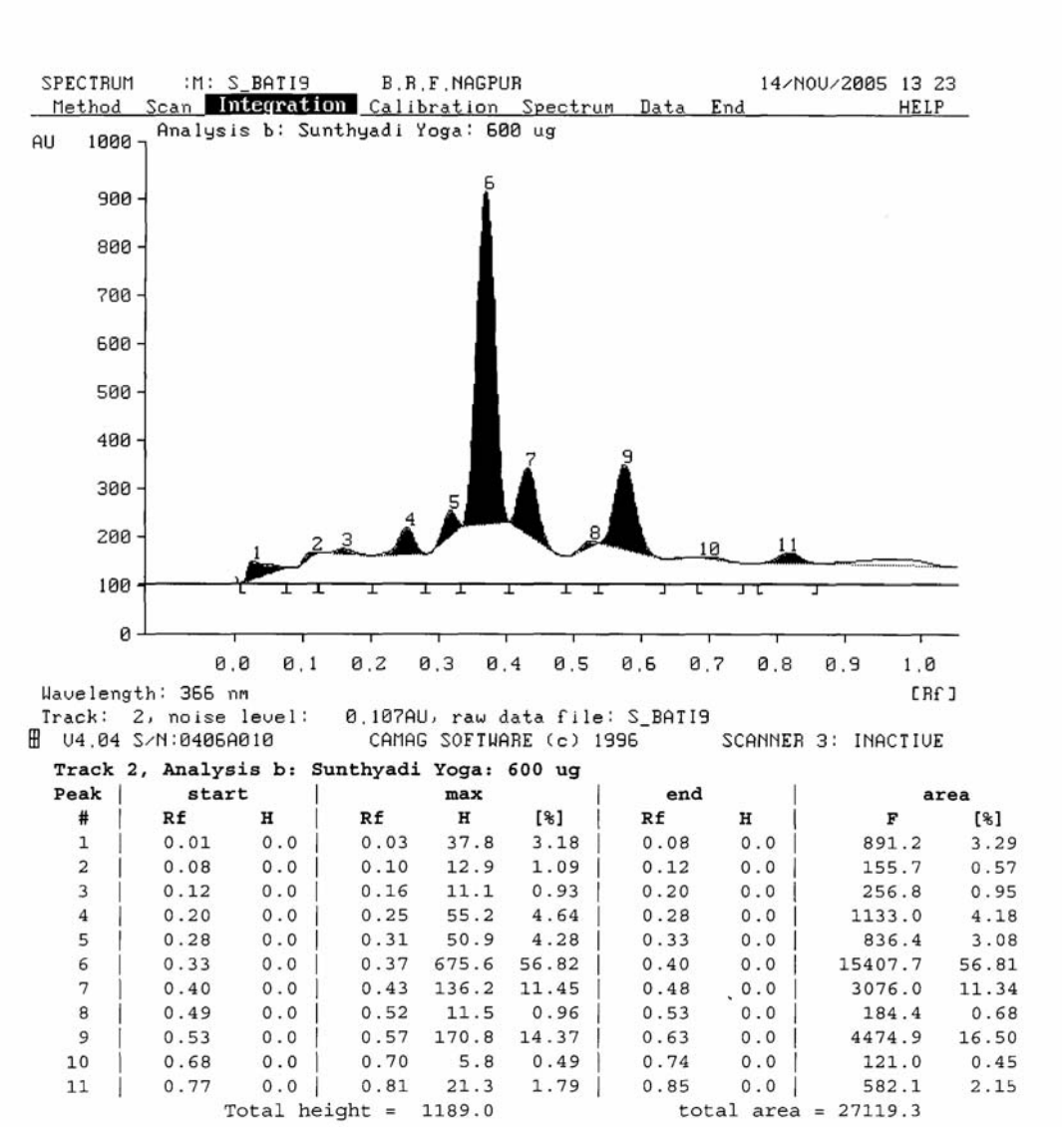


Track 2, Analysis b: Sunthyadi Yoga: 600 ug

Peak	start		max			end		area	
#	Rf	H	Rf	H	[%]	Rf	H	F	[%]
1	-0.02	0.0	0.01	492.2	34.33	0.03	0.0	6471.7	17.15
2	0.03	0.0	0.09	413.4	28.83	0.15	0.0	14405.8	38.18
3	0.17	0.0	0.20	12.0	0.83	0.21	0.0	211.5	0.56
4	0.21	0.0	0.24	35.3	2.46	0.26	0.0	730.2	1.94
5	0.27	0.0	0.28	14.4	1.01	0.30	0.0	195.9	0.52
6	0.31	0.0	0.32	5.0	0.35	0.34	0.0	40.0	0.11
7	0.34	0.0	0.38	141.0	9.83	0.41	0.0	3327.6	8.82
8	0.41	0.0	0.47	150.7	10.51	0.52	0.0	5365.7	14.22
9	0.54	0.0	0.56	11.9	0.83	0.58	0.0	153.6	0.41
10	0.59	0.0	0.62	53.3	3.72	0.68	0.0	1969.5	5.22
11	0.69	0.0	0.73	11.1	0.77	0.75	0.0	231.8	0.61
12	0.89	0.0	0.97	93.6	6.53	1.05	4.4	4631.6	12.27

Total height = 1434.0 total area = 37735.0

Fig Ia. HPTLC Finger prints of Śuṇṭhyādi yoga - (UV 254 nm)

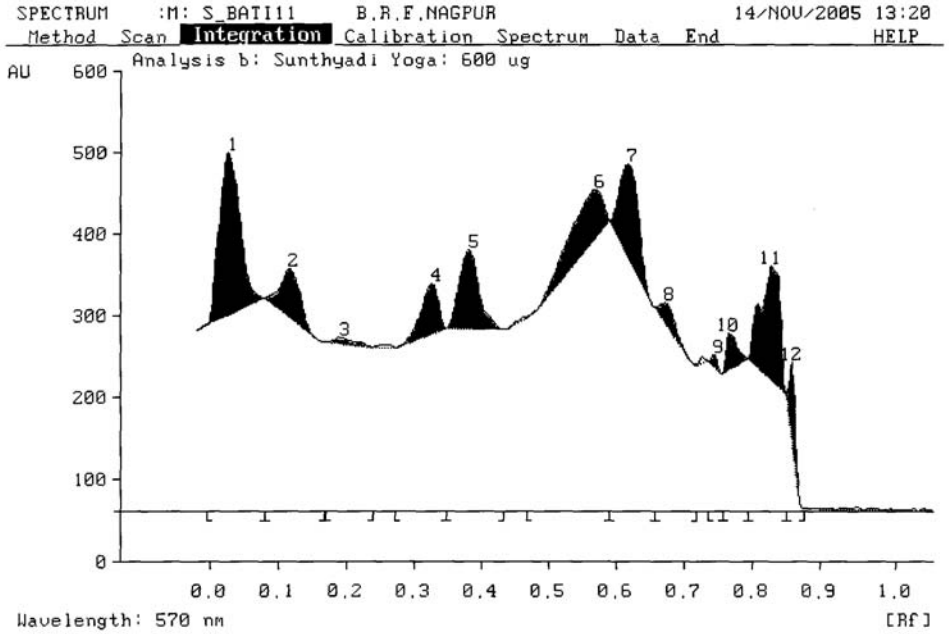


Track 2, Analysis b: Sunthyadi Yoga: 600 ug

Peak	start		max			end		area	
#	Rf	H	Rf	H	[%]	Rf	H	F	[%]
1	0.01	0.0	0.03	37.8	3.18	0.08	0.0	891.2	3.29
2	0.08	0.0	0.10	12.9	1.09	0.12	0.0	155.7	0.57
3	0.12	0.0	0.16	11.1	0.93	0.20	0.0	256.8	0.95
4	0.20	0.0	0.25	55.2	4.64	0.28	0.0	1133.0	4.18
5	0.28	0.0	0.31	50.9	4.28	0.33	0.0	836.4	3.08
6	0.33	0.0	0.37	675.6	56.82	0.40	0.0	15407.7	56.81
7	0.40	0.0	0.43	136.2	11.45	0.48	0.0	3076.0	11.34
8	0.49	0.0	0.52	11.5	0.96	0.53	0.0	184.4	0.68
9	0.53	0.0	0.57	170.8	14.37	0.63	0.0	4474.9	16.50
10	0.68	0.0	0.70	5.8	0.49	0.74	0.0	121.0	0.45
11	0.77	0.0	0.81	21.3	1.79	0.85	0.0	582.1	2.15

Total height = 1189.0 total area = 27119.3

Fig Ib. HPTLC Finger prints of Śuṇṭhyādi yoga - (Fluorescent 366 nm)



Track 2, Analysis b: Sunthyadi Yoga: 600 ug

Peak	start		max			end		area	
#	Rf	H	Rf	H	[%]	Rf	H	F	[%]
1	-0.00	0.0	0.03	199.2	21.37	0.08	0.0	5137.0	23.95
2	0.08	0.0	0.12	60.8	6.52	0.17	0.0	1496.9	6.98
3	0.17	0.0	0.19	7.9	0.85	0.24	0.0	214.1	1.00
4	0.27	0.0	0.32	60.7	6.51	0.34	0.0	1352.3	6.30
5	0.34	0.0	0.38	95.9	10.28	0.43	0.0	2436.2	11.36
6	0.46	0.0	0.56	61.9	6.64	0.59	0.0	2791.3	13.01
7	0.59	0.0	0.62	118.2	12.69	0.65	0.0	2789.0	13.00
8	0.65	0.0	0.67	27.4	2.94	0.71	0.0	478.5	2.23
9	0.73	0.0	0.74	15.3	1.64	0.75	0.0	111.1	0.52
10	0.75	0.0	0.76	44.5	4.77	0.79	0.0	594.4	2.77
11	0.79	0.0	0.82	140.7	15.10	0.84	0.0	3414.9	15.92
12	0.84	0.0	0.85	99.6	10.68	0.87	0.0	636.6	2.97

Total height = 932.0 total area = 21452.4

Fig Ic. HPTLC Finger prints of Śuṇṭhyādi yoga - (After derivitization 570 nm)

Observations: - The Śuṇṭhyādi yoga plate scanned under UV, wavelength 254 nm showed 12 peaks (spots) and the observed Rf values were 0.01, 0.09, 0.20, 0.24, 0.28, 0.32, 0.38, 0.47, 0.56, 0.62, 0.73 and 0.97. Under fluorescent, wavelength 366 nm showed 11 peaks with Rf values 0.03, 0.10, 0.16, 0.25, 0.31, 0.37, 0.43, 0.52, 0.57, 0.70 and 0.81. And on derivitization with vaniline sulphuric acid heated for 5 minutes at 105^0C showed 12 peaks at wavelength 570 nm and the Rf values were 0.03, 0.12, 0.19, 0.32, 0.38, 0.56, 0.62, 0.67, 0.74, 0.76, 0.82 and 0.85. (Fig. I a-c)

Discussion and conclusion

The sample of formulation was studied for their organoleptic characters and subjected to physico-chemical analysis to obtain standard values of the final products. There are large numbers of techniques and procedures available for standardization of the herbal drugs, among them few suitable techniques were adopted on the basis of their availability, and cost effectiveness.

The pH value of the formulation suggests that the drugs are acidic in nature, may be due to the presence of Eraṇḍabīja majja, which contains ricinoleic and stearic acids as principal constituents. The ash value gives an idea of inorganic constituents and salts present in that particular drug. More water-soluble extractive percentage observed may be due to the presence of guggulu which is water soluble and the high percentage of alcohol soluble and ether soluble extractives may be due to the presence of eraṇḍa bīja majja which contains more percentage of volatile and fixed oils.

Very often it is reported that the guggulu containing vatis do not disintegrate in the digestive system. Considering this fact the scholars (Anjana Chaube *et al*) had conducted extensive studies on disintegration time of various guggulu containing preparations. These studies suggested that the disintegration time varies depending on the ingredients and processing methods of guggulu formulations i.e. 1 to 4 hours and the disintegration time may be reduced by adding talc and sodium bicarbonate as additives. In this study, the disintegration time observed was comparatively less i.e. 98 minutes. This may be due to the presence of guḍūci satva (starchy portion), sunthi curna and eraṇḍabīja majja.

The developed TLC /HPTLC fingerprints of the drug is useful to verify the batch-to-batch quality and purity of the drugs. The chromatograms of these two formulations were developed with aim to standardize the quality of self formulated and prepared drugs. Further batch preparations may be compared with developed chromatogram fingerprints to judge the authenticity qualitatively. The parameters considered for evaluation are number of resolved sports corresponding to probable number of constituents, their Rf values and UV visible or fluorescence spectrum as a mark of their tentative identification. In addition to above the peak areas or height of individual peak may be considered as a measure of tentative concentration of constituents. The peak area or height ratio of various spots also evaluate as a measure of relative concentrations of various constituents in the extract.

Acknowledgements

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RICKETS AND ITS MANAGEMENT

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Abstract: Rickets is a nutritional disorder characterized by skeletal deformities. It is caused by a decreased concentration of the mineral hydroxyapatite in bones and cartilage due to low levels of calcium and phosphorus in the blood. Vitamin D is essential for the maintenance of normal calcium and phosphorus levels. Classic rickets, a deficiency disease of children characterized by improper development or hardening of bones, is due to lack of sufficient vitamin D in the diet, or to insufficient ultraviolet radiation from direct sunlight. This paper briefly discusses the causes, symptoms and probable complications of rickets and some ayurvedic formulations effective in the management of rickets.

Introduction

The term rickets is derived from the English word *twist* or *wrick*. Rickets is a bone disease, which is a common childhood causing progressive softening and weakening of structure of bone. It is caused by lack of vitamin D, calcium or phosphate. The deficiency of vitamins may be caused by poor nutrition or malabsorption syndrome in which the intestine does not adequately absorbs nutrients from food. If the blood levels of these minerals become too low, other body hormones may stimulate and release calcium and phosphate from the bones to the blood to elevate blood levels. There is loss of calcium and phosphate from the bones, which causes destruction of the supportive matrix. It is most likely to occur during periods of rapid growth when the body demands a high level of calcium and phosphate. Rickets may be seen in young children of 6 to 24 months and is uncommon in the newborn. The condition in adults is called Osteomalacia.

Causes and symptoms

The following are the general factors that cause rickets:

- Lack of dietary calcium and vitamin D
- Nutritional deficiency and poor diet
- Impaired function of the pancreas
- Kidney disorders involving renal tubular acidosis
- Prolonged use of steroids and anti-seizure drugs
- Hereditary rickets (X-linked hypophosphatemia)
- History of chronic diarrhea

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- Liver disorders
- Hyperparathyroidism

Generally, rickets is a problem that is found in industrialized big cities and especially in the tropics. The main symptoms of rickets in infants are 1) deformed skull, 2) delayed sitting, crawling and walking and 3) late closing of fontanels. The other symptoms of rickets are:

- The first noticeable instance is thin and pliable skull, and on pressing it feels like pressing on a ping-pong ball.
- Bone pain or tenderness in arms, legs, spine and pelvis
- Wrists and ankle joints may appear swollen
- One of the earliest signs of rickets in the infant is craniotabes (softening of skulls)
- Enlargement of the tip of the rib bones creating a string of lumps called the rachitic rosary.
- Tetany
- Dental problems such as failure of teeth to form properly, higher incidence of cavities and caries, progressive weakness and delayed formation of teeth.
- Skeletal deformities such as bowlegs, forward projection of the breast bone (pigeon chest)
- Pelvic abnormalities, along with a curved spine and a forward projected breast bone.
- Cramps, muscle spasm.
- Short stature (adults less than 5 feet tall)
- Impaired growth
- Increased tendency towards bone fractures
- Spine deformities like scoliosis (side way curves of spine), kyphosis (hunch-back)

Diagnosis

Rickets is confirmed by the history and physical examinations of the patient. The diagnosis is confirmed by lab investigation like serum calcium, serum phosphrous, serum alkaline phosphatase, parathyroid hormone, arterial blood gas (to rule out acidosis), X-rays of affected parts, bone biopsy (rarely necessary) and ALP (alkaline phosphatase isoenzyme)

Treatment

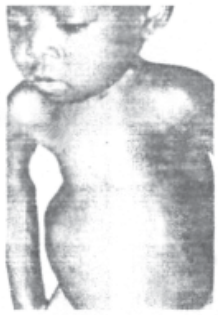
Luckily, rickets is now a treatable and preventable disease. It is necessary to understand the roles of vitamin D, calcium and phosphorus in bone growth, as well as the mechanism or the disease in order to appropriately diagnose and treat it.

Frontal bossing

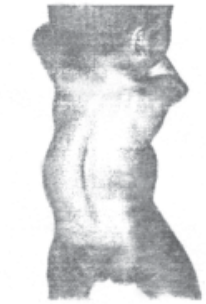
X-ray of ricket's child

It is a nature's gift that mother and baby can produce vitamin D on their own when their skin is exposed to sunlight (ultraviolet light). If the skin is fair, then take the baby outside for 15 to 20 minutes a week which can give enough vitamin D. Babies need an average of 400 IU of vitamin D per day to prevent rickets. Nursing mothers should make sure to get plenty of vitamin D; if it is not possible by the natural method, then vitamin D should be given orally. Neither breast milk or cow milk nor baby food contains much vitamin D.

A single dose of 600,000 lU of vitamin D_3 orally or 1M (intramuscular) induces rapid healing. If the healing sign of rickets is not seen on X-ray plate of bones within 3-4 weeks of therapy, the above dose may be repeated. Patients, who respond to this therapy, should receive 400 units of vitamin D_3 per day after the process of commencement of healing. This can prevent complications, including developmental delays.



Chest deformity



Scoliosis

To prevent or reduce deformities, bracing or positioning can be used. In some case of skeletal deformities, surgery may be required. The following are some āyuṛvedic formulations effective in the management of rickets.

1. Vamśalocanacūṛṇa (200 mg) and Kukkuṭāṇḍatvak bhasma (200 mg) with honey - thrice a day; or Vasantamālatī (40 mg), Muktā pañcāmṛta (60 mg), Pṛavāḷabhasma (80 mg) and Silājitvādi lauha (80 mg) with milk - thrice a day.
2. Śiśuśoṣāntak capsule - 2 Nos. - twice a day with goat milk
3. Śoṣāntak taila - for local application on the affected parts
4. Aravindāsava - 5 to 10 ml with equal quantity of water - twice a day.
5. Śaṅkhapuṣpī taila - for massaging on the head
6. Gaḷa taila, Śatāvarī taila or Mahānārāyaṇa taila - for regular external massage in a mild sunlight.
7. Cod liver oil - for external application on the affected part.
8. Tṛiśatipṛasāraṇī taila, Balālākṣādi taila, Candanabalālākṣādi taila - for local application.
9. Kumārakalyāṇa Rasa, Śambūkabhasma, Śaṅkhabhasma, Muktādi vaṭi and Balācatuṛbhadracūṛṇa are also effective in the treatment of rickets.

Cow milk, milk products, cheese, butter, egg yolk, liver, meat, fish, mango, multi vitamin pills and green vegetables are good sources of

vitamin D. Breast milk, a primary source of childhood nutrition, contains sufficient amounts of calcium and phosphorus for an infant, but very little vitamin D. The recommended daily dose of vitamin D in infants is 5.0 ug (200 IU) per day, whereas in children, it is 10 ug (400 IU) per day.

Complications

The following are the general complications observed in rickets:

- Teething may be delayed and it may be poorly formed with cavities
- Chronic skeletal pain and skeletal deformities
- Skeletal fractures may occur without cause
- Bowed legs, knock-knees, or bone fractures are common
- It lowers a child's immune defenses
- Diseases like anaemia, pneumonia and diarrhoea.

Conclusion

Vitamin D in its active form acts as a hormone to regulate calcium absorption from the intestine and to regulate levels of calcium and phosphate in the bones.

Rickets is not a contagious disease. If the patient's family has a history of disorder that can cause rickets, then genetic counseling has to be obtained. Vegetarians are particularly likely to develop rickets because there is very little vitamin D in vegetables. If a child presents certain disorders like gastrointestinal disorder, then dietary supplements may be required. Dark skinned people require almost six times as much sunlight exposure to make the same amount of vitamin D as those with fair skin. Too much vitamin D is a possible danger and excessive sunlight exposure can cause burn, eczema, skin problems and duodenal ulcers.

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ROLE OF MILK IN ŚODHANA (DETOXIFICATION) WITH SPECIAL REFERENCE TO NUX-VOMICA

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Abstract: Śodhana is a process of purification and detoxification performed in āyuṛvedic system of medicine on several metals, minerals, animal products and poisonous herbal drugs. There are so many solvent systems like kañji (sour gruel), takṛa (butter milk), kvātha (decoction), dugdha (milk), etc. Among them milk is the most commonly used media for śodhana (detoxification) of poisonous herbal drug such as nux–vomica. This paper deals with the status of milk before and after śodhana treatment of nux–vomica seeds.

Introduction

Milk is a natural, heterogeneous and complex biochemical fluid, which is a nearly complete food with quality nutrients harmonized together in adequate proportion. There is a good balance between fat, protein, carbohydrate, minerals and vitamins in it, each being present in sufficient and good amounts[1] Milk is a typical example of a natural emulsion of water and fat.

The śodhana process described in āyuṛvedic classics is not merely a process of separation or purifications. It is a process of detoxification also. The main objective of śodhana is to make the material suitable for further processing and increase the bioavailability of the drug. It is interesting to observe that the specific media is used for śodhana of a particular drug like godugdha (cow's milk) and viṣatinduka (nux-vomica - *Strychnos nux - vomica* Linn.)[2]. So, it may be inferred that the media plays an important role in the śodhana process (Table 1).

Nux–vomica is included in the upaviṣa dravyas in the classics of Rasaśāstṛa by the name, viṣatinduka. In modern toxicology, it is categorized under spinal poisons. The seeds of nux–vomica contain three active toxic principles namely strychnine, brucine and loganin. Out of these, strychnine and brucine are the potent toxic active principles that act as central nervous system stimulant, particularly on the anterior horn cells of the spinal cord.[3]

There are very few reports on the investigations of the śodhana process on nux–vomica. It has been reported that the detoxification treatment of nux–vomica seeds by soaking in cow's urine and boiling in cow's milk selectively removes

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TABLE 1

Milk used as media for śodhana referred to in various āyuṛvedic texts

Varga	Name	RRS*	RSS*	RT*	AFI*
Mahārasa	Abhṛaka	Niṛvāpa (7 times)	Niṛvāpa	Niṛvāpa (7 times)	Niṛvāpa (7 times)
	Vimal	-	Svedana	-	
	Śilajit	Leave in milk	Leave in milk	-	
Uparasa	Gandhaka	Dhalana, Svedana	Dhalana	Dhalana (3 times)	Dhalana
	Gairika	Bhāvana		Bhāvana	Bhāvana (3 times)
Sādhāraṇarasa	Hiṅguḷa	Meṣadugdha Bhāvana	Bhāvana (Mahiṣa / Meṣa dugdha)	Meṣa dugdha Bhāvana (3 times)	
	Somala	-		Svedana	Svedana (Go/aja dugdha)
Ratna	Taṛkṣya	Svedana		Svedana	
Dhātu	Yaśada	-		Dhalana (21 times)	
	Kānta lauha	-	Abhiṣeka (Mahiṣa kṣīra)		
Viṣa	Vatsanābha	-	Svedana (Aja/go dugdha)	Godugdha Svedana	
				Ajadugdha Svedana	
Upaviṣa	Viṣatinduka	-		Svedana	Svedana
	Jaypāḷa	-	Svedana	Svedana	Svedana
	Bhallātaka	-	-	-	Nimajjana
	Dhātura	-		Svedana	Svedana
	Guñjā	-		Svedana	
	Karavīra	-	-	-	Svedana
Anya	Guggulu	-	Svedana	Svedana	Svedana

* RRS - Rasaratnasamuccayam, RSS - Rasendrasārasamgraham, RT - Rasataraṅgiṇi, AFI - Ayurvedic Formulary of India.

the toxic alkaloids (strychnine and brucine) rendering the nux-vomica non-toxic[4]. Taking all these in consideration the present study was planned to investigate the changes that occur in the media, i.e. milk after śodhana of nux–vomica seeds.

Objectives

- To detoxify (śodhana) nux–vomica by using milk as media
- To study the resultant milk after śodhana physico-chemically

Materials and methods

Śodhana of nux–vomica[5]

Nux–vomica śodhana was performed by svedana process (boiling in liquid bath). For this purpose, the seeds of nux–vomica were taken in a cloth piece and the help of an iron rod made a swing. It was then placed in a S.S. vessel that contained cow's milk (the amount of cow's milk being sufficient for completely merging of the seeds). Then it was boiled for 3 hours. Gentle heat was provided and the process was continued by adding cow's milk little by little. Finally, after 3 hours the seeds were collected, washed with hot water, powdered and stored in a glass bottle.

Physico–chemical analysis of media

The media plays an important role in the physico–chemical changes occurring in the material during the sodhana process and the physico–chemical nature of media changes accordingly. The pH and specific gravity of the media (cow's milk) was measured before and after śodhana. The pH of the media was taken and the specific gravity measured by the specific gravity bottle in a single pan weighing balance.

Assay for alkaloids

Qualitative test for alkaloids[6]: - The following general reagents are used to detect the presence of alkaloids in the milk after śodhana.

1. Dragendorff's reagent**: -** prepared by excess of potassium iodide added to a solution of bismuth nitrate, gave an orange–red precipitate on adding with the resultant milk after śodhana.
2. Mayer's reagent**: -** made by adding potassium iodide to a solution of mercuric chloride until the precipitate of mercuric chloride redissolves. When added with resultant milk after sodhana gave a pale yellow precipitate.
3. Hager's reagent**: -** prepared by making a saturated solution of picric acid, gave a reddish brown precipitate, when added to the resultant milk after śodhana.

Extraction of alkaloids[7]

A weighted quantity of the dried milk after sodhana was macerated with a measured quantity of ethanol and enough ammonia solution to liberate the alkaloids. The extract was run off in a Soxlet extractor and an aliquot portion of it was assumed to obtain a corresponding amount of the total alkaloids.

The extracted fraction was divided into two i.e. for strychnine and brucine[8]

Test for strychnine: - One fraction was dissolved in a few drops of concentrated sulphuric acid in a porcelain dish, and a little powdered potassium dichromate was added to the solution. An intense violet colour was produced, which slowly changed first to red and then to yellow.

Test for brucine**: -** The remaining fraction gave

a deep red coloration when mixed with nitric acid.

Results

Śodhana of nux–vomica: - This procedure was performed thrice, each time 200 g of raw seeds were taken. An average of 1500 ml of cow's milk was taken in each procedure as media for śodhana. After completion of svedana procedure, the volume of remaining milk was 745 ml (avg.). At the end of the śodhana process, 194.33 g (avg.) of the śodhita nux-vomica powder was achieved (Table 2). During the procedure the temperature of media was 107° C.

TABLE 2

Weight/volume of nux-vomica and milk before and after śodhana

Batch	Description	Wt. (g) / Vol. (ml)		Temp. (°c)
		Before	After	
1	Nux-vomica	200	194	
	Cow's milk	1300	720	105
2	Nux-vomica	200	195	
	Cow's milk	1600	780	109
3	Nux-vomica	200	194	
	Cow's milk	1400	780	107

Physico-chemical analysis of media: - The pH of media (cow's milk) was decreased from 6.5 to 6 after sodhana and specific gravity increased up to 0.03 after śodhana (Table 3).

The qualitative assay for alkaloids in the resultant milk after śodhana was found positive:

Tests for alkaloids:

Dragendorff's reagent	:	+
Mayor's reagent	:	+
Hager's reagent	:	+
Test for strychnine	:	+
Test for brucine	:	+

TABLE 3

Physico-chemical analysis of media (milk) before and after śodhana

Batch No	pH		Specific gravity	
	Before	After	Before	After
1	6.5	6.0	1.0405	1.0680
2	6.5	6.0	1.0405	1.0716
3	6.5	6.0	1.0405	1.0747

Discussion

According to āyuṛvedic classics milk is having the properties like guru (heavy), śīta (cold), madhura (sweet), mṛdu (softness), pṛasāda (leisureliness), snigdha (unctuousness), sthira (stability), śḷakṣṇa (smoothness), picchila (sliminess), and sāndra (concentrated), and these are just opposite to the properties of viṣa (poison) like laghu (light), uṣṇa (hot), kaṭu–tikta (pungent and bitter), tīkṣṇa (sharpness), āśu (quickness), rūkṣa (ununctuousness), vyavāyi (pervasiveness), vikāṣi (expansiveness), viśada (non sliminess), sūkṣma (subtleness) (Table 4). So, milk is mentioned as general media for śodhana of viṣadravyas (poisons)[9].

Svedana (boiling under liquid bath) process of detoxification treatment is nothing but a process of extraction. Here flow of media occurs through the coarse powdered drug kept in a swing during boiling due to temperature gradient. So, this method should be considered as percolation method of extraction, where media soluble toxic principles get separated from the coarsely powdered poisonous drug.

The seeds of nux-vomica contain the alkaloids strychnine and brucine together with much smaller quantities of other alkaloids of minor importance. Nux-vomica seeds usually contain about 3 % of total alkaloids of which about one half is strychnine. Pharmacologically,

TABLE 4

Comparative properties of viṣa and milk

Sl. No	Properties of viṣa	Properties of milk
1.	Laghuta (light)	Guruta (heavy)
2.	Uṣṇata (hot)	Śītata (cold)
3.	Kaṭutiktata (pungent and bitter)	Madhurata (sweet)
4.	Tīkṣaṇata (sharpness)	Mṛduta (softness)
5.	Āśuta (quickness)	Prasadata (leisureliness)
6.	Rūkṣata (ununctuousness)	Snigdhata (unctuousness)
7.	Vyavāyata (pervasiveness)	Sthirata (stability)
8.	Vikasitva (expansiveness)	Ślakṣaṇatva (smoothness)
9.	Visadata (non sliminess)	Picchilata (sliminess)
10.	Sūkṣamata (subtleness)	Sāndrata (concentrated)

brucine is much less active than strychnine, being only $^{1}/_{10}{}^{th}$ as toxic, the pharmacopoeial assay of nux–vomica is a determination, not of total alkaloids, but of strychnine only[10].

It has been reported that the śodhana process of nux–vomica brings about a quantitative change in the alkaloidal content of the seeds (about 63%), with no change in the composition of the alkaloids[11]. The present study proves the presence of active alkaloids in the media (milk), obtained after śodhana of nux–vomica seeds. Thus the claim that the śodhana process detoxifies the nux–vomica seeds is substantiated.

Conclusion

Milk is used as a general media for detoxification treatment of viṣa dravyas (poisons). Cow's milk successfully extracts the poisonous principles (strychnine and brucine) from the seeds of nux–vomica and render the nux–vomica seeds non–toxic.

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EFFICACY OF *WITHANIA SOMNIFERA* IN THE MANAGEMENT OF STRESS - A CLINICAL STUDY

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Abstract: Stress is a natural response that occurs when we are threatened or overwhelmed. It hampers function of the immune system, leaving people more vulnerable to many diseases. It also affects some disorders directly. If not managed appropriately, stress can lead to serious problems. Exposure to chronic stress can contribute to both physical illnesses, such as heart disease, and mental illnesses, such as anxiety disorders. This clinical study on the water extract prepared from specific chemo-type of aśvagandhā (*Withania somnifera*) has shown significant anti-stress activity with special reference to occupational stress.

Introduction

Due to modernization, the society is experiencing more and more problems and complications on various level of health i.e. physical, mental, social and spiritual as well. Stress is an unpleasant over response of the body both in physical and psychological aspect, produced due to some unwanted factors precipitating by overgrowing demand according to modem society.

Some unwanted acute and chronic physical and psychological abnormal situations over-activate some vital areas of the brain, which are amygdale, hippocampus, reticular activating system, and the hypothalamus; as a result, chiefly autonomic nervous system is affected due to which sympathetic over activity occurs, and thereby adrenalin, noradrenalin, cortisol secretion are increased, also dehydroepiendrosterone and serotonin secretion are decreased. Abnormal release of these hormones and neurotransmitters produce unpleasant physical and psychological manifestations of the body during acute and chronic stressful situations.

Āyuṛveda recommends aśvagandhā particularly in debilitating condition, restoration of health, diseases culminated from stress and as nervine tonic (Sharma P. V., 1978). But no such systemic clinical trial report is available to confirm that this can be used as a safe and potent anti-stress drug. This study in the first time reveals the systemic clinical observation of the anti-stress activity of *Withania somnifera* with scientific validation.

The central action and psychotropic effects of this drug shown to provide relief reducing in

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anxiety levels and neuroticism; it contains the following percentage of ingredients:

1. Glycowithanolides (> 8%): - Composed of fully characterized withanolide glycosides (also called sitiindosides, e.g. sitoindosides VII to X & XV; scheme II)
2. Withaferin A (> 2%): - A withanolide aglycone (in combination with oligosaccharides; it elicits immuno-potential effect, while per se it is immuno-suppressive).
3. Oligosaccharides (> 32%): - These compounds act as systemic bioactive carriers (in āyuṛveda, the action is called yogavāhi).
4. Alkaloids (> 0.1%): - Tropane alkaloids (devoid of scopolamine and equivalents that are toxic in nature and produce dementia) - e.g. tropine and pseudotropine.
5. Polysaccharides (> 0.2%): - At higher doses these compounds produce deep and sustained depression.

Objectives

The main objectives of this clinical study were - a) to establish the clinical efficacy of aśvagandhā in the subjects prone to stress or those suffering from stress disorders and b) to evaluate the safety of the drug in the subjects that had been studied.

Methods and materials

The trial patients were selected irrespective of sex, religion, occupation, income, status, etc. from the O.P.D. and I.P.D. of male and female ward of Central Research Institute (Ay), Kolkata.

Inclusion criteria

- Freshly diagnosed cases, who had been suffering from chronic stress, not receiving any other treatment from out side.
- Those who showed willingness to give written informed consent for participation in the study.

Exclusion criteria

- Any concomitant serious disorder of the liver, kidneys, heart, lungs or other organs.
- Receiving or having received within past 1 month any anti-stress treatment
- Any other drug treatment being received simultaneously that may influence the study outcome
- Subject unlikely to comply with the trial protocol
- No specific target group
- Below 18 and above 60 years

Assessment criteria and schedule

All the patients enrolled in the study were subjected to examinations - history of illness, family history, clinical features, etc. as a part of the screening procedure and then received the treatment as advised for 60 days. After the screening, the following subjective and objective criteria were done:

- Pre-treatment, bi-weekly and post-study visits
- The vital clinical features such as pulse, blood pressure, body weight and neurological status were recorded
- Stress related other clinical manifestations like insomnia, fatigue, palpitation, perspiration, forgetfulness, trembling, flushing, irritability, inability to concentrate, impending doom and depersonalization were also recorded.

After recording the important clinical features for each subject, blood was collected at the

beginning of the treatment (0-day) and after three months (60th day) for estimation of followings:

- Hemoglobin Percentage
- Total and differential white blood cell count
- Fasting blood sugar
- Lipid Profiles
- Serum dehydroepiandrosterone sulphate (DHEAs) at morning
- Serum cortisol at morning
- C-reactive protein

Drug administration

The trial drug coded as 'D' capsule contained 250 mg aśvagandhā water extract and the 'E' coded capsule contained 125 mg water extract. The placebo drug, coded as 'B' capsule contained 250 mg silica compound.

The 'D' coded drug was given to the patients twice daily 15 minutes before meal for 60 days and the 'B' coded drug was also given in the same dose and period to the placebo group. The 'E' coded drug was divided into two groups i.e. E1 group and E2 group; where in El group, the trial drug was given 125 mg once daily 15 minutes before meal and in E2 group the same drug was given twice daily 15 minutes before meal for 8 weeks.

Assessment

In the subjective criteria, the trial drug coded as 'D' showed highly significant clinical improvement in all the above said stress parameters like insomnia, fatigue, palpitation, etc. on the 60th day while compared with the 0 day (i.e. before treatment) and the placebo treatment (coded as 'B') value. In the objective criteria, the drug coded as 'D' showed moderate to high significant improvement in the 60th day compared with the 0 day and the placebo treatment value.

The trial drug coded as 'E2' showed moderate significant improvement in all the said clinical stress parameters in the 60th day compared with 0 day and placebo treatment value in both the subjective and objective criteria. On the 30th and 60th day, the trial drug coded as E1 showed mild to moderate significant improvement in the stress parameters compared to before and placebo treatments both in subjective and objective criteria.

Discussion

In this study, mainly occupational stress disorders were selected for the trial, which was conducted under the CCRAS, Dept. of AYUSH, Ministry of Health & family Welfare, Govt. of India. Total 84 patients were selected where 60 patients had continued and completed the trial. Among 60 patients, 20 patients were selected under Group D (i.e. in the dose of 250 mg twice daily before meal) and 10 patients for group B (i.e. placebo; 250 mg twice daily before meal). 16 patients were selected for E2 group where the recommended dose reduced to 125 mg twice daily before meal and 14 patients in El group, 125 mg dose was given once daily before meal.

In the group D, the trial drug was administered in the cases of moderate to severe degree of stress disorders after proper estimation of stress by prescribed format and questionnaires. The drug was administered twice daily for the period of 8 weeks. During the study no other drug was given and dietary restriction was imposed. In this group, the response of the treatment was evaluated on all the subjective and objective criteria.

In the group E2, the treatment response on pulse rate, sleeplessness, irritability, inability to concentrate, fatigue, appetite and the feeling

of impending doom were found highly significant response. More over, the subjective improvement on blood pressure, palpitation and memory improvement were found mild to moderately significant.

In the evaluation of objective criteria for the group E2, the treatment response on Hb%, blood sugar, serum cholesterol level, serum triglyceride, serum cortisol in morning and serum DHEAs showed moderately significant improvement, whereas serum LDL, HDL and VLDL showed highly significant response when compared with the group B. In the evaluation of subjective criteria for the group E1, the treatment response on pulse rate, palpitation, sleeplessness, etc. were found highly significant response compared with placebo. More over, the subjective improvement on irritability and perspiration were found mild to moderately significant.

In the evaluation of objective criteria for the group E1, the treatment response on Hb%, sugar, Serum cholesterol and triglyceride showed no significant response, whereas the estimation of serum LDL, HDL and VLDL, etc. showed significant response. The treatment result of this group showed tendency of the gradual improvement of the said stress parameters when compared with the group B value.

Conclusion

Āyuṛveda, the oldest and richest medical system focuses on two main objectives for health care i.e. prevention of body and mind from ailments, and secondly, curative aspect from the diseases and degeneration. Carakasamhita, the leading āyuṛvedic classic, specially deals with preventive aspect as well as curative aspect with more emphasis on rasāyana therapy. In rasāyana therapy (rejuvenation), this is mainly dealt with some plant products as well as minerals and marine products. The rasāyana therapy, which is mainly emphasized on preventive aspect, is described as a group of plants having adaptogenic activity. *Withania somnifera* holds a front rank among these adaptogenic plants.

Several animal experimental studies had already been carried out with *Withania somnifera* on its different activities such as 1) anti-stress (Bhattacharya S and Muruganandan A, 2003), 2) antioxidant (Bhattacharya *et al*, 1997), 3) immuno-modulatory activity (Davis and Kuttan, 2000; Ghosal S, 1989), 4) anti-cancer (Prakash *et al*, 2002), 5) anti-tumor (Jayaprakash *et al*, 2003), 6) cardio-protective (Dhulay J N, 2000) and 7) anti-osteoarthritic (Kulkemi *et al*, 1991). But no systemic clinical trial report is available to confirm that this can be used as a safe and potent anti-stress drug. In this study, the water extract prepared from specific chemo type of aśvagandhā showed significant anti-stress activity with special reference to occupational stress. It is also observed that the trial drug has no side effects and or adverse drug reactions. In chronic treatment, low doses treatment schedule (group El) may be successful and further study is needed for the evaluation of the anti-stress activity of this drug in chronic stress disorders.

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NUTRITIONAL EFFICACY OF AGASTYAHARĪTAKI RASĀYANA WITH SPECIAL REFERENCE TO RĀJAYAKṢMA

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Abstract: There are various rejuvenating (rasāyana) formulations referred to in the āyuṛvedic classics; they vary from the daily and commonly employable, to promoting a particular effect like intellect (medhya), etc. The benefits and application of rasāyana are in many folds; they bring up the excellent qualities in tissues (dhātu) and enhance immunity. This paper briefly discusses the efficacy of Agastyaharītaki Rasāyana in the management of rājayakṣma.

Introduction

Agastayaharītaki Rasāyana is explained in Śāṛṅgadharasamhita as a naimittika rasāyana (rejuvenating therapy performed on specified occasions) recommended in the cases of cough (kāsa), shortness of breath (śvāsa) and tuberculosis (rājayakṣma) for alleviating the disease and giving the energy. Rājayakṣma is an ailment that may affect at any age. Due to many associated constitutional disturbances, the nourishment of the body is greatly impaired and this aptly suits to the synonyms of kṣaya, which is coined for this disease.

The nearest clinical entity for rājayakṣma is pulmonary tuberculosis. With the prolonged course of illness and the employment of chemotherapeutic agents, the person becomes grossly debilitated and needs adjuvant nutritional support. Decreased nutritional status is considered to be one or the chief predisposing factors of this disease.

Modern nutritional supplementations may not fulfill the requirement, as they do not aim at the improvement of metabolic derangements. But rasāyana drugs exert their efficacy by correcting dhātvagni and clearing the śṛotas due to their digestive and carminative effects. The modern Anti Koc's Treatment (AKT) regimen has almost resulted in successful control of the disease but makes plenty of adverse effects. Hence it is essential to find a suitable compound that could enhance the nutritional status and also decrease the adversities associated with AKT. Considering these aspects, a study on Agastyaharītaki Rasāyana for improving the nutritional status in rājayakṣma patients was under taken.

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Materials and methods

26 patients of rājayakṣma (proven pulmonary tuberculosis) were selected for clinical trail from the OPD and IPD of SDM College of Āyuṛveda and Hospital, Hassan and Vivekananda Youth Moment, Saragur.

Inclusion criteria

- Diagnosed cases of pulmonary tuberculosis undergoing revised tuberculosis regimen
- Patients between the ages of 17-55

Exclusion criteria

- Tuberculosis patients of other than pulmonary involvement
- Patients who arc suffering with immuno-suppressive disorder like HIV.
- Patients having other chronic illness
- Tuberculosis patients with complications

Assessment criteria

- Decrease in adverse effects
- Improvement in the nutritional status
  Anthropometery
  Hematological.
- Decrease in clinical signs and symptoms of the disease

The Agastyaharītaki Rasāyana consisting of 26 drugs (Table 1) was prepared according to the principles of Avalehakalpana. There are references to the efficacy of this formulation in almost all āyuṛvedic classics. The only difference observed between Agastya yoga and rasāyana is that in Agastya yoga, harītaki is put in powder-form; whereas in Agastya rasāyana, harātaki has to be put as such in Avaleha media i.e. without making it into powder-form.

Observations

Most of the eleven symptoms (ekādaśa lakṣaṇas) explained in the case of rājayakṣma were found in the studied cases. Kāsa (cough) was present in 96% and raktaṣṭhīvana (blood spilling) in 11.53%; other symptoms were reported in the range between 40 to 80% (Table 3)

Results and discussion

Symptoms

Among the probable symptoms of rājayakṣma, majority of the symptoms were found in the studied cases. Coughing was present in 96%,

TABLE 1

Ingredients of Agastyaharītaki Rasāyana

Vilva	*Aegle marmelos*
Agnimandha	*Premna corymbosa*
Syonāka	*Oroxylum indicum*
Pāṭala	*Stereospermum colais*
Gambhārī	*Gmelina arborea*
Śālaparṇi	*Pseudarthria viscida*
Pṛśniparṇi	*Desmodium gangeticum*
Kaṇṭakāri	*Solanum surattense*
Bṛhati	*Solanum indicum*
Gokṣura	*Tribulus terrestris*
Śankhapuṣpi	*Canscora decusseta*
Yavāsa	*Fagonia cretica*
Śaṭhi	*Hedychium spicatum*
Balā	*Sida rhombifolia* ssp. *retusa*
Puṣkaramūla	*Inula racemosa*
Harītaki	*Terminalia chebula*
Gajapippali	*Scindapsus officinalis*
Apāmārga	*Achyranthus aspera*
Pippalīmūla	*Piper longum*
Citṛaka	*Plumbago indica*
Bhārṅgi	*Clerodendrum serratum*
Yava	*Hordeum vulgare*
Taila	Gingely oil
Madhu	Honey
Guḍa	Jaggery
Ghṛta	Ghee

and blood spilling in 11.5%.. Other symptoms were reported in the range between 40 to 80%. A greater percentage of reduction in the symptoms was observed in the rasāyana group at the end of the study period.

Rasāyana therapy in reducing the adversities

Common adverse reactions reported for Anti Tuberculosis Treatment (ATT) are pertaining to Gastro Intestinal Tract symptoms like nausea, vomiting, burning sensation in epigastric region, edema and rashes. All these symptoms were reported in both the groups during the commencement of treatment. At the end of the study period, greater percentage of reduction of adversities was observed in the rasāyana group.

TABLE 2

Incidences in relation to different parameters

Description	No. of patients	%
A. Age-wise incidence:		
- 18-25	9	34.6
- 25-35	10	38.46
- 35-45	5	19.23
- 45-55	2	7.69
B. Sex:		
- Male	14	54
- Female	12	46
C. Occupation:		
- Agriculture	15	57.69
- Housewife	8	30.72
- Student	1	3.84
- Cleaner	1	3.84
- Business	1	3.84
D. Socio-economic status:		
- Very poor	12	46.5
- Poor	11	42.30
- Lower middle class	3	11.5

Nutritional status

Under-nutrition is one of the risk factor for the spread of tuberculosis as the disease is seen more in lower socio-economic group, where the deficiency of proteins, essential vitamins and minerals is very common. Deficiencies of these nutrients also impair the immunity. Further, the commencement of multi drug therapy reduces the appetite and digestion and causes certain other constitutional disturbances also. In the initial stages of the disease, presence

TABLE 3

Incidence of symptoms at the time of reporting

Symptoms	No. of patients	%
Kāsa	25	96.15
Kaphaṣṭhīvana	17	65.38
Pāṛśvasūla	16	61.53
Jvara	12	46.15
Skandhaśūla	21	80.76
Aruci	12	46.15
Śvāsa	22	84.61
Raktaṣṭhīvana	3	11.53
Śirorujā	12	46.15

TABLE 4

Relief in subjective parameters in both the groups

Symptoms	AHR + AKT		AKT	
	Bt %	At %	Bt %	At %
Kāsa	92.3	23.0	100	92.30
Kaphaṣṭhīvana	61.5	0	84.6	38.4
Pāṛśvasūla	46.10	15.3	69.2	38.4
Jvara	69.2	7.6	46.1	15.3
Skandhaśūla	76.0	0	84.6	84.6
Aruci	69.2	7.6	46.1	30.7
Śvāsa	76.0	30.7	100	84.6
Raktaṣṭhīvana	7.6	0	7.6	0
Śirorujā	61.5	0	30.7	7.6

AHR - Agastyaharītaki Rasāyana, AKT - Anti Koc's Treatment, Bt - Before treatment, At - After treatment

of infection contributes to greater breakdown of muscle protein, which causes for wasting. Apart from this, indigestion and mal-absorption aggravates the problem. The caloric requirement during injection will be usually higher, which may not be met satisfactorily in many of the cases. In the present study statistics shows greater increase of serum proteins in the rasāyana group. Apart from this observation, positive gains are noted in anthropometrical assessments also.

Subjective parameters

Weight: - Patients in both the groups got gain in weight with an average percentage of 1.46 kg in ATT group and 3.5 kg in rasāyana group.

Body Mass Index (BMI):- There is an increase in BMI in both the groups after the treatment with a mean value of 1.23 in ATT (Control) group, and 4.01 in rasāyana group.

Objective parameters

Hb%: - The mean percentage improvement noted in the Control group was 11.45% and 18.69% in the rasāyana group This shows the high significance in both the groups. But gains were higher in rasāyana group.

TABLE 5

Relief in adverse affects in both the groups

Adverse actions	AHR		AKT	
	Bt %	At %	Bt %	At %
Nausea	76.0	15.3	53.8	30.7
Vomiting	61.5	30.7	30.7	23.0
Abdominal pain	23.0	15.3	7.6	7.6
Burning sensation in epigastric region	38.4	7.6	53.8	46.1
Edema	76.0	0	0	0
Rash	15.3	7.6	23.0	15.3

TABLE 5

Assessment of weight, BMI, Hb%, etc in both the groups before and after treatment

Descriptions	ATT			ATT+AHR		
	Bt	At	%	Bt	At	%
1. Weight	36.84	37.30	1.46	38.03	39.4	3.58
2. BMI	15.53	15.72	1.23	15.95	16.48	4.01
3. Hb%	10.81	12.06	11.45	9.46	11.23	18.69
4. Serum protein	6.85	7.35	9.63	6.4	7.32	14.92

Serum protein: - There was gain of serum protein in both the groups. However, the gains were higher in the rasāyana group. The improvement was 9.63% in the ATT group and 14.9 in the rasāyana group.

Probable mode of action

The ingredients of Agastyaharītaki Rasāyana include daśamūla, which are predominantly of vāta and kapha pacifying. These are the main doṣas involved for the pathogenesis of the disease; hence all the symptoms of the disease rājayakṣma improved by rasāyana therapy. Gajapippali (*Scindapsus officinalis*) and citṛaka (*Plumbago indica*) are known for their carminative action and promoting proper metabolism. This is the reason for reduction of nausea, vomiting, and abdominal pain more in the rasāyana group. Bhārṅgi (*Clerodendrum serratum*), puṣkaramūla (*Inula racemosa*), apāmārga (*Achyranthus aspera*) and śaṭhī (*Hedychium spicatum*) are having the anti-inflammatory properties. The anti inflammatory action of these drugs helps in reducing the inflammatory changes in the alveoli and respiratory tract and reduce the symptoms like parśvasūla (pain in the lateral sides), svarabheda (hoarseness) and śvāsa (shortness of breath).

Conclusion

- From the explanation of probable symptoms of rājayakṣma, it was very much evident of the clinical entity 'pulmonary tuberculosis' in the selected subjects.
- The disease is predominantly affecting the lower socio-economic group with a slight higher occurrence among males.
- Impairment in nutritional status forms an important predisposing factor of rājayakṣma. However, the disease process aggravates malnutrition.
- It is necessary to introduce a suitable nutritional adjuvinant in rājayakṣma. Such supplement must also correct the associated adversities of multi drug therapy; Agastya-harītaki Rasāyana fulfills this requirement.
- With a view of proper administration and continuous monitoring, confirmed Tuberculosis cases that were undergoing DOTS therapy, were administered with Rasāyana drug daily.
- Most of the cases were selected from tribal areas where people living in very poor socio economic status. This helped in affective monitoring of the cases.
- This work supports the view that administration of Naimittika Rasāyana enhances the efficacy of treatment and enables the patients for a better recovery.

INSTRUCTIONS TO THE AUTHORS

Prospective contributors to Aryavaidyan are urged to go through these "Instructions" before finalising their manuscripts.

1. **Submission of a manuscript** :- The manuscript should be in English. It should be submitted in three copies typed in double space on sheets of A4 size with wide margins. Submission of a manuscript is held to imply that it has not been published elsewhere and that, if accepted, it will not be republished in any other journal in the same or similar form without prior written permission of the Chief Editor.

2. **Scope of Aryavaidyan** :- Contributions are welcome from the fields of Ayurveda and allied subjects such as ethnomedicine, naturopathy, Siddha, Unani, Homoeopathy, Yoga, modern medicine, drug research, pharmacognosy, botany, phytochemistry and pharmacology. The contribution may be in the form of a research paper, review article, clinical observation or a book review. All contributions will be subjected to peer review by subject experts and will be accepted for publication only on the approval of the Committee.

4. **Text organisation** :- A manuscript must be in its final form when submitted. The first page should contain the main title of the paper and a running head line, author's name and his affiliation in full. The main title of the paper should contain words necessary for correct indexing and be as brief as clarity permits. The second page should contain an abstract, not exceeding two hundred words with pertinent information on the material and method used, important results and major conclusions. The body of the manuscript should start on the third page. The text should be arranged in the following order with appropriate headings: Introduction, material and methods, results, discussion, conclusions, acknowledgements and references. The paper should end with the date of submission and the correct address of the first author, including e-mail address, if any.

5. **Tables** :- All tables should be typed on separate sheets. They should be numbered and should have appropriate titles. The tables should be referred in text by their numbers and the most suitable location of the table in the printed paper should be indicated in the left margin of the manuscript.

6. **Illustrations** :- Line drawings should be submitted as original artwork executed in black ink. Words and figures should be big enough to be easily readable after size reduction. Continuous tone illustrations should be submitted as un-mounted glossy prints, suitable for half tone photography. The author's name and title of the paper should appear on the back of each illustration and the top of the figure should be indicated. Figure should be numbered and referred to in the text as "Fig 1" etc. The approximate position of the figures should be indicated in the margin of the manuscript. Each figure must have a descriptive legend, which should be typed on the attached sheets.

7. **References** :- The reference list should contain only necessary references. It should be arranged in the order in which the references appear in the text and numbered accordingly. Abbreviations should be in conformity with the style of Index Medicus (New series). Example:

1. John Bernar Hentory, *Clinical diagnosis and management by laboratory methods,* 17th Ed., WB Saunders Company, Philadelphia, p. 172-175, 1989.

Italics should be marked in the manuscripts by underlying.

8. Asterisks should be used to indicate footnotes.

9. As a rule the first author alone is entitled to receive the voucher copy.

The Ayurveda Seminar of Arya Vaidya Sala is an important annual event ever since it was started in 1964. The 43rd Seminar was held at Calicut on 29.10.06. The topic for discussion was PARKINSONISM. Over one thousand physician-delegates enriched the session with their active participation. Students and research scholars from various institutions also took part in the deliberations.

Four papers were presented for discussion: *Ayurvedic perspective* (Dr. Prakash Mangalassery), *Ayurvedic therapeutic approach* (Dr. K. Murali), *Ayurvedic experiences in treatment* (Dr. K.G. Ravindran) and *Modern Approach* (Dr. S. Ram Manohar). Dr. C.R. Agnives was the moderator of the interactive session enlivened by the inquisitive interference by the participants. Dr. K.Rajagopal giving the valedictory message called upon the medical fraternity to put their heads together to find out solutions to alleviate the suffering of humanity.

Dr. P.K. Warrier, Chief Physician and Managing Trustee of Arya Vaidya Sala, in his inaugural address, stressed the need for continued research in ayurveda. We have a strong knowledge-base. The pioneering efforts of leaders like Vaidyaratnam P.S. Varier in the last century were to initiate a process of revitalization by widening the scope and sphere of that base. Twenty-first century demands more in-depth and innovative studies to fulfill the aspirations of the new generation embracing ayurveda enthusiastically.

The day-long deliberations were fruitful; they instilled confidence in the participants and inspired many to pursue the path of higher learning.

Two papers presented from different perspectives are given here.

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PARKINSONISM
MODERN MEDICINE APPROACH

Dr S Ram Manohar*

Definition

Parkinsonism is a syndrome (a group of symptoms) characterized by four cardinal clinical features, viz, 1) Tremor 2) Rigidity (stiffness) 3) Bradykinesia (decreased movements) and 4) postural imbalance (unsteadiness).

Classification

Parkinsonism is broadly classified into two groups:

- Primary: due to diseases of the brain
- Secondary: due to other systemic conditions

Primary Parkinsonism

The Primary Parkinsonism includes:

1. Parkinson's disease
2. Other neurodegenerative disorders like Progressive Supranuclear Palsy, Motor Neuron Disease with Parkinsonism, Dementia with Lewybodies, Olivo Ponto Cerebellar Atrophy, Alzheimer's Disease with Parkinsonism, Shy drager syndrome, Wilson's disease, Huntington's disease, etc.
3. Other acquired conditions like Vascular Parkinsonism, Normal Pressure Hydrocephalus, etc.

Secondary Parkinsonism

It is seen in Head injury, infections (viral, syphilis), metabolic (hypoparathyroidism) drugs (neuroleptics, reserpine, alpha methyl dopa, metoclopramide), Toxins (1-methyl-4-phenyl 1,2,3,6-tetrahydropyridine, cyanide, methanol, carbon monoxide)

Parkinson's disease

This is the commonest form of Primary Parkinsonism. A British Neurologist James Parkinson first described this disease in the year 1817 in his publication *Shaking palsy*.

Epidemiology

The prevalence of Parkinson's disease is 0.1%. Parkinson's disease accounts for 75%of all cases of Parkinsonism. The age of onset is above 50 years. The peak age being 60s. The natural course of the disease takes 10-25 years.

Genetics

95% of Parkinson's disease is sporadic, only 5% is familial (autosomal dominant or recessive). The familial type has an early onset (before 50 years) and a slower progression. Parkinson's disease is due to a complex interaction between genetic vulnerability and

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environmental factors. Several genes have been identified in familial Parkinson's disease. Park-1 and Park-5 are associated with autosomal dominant type and Park-2 and Park-7 are associated with autosomal recessive type (Juvenile Parkinson's disease)

Neuropathology

In Parkinson's disease macroscopically the brain shows atrophy of mid brain and loss of melanin pigment in Pars Compacta of Substantia nigra. Microscopically there is degeneration of the dopaminergic cells in Substantia nigra and presence of Lewy bodies in the remaining neurons. Lewy bodies, the hallmark of Parkinson's disease are eosinophilic intraneuronal inclusions of Alpha Synuclein.

Neurochemistry

In Parkinson's disease the dopaminergic neurons of Substantia nigra projecting to the Corpus striatum undergo degeneration resulting in the depletion of the neurotransmitter dopamine in the striatum. Normally there is a balance between the dopaminergic and the cholinergic systems in the striatum. In Parkinson's disease there is a hypodopaminergic state with a relative hypercholinergic state.

Pathogenesis

Oxidative stress by the free radicals leads to dopamine cell death. This has been proved in animal models by 1-methyl-4-phenyl 1,2,3,6-tetrahydropyridine (a contaminant of heroin) and Rotenone (an insecticide)

Risk factors

Factors that increases the risk of Parkinson's disease are:

1. A positive family history
2. Male gender
3. Head injury
4. Pesticides
5. Use of well water and rural living

Factors that decreases the risk are:

1. Coffee drinking
2. Smoking
3. Non steroidal anti inflammatory drugs
4. Oestrogen in women

Clinical features

It is broadly divided into two i.e. motor and non-motor.

The motor features

1. Tremor
2. Rigidity
3. Bradykinesia
4. Micrographia
5. Hypophonia
6. Abnormal Stance
7. Abnormal Gait
8. Abnormal Facies

Tremor

This is the most common feature and seen in 85% of cases of Parkinson's disease. This is a rhythmic to and fro movement seen distally in the hands and feet. This is slow (frequency-4 to 6Hz) and seen at rest and has pill-rolling character. This starts unilaterally and spreads to the other side usually after 1 year. It also spreads to involve the lips, tongue and jaws. It rarely involves the head. The tremor decreases with action and hence does not interfere with the activities of daily living. The tremor in Parkinson's is not a disability for the patient but more bothersome for the relatives.

Rigidity

Parkinson's disease patients have a

characteristic cog wheel rigidity which starts unilaterally either in the upper or lower limb and spreads to the opposite side usually after one year. There is stiffness of all the muscles leading to pain and slowness in movements. Rigidity also causes a chronic backache and also limb pains which may be mistaken for cervical and lumbar spondylosis in the elderly.

Bradykinesia

There is significant slowness of all movements like getting up, walking, eating, bathing, etc. All activities of daily living are slow. In view of the severe motor retardation this may be mistaken for generalized fatigue or depression.

Micrographia

Patients with Parkinson's disease write very slowly and the letters become smaller and smaller as they continue to write. For example if a long word is written the first alphabet will be big and the last will be very small as shown here: **Thiruvananthapuram** This is called Micrographia.

Hypophonia

Patients with Parkinson's disease has a low volume monotonous speech.

Stance

Parkinson's disease patients stand with head flexed, stooping forwards and at times with sideways tilt of the trunk. The limbs are kept rigid and flexed.

Gait

Parkinson's disease patients have difficulty in initiating walking. They have a start hesitation. They walk with short shuffling steps and decreased arm swing. Some have a festinant gait with forward propulsion and run forwards as if to catch their own centre of gravity and fall forwards. Some have retropulsion. Even a small obstacle will cause sudden stoppage, known as Freezing phenomenon. They have postural instability with loss of corrective reflexes leading to frequent falls.

Facies

They have a mask like expressionless facies. They have a staring gaze with decreased eye blink. Some may have Blepharospasm.

The non-motor features

Pain

Pain is an early feature of Parkinson's disease. They complain of backache, lumbago and cramp like pains in the legs. Only years later other features of Parkinson's disease become evident. Diagnosis at this stage requires a good clinical skill.

Cognitive impairment

Mild cognitive impairment is seen as the disease advances. This is absent in the early stages of the disease. An early or severe dementia negates the diagnosis of Parkinson's disease and one has to consider other alternative possibilities of Parkinsonism like Dementia with Lewy Body or Huntington's disease or Alzheimer's disease with Parkinsonism etc.

Sleep disturbances

Daytime drowsiness, insomnia at night, restless leg syndrome, hallucinations (drug induced), etc. are some of the sleep disorders in Parkinson's disease.

Psychiatric symptoms

Depression, anxiety and psychosis are often seen with Parkinson's disease These may be part of the disease or drug induced.

Anosmia:- Loss of smell.

Autonomic dysfunction

Orthostatic hypotension, constipation, urinary urgency, excessive seborrhea, sweating, impotence, etc. are seen in Parkinsonism.

Akathesia

A distressing sensation of inner restlessness and subjective shortness of breath are sometimes seen.

Sleep disorders, depression and anosmia may long precede the motor symptoms and make the diagnosis of Parkinson's disease very difficult in the early stages.

Investigations

There is no single investigation to prove Parkinson's disease. The diagnosis is based on the clinical examination and hence the clinical skill of the doctor is very important in the early correct diagnosis of the disease.

Investigations are mainly done to establish other causes of Parkinsonism other than Parkinson's disease.

- An MRI done in the late stages of Parkinson's disease may show Midbrain atrophy due to neuronal loss in Substantia Nigra.
- Serum Copper and Ceruloplasmin - to rule out Wilson's disease
- Blood levels of Manganese and Carbon monoxide may be done to look for a toxic cause for Parkinsonism.
- Serum Calcium levels and Hormone studies can be done to exclude hypoparathyroidism causing Parkinsonism. Immunological assays are done to rule out Neurosyphilis.
- A CT scan may be done to diagnose Normal Pressure Hydrocephalus or Vascular Parkinsonism.

Thus Parkinson's disease is confirmed by excluding other causes of Parkinsonism by various investigations as there is no test to confirm Parkinson's disease.

Differential diagnosis

The single most important point in the management of PARKINSON'S DISEASE is accurately diagnosing the condition and differentiating from the innumerable other causes of Parkinsonism with a similar clinical presentation. A few common conditions are listed below:

Progressive supranuclear palsy (PSP)

This resembles Parkinson's disease. The patient of PSP has Gaze palsy, especially vertical, lid retraction, cervical dystonia with head extension, dysphagia and dysphonia due to Pseudobulbar palsy. They have frequent backward falls. Unlike Parkinson's disease this progresses rapidly and responds poorly to treatment.

Dementia with Lewy body

Early and significant dementia helps to identify this condition.

Vascular parkinsonism

Motor weakness and Pyramidal deficits help to identify this condition

Motor neuron disease (MND) with Parkinsonism

Here the features of MND especially the wasting and weakness of hand muscles and Pyramidal signs help to identify this condition.

Other common disorders to be differentiated are Olivo Ponto Cerebellar Atrophy, Alzheimer's disease with Parkinsonism, Shy Drager

syndrome, Wilson's disease, Huntington's disease, Multi system atrophy, Normal Pressure Hydrocephalus, Intra cranial space occupying lesions, Neurotoxins (Carbon monoxide and Manganese)

Treatment

The aim of the treatment is to correct the Dopaminergic-Cholinergic imbalance in the striatum. The Hypodopaminergic state is corrected by drugs like Levodopa, Dopamine agonists (Bromocriptine) and Amantadine. The relative Hypercholinergic state is corrected by Anticholinergic drugs. Several neuroprotective drugs are under trial. The drug used routinely is Seligiline.

- Antioxidants like Vitamin E are also used routinely.
- Surgical treatment include Palidotomy, Thalamotomy, Deep brain stimulation.
- Physiotherapy also plays an important role in the management of Parkinson's disease.

Prognosis

The natural course of Parkinson's disease is a steady progression over 10-25 years. The disease progresses slowly and in the first five years can be fully controlled with drugs. In the next five years the patient has mild disability even on drugs with normal activities of daily living. From 10-20 years they have moderate disability, activities of daily living is affected and needs personal help and lots of drug induced problems like Dyskinesia and On-Off phenomenon will be present. After 20 years they are totally bedridden and death is mostly due to complications of immobility.

Socio- economic and emotional factors

Parkinson's disease is a steadily progressing disease for which no cure has been discovered so far. Hence the very diagnosis shatters the confidence of the patient and worries the family. The patient becomes dependant on drugs lifelong. Though in the first 10 years he may be able to continue his job, after 10 years his illness and drug induced problems interfere with his job and earnings. The monitory burden steadily increases. The patient needs family support both physically and monitorily. The patient and the family need a psychological support to live with the illness. Many patients lose their job and need rehabilitation. Rehabilitation centers for Parkinson's disease should be established in every district by the Govt. or NGOs. The society should give a moral support to the patient and family.

Future research

Research work is going on all over the world to find answers to several unanswered questions like:

- What is the aetiology of Parkinson's disease?
- Is there a genetic predisposition?
- What are the environmental factors causing the illness?
- How to prevent the progression of the illness?
- Newer drugs to regress the disease without side effects.
- Newer surgical techniques.
- Genetic Modulation.

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AYURVEDIC APPROACH TO PARKINSONISM

Prakash Mangalasseri*

Introduction

Parkinson's disease, the most common form of Parkinsonism is a chronic, progressive degenerative disorder of the central nervous system usually seen at the 6th decade of life. It is characterized by the following major symptoms:

- Tremor
- Rigidity
- Akinesia/Bradykinesia
- Postural instability

These symptoms are also associated with gait and speech disturbances, difficulty in swallowing; sleep disturbances, depression and dementia in the course of the disease. The symptoms in Parkinson's disease vary from patient to patient. They may appear slowly and in no particular order. Early symptoms may subtle and progress over many years before reaching a point where they interfere with normal daily activities.

The references of certain disorders similar to Parkinsonism are available in āyuṛvedic classics. They include śirakampa[1], vepathu[2] and kampavāta[3]. In the chapter of Kiyanta:śirasīya, Caraka enlists śirakampa as one among important śirorogas like aṛdita or aṛdhāvabhedaka[4]. In Siddhisthāna of Carakasamhita, śirakampa caused by vitiation of vāta by aggravation of rūkṣaguṇa is explained[5]. Vepathu is enlisted under one among the 80 nānātmajavikārās of vāta. Mādhava defines vepathu as generalized vātavikāra with saṛvāṅgakampa [generalized tremor including śirakampa (head tremor)][6]. A separate disease with the nomenclature as kampavāta is referred to in Basavarājīya. Different varieties of kampa (tremor) are explained as kākavāta and bahukampavāta in this āyuṛvedic classic. Certain symptoms explained in this context like netṛabhramaṇa and dehabhramaṇa (Rhombergism?), etc. are very specific to nervous system. Many scholars are tried to correlate kaḷāyakhañja with Parkinsonism, which seems to be incorrect, because kaḷāyakhañja is characterized with intentional tremor[7].

Even though multiple references are available in classics as shown above, they are not sufficient enough to understand the disease like Parkinson's in āyuṛvedic parlance.

Caraka refers to the āyuṛvedic methodology of understanding of a disease which has no a textual reference[8]. Diseases are innumerable in varieties depending on their distinctive features like pain, signs and symptoms, etiology, site of origin, manifestation, etc. One doṣa makes different diseases in relation with the difference in etiological factors (samuthānaviśeṣa) and variability in the sites of affliction (sthānāntara-

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gatatva). Therapeutic initiation can be achieved by understanding the nature of disease (vikārapṛakṛti), various sites of morbid doṣa, etc. (adhiṣṭhānantarāṇi) and variety of causes (smuthānaviśeṣa)[9].

Back to basics

Before proceeding to the pathological details, certain physiological aspects have to be discussed. Vāta is the humour, which control all the motor activities (ceṣṭā)[10]. Among the five divisions of vāta, vyānavāyu is responsible for body movements (ceṣṭā) and gait (gati)[11]. Ceṣṭā as well as gati is contributed by moving (cala) property of vāta. When the moving property attains direction, it is termed as ceṣṭā as well as gati.

Here the question is whether cala should be considered as property of vāta or not? It is very interesting to note that in the chapter of Vātakalākalīya, a chapter devoted to discuss vāta, Caraka has omitted cala from the properties of vāta and instead, included dāruṇa[12]. Here, Cakṛapāṇi, the famous commentator of Caraka, observes dāruṇatva as calatva itself because of calatva. He also puts forward a second opinion that dāruṇatva is reducing nature (śoṣaṇa svabhāva). The second classification seems to be more appreciable. The cala is more or less an action (kaṛma) rather than a property (guṇa) especially in therapeutic aspect. The cala property can be manipulated by applying other properties like cold (śīta), hot (uṣṇa) light (laghu) and heavy (guru). In other words, the properties like rūkṣa, laghu, śīta, khara, etc. favour or manifest as cala. In therapeutic aspect also hypoactive (calābhāva) or hyperactive (calādhikya) can be treated by snigdhoṣṇa or rūkṣaśīta pṛayogas.

The role of śītaguṇa in manifestation of calatva is also important. In vātapṛakṛti, the individual becomes intolerable to cold (śītāsahiṣṇuta) and shows frequent tremor (pṛatata udvepaka) and rigidity (stambha)[13]. Kampa and stambha are interdependent and both are abnormal manifestation of cala. Kampa is manifested when śītaguṇa associates with rūkṣādi guṇas. When śītaguṇa associates with snigdha, stambha (sthairya?) may be manifested.

Here certain considerations of upadhātu are also important. Snāyu is explained as upadhātu of meda[14]. Rūkṣana or snehana directly operate in medodhātu and subsequently shows influence in its upadhātu (snāyu). Medośoṣaṇa or medovṛddhi may manifest as snāyuvikāra. It has to be noted that Caraka has not explained any upadhātu for deeper tissues like asthi or majja which are common pathological sites of vāta.

Symptomatology of Parkinson's disease

To identify the nature of disease, the important symptomatology of Parkinson's disease is detailed below with its possible āyuṛvedic analogues:

• Tremor	Kampa
• Rigidity	Stambha
• Bradykinesia	Ceṣṭāsaṅga
• Akinesia	Ceṣṭāhāni
• Gait disturbance	Gatisaṅga
• Postural instability leading to fall	Skhalanam gatau
• Dysphasia	Vākgraha
• Dysarthria	Svaragraha
• Flexed posture	Vinamana
• Dementia	Smṛtikṣaya
• Depression	Viṣāda

The āyuṛvedic terminologies used above are not simple translations, but are taken from the different contexts of āyuṛvedic classics. Amongst the above symptoms, kampa and

stambha are important. They are preliminary and the others are resultant of the same. Hence these two symptoms have to be analysed in detail.

Stambha

Stambha is defined as stabdhatā[15] or niścalīkaraṇam[16]. It can be explained as rigidity or stiffness. Stambha is a cardinal symptom of vātakopa[17], which is also seen in pittakṣaya[18].

While enlisting pathology of different doṣavikalpa, Caraka explains stambha and vepathu along with other symptoms like śaitya, toda, gaurava, etc. in the symptomatology of hīnapitta-vṛddhavātakapha[19]. According to Aṣṭāṅgasamgraham, when pitta in kṣīṇa āśayāpakarṣa of samakapha with kupitavāta cause stambha along with śaitya and gaurava[20].

Stambha and kampa occurs when vāta is vitiated in snāyu[16]. When doṣas are located in snāyu, sirā or kaṇḍarā, the symptomatology is stambha, saṅkoca, khalvī, granthi, sphuraṇa or supti[21]. Stamba may manifest as localized (ekāṅga) or generalised (saṛvāṅga). It is a symptom in māmsamedogatavāta[22], snāyupṛāptavāta[16], saṛvāṅgavāta[23] and śirasthakapha[24]. The above points are summarized in Table 1.

Kampa

Kampa is explained as vepathu[25] or ativepanam[26]. Localized obvious tremor is called vepanam[27]. Kampa may be correlated to tremor. It is a cardinal symptom of vātavṛddhi as well as kopa[28]. It is also seen in pittakṣaya[18]. Vepana is explained under the symptom of kaphakṣaya[29]. As explained earlier, vepana is seen along with stambha in doṣavikalpa of hīnapitta-vṛddhavātakapha[19]. Vepana may also manifest when pittaśḷeṣmakṣaya leads to kevalavātavṛddhi which afflicts māmsa[30].

TABLE 1

▪ Doṣa	- Vātakopa (Vāta ↑↑↑)
	- Pittakṣaya (Pitta ↓)
	- Hīnapitta-kaphavātavṛdhavikalpa (Pitta↓ Vāta↑ Kapha↑)
	- Kṣīṇapitta āśayāpakarṣa of samakapha by vṛddhavāta (Pitta↓ Kapha= Vata↑)
▪ Dhātu	- Māmsa, meda (?)
▪ Upadhātu	- Snāyu
▪ Dehadoṣa	- Ekāṅga/Saṛvāṅga
▪ Specific pathology	- Māmsamedagatavāta
	- Snāyupṛāptavāta
	- Saṛvāṅgavāta
	- Śirasthakapha

Rasakṣaya may manifest as kampa[31]. Kampa is a cardinal symptom of snāyupṛāptavāta[16]. As in the case of stambha, kampa may also manifest ekāṅga (localized) or saṛvāṅga (generalized). The textual details of kampa can be summarized as follows:

• Doṣa	- Vātavṛddhi or kopa
	- Pittakṣaya
	- Kaphakṣaya
	- Hīnapitta-vṛddhavāta-kaphavikalpa
	- Kṣīṇapitta-kaphavāta-vṛddhavikalpa
• Dhātu	- Rasakṣaya
• Upadhātu	- Snāyu
• Dehadeśa	- Ekāṅga/Saṛvāṅga
• Specific pathology	- Snāyupṛāptavāta
	- Saṛvāṅgavāta

Kampa and stambha

Kampa and stambha are abnormal pattern of cala; both seem to be interdependent. Kampa and stambha manifest together in hīnapitta with kaphavātavṛddhi. Vāta is always vṛddha or kupita in both kampa and stambha. Pitta is

almost always kṣīṇa. The status of kapha may vṛddha, sama or kṣīṇa. When vāta is vitiated in snāyu, it may manifest as poverty of movements as in stambha or hyperkinetic movements like in kampa or ākṣepa (convulsion). (It may also manifest as śūla as in radiculopathy) Caraka has enumerated stambha and kampa as upadhātupṛadoṣaja-vyādhis[32].

Ceṣṭāsaṅga and gatisaṅga

Ceṣṭāsaṅga, ceṣṭāhāni or kṛiyāsu aśakti can be explained as bradykinesia or akinesia. Kṛiyāsu aśakti is defined as inability to perform general body movements like ākṣepaṇa, apakṣepaṇa, pṛasāraṇa, ākuñcana, etc[33]. Ceṣṭāstambha is a symptom of kaphāvṛtavyāna[34]. Ceṣṭāhāni is a symptom of udānāvṛtavyāna[35]. (Kṛiyāsu aśakti seen in snāyuviddha is nothing other than palsy, which is mentioned here to show the involvement of snayu in motor deficit[36]). When vyāna is subjected to āvaraṇa, it fails to perform its functions like flexion, extension, etc. thereby slow down bodily activities. Poverty of movements may be in the form of ceṣṭāsaṅga (bradykinesia) or in the form ceṣṭāhāni (akinesia)

Gatisaṅga can be explained as gait disturbances. It is a symptom of kaphāvṛtavyāna[37]. Yānāśakti (inability to move or travel) is seen in snāyumaṛmaviddha[38]. Skhalana gatou is explained as postural instability leading to fall. It is one among the symptom of kaphāvṛta-vyāna[39].

Involvement of higher functions

Vākgraha may be compared with dysphasia. Svaragraha is dysarthria. Vākgraha is an important symptom of kaphāvṛtavyāna[39]. Vāk-graha as well as svaragraha are together seen in kaphāvṛta-udāna[40]. In the advanced stage of the disease pṛāṇa may associate in pathology and manifest as symptoms with disturbances in memory, mood and cognition as dementia (smṛtikṣaya) or depression (viṣāda). Smṛtikṣaya and saṛvendriyānām śūnyata (sensorial impairment) are symptoms of pṛānāvṛtavyāna[41]. Deglutition (annapṛaveṣṭa) is a symptom of pṛāṇa and any derangement in the function of pṛāṇa may show symptoms of dysphagia.

Samuthānaviśeṣa

Identifying the variety of etiological factors (samuthānaviśeṣa) is as important as previous explained nature of disease (rogapṛakṛti) and site and mode of onset (adhiṣṭhānāntarāṇi). The comprehensive knowledge on etiological factors helps the physician to avoid etiological factors (nidāna parivaṛjana) for prevention of the disease (svāsthyasamrakṣaṇa) to get idea regarding extent of doṣaduṣṭi (doṣapṛamāṇa-viśeṣa) and to plan line of management (upaśayānupaśaya). The different etiological factors explained in the context of Parkinsonism including Parkinson's disease are listed below:

1. Idiopathic
2. Toxin induced
   (Manganese, co-poisoning, etc.)
3. Drug induced
   (eg. prolonged use of tranquilizing drugs)
4. Repeated head trauma
5. Accompanying other neurological disease
6. Post encephalitic
7. Tumours of brain (rarely)

Let us now examine the different etiological factors explained in āyuṛvedic scriptures in clinical conditions similar to Parkinsonism.

Administration of rūkṣādi guṇa

Caraka highlights śirakampa in the context of Tṛimaṛmīyasiddhi and explains it is as caused by kupitavāta due to administration of rūkṣādi

guṇas[42]. It may understand as aggravation of guṇas like rūkṣa, laghu, khara, etc. along with śītaguṇa. Substances containing kaṣāyarasa impart stambha[43]. Tea, coffee, narcotics, chewing of tobacco, etc. may be identified as kaṣāyarasapṛadhānadravyas. Kaṭurasa imparts kampa in the body[44]. Pickles and spicy foods contain too much kaṭurasa. Rūkṣādi dietary articles may be understood as oil fried food, pulses like kaḷāya, rājamāṣa, etc. tubers, wafer, biscuits, fast food and soft drinks. Cintā, śoka and bhaya leading to continuous stress are important vihāras for aggravation of rūkṣādiguṇa by rasakṣaya[45]. Smoking also aggravates rūkṣādiguṇa. The same way air conditioning or continuous exposure to fan (śītamārutaseva) provokes vāta by aggravation of rūkṣādiguṇa.

Viṣa

Stambha and kampa are important symptoms of dūṣīviṣa as well as sthāvaraviṣa. According to Suśṛuta, kāḷakūṭaviṣa causes vepathu (tremor), stambha and spaṛśāñjāna (anesthetic effect)[46]. Musthaka is also a deadly poison enlisted under sthāvaraviṣa which causes gātṛastambha and vepathu[46]. Now a days, these references should be identified as environmental toxins, pesticides, etc. It is worth to note that deadly poisons like endosulphan, etc. are to be considered as dangerous health hazards of today.

Śirobhighāta and svabhāvaja

Caraka has not explained stambha, kampa or any other related symptoms among symptamatology of śirobhighāta[47], but the context is explained as acute head trauma. Parkinson's disease is not a resultant of acute trauma to head; however, repeated head trauma certainly causes the same, like Punch Drunk Syndrome as in the case of professional boxers. In this context, a doṣaja maṛmābhighāta of śiromaṛma, which is common in target aiming professionals like businessmen, etc. who has overload of files, may be considered.

According to Śāṛṅgadhara, senility imparts reduction (hṛāsa) of intellect (medha), cognitive power (buddhi) and matter skills (kaṛmendriya) by nearly 5th or 6th decades of life and so on.

Iatrogenic causes

Over administration of stambhana therapy (atistambhana) leads to stamba, saṅkoca of snāyu and tvak, kampa, hṛtgraha, vākgraha and hanugraha[48]. This can be included as iatrogenic cause of the disease.

Sampṛāpti (etiopathogenesis)

The etiological factors, symptomatology, site of manifestation, etc. are discussed above. From these observations the sampṛāpti of Parkinson's disease may be formulated on āyuṛvedic parlance.

The clinical condition is essentially caused by vātakopa. Vāta may get vitiated by dhātukṣaya or āvaraṇa. In the first case, administration of rūkṣādiguṇas (rūkṣa, laghu, khara, etc.) along with śītaguṇa causes dhātukṣaya and following emptiness (riktata) in dhātu and correspondingly in their respective sṛotas. In the case of āvaraṇa, the etiopathological factor is that which aggravates the kapha. Kapha is aggravated along with vāta by mixing of uṣṇa, snigdha, śuṣka dravas and guru guṇas combined with śīta just as in ūrustambha. The aggravated kapha causes obstruction (māṛgarodha) of vāta, very specifically vyānavāta.

In the pathological sequence of dhātukṣaya, vāta gets more space (avakāśa) in riktadhātu or sṛotas and vitiated. Vāta with increased cala

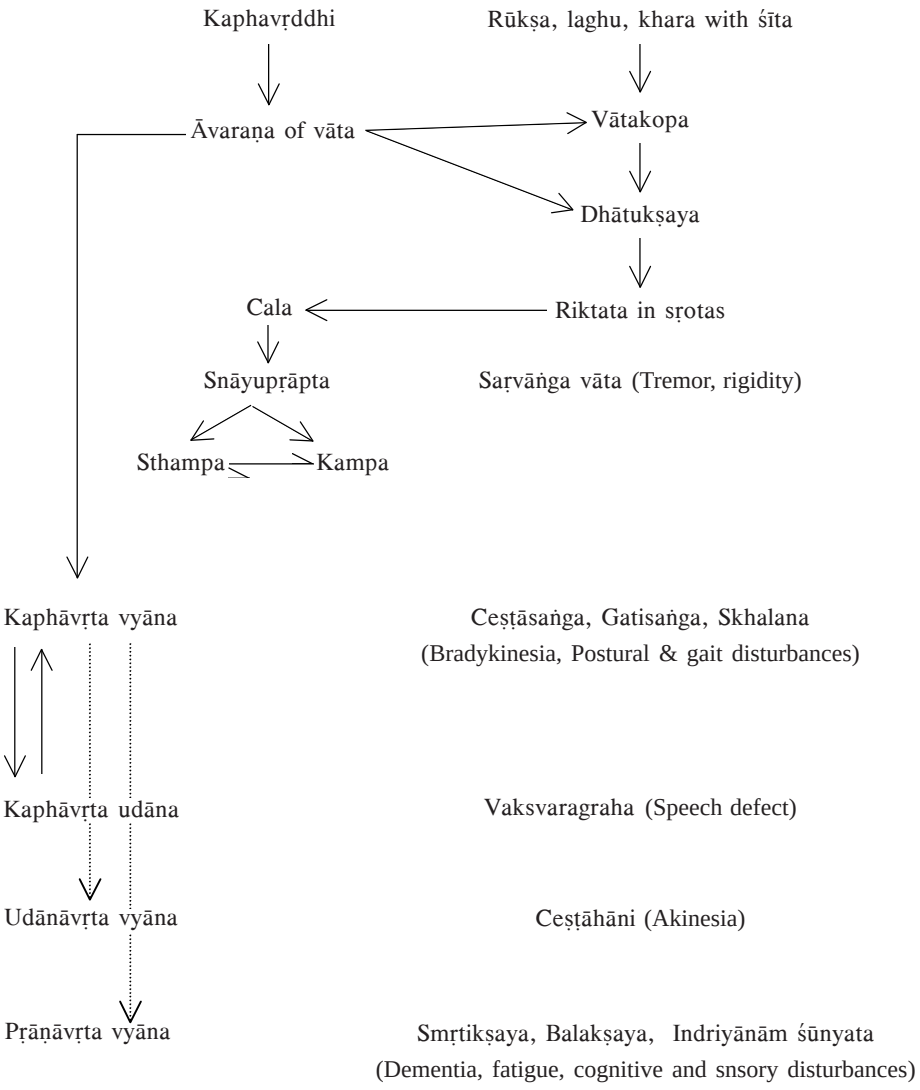

CHART 1

The etiopathogenesis (samprapthi)

property is called as gatavāta. The vitiated vāta, because of specificity of nidāna as well as khavaiguṇya, identifies its adobe as snāyu and manifests as snāyupṛāptavāta. Snāyupṛāptavāta is characterised as stambha and kampa. They seem to be inter-complimentary. Stambha contributes kampa and vice versa because of the same adhiṣṭhāna of vitiated doṣa.

In the pathological sequence of āvaraṇa of vāta by kapha, it may manifest generally as kaphāvṛtavāta and shows symptoms of localized or generalized stambha. The āvaraṇa of vāta by kapha may be very specific to kaphāvṛtavyāna. The kaphāvṛtavyāna shows the symptoms of ceṣṭāsaṅga, gatisaṅga, skhalanam gatau, etc. which are nothing other than due to poverty of movements. They manifest postural and gait disturbances, etc. as bradykinesia.

The pathology of āvaraṇa of kapha may advance to higher functional levels of vāta like kaphāvṛta-udāna, which manifest as vākgraha or svaragraha. These are speech disturbances characterized as dysarthria and dysphasia. When udāna and vyāna are under the āvaraṇa of kapha, it may further cause anyonyāvāraṇa of udāna and vyāna. Udānāvṛtavyāna is manifested as ceṣṭāhāni (akinesia). The anyonyāvaraṇa may further advance to higher functional levels according to worsening of pathology. When vyāna get āvaraṇa by pṛāṇa (i.e. pṛāṇāvṛtavyāna), loss of memory (smṛtikṣaya), loss of motor power (balakṣaya) and impaired sensorium (indriyānām śūnyata) may manifest. These may also be considered as dementia, fatigue, cognitive and sensory disturbances explained in the later stages of Parkinson's. (Chart 1)

Roganāma (nomenclature of the disease)

Caraka says that if a physician is not able to name a particular disease, he need not feel ashamed because it is not possible to name all types of the diseases in definite terms[9]. In the case of Parkinson's disease also the situation is not different. It is not ideal to call the disease by the clinical presentations as snyāyupṛāptavāta, kaphāvṛtavyāna, udānāvṛtavyāna or pṛāṇāvṛtavyāna. At the same time, all these are present as pathological element in sequence. These can be used for diagnosis as well as treatment also. So the disease can be named as Parkinson's disease only.

Conclusion

The characteristic features of Parkinson's disease can be concluded as follows:

1. Uthāna (onset)
   - Kaphavāta - stambha pṛadhāna or
   - Kevalavāta - kampa pṛadhāna
2. Gati (course)
   - Āvaraṇa leading to dhātukṣaya or
   - Directly dhātukṣaya
3. Deśa (site of manifestation)
   - Ekāṅga or
   - Saṛvāṅga
4. Adhiṣṭhāna (location of doṣa)
   - Śārīra
   - Mānasa
5 Rogamārga
   - Madhyama
6. Pṛakopana (provoking factors)
   - Rūkṣādi with śīta or
   - Miśṛaguṇa with śīta
7. Ātmana (nature of disease)
   - Cirakāri and
   - Dāruṇa

8. Vedanā and samsthāna (sign and symptoms)
   - Stambha,
   - Kampa
   - Ceṣṭāsaṅga / ceṣṭāhāni
   - Gatisaṅga / skhalanam gatau
   - Vāk-svaragraha
   - Smṛtikṣhaya

The disease is apataṛpaṇotva and pakvāśayotha. It is an upadhātupṛadoṣajavikāra and maṛma-sthavyādi. Due to the seriousness of the location of doṣa (gāmbhīrya of sthāna), even in the earlier stage (nava), the disease is kṛcchṛatama-sādhya (prognosis only on strenuous manage-ment strategies)[49], otherwise the disease becomes non-curable by time.

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