ISSN 0970 - 4086

Āryavaidyan

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Of all the gifts,
the most precious is health

Vol. XXIV, No. 4
May - July, 2011

A QUARTERLY JOURNAL OF
THE ARYA VAIDYA SALA - KOTTAKKAL

āryavaidyan

A Quarterly Journal of
the Arya Vaidya Sala, Kottakkal.

Vol. XXIV., No. 4 | Regn. No. 55127/87 | May - July, 2011

Aryavaidyan is intended to encourage scientific writing and intellectual interactions among scholars, academicians, practitioners and students of ayurveda and allied subjects like Siddha, Unani, modern medicine, etc.

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Quarterly journal of Arya Vaidya Sala

सततध्ययनं, वादः परतन्त्रावलोकनम् ।
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Single copy	Rs. 35/-
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Arya Vaidya Sala, Kottakkal
Malappuram District
Kerala State
Pin - 676 503, India.

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Fax : 2742210, 2742572
E-mail : publications@aryavaidyasala.com

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FROM THE PAGES OF VĀGBHAṬA - LXXXV

Dr. A. Raghunathan*

Abstract: Jvara nidānam continues. Among various types of jvara, viṣama types are discussed in this issue. Influence of bodily humours, season, mind, etc. on jvara is emphasised. The signs and symptoms on the relief of jvara are also mentioned.

Type of viṣamajvara

ज्वरः पञ्चविधः प्रोक्तो मलकालबलाबलात् ।। ५६ ।।
प्रायशः सन्निपातेन भूयसा तूपदिश्यते।
सन्ततः सततोऽन्येद्युस्तृतीयकचतुर्थकौ ।। ५७ ।।

(jvaraḥ pañcavidhaḥ prokto
malakālabalābalāt ।। 56 ।।
Prāyaśaḥ sannipātena
bhūyasā tūpadiśyate ।
santataḥ satatoऽnyedyu-
stṛtīyakacaturthakau ।। 57 ।।)

Jvara with unsteady nature is 5 in number viz. Santata, Satata, Anyedyu, Tṛtīyaka and Caturthaka occurring mostly due to the vitiation of all doṣas in accordance with the strength and weakness of mala and kāla.

Note:- Jvara is of two major categories: nija with 7 subdivisions and āgantu with various subdivisions (Chart I). Jvara may occur either due to the vitiation of doṣas inside (nija) or due to the affliction from outside (āgantu) causing vitiation of doṣa only at the second phase. Some types of jvara may fall in both these categories; for e.g., fevers occurring due to the influence of region, season, etc. The meaning of 'malakāla-balābalāt' can be commented as i) due to the strength of doṣa vitiation, ii) due to the strength of seasonal variation, iii) due to the strength of both together, iv) due to the strength of either one or both and v) due to lack of strength of one or both. So, the seasonal fevers influencing the koṣṭha to produce vitiation of a doṣa are mainly dealt as viṣamajvara showing viṣama (vi-ṣama i.e. ir-regular) nature.

धातुमूत्रशकृद्वाहिस्रोतसां व्यापिनो मलाः ।
तापयन्तस्तनुं सर्वां तुल्यदूष्यादिवर्द्धिताः ।।५८ ।।
बलिनो गुरवः स्तब्धा विशेषेण रसाश्रिताः ।
सन्ततं निष्प्रतिद्वन्द्वा ज्वरं कुर्युः सुदुःसहम् ।।५९ ।।
मलं ज्वरोष्मा धातून् वा स शीघ्रं क्षपयेत्ततः ।

(Dhātumūtraśakṛdvāhi-
srotasām vyāpino malāḥ ।
tāpayantastanum sarvām
tulyadūṣyādivarddhitāḥ ।। 58 ।।
Balino guravaḥ stabdhā
viśeṣeṇa rasāśritāḥ ।

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santatam niṣpratidvandvā
jvaram kuryu: sudu:saham ॥ 59 ॥
Malam jvaroṣmā dhātūn vā
sa śīghram kṣapayettata: ।)

Doṣas spreading through different channels of different dhātus (channels of urine and fecal matter), increase and moreover, on reaching the dhātus of similar nature, turn more potent and heavy in nature, do obstruct the channels. Such doṣas when lodge, especially at the rasadhātu, cause unbearable fever in the absence of obstacles. Thus raised temperature of this jvara will emaciate quickly the malas and dhātus in the particular channel.

सर्वाकारं रसादीनां शुद्ध्याऽशुद्ध्याऽपि वा क्रमात् ।। ६०
वातपित्तकफै: सप्त दश द्वादश वासरान् ।
प्रायोऽनुयाति मर्यादां मोक्षाय च वधाय च ।।६१ ।।
इत्यग्निवेशस्य मतं, हारीतस्य पुन: स्मृति: ।
द्विगुणा सप्तमी यावन्नवम्येकादशी तथा।।३२ ।।
एषा त्रिदोषमर्यादा मोक्षाय च वधाय च ।
शुद्ध्यशुद्ध्यौ ज्वर: कालं दीर्घमप्यनुवर्तते ।।६३ ।।
(sarvākāram rasādīnām
śuddhyāSśuddhyāSpi vā kramāt ॥ 60
Vātapittakaphai: sapta
daśa dvādaśa vāsarān ।
prāyoSnuyāti maryādām
mokṣāya ca vadhāya ca ॥ 61 ॥

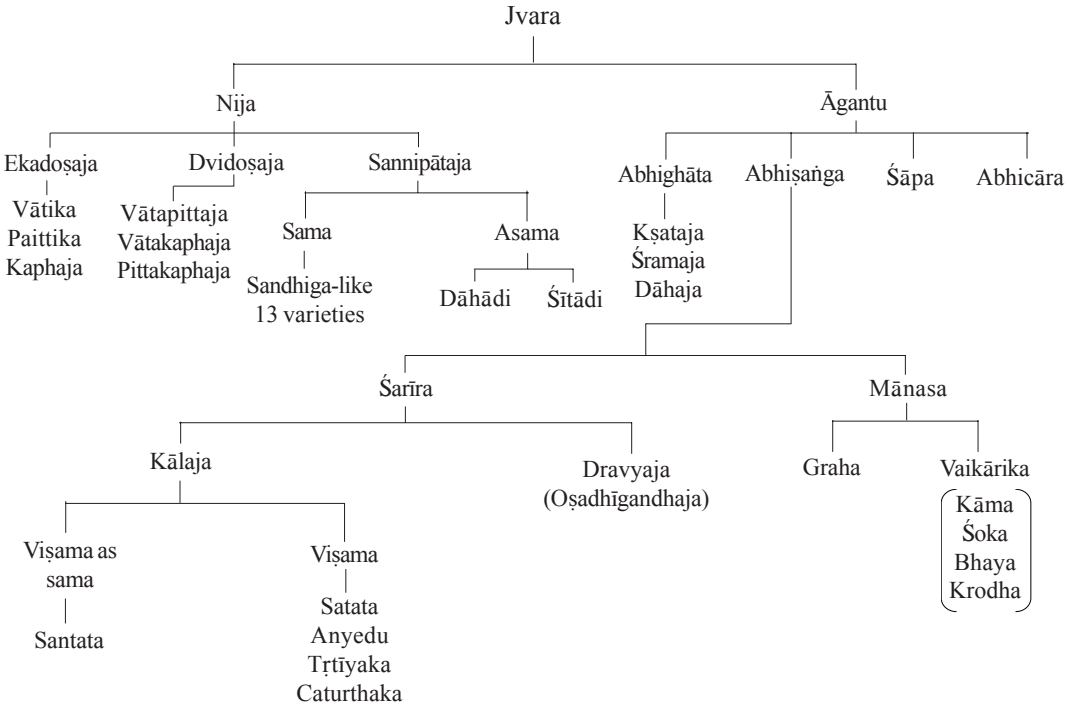

Chart 1. Classification of jvara

Ityagniveśasya matam,
hārītasya puna: smṛti: ।
dviguṇā saptamī yāvanna-
vamyekādaśī tathā ॥ 62 ॥
Eṣā tridoṣamaryādā
mokṣāya ca vadhāya ca ।
śuddhyaśuddhyau jvara: kālam
dīrghamapyanuvartate ॥ 63 ॥)

Therefore, these doṣas, on making purity or impurity of rasādidhātus, may either cause relief of fever or death of the patient respectively. The number of days (of fever) differs as per the evolved doṣas. According to ācārya Agniveśa this is 7, 10 and 12 days for vāta, pitta and kapha doṣas respectively. But ācārya Hārīta opines that the number of days are 14, 18 and 22 respectively. In this particular jvara, the affliction of temperature may prolong according to purity and its absence of the dhātus.

Note:- Santatajvara, though appears continuously, is with the nature of viṣamajvara. It is mentioned as rasāśrita jvara; which means the doṣa causing this fever will be lodged at the rasadhātu.

Rasa and rakta have to be considered together as one entity that circulates all over the body incessantly; it is nothing but the blood. Here in santatajvara, vitiation of doṣa is settled in blood and it heats the whole body, especially wherever the vitiated doṣa circulates through the dūṣya (dhātu) which are similar in nature with the evolved doṣa.

This santata jvara may occur by kapha, pitta and vāta as usual. Even then, the signs and symptoms will be the same as those jvara of nija category; the difference is only in the nature of doṣa-vitiation. In nija jvara it would not be so strong, heavy and non-liquefiable as in viṣama jvara; the prolonging nature is also a particular feature of viṣamajvara.

Another particularity of santata jvara is that it may either subside or become fatal within a particular period from the date of affliction. This is 7 days for kapha-santatajvara and 10 and 12 days for pittaja and vātika types respectively. How does this particular phenomenon occur? This can be answered from the following conclusions:

The temperature evolved by vitiation of a particular doṣa in this jvara will heat the whole body and it cannot go out freely as the peripheral channels are being constricted (due to jvara). Therefore, this temperature will return to its domicile dhātu (āśraya) and starts to heat the vitiated doṣa itself, making it strong and light and then expel it away from the āśraya after liquefying the doṣa. Thus, the āśrayaśuddhi (purification of substratum) happens and the jvara will subside naturally.

On the other hand, if this high temperature could not get the doṣa combination as free, may inflict and infect the whole āśraya and even cause suppuration (pāka) and lead to death. This is the concept of dhātupāka described in other treatises. Destruction of doṣa vitiation leads to health, is termed as doṣapāka.

For instance, in the kaphaja-santatajvara, kaphadoṣa is lodged in the lungs and heats the body incessantly. It may subside within 7 days or may cause the suppuration of the lungs bringing the death. This may be a condition of pneumonia. Likewise, according to some commentators, paittika and śḷaiṣmika santata-jvaras can be correlated to typhoid and typhus fevers, where the āśrayasthānas are the liver, spleen and small intestine (pittadoṣasthānas) in the former and nervous system (vātadoṣa sthāna) in the latter.

It may be considered that if the śuddhi of āśraya is obtained, fever may not be there, if not, the patient may die due to severe infection of the āśraya (the aśuddhi of āśraya). On total purity of āśraya, the fever will be completely abated, and on the contrary i.e. on total infection of āśraya or avayava, septicaemia-like conditions may develop and the body will fail to sustain the life. On partial purity or impurity of the āśraya, fever may prolong neither subsiding nor becoming fatal.

Nature of viṣamajvara

कृशानां व्याधिमुक्तानां मिथ्याहारादिसेविनाम् ।
अल्पोऽपि दोषो दूष्यादेर्लब्ध्वाऽन्यतमतो बलम् ।।६४ ।।
सविपक्षो ज्वरं कुर्याद्विषमं क्षयवृद्धिभाक् ।

(Kṛśānām vyādhimuktānām
mithyāhārādisevinām ।
alpoऽpi doṣo dūṣyāder-
labdhvāऽnyatamato balam ।। 64 ।।
Savipakṣo jvaram kuryād-
viṣamam kṣayavṛddhibhāk ।)

Though the evolved doṣa primarily is meager, it will gain more strength from any of the factors like dūṣya (dūṣya, deśa, kāla, etc.) and produce fever of unsteady nature due to the existence of obstacles for this doṣa. It is found mostly in lean patients whenever they use unwholesome food or such articles soon after recovery.

दोष: प्रवर्तते तेषां स्वे काले ज्वरयन् बली ।।६५।।
निवर्तते पुनश्चैष प्रत्यनीकबलाबल:।
क्षीणे दोषे ज्वर: सूक्ष्मो रसादिष्वेव लीयते ।।६६ ।।
लीनत्वात्कार्श्यवैवर्ण्यजाड्यादीनादधाति स: ।

(doṣa: pravartate teṣām
sve kāle jvarayan balī ।। 65 ।।
Nivartate punaścaiṣa
pratyanīkabalābala: ।
kṣīṇe doṣe jvara: sūkṣmo
rasādiṣveva līyate ।। 66 ।।
Līnatvātkārśyavaivarṇya-
jāḍyādīnādadhāti sa: ।)

Here the doṣa vitiation is strong enough to cause a rise in temperature only at the concerned time of that doṣa. Whenever the doṣa vitiation becomes weak due to the gain of strength by its opposing factors, naturally the body is devoid of heat. At that time fever will be there in subtle form (dormant state) in dūṣyas like rasa, rakta, etc., developing emaciation, discoloration and inefficiency of the afflicted patient.

Santatajvara and others

आसन्नविवृतास्यत्वात्स्रोतसां रसवाहिनाम् ।।६७ ।।
आशु सर्वस्य वपुषो व्याप्तिर्दोषेण जायते।
सन्तत: सततस्तेन, विपरीतो विपर्ययात् ।।६८ ।।
विषमो विषमारम्भक्रियाकालोऽनुषङ्गवान् ।

(āsannavivṛtāsyatvāt-
srotasām rasavāhinām ।। 67 ।।
Āśu sarvasya vapuṣo
vyāptirdoṣeṇa jāyate ।
santata: satatastena,
viparīto viparyayāt ।। 68 ।।
Viṣamo viṣamārambha-
kriyākāloऽnuṣaṅgavān ।)

In santatajvara spreading of doṣa vitiation is speedy because of the proximity and dilated openings of rasavaha channels. That is why there is always a rise in temperature in santata jvara. But, in other viṣamajvaras (satata, anyedyu, etc.), there would not be a rise in temperature all the time due to the lack of proximity and dilated openings of channels of concerned dūṣyas. There the nature of rise of temperature is viṣama (not with similar nature). The irregularity in the commencement, active

stage, time of fever and especially the prolonging nature indicate a fever as viṣama.

Note:- The actual site of development of fever is koṣṭha. All nija category fevers are located in the koṣṭha itself. On reverse, āgantu fevers are lodged in śākha (skin, rakta, māmsa like dhātus). But viṣamajvaras are lodged on both of these sites. In the same way, nija fevers are occurring due to doṣa vitiation by the problem of food like factors, whereas āgantujvaras are occurring by the trauma like factors.

Viṣamajvaras occur due to internal vitiation as well as seasonal vitiation. Though the causative factors are meager, it may become stronger being attained the strength from similar dhātu, season, region, etc. But that cannot maintain a fever with a regular nature; on changing the region, season, etc. that may diminish making a fluctuating nature of fever.

The difference between santata and other fevers under viṣama category is dealt now. How does the santata become viṣama being present always in the body?

Irregularity in the intensity, period of over affliction, etc. indicate the viṣama nature of santata jvara though it is present always due to the proximity of koṣṭha and rasavahaśrotas and the widened faces of these channels.

दोषो रक्ताश्रयः प्रायः करोति सततं ज्वरम् ।।६९।।
अहोरात्रस्य स द्विः स्यात् सकृदन्येद्युराश्रितः ।
तस्मिन्मांसवहा नाडीः मेदोनाडीस्तृतीयके ।।७०।।
ग्राही पित्तानिलान्मूर्ध्नस्त्रिकस्य कफपित्ततः ।
सपृष्ठस्यानिलकफात् स चैकाहान्तरः स्मृतः ।।७१।।

(doṣo raktāśraya: prāya:
karoti satatam jvaram ॥ 69 ॥
Ahorātrasya sa dvi: syāt
sakṛdanyedyurāśrita: ।
tasminmāmsavahā nāḍī:
medonāḍīstṛtīyake ॥ 70 ॥
grāhī pittānilānmūrdhna-
strikasya kaphapittata: ।
sapṛṣṭhasyānilakaphāt
sa caikāhāntara: smṛta: ॥ 71 ॥)

Generally satatajvara occurs when the doṣa vitiation stays in the raktavahadhātu. This type of fever manifests twice a day when the doṣa vitiation remains in the māmsavaha channels. Tṛtīyakajvara afflicts every alternate day when the doṣa vitiation occurs in the medovaha channels. This jvara is developed because of pitta-kapha combination and by kapha-pitta combination while making the catching discomfort of the head, of the sacral area and of the back bone respectively.

चतुर्थको मले मेदोमज्जास्थ्यन्यतमस्थिते ।
मज्जस्थ एवेत्यपरे प्रभावं स तु दर्शयेत् ।।७२ ।।
द्विधा कफेन जंघाभ्यां स पूर्वं शिरसोऽनिलात् ।
अस्थिमज्जोभयगते चतुर्थकविपर्ययः ।।७३।।
त्रिधा, द्व्यहं ज्वरयति दिनमेकं तु मुञ्चति ।

(Caturthako male medo-
majjāsthyanyatamasthite ।
majjastha evetyapare
prabhāvam sa tu darśayet ॥ 72 ॥
Dvidhā kaphena jaṅghābhyām
sa pūrvam śirasoऽnilāt ।
asthimajjobhayagate
caturthakaviparyaya: ॥ 73 ॥
tridhā, dvyham jvarayati
dinamekam tu muñcati ।)

Caturthakajvara occurs when the doṣa vitiation remains either in the medodhātu or in the majjadhātu or in the asthidhātu. According to

some ācāryas, it is only due to the stay of doṣa in the majja. The doṣa vitiation does show its efficacy two-fold here, either by appearing and spreading upwards from the calf area due to the predominance of kapha or by spreading downwards from the head due to the vāta dominance.

A peculiar fever named Caturthakaviparyaya afflicts the patient for two consecutive days making a recess of one day.

Note:- Out of 5 types of viṣamajvara, santata will be there incessantly fluctuating the intensity of temperature and other complaints. Santata attacks twice a day (in 24 hours), and anyedyu jvara once a day. Tṛtīyaka attacks every alternate day (tṛtīyaka means third one - here, it again appears on the third day of attack). Though all viṣamajvaras are sannipāta in nature, it shows the features of dominance doṣa. Tṛtīyaka is showing dividoṣa samsarga features. On the dominance of vāta with pitta, the discomfort will be on the head. By the supremacy of vāta and kapha, backbone area will be with stiffness. Stiffness in the coccygeal area is by the predominance of kapha and pitta.

Caturthaka that appears every fifth day also shows variety in nature. By the dominance of kapha attack, it commences from both the calves, whereas if it is from the head, is the case of dominance of vātadoṣa. Caturthakaviparyaya is just opposite to caturthaka with respect to the manifestation of jvara. In caturthaka, fever will be there only one day and it will not present in the next two consecutive days. But in caturthakaviparyaya, there will be fever on 2 consecutive days and the other day will be free of fever. Though by the nature of manifestation caturthakaviparyaya is opposite to caturthaka by the tendency of commencing every fifth day, both are similar. That is why the former is considered as a variety of the latter.

बलाबलेन दोषाणामन्नचेष्टादिजन्मना ।।७४।।
ज्वरः स्यान्मनसस्तद्वत्कर्मणाश्च तदा तदा।
दोषदूष्यर्त्वहोरात्रप्रभृतीनां बलाज्ज्वरः ।।७५।।
मनसो विषयाणां च कालं तं तं प्रपद्यते ।

(balābalena doṣāṇā-
mannaceṣṭādijanmanā ।। 74 ।।
Jvaraḥ syānmanasastadvat-
karmaṇāśca tadā tadā ।
doṣadūṣyartvahorātra-
prabhṛtīnām balājjvaraḥ ।। 75 ।।
Manaso viṣayāṇām ca
kālam tam tam prapadyate ।

In viṣamajvara, rise in temperature occurs due to the presence and absence of the strength of doṣas that developed from various food articles and physical activities as well as from the activities of mind on various situations. So, it can be stated that the time of temperature-rise depends upon the particular strength of doṣa, dūṣya, season, day and night, etc., and in the same way, the strength of objects influenced on the mind of the jvara patient.

Note:- The site of jvara is koṣṭha. The site of doṣa vitiation to provoke jvara varies accordingly. In nijajvara, it is koṣṭha and illness will be there always; in āgantujvara, mostly the site for doṣa to produce jvara is śākha hence jvara afflicts intermittently. In viṣamajvara, the site of doṣa varies as the nature of fever is viṣama. Regional factors like dūṣya and time factors like day, night, season also influence in the production and intensity of jvara. Like all these factors, objects of mind also play a major role.

Relief of jvara

धातून् प्रक्षोभयन् दोषो मोक्षकाले विलीयते ।।७६ ।।
ततो नरः श्वसन् स्विद्यन् कूजन् वमति चेष्टते ।
वेपते प्रलपत्युष्णौः शीतैश्चाङ्गैर्हतप्रभः ।।७७ ।।
विसंज्ञो ज्वरवेगार्तः सक्रोध इव वीक्षते ।
सदोषशब्दं च शकृद्द्रवं सृजति वेगवत् ।।७८ ।।

(dhātūn prakṣobhayan doṣo
mokṣakāle vilīyate ।। 76 ।।
Tato naraḥ śvasan svidyan
kūjan vamati ceṣṭate ।
vepate pralapatyuṣṇauḥ
śītaiścāṅgairhataprabhaḥ ।। 77 ।।
Visamjño jvaravegārtaḥ
sakrodha iva vīkṣate ।
sadoṣaśabdam ca śakṛd-
dravam sṛjati vegavat ।। 78 ।।)

Doṣa vitiation relieves to dormant state by disturbing the dhātus that causes the patient to inhale hardly, sweat profusely, mourn and vomit. The patient may show unusual activities, tremor, delirium, heat as well as cold over the body parts, diminished luster, fainting and may wear frustrated or angry look. He may evacuate watery stools associated with āma, producing sounds, at sudden.

देहो लघुर्व्यपगतक्ळममोहतापः
पाको मुखे करणसौष्ठवमव्यथत्वम् ।
स्वेदः क्षवः प्रकृतियोगि मनोऽन्नलिप्सा
कण्डूश्च मूर्ध्नि विगतज्वरलक्षणानि ।।७९।।

(Deho laghurvyapagatakḷamamohatāpaḥ
pāko mukhe karaṇasauṣṭhava-
mavyathatvam ।
sveda: kṣava: prakṛtiyogi manoऽnnalipsā
kaṇḍūśca mūrdhni vigatajvara-
lakṣaṇāni ।। 79 ।।)

The signs and symptoms of actual relief of jvara are as follows: lightness of the body, lack of lassitude, confusion and pyrexia, appearance of mouth ulcers, presence of skill for activities, lack of discomforts, natural perspiration, appearance of sneezing, undisturbed mind, presence of interest to take food and the sensation of itching on the head.

Note:- Viṣamajvaras, whenever hide into their own āśrayas due to loss of strength by the influence of dissimilar season, region, etc., produce some discomforts in the body for a while and disappear. By seeing such symptoms one should not consider that it is a permanent relief of the disease. Being shown such complications, viṣamajvara will disappear as the doṣa vitiation dissolves tentatively into their own dhātus. At that period, the vitiation causes emaciation like weakening states of body up to the next spell being expecting the similar factors to regain the strength to manifest again.

The features described last are the indications for a physician to assure the actual relief of fever.

इति श्रीवैद्यपतिसिंहगुप्तसूनुश्रीमद्वाग्भटविरचितायामष्टाङ्गहृदयसंहितायां तृतीये निदानस्थाने ज्वरनिदानं नाम द्वितीयोऽध्यायः ।।२।।

(iti śrīvaidyapatisimhaguptasūnu-
śrīmadvāgbhaṭaviracitāyāmaṣṭāṅgahṛdaya-
samhitāyām tṛtīye nidānasthāne
jvaranidānam nāma dvitīyoऽdhyāyaḥ।।2।।)

Thus ends the 2nd chapter named jvara-nidānam in Nidānasthāna of Aṣṭāṅgahṛdaya written by Vāgbhaṭa, the son of Vaidyapati Simhagupta.

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EFFECTS OF WATER EXTRACT OF *URTICA DIOICA* LEAVES ON GLYCEMIC, LIPIDEMIC AND INSULINEMIC STATUS OF TYPE 1 DIABETIC INDUCED RATS

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Abstract: The effects of the leaves of *Urtica dioica*, a traditional antidiabetic herb used in India and Bangladesh, on the glycemic, lipidemic and insulinemic status of type 1 diabetic induced rats were studied. Adult *long evans* male rats, bred at BIRDEM Animal house, Dhaka, Bangladesh were used in this study. Type1 DM was produced with single intraperitoneal injection of Streptozotocin using standardized methods. Serum glucose was estimated by Glucose-Oxidase (GOD-PAP) method, serum insulin was measured by ELISA technique specific for rats. There was a significant decrease in the body weight of the *U. dioica* treated group whereas in the other group it was increased. The fasting serum glucose levels and triglycerides level were significantly low; cholesterol level was decreased. It is concluded that the water extract of *U. dioica* improve the glycemic, lipidemic and insulinemic status of the diabetic rats.

Introduction

Diabetics Mellitus is a clinical syndrome characterized by hyperglycemia caused by a relative or absolute deficiency of insulin at the cellular level. It is the most common endocrine disorder all over the world, which is increasing day by day (Tong and Cockrum 2003). Plant materials are considered to be the alternative sources for finding out new leads for hypoglycemic agents. A total of more than 400 species were reported to display hypoglycemic effects, but few of them have been investigated scientifically (Bailey and Day 1989). *Urtica dioica* (stinging nettle), belongs to the family Urticaceae, is an annual and perennial herb seen in South Asian countries and in the Indian subcontinent (Fig. I). This plant contains several mineral salts, particularly calcium and potassium, silicic acids (1 to 4 %), some volatile oils and a mixture of flavonoids (up to 1.8%). Vitamins C, K and several B vitamins are present; tender shoots are rich in vitamin C and carotene (Taylor, 2006).

The anti-diabetic effect of this plant dates back to the old writing of Avicenna (Taylor, 2006). Farzami *et al.* (2003) has observed that there is induction of insulin secretion by component of *U. dioica* leaves extract in perfuse Islets of

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Langerhans, and that there is *in vivo* effect in normal and streptozotocin (STZ) induced diabetic rats. The constant effect of hydroalcoholic extract of the leaves has no hypoglycemic effect (Golalipour *et al.* 2006). Oral and i. p. administration of hydroalcoholic extract of the plant showed a strong glucose lowering action in streptozotocin (STZ) induced diabetic rats, whereas normal rats did not show any hypoglycemic effect (Garjani *et al.* 2006). Some studies also suggest that it has anti-hyperglycemic activity as aqueous extract (Bnouham *et al.* 2003). So it is difficult to establish its real action on diabetes. As there are contradictory views regarding the effect as hypoglycemic/ anti-hyperglycemic activities of leaf extract, the study was done to explore the effect of water extract of *U. dioica* on the body weight, glycemic status, lipidemic and insulinemic status in type1 diabetic induced rats

Fig. I
Urtica dioica - Flowering branch

Materials and methods

Preparation of the extract

The mature leaves of *U. dioica* were collected from the mountain range of Assam (India) during the month of August 2008. Four kg of leaves were thoroughly washed and dried under shade (inside a closed room) for 14-15 days in order to restore its medicinal properties. After drying, the leaves were ground and the powder (900g) was dissolved in distilled boiled water (3.6 l) in a clean glass container and then cooled in room temperature. Then it was filtered through filter paper. The filtrate was collected and evaporated at a reduced pressure using a rotary vacuum evaporator at a constant temperature of 45°C. The extract was finally freeze-dried at -55°C. The dried sample (86 g) was stored in a reagent bottle at 2-8°C in a freezer. The water extract was utilized for biological experiments.

Animal

Adult male *long-evans* rats, weighing 180-250 g, were used throughout the study. The animals were bred at BIRDEM Animal House maintained at ambient room temperature and fed with pellet diet and water *ad libitum.*

Induction of diabetes

Type 1 DM was produced with a single intraperitoneal injection (i.p.) of streptozotocin (STZ, Upjohn Company, Kalamazoo, MI, USA) at a dose of 65-mg/kg-body weight to adult rats (3-4 months) employing the standardized methods used in BIRDEM (Wu *et al.*, 2008).

Experimental design

The rats were divided into 3 groups for experiment: i) normal water control group (n=8) fed with deionized water at a dose of 10 ml^{-kg} BW, ii) type 1 water control group (n=8) and iii) type 1 extract treated group (n=8) fed with water

extract of *U. dioica* at a dose of 1.25 g^{-kg} BW (Ali *et.al.,* 1993). The rats were fed for 8 days, with water extract of *U. dioica*. Blood samples were drawn at 0 day by amputation of the tail tip and on 8th day by decapitation.

Blood biochemistry

The effect on BW was measured on 1st, 3rd, 5th and 8th days. Serum glucose was measured by Glucose Oxidase (GOD-PAP) method using micro-plate reader (Bio-Tec, ELISA). Serum lipid profile (Cholesterol, Triglycerides (TG)) was measured by enzymatic colorimetric (Cholesterol Oxidase/Peroxidase) method, using auto-analyzer, AutoLab. A rat insulin kit (ELISA method) was used to measure serum insulin (Crystal Chem Inc. 1536 Brook Drive, Suite A, USA).

Data analysis

Data from the experiments were analyzed using the Statistical Package for Social Science (SPSS) for Windows. Values were expressed as mean ± SD. Analysis of variance (ANOVA, Bonferroni Post Test) and pair 't' test were done as the test of significance. $p < 0.05$ was considered as the minimal level of statistical significance.

TABLE 1
Effect of *U. dioica* water extract on body weight of Type1 Diabetic model rats (n=8)

M + SD	Body weight (gm)			
	1st day	3rd day	6th day	8th day
Normal Control	214 + 27 (100%)	216 + 28 (100.9%)	224 + 29 (105%)	230 + 32 (107%)
Type 1 control	173 + 22 (100%)	173 + 23 (100%)	175 + 23 (101%)	175 + 23 (101%)
U. dioica treated	186 + 10 (100%)	173 + 14[a] (93%)	158 + 11[b] (85%)	148 + 18[b] (79%)

[a] p <0.02-0.01; [b] p=0.000

Results

Effect on body weight: - Body weight of each rat was taken at three days interval. There was a significant decrease in the body weight of the *U. dioica* treated group in 3rd ($p<0.01$), 5th (p=0.000) and 8th (p=0.000) day of experiment whereas in other group it was increased (Table 1).

Effect on fasting serum glucose and lipid levels: - The water extract of *U. dioica* showed a significant hypoglycemic effect on experimental rats. The fasting serum glucose levels were significantly low (p=0.000) in the extract treated

TABLE 2
Effect of *U. dioica* water extract on fasting serum glucose and lipid levels of type 1 diabetic model rats

Group	Glucose level (mMol/l)		Cholesterol (mg/dl)		Triglycerides (mg/dl)	
	0 day	8th day	0 day	8th day	0 day	8th day
1. Normal Control (n=8)	7.8 + 1.6 (100%	6.8 + 1.2 (87.17%)	56 ± 5 (100%)	55 ± 4 (98%)	65 ± 19 (100%)	49 ± 7 (75%)
2. Type 1 Control (n=8)	28.4 + 6.5 (100%)	25.19 + 6.4 (88.69%)	68 ± 15 (100%)	76 ± 31 (111 %)	113 ± 29 (100%)	119 ± 28 (105%)
3. *U. dioica* treated (n=8)	21.52 + 2.5 (100%)	8.8 + 3.7* (40.89%)	58 ± 11 (100%)	42 ± 2 (72%)	91 ± 15 (100%)	37 ± 11* (40%)

* p = 0.000

group on 8th day compared to the control group. The triglycerides level was significantly low (p=0.000) and the cholesterol level is decreased by 28 % compared to control group in *U. dioica* treated group (Table 2).

Effects on serum insulin level:- There was significantly high (p<0.004) insulin level in the extract treated group. It indicates that the 8 days' treatment with the *U. dioica* water extract enhanced insulin secretory activity by stimulating the residual pancreatic â-cells of experimental rats (Table 3).

Discussion

Although oral hypoglycemic agents and insulin is the mainstay of treatment of diabetes and are effective in controlling hyperglycemia, they have well known side effects and fail to significantly alter the course of diabetic complications (Rang *et al*., 1991). As the knowledge of heterogeneity of this disorder increases, there is need of looking for more efficacious agents with lesser side effects. Moreover, the existing drugs do not modify the course of diabetic complications. In relation to plants also, barring a few studies (Grover *et al*. 2000, Srivastava *et al*. 1988, Karunanayaka *et al*., 1990, Mostofa *et al*., 2007, Ahmed *et al.,* 2005), most of the studies have not assumed the impact of these plants on the course of diabetes and its complications, particularly the macrovascular pathologies. In the present investigation, it was found that STZ produced significant increase in fasting glucose levels ranging between 21.52±2.5 to 292.9 mmol/l. Injection of STZ produces fragmentation of DNA of pancreatic â-cells, which stimulates poly (ADP-ribose) and depletes NAD. Ultimately it leads to destruction of â-cells and there is hyperglycemia and hypoinsulinemia (Goyal, 1999). Treatment with *U. dioica* significantly reduced the serum glucose levels for 8th days value in type1 compared to the control Group. Dyslipidemia is an important risk factor for atherosclerotic complications of diabetes. Hypercholestero-lemia and hypertriglyceridemia have been reported to occur in STZ induced diabetic rats (Sharma *et al*. 1997). Apart from blood glucose lowering activity of *U. dioica,* changes in lipid profile have also been observed. Regarding total cholesterol level, no significant reduction was found, but there was a reduction of 28% in extract treated group compared with diabetic control rats on the 8th day. *U. dioica* water extract significantly (p=0.000) decrease the triglycerides level in extract fed diabetic rat compared to control rats. As dyslipidemia is very common among diabetics, so improvement in the lipid abnormalities must play beneficial role in inhibiting such complications. There was significantly (p< 0.004) increase in insulin level in extract treated diabetic rats whether in control rats the insulin secretion was decreased. The *U. dioica* water extract seem to be mediated through improvement in â-cell morphology and/ or function. Prevention of ongoing â-cell damage, recovery of partially damaged â-cells, regeneration of new cells and stimulation of

TABLE 3
Effects of *U.dioica* water extract on serum insulin level of type1 diabetic model rats (n=8)

Group	Insulin level (µg/ml)	
	0 day	8th day
1. Normal control	0.856 ± 0.365	0.776 ± 0.282
2. Type 1 control	0.315 ± 0.269	0.284 ± 0.208
3. *U. dioica* treated	0.105 ± 0.086	0417 ± 0.361*

* p <0.004

insulin secretion in functional cells are the alternate possibilities induced by the water extract.

Conclusion

U. dioica water extract has hypoglycemic and hypolipidemic properties, which have an association with improved insulinemic status. The plant merits further exploration both chemically and biologically to identify the active principles and mechanism of action.

Acknowledgements

We gratefully acknowledge the financial and logistic supports provided by the International Program In the Chemical Science (IPICS), Uppsala University Sweden and Asian Network of Research on Antidiabetic Plants Materials, Dhaka to perform the study.

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ANTI-MICROBIAL ACTIVITY OF THE BARK OF *OUGEINIA OOJEINENSIS* (ROXB.) HOCHR.

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Abstract: *Ougeinia oojeinensis* (Roxb.) Hochr., belonging to Fabaceae family, is a deciduous tree found throughout India. It is used to cure a number of diseases. The antimicrobial potency of the bark of *O. oojeinensis* has been studied using the ethanolic and aqueous extracts against a wide number of bacterial and fungal organisms by disc diffusion method. The ethanolic extract at a concentration 3mg/ml showed significant activity against the bacterial and fungal organisms investigated.

Introduction

Historically, plants have provided a source of inspiration for novel drug compounds, as plant-derived medicines have made large contributions to human health and well being. Their role is two-fold in the development of new drugs: a) they may become the base for the development of a medicine, a natural blue print for the development of new drugs and b) a phyto-medicine to be used for the treatment of diseases. Traditional medicine using plant extracts continues to provide health coverage for over 80% of the world's population, especially in the developing world[1].

Syandana (*O. oojeinensis*) belongs to the family Fabaceae and is used in various traditional folklore medicines to cure various ailments such as jaundice, leprosy, leucoderma, diarrheoa, diabetes, fevers, ulcers, gonorrhea, etc.[2-3] It is used in the whole of northern and central India and in Deccan peninsula[4-5]. Phytochemical investigation of *O. oojeinensis* showed the presence of lupeol, phytol, squalene, hydroxy-lupeol, betulin and isoflavanones such as dalbergiodin, homoferririn, ougenin[6-8] (Fig. I).

A literature survey showed that no systemic approach has been made to study the antimicrobial activity of this plant, and an attempt was made to evaluate the antimicrobial activity of ethanolic and aqueous extracts of *O. oojeinensis* bark.

Materials and methods

The bark was collected from Munnar, Western ghats, Kerala in the month of May. The collected material was authenticated by Botanist, PARC, Chennai and was deposited at the herbarium of Department of Pharmacognosy, KPCP, Thiruvanamalai along with a voucher sample of crude drug in the Crude Drug Museum.

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Preparation of extract: - About 50g of the air dried powdered plant material was extracted successively with ethanol and distilled water respectively. The extracts were then made to powder by using rotary evaporator under reduced pressure. Bark of *O. oojeinensis* yielded 4.5% and 3.7% w/w extract with ethanol and distilled water respectively.

Phytochemical screening: - Dried extracts were investigated by various chemical tests.[9]

Screening of anti-microbial activity: - The *in-vitro* anti-microbial activity of the ethanolic and aqueous extracts of the *O. oojeinensis* was studied by disc diffusion method. Both the extracts at the concentration 3mg/ml were tested against the bacteria (*Escherischia coli, Staphylococcus aureus, Pseudomonas aeruginosa* and *Streptococcus viridans*) and fungi (*Aspergillus flavus, Aspergillus niger, Candida albicans* and *Malessezia fuffur*). (Fig II&III)

Fig.I. Habitat of the tree of *O. oojeinensis*

Inoculam: - All the micro-organisms were inoculated in Muller-Hinton media and incubated at 37°C for 4 hours. The turbid solution so produced was then diluted with the same media and compared with the standard. This level was equivalent to 3.0 x 108CFU/ml.[10]

Disc diffusion method: - Muller-Hinton agar media was prepared and transferred to sterile petridishes and allowed to solidify. A suspension of inoculam was added to media and swabs the entire surface of the agar media. The inoculam was equally distributed in surface of the media by rotating the plate. Sterile discs 5mm in diameter dipped in solution of ethanolic and aqueous extract, standard and control were placed on the surface of agar plates. Left the plates for 1 hour at room temperature as a period of pre-incubation diffusion to minimize the effects of variation in time between the applications of the different solutions. The activities of the extracts were compared to the antibacterial and antifungal standards of ciprofloxacin and ketaconazole by incubated at 37°C for 48 hours. The diameter of the zone of inhibition was observed and measured.[11-14]

Results and discussion

The phytochemical analysis of the extracts showed the presence of tannins, terpenes, steroids and flavanoids. Ethanolic and aqueous extracts were subjected to antimicrobial activity. The ethanol and aqueous extracts showed significant antibacterial and antifungal activity against organisms tested when compared to standard drugs, ciprofloxacin and ketaconazole, whereas the ethanolic extract possesses greater antimicrobial activity (Table 1). The chemical

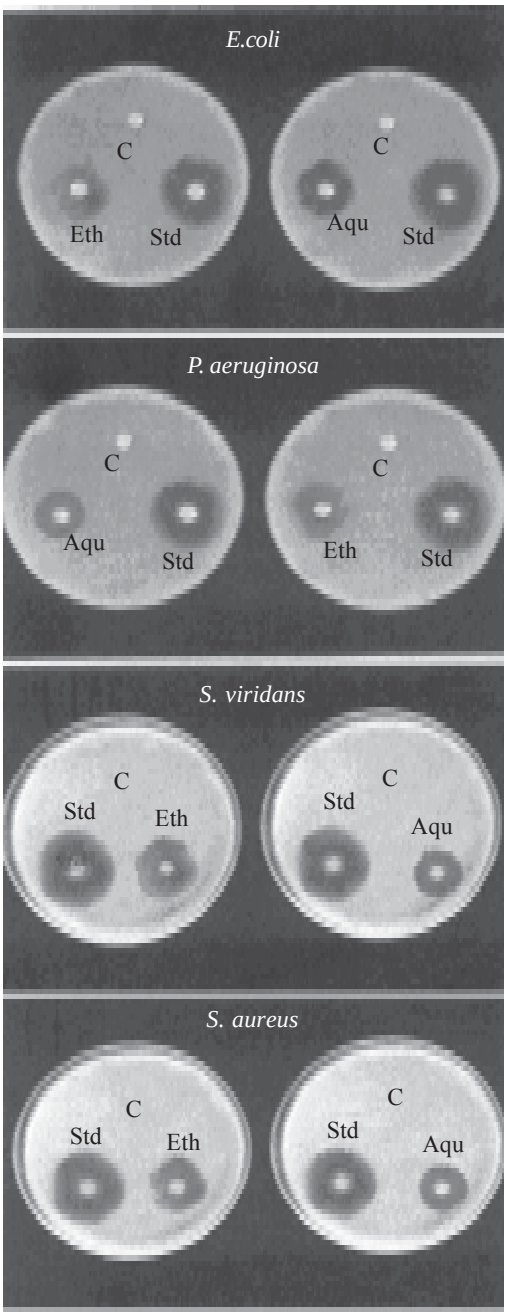

Fig.II. Antibacterial activity of ethanolic and aqueous extract of *O.oojeinensis*
C Control; **Std** Standard; **Aqu** Aqueous; **Eth** Ethanol

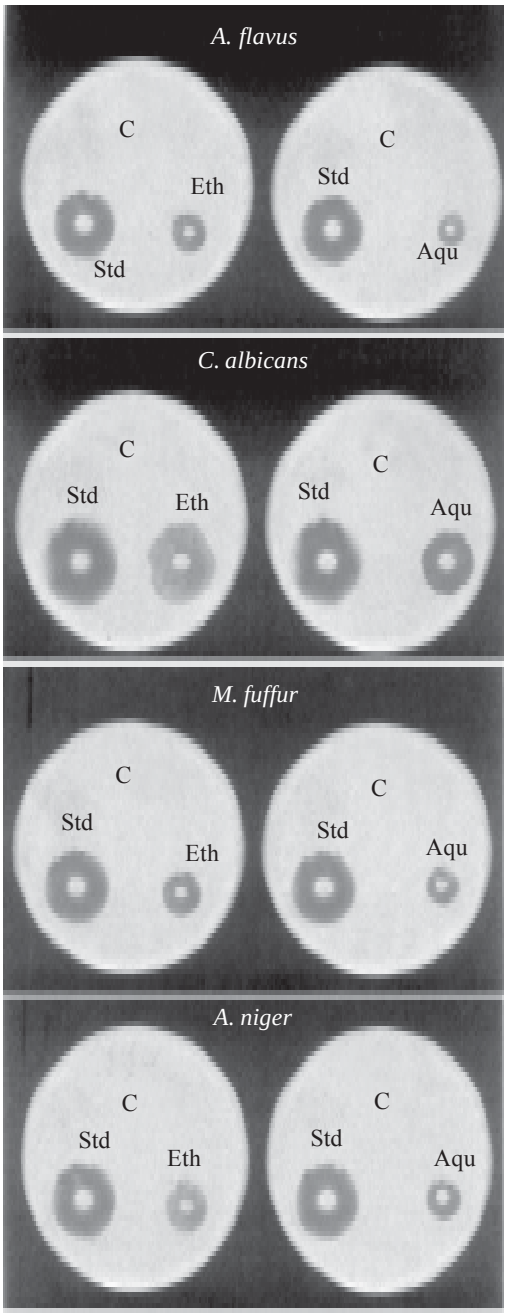

Fig.III. Antifungal activity of ethanolic and aqueous extract of bark of *O. oojeinensis*
C Control; **Std** Standard; **Aqu** Aqueous; **Eth** Ethanol

TABLE 1
Antimicrobial activity of ethanolic and aqueous extracts of *O. oojeinensis*

Organisms	Zone of inhibition (mm)			
	Std	DMF	Eth.	Aqu.
1. *E. coli*	33	-	24	20
2. *S. aureus*	28	-	18	13
3. *P. aeruginosa*	30	-	21	15
4. *S. viridans*	30	-	20	13
5. *A. flavus*	30	-	22	16
6. *A. niger*	28	-	14	11
7. *C. albicans*	24	-	10	7
8. *M. fuffur*	28	-	13	10

Eth - Ethanolic extract; Aqu - Aqueous extract.
Standard (Std): Ciprofloxacin (1mg/ml) and ketoconazole (1mg/ml); Dose of test extracts: 3mg/ml

constituent flavanoids and tannins may be responsible for the antimicrobial activity of the bark extract.

Acknowledgement
The authors are thankful to Dr. S. Raja., Principal, Kamalakshi Pandurangan College of Pharmacy, Thiruvanamalai for providing necessary facilities to complete this research work successfully. And are also thankful to Dr. B. Chamundeswari, Head, Department of Pharmacognosy, Sri Ramachandra University, Porur, Chennai.

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EFFICACY OF VARDHAMĀNA PIPPALĪ IN THE MANAGEMENT OF ASCITES (JALODARA) - A CASE STUDY

Umesh Choudhary and Ajai Kr. Pandey*

Abstract: Cirrhosis of liver and chronic hepatic parenchymal disease are the most common causes of ascites. In the target-oriented conventional system of medicine, the available therapeutic measures are not up to the mark for its management. It may lead to a variety of unwanted effects also. In this regard, herbal and herbo-mineral drugs of āyurvedic system of medicine are giving promising result. In this study, pippalī (*Piper longum*) was selected and given as kalpa-form with milk as anupāna. The patients responded well.

Introduction

The term ascites is derived from the Greek word 'Ascos' meaning bag or sac. Ascites is a condition of abnormal fluid accumulation within the peritoneal cavity. Cirrhosis of the liver is one of the most common causes of ascites but other conditions such as congestive cardiac failure, kidney failure, infections or cancer may also lead to ascites. In case of mild ascites, there may be no symptoms, but severe ascites leads to abdominal distention. Patients with ascites generally complain of progressive abdominal heaviness and pressure as well as shortness of breath due to mechanical impingement on the diaphragm. If ascetic fluid is greater than 500ml, it can be demonstrated on physical examination by bulging flanks and fluid waves performed by examining the abdomen. Smaller amounts of fluids may be detected by an ultrasound of the abdomen. The prognosis of the ascites primarily depends on its under lying cause. The prognosis of malignant ascites is poor (20-58 weeks survival). Ascites due to liver cirrhosis has a fair prognosis (3 years survival in about 50%).

In āyurveda, ascites is comparable in terms of etiology, and pathogenesis, and clinical presentations to jalodara. All the classical texts of āyurveda have described jalodara and its management in detail. Jalodara is a tridoṣa disorder with the involvement of dūṣyas and srotasas like - rasavaha, raktavaha, udakavaha, māmsavaha and svedavaha. In this regard, a clinical experience of a 22 years old female who was suffering from ascites (jalodara) since 2.5 years, is shared here. The patient was a house wife; brought to us in the Kāyacikitsa O.P.D. of S.S. Hospital, IMS BHU with the complaints of pain and distention of abdomen, decrease urine output, constipation, decreased appetite, body ache and general weakness. For this, she took medication and paracentesis was performed by

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a private hospital. She got temporary relief, but after 8 - 10 days, the problem reappeared. A few days back, she again took medical advice from the Gastroenterologist and was admitted. Besides medical advice, three times paracentesis were also performed in the hospital, but there was no relief. So, for a treatment as per āyurvedic approach, she came to us and was admitted in the Kāyacikitsā ward.

All the routine investigations were done. The case history of the patient was as follows:-

General physical examination

G.C.	- Poor
B.P.	- 100/60mmHg
P/R	- 68/min., soft, regular, feeble
Temp.	- Afebrile
Pallor	- Present (+)
Icterus	- Absent
Cyanosis	- Absent
Clubbing	- Absent
Edema	- B/L Pedal edema (pitting)
JVP	- Normal
Tongue	- Uncoated
Trachea	- Centrally placed
Thyroid	- Not enlarged
Local lesion	- Absent

Systemic examination

CNS - Fully conscious (well oriented with time, place and person)

CVS - S1 S2 normal (no murmur).

R/S - B/L equal air entry (no added sound)

GIT - Inspection:- Distended and shiny abdomen, superficial abdominal veins and rectus abdominis prominent.

Palpation:- No hepatomegaly, Splenomegaly - 4 fingers, hard in consistency; No palpable abdominal, axillary and inguinal lymph node; Mild tender in Lt. Hypochondriac region

Percussion:- Shifting dullness present, Fluid thrill present

Auscultation:- Bowel sound reduced

GUS - Decrease urine output

Menstruation:- Irregular; menstrual cycle – 20 - 25 days, lasting for 4-6 days, No abnormal vaginal bleeding and discharge.

Personal details:- Build - Lean, Height - 5'1", Weight - 33 kg

The lab investigation at the time of admission and discharge is shown in Table 1

USG Abdomen:- Coarsened hepatic parenchymal echo texture (? chronic hepatic parenchymal disease) with thickened, oedematous gall bladder wall with mild splenomegaly with gross ascites (? portal hypertension) -

Ascitic Fluid (R/M, CYTOLOGY)

- Protein- 2.7gm%
- TWBC – 5000cumm
- DC - N-05%, L-85%, M- 10%
- No Malignancy

ADA - 25.7 IU/L (Non Tubercular)

Treatment history

The patient was admitted in the Kāyacikitsā ward, and Vardhamāna pippalī kalpa (1- 6 pippali) was given for 1 month as a kalpa with milk as an anupāna during the treatment period. After that, the following āyurvedic drugs were given orally for 15 days. Low salt diet was advised.

1. Punarnavāmaṇḍūra (500mg) and Śveta parpaṭi (500mg) - bd
2. Pravāḷa piṣṭi (500mg) - bd
3. Tṛṇapañcamūla kvātha (40ml) - bd
4. Amḷapitta miśraṇa (3 tsf) - tds

Wholesome and unwholesome:- Advised to take fat free milk and water intake according to 24 hours' urine output; rice, wheat, greegram, paneer (cheese) and green vegetables; and to avoid fried, spicy, heavy and oily food items.

The treatment response was assessed on the basis of clinical symptoms. After a course of Vardhamāna pippalī kalpa and medicines for 30 days, 60% improvement was observed in the symptoms. The condition of the patient at the time of discharge is given below:

- Reduced distension of abdomen (girth measurement is shown in Table 2)
- No pain in abdomen
- Appetite - improved
- Urine output- near to normal
- Size of spleen enlargement reduced from 4 to 2 fingers
- Bowel function- normal
- Feels well

The patient was discharged and advised to continue the following medicines for 15 days and asked to report.

- Pippalī naimittika rasāyana (500mg) - bd with honey after meal.
- Punarnavāmaṇḍūra (500mg) and Śveta parpaṭi (500mg) - bd
- Tab. Liv 52 DS - 1 bd
- Śarapuṅkha pañcāṅga antardhūma bhasma (500mg) - bd with honey after meal.

TABLE 2
Girth measurement of abdomen

Date	TPP (inches)	UMB (inches)	ASIS (inches)
09.09.10	27.5	28	27.5
11.09.10	27	27	27
13.09.10	27	26	26
15.09.10	26.5	25.5	26
29.09.10	26	25	24.7
01.10.10	25	25	25
04.10.10	24.5	25	24.5
08.10.10	24	24.4	24
12.10.10	23.5	23	23

TPP - Trans pyloric plane; UMB - Umbilicus; ASIS - Ant. Sup. Iliac spine

Diet restriction, especially low salt diet and relaxation, were advised.

In the first follow up (after 15 days), it was found that the patient got 70% improvement. After thorough interrogation and physical and systemic examination, the following medicines were advised for another 15 days:-

- Pippalī naimittika rasāyana (500mg) - 1 bd
- Punarnavāmaṇḍūram (500mg) and Śveta parpaṭi (500mg) - 1 bd
- Rohītakāriṣṭa (20 ml) - bd

TABLE 1
Lab investigation at the time of admission and discharge

At the time of admission	At the time of discharge
1. Hb - 9.8 gm/dl	Hb - 10.5 gm/dl
2. TWBC - 5000/cumm	TWBC - 6500/cumm
3. DLC - P 66 L_{18} E_9M_0 B_0	DLC - P-60, L-25, E-4, M-01, B-0
4. RBC - 3.33mill./cumm	RBC - 3.40mill./cumm
5. LFT - SGPT-96 IU, SGOT- 113 IU, TBIL -3.2 mg/dl, DBIL-1.5mg/dl, ALKP -384.9 IU, TP - 7.3g/dl, ALB - 3.3 g/dl.	LFT - SGOT- 48 IU, SGPT- 93 IU, TBIL- 1.6 mg/dl, DBIL- 0.5 mg/dl, ALKP- 200 IU, TP- 7.5 g/dl, ALB- 3.5 g/dl.
6. RFT - Creat. - 1.15 mg/dl, Urea- 44.3mg/dl, Na -140.8mmol/l, K - 4.5mmol/l, Cl - 97.7mmol/l	RFT - Creat.- 1.05 mg/dl, Urea- 38mg/dl, Na - 142 mmol/l, K- 4.00 mmol, Cl- 95.2 mmol/l.
7. HBsAg - Negative	

In the second follow up after 15 days, the improvement in terms of patient's view was as follows:

- Reduced distension of abdomen - 90%
- No pain in abdomen
- Appetite -100%
- Urine output - normal
- Size of spleen enlargement reduced from 2 to 1 finger
- Bowel function - normal

After physical and systemic examination, the following medicines were advised for 1 month along with ongoing modern medicine.

1. Low salt diet.
2. Punarnavāmaṇḍūra (500mg) - bd after meal with honey.
3. Guḍūcīsattva (250 mg) - bd after meal with water.
4. Pravāḷa piṣṭi (250) mg - od after meal with milk.
5. Rohītakāriṣṭa (20 ml) - bd with equal quantity of water after meal.
6. Easylax powder (2 tsf) - hs with a cup of lukewarm water at bed time.

In the third follow up, she had completely recovered from jalodara (ascites) but splenomegaly was still present though the size was reduced. Advised to continue the following medicines:

i. Pippalī naimittika rasāyana (500mg) - 1 bd
ii. Guḍūcisattva (250 mg) - bd after meal with water.
iii. Śarapuṅkha pañcāṅga antardhūma bhasma (500mg) - bd with honey after meal.

Discussion

The drug pippali in kalpa-form acts by its tīkṣṇa guṇas at the root cause of the disease and has the ability to clean the body channels by enhancing blood circulation. Beside this, pippali also has the capacity to regulate bioenergy system as a whole. The patient was well tolerated pippali in kalpa-form and no unwanted effects were reported. Thus it can be concluded that pippali in kalpa-form along with other āyurvedic drugs are safe, cost-effective and it corrects the watery element and improves overall function.

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4. Śveta parpati (Siddhayogasamgraha)
5. Pravāla piṣṭi (Rasaratnasamuccayam)
6. Śarapuṅkha pañcāṅga antardhūma bhasma (Svānubhūta)
9. Rohītakāriṣṭa (Bhaiṣajyaratnāvali)
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EFFECT OF EXPOSURE TO DOMESTIC SMOKE ON LUNG FUNCTION AMONG RURAL WOMEN - A COMMUNITY-BASED STUDY

Neelam Sukhsohale[1] and Yogini biyani[2]

Abstract: A community based cross-sectional study was conducted in Raipura village of Nagpur to assess the effect of exposure to domestic smoke on lung function among rural women and to compare the pulmonary functions in healthy non-smoking women using different types of cooking fuels. High prevalence of abnormal pulmonary function was found in biomass fuel users compared to kerosene stove users, LPG users and mixed fuel users.

Introduction

Indoor air pollution can be traced back to prehistoric times when humans first moved to temperate climates and it became necessary to construct shelters and use fire inside for cooking, warmth and light. Fire led to exposure of high levels of pollution as evident by the soot found in prehistoric caves[1]. Although non-occupational indoor air pollution goes back to ancient times, when prehistoric man started to use open fires in confined spaces, systematic research efforts in this field have started only recently. In the 1960's Biersteker and De Graaf were among the first to recognize the implications of indoor air pollution[2].

Poor households in rural areas of developing countries depend heavily on wood, dung and other biomass fuels for cooking. Biomass combustion under primitive conditions result in very high indoor smoke exposures in developing countries[3].

Objectives:- To assess the effect of exposure to domestic smoke on lung function among rural women and to compare the pulmonary functions in healthy non-smoking women using different types of cooking fuels.

Material and methods

A community based cross-sectional study was carried out in Raipura Village of Nagpur district among 760 rural women.

Inclusion criteria: - Every woman aged 15 years and above involved in household cooking with four types of cooking fuels viz, biomass, kerosene stove, LPG & mixed (combination of two and more cooking fuels).

Exclusion criteria:- Women who were not involved in cooking or those who had never

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been exposed to any cooking fuels; those having history of smoking; and children aged less than 15 years.

Before proceeding to the main study, a proforma was tested by conducting a pilot study in 100 women. The study was approved by Ethics Committee of the Indira Gandhi Government Medical College, Nagpur.

All 760 subjects were interviewed by house-to-house survey and subjected to detailed Socio-demographic profile and duration of exposure to cooking fuels. Finally, abnormal pulmonary function of the study subjects was assessed by the measurement of peak expiratory flow rate (PEFR). The PEFR was measured by Mini Wright's Peak Flow Meter after explaining and demonstrating the procedure to each study subject. Overall, three readings were recorded in each study subject and the highest of these three readings was considered as a representative value. PEFR<80% of the predicted was considered as abnormal pulmonary function[4].

Statistical analysis:- Percentage and standard error was calculated. Chi Square test and Z test were used to compare the difference in different age groups and various types of cooking fuels. P value less than 0.05 was considered as statistically significant.

Results

It was found that majority of the study subjects were using exclusively biomass fuels for cooking followed by mixed fuel users exclusively LPG users and the least were exclusively using kerosene stove. Most of the study subjects were in the age group of 15-25 years (Table 1). The prevalence of abnormal PEFR among the study subjects is shown in Table 2. The age-wise prevalence of PEFR among study subjects is shown in Table 3.

TABLE 1
Distribution of study subjects according to age and types of cooking fuels

Age group	Bio-mass	Kero-sene	LPG	Mixed	Total
15-25	83 (32.9%)	25 (34.2%)	70 (36.4%)	99 (40.7%)	277 (36.4%)
25-35	57 (22.6%)	18 (24.6%)	60 (31.2%)	58 (23.9%)	193 (25.4%)
35-45	42 (16.7%)	15 (20.5%)	30 (15.6%)	40 (16.5%)	127 (16.7%)
45-55	28 (11.1%)	9 (1.2%)	18 (9.4%)	18 (7.4%)	73 (9.6%)
55-65	21 (8.3%)	5 (6.8%)	6 (3.1%)	16 (6.6%)	48 (6.3%)
> 65	21 (8.3%)	1 (1.4%)	8 (4.2%)	12 (4.9%)	42 (5.5%)
Total	252	73	192	243	760

TABLE 3
Age-wise prevalence of PEFR among study subjects

Age group (years)	No.of study subjects		SE	Z	P
	W-PEFR* (n=221)	WT-PEFR* (n=539)			
15-25	72 (32.6%)	205 (38.0%)	3.78	1.44	>0.05
25-35	45 (20.4%)	148 (27.4%)	3.32	2.14	<0.05
35-45	35 (15.8%)	92 (17.1%)	2.94	0.42	>0.05
45-55	28 (12.7%)	45 (8.3%)	1.70	1.70	>0.05
55-65	22 (9.9%)	26 (4.8%)	2.22	2.32	<0.05
> 65	19 (8.6%)	23 (4.3%)	2.08	2.08	<0.05

*W-PEFR = With abnormal Peak Expiratory Flow Rate; WT-PEFR = Without abnormal Peak Expiratory Flow Rate

Discussion

Biomass in the form of wood, crop residues, and animal dung is used in more than two fifths of the world's households as the principal fuel. In such households women are most likely to be affected, as they spend more time indoors. The main pollutants in this environment are suspended particulate matter (SPM), consisting of dust, fumes, mist and smoke; Polycyclic Organic Matter (POM) including a number of known carcinogens called Benzo(a)pyrene, Poly aromatic hydrocarbons, benzene and gaseous pollutants like carbon monoxide, formaldehyde, oxides of sulphur and nitrogen[4].

Overall, the prevalence rate of abnormal pulmonary function amongst women using biomass fuel who never smoked was found to be 43.3%. This high prevalence is primarily due to the fact that they sit most of the time near the fire place in the dwellings which are overcrowded but not well ventilated and as such is much more exposed to domestic smoke. These observations were consistent with the findings of other investigators. Study carried out by Behera D[7] reported that PEFR values were the lowest in the biomass fuel users.

Smoke emission from fuels from domestic cooking fuels is an important source of indoor air pollution. Oxides of nitrogen, sulphur dioxide, and unburnt hydrocarbons produced by all types of cooking fuels, are considered to be potent respiratory irritants[7]. Soot particles which are generated more with biomass fuel are probably more hazardous as observed in the present study. Measurement of lung function in the form of PEFR further confirmed the fact that exposure to domestic cooking fuels has deleterious effects on respiratory functions.

A number of studies from India and other countries[7-11] including United States of America, Europe, Nepal and Mexico have described lung function abnormalities attributable to exposure to domestic cooking and indoor pollution. These studies have reported both obstructive and restrictive ventilatory defects and combination of two to occur in subjects particularly in women who are exposed to such fuels.

The severity of the high risk presented by indoor air pollution depends on the length and level of exposure to these pollutants emitted by fires using wood, animal dung, scrub plants or crop residues as fuels. Women who spend many hours in poorly ventilated structures and who are exposed to smoke from cooking stoves face high risks from indoor air pollution.

Conclusion and recommendations

The study revealed that biomass fuel exposure is an important risk factor in the causation of abnormal pulmonary function amongst women residing in rural areas of Nagpur district. It is

TABLE 2
Prevalence of abnormal PEFR among study subjects

Description	Type of cooking fuel				Total (n = 760)	Statistical test $\chi 2$, df	'p' value
	Biomass (n = 252)	Kerosene[1] (n = 73)	LPG[2] (n = 192)	Mixed[3] (n = 243)			
Abnormal PEFR	109 (43.3%)	15 (20.5%)	45 (23.4%)	52 (21.4%)	221(29.1%)	37.04, 3	< 0.01

1. Biomass Vs Kerosene - $\chi 2 = 12.37$, df 1, $p<0.01$; 2. Biomass Vs LPG - $\chi 2 = 18.89$, df 1, $p<0.01$; 3. Biomass Vs Mixed - $\chi 2= 26.92$, df 1, $p<0.01$

therefore concluded that cooking with any of the cooking fuels cause indoor air pollution. It is important to have better designed houses with adequate ventilation and stove vents that are cleaned regularly if pollution due to domestic smoke is to be reduced. Hence we recommend that measures should be taken to ameliorate the indoor levels of air pollution by the use of smokeless stoves or by substituting fuels.

Biomass smoke is a complex mixture of combustion products and further work is required to identify the large number of harmful and potentially toxic substances that it contains and to evaluate their health significance.

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ĀYURVEDIC MULTI-DRUG THERAPY IN POST-VIRAL ARTHRITIS

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Abstract: Chikungunya (CHIK) is a viral infection associated with fever and arthralgia which causes viral arthritis. Modern medicine is yet to develop a vaccine or curative agents for this. Āyurvedic system of medicine is managing the cases with safe and effective remedies. In this study, the observations made with multi-drug therapy on 24 confirmed cases of post arthritis of CHIK infection was reported and has shown good results.

Introduction

In recent years Chikungunya (CHIK) has been spreading across several countries of Africa and Asia including India. It is a viral disease transmitted through the vector of mosquitoes. The responsible CHIK virus is the alpha virus which is carried by the Ades egypti mosquito[1].

The incubation period of chikungunya is from two to five days. Symptoms of the disease include fever up to 40°C (104°F), a petechial or maculopapular rash of the trunk and occasionally the limbs, and arthralgia or arthritis affecting multiple joints.[2] Other non-specific symptoms can include headache, conjunctival infection and slight photophobia. Typically, the fever lasts for two days and then ends abruptly. However, other symptoms viz. joint pain, intense headache, insomnia and an extreme degree of prostration last for a variable period; usually for about 5 to 7 days[4]. There would be complaint of joint pains for a much longer period; some as long as 2 years, depending on their age.[3,4]

It is a fact that CHIK fever has not mentioned in the āyurvedic classics. However, CHIK symptoms can be correlated with the symptoms of vātakaphajvara[5] and āmvāta[6] such as body ache, lethargy, insomnia, fever, headache, arthralgia, etc. which are well documented in āyurvedic classics.

Āma, an indigested metabolic material generated from improper digestion, acts as the breeding centre for viral or bacterial toxins to trigger the various symptoms by lowering the immunity. At this stage, it is labelled as āmaviṣa[7]. The hypofunction of agni - mandāgni (low digestive fire) - is considered as the prime factor for initiation of pathogenesis of most of the diseases including fevers[8]. This vital concept of āyurveda holds good for planning

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the treatment of chikungunya. Some experts refer this condition to sandhijvara which appears to be a coined word and lacks authentic descriptions.

Basing on the symptomatology, āyurvedic physicians of the different parts of the country generally prescribe formulation like Triphala, Pañcatikta kaṣāya, Amṛtottaram kaṣāya, Sudarśana cūrṇa, Dhanvantarī vaṭi, Yogarāja guggulu, Bilvādi vaṭi, Amṛtāriṣṭa, etc. Keeping in view the suggestion made by experts, a clinical study was carried out with certain āyurvedic formulations with known antipyretic and anti-inflammatory activity.

Materials and methods

24 patients with history of CHIK associated with viral arthritis reported at Sasoi OPD centre of IPGT & RA, Gujarat Ayurved University, Jamnagar were included in this randomized uncontrolled clinical trial for evaluating the efficacy of āyurvedic formulation in the treatment of arthritis due to CHIK. The treatment period was for four weeks and follow-up was made after four weeks. Treatment protocol consisted of the below mentioned formulae:

1. Daśamūla kvātha (yavakuta) - 30 ml - twice a day before meal[9].
2. Rāsnāsaptaka kvātha (yavakuta) - 30 ml - twice a day before meal[9].
3. Yogarājaguggulu - 500mg - twice a day after meal.
4. Agnituṇḍi vaṭi - 125mg - twice a day after meal.
5. Śuṇṭhi-gomūtra lepa followed by svedana - at bed time for 20 minutes.

Pathyāpathya:- Laghu āhara (light food) was advised as wholesome (pathya). Guru (heavy),

TABLE 1
Gradation of signs and symptoms

Symptoms/signs	Gradation
1. Sandhiśūla (joint pain)	
- No pain	0
- Mild pain	1
- Moderate pain but	
- no difficulty in walking	2
- difficulty in walking	3
- unable to walk	4
2. Sandhiśotha (swelling of joint)	
- No swelling	0
- Slight swelling	1
- Moderate swelling	2
- Severe swelling	3
3. Sandhigraha/stambha (stiffness of joint)	
- No stiffness	0
- Stiffness in the morning and reliving within 30 min. by movement	1
- Stiffness in the morning and reliving within 120 min. by movement	2
- Stiffness continue for whole day	3
4. Śiraśūla (headache)	
- No headache	0
- Occasionally with low intensity	1
- Frequently with moderate intensity but do not disturb daily routine work	2
- Always with moderate intensity, sometimes disturbs routine work	3
- Always severe intensity associated with vomiting, nausea, etc.	4
5. Angamarda (body ache)	
- No bodyache	0
- Mild bodyache which do not disturb routine work	1
- Moderate bodyache which sometime disturbs routine work	2
- Severe bodyache which leads to bed rest	3

Responses:
a) Good - 76-100% relief
b) Fair - 51-75% relief
c) Poor - 26-50% relief
d) No response: below 25% relief or no relief at all

durjara (difficult to digest), śīta (cold), abhiśyandi (causing heart-burn or sour eructation), paryuṣita (stale) vistambhi (causing distention) āhāra, ajīrṇa bhojana (over eating) and divāsvapna (day sleep) were proscribed as unwholesome (apathya).

Assessment criteria

To assess the effect of the therapy objectively, all the signs and symptoms were given scoring depending upon their severity (Table 1).

Results and discussion

The effect of the therapy was statistically highly significant on joints pain of knee, ankle, wrist; joint stiffness of knee, elbow, writs, hips and loins; and on swelling of joints in knee, elbow and wrist. The effect was significant on joint stiffness and swelling of ankle. The therapy did not show significant result on joint swelling of elbow. (Table 2)

The treatment was carried out by taking into

TABLE 2
Effect of therapy on the symptoms of chikungunya

Symptoms	Mean + SEM		% of change (decrease)	't'	p
	BT	AT			
1. Jānuśūla (knee joint pain)	2.46 ± 1.01	0.46 ± 1.01	81.25	8.33	<0.001
2. Gulfaśūla (ankle joint pain)	1.69 ± 1.27	0.31 ± 1.35	81.82	8.01	<0.001
3. Kurparaśūla (elbow joint pain)	1.68 ± 1.14	0.82 ± 1.16	48.15	2.48	<0.05
4. Manibandhaśūla (wrist joint pain)	1.91 ± 0.98	0.31 ± 1.04	83.33	10.81	<0.001
5. Jānugraha (stiffness in knee joint)	2.21 ± 1.20	0.92 ± 1.27	58.06	7.02	<0.001
6. Gulfagraha (stiffness in ankle joint)	1.50 ± 1.33	0.33 ± 1.40	77.78	5.61	<0.001
7. Kurparagraha (stiffness in elbow joint)	1.50 ± 1.15	0.13 ± 1.22	91.67	8.12	<0.001
8. Manibandhagraha (stiffness in wrist joint)	2.69 ± 1.27	0.46 ± 1.39	82.86	8.29	<0.001
9. Kaṭī graha (stiffness in hips & loins)	1.58 ± 1.39	0.16 ± 1.47	89.47	8.08	<0.001
10. Jānuśotha (swelling on knee joint)	2.00 ± 1.03	0.70 ± 1.09	65.00	6.39	<0.001
11. Gulfa śotha (swelling on ankle joint)	2.14 ± 1.68	0.85 ± 1.79	60.00	8.18	<0.001
12. Kurpara śotha (swelling on elbow joint)	2.17 ± 1.06	0.55 ± 1.14	74.36	7.43	<0.001
13. Manibandha śotha (swelling on wrist joint)	1.54 ± 1.32	0.18 ± 1.41	88.24	8.68	<0.001

<0.001 - Highly significant; <0.05 Significant

consideration the symptoms according to āyurvedic point of view. It was inferred that the disease manifests due to improper pācana and production of āma which should be treated accordingly. All the formulations included in the study help to decrease the āma in one way or the other by influencing the agni while application of gomūtra-śuṇṭhi lepa locally helps to reduce the śotha and āma.

Conclusion

Although the sample size of the study was small, it showed encouraging results indicating significant anti-inflammatory and analgesic activity of the āyurvedic formulation in the management of CHIK arthralgia.

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ANTI-PSYCHOTIC ACTIVITY OF MĀMSYĀDI KVĀTHA - AN EXPERIMENTAL STUDY

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Abstract: Māmsyādi kvātha, an āyurvedic formulation cited in Siddhayogasaṅgraha, is said to be highly effective in psychiatric disorders. The ingredients are: jaṭāmāmsi (*Nardostachys grandiflora*), aśvagandha (*Withania somnifera*) and pārasīkayavāni (*Hyoscyamus niger*) in 8:4:1 ratio respectively. The test formulation was subjected to antipsychotic activity. The models selected for this were exploratory behaviour test and D-amphetamine induced stereotype test in mice. The test drug showed significant antipsychotic activity in D-amphetamine induced stereotypy test. However, the action was not observed in exploratory behaviour test.

Introduction

Homeostasis enhances the quality of life, and disturbance in any component mar health. Among these factors manas (mind) is having its own identity in regulating and synchronizing other factors. Disturbed manas hampers the biological elements too.

Antipsychotic drugs are called neuroleptics or major tranquilizers because they reduce the agitation and disturbed behaviour often associated with delusions and hallucinations in schizophrenia or senile illness. All the antipsychotic drugs have adverse effects like excessive sedation, CNS disturbance, autonomic nervous system disturbance and extrapyramidal symptoms. Āyurvedic formulations are designed in such a way that they not only act as antipsychotic drugs but they also bring back the homeostasis among other components of life. Māmsyādi kvātha, a potent psycho-neuro-pharmacologically active compound, was subjected to antipsychotic activity in the study.

Objectives

- To evaluate the antipsychotic activity of the test formulation - Māmsyādi kvātha.
- To assess the antipsychotic activity of the components of Māmsyādi kvātha (jaṭāmānsi, aśvagandha and pārasīka yavāni)

Materials and methods

Animals:- Swiss albino mice of either sex weighing between 20g - 40g were randomly selected and maintained in the animal house attached to the pharmacology laboratory of IPGA & RA. They were maintained on 'Amrut' brand mice pellets. Both food and tap water were

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given *ad libitum*. Animals were exposed to natural day and night cycle. 60-85% of humidity was maintained. The drugs under trial were administered orally with the help of a specially prepared catheter.

Administration: - Freshly prepared decoction of the above mentioned drugs were administered orally in a dose of 80 ml per kg per day. The duration was 7 days for chronic study and one day for acute study.

Statistical analysis: - It was done by employing students 't' test for paired and unpaired data and also by non parametric methods. A 'p' value of less than 0.05% was considered as statistically significant.

Experimental procedure: - Experiments were carried out with 2 dosing schedules: i) Acute Study:- Test drugs administered one hour prior to experimentation. On the same day experiments were conducted. ii) Chronic Study: - Trial drugs were administered for 7 days, on the 8th day morning experiment was done one hour after the administration of the test drug.

Test formulation: - Māmsyādi kvātha (Ref. Siddhayogasaṅgraha); Ingredients: i) jaṭāmāmsi (1 part), ii) aśvagandha (4 parts) and iii) pārasīkayavāni (8 parts). The details such as part used, potency, etc. of the ingredient drugs are shown in Table 1

Preparation of medicine:- Jaṭāmāmsi kvātha (decoction) was prepared by boiling 1 part of coarse powder of jāṭāmamsi in 16 parts of water and reduced into ¼th part. Decoctions of aśvagandha, pārasīkayavāni and māmsyādi were prepared by the same method. For each experiment, fresh decoction was prepared (1 ml of the decoction consists of the water extractable material of 500 mg of the drug).

Experimental models

Exploratory behavior of mice: - This was studied according to the method of Shillito (1970) with slight modifications, using a tunnel board instrument. Instead of mice kept in reverse day and night conditions, mice exposed to natural day and night light cycle were used. The instrument consists of a wooden board measuring 61 cm x 61 cm on to which twelve tunnels (aluminum) 7.5 cms long and 4 cms in diameter were fixed in a symmetrical pattern and numbered from 1 to 12. One hour after drug administration mice were placed one at a time on the left hand corner of the instrument.

The experiment was conducted in dimly lit area and each mouse was observed for 5 minutes. The number of each tunnel entered by the mouse in each minute was noted. From this total number of tunnels entered and entry into different tunnels during the first minute and five minutes

TABLE 1
Details of the test drugs

Sanskrit name	Botanical name	Family	Guṇa	Part used
Jaṭāmāmsi	*Nardostachys grandiflora*	Valerianaceae	Samñjāsthāpana	Rhizome & oil
Aśvagandha	*Withania somnifera*	Solanaceae	Balya bṛmhana viṣaghna (Ca) Śothahara ropana (Su)	Roots
Pārasīkayavāni	*Hyoscyamus niger*	Solanaceae	-	Dried leaves with flowering tops, seeds

of observation period was calculated. The number of different tunnels entered during the first minute of observation period and during the entire observation period was considered as the index of exploration (Shillito E. (1970), Br. J. Pharmac. 40, 113).

D-amphetamine induced stereotypy test in mice:- The effect of test drugs on D-amphetamine induced stereotypy was observed as follows. Test drugs administered one hour prior to D-amphetamine injection (5 mg/kg) and stereotypy behaviour was assessed at 20 min, 40 min, 60 min and 90 minutes after amphetamine administration (injected through intraperitoneal route). Stereotypy scored as per Valame and Gupta (1981) as follows:

Score 0 No stereotyped behaviour

Score 1 Moderate and non-continuous sniffing, grooming, rearing, licking or biting and responsiveness towards the experimenter.

Score 2 Moderate intensity and continuous sniffing, grooming, licking, biting, rearing and slight responsiveness towards the experimenter.

Score 3 High intensity and continuous sniffing, grooming, rearing, licking and biting. No responsiveness towards experimenter.

Peak stereotypy behaviour in each mouse was noted. The mice administered with tap water served as control group [Valame S.P., Gupta K.G., (1981) Ind. J. Pharmac. 13(2), 203].

Observations

The data pertaining to the effect of test drugs on 'exploratory behaviour' of albino mice is shown in Table 2. An apparent increase in number of different tunnels entered during first minute was observed in aśvagandha (110.52%) and pārasīkayavāni (65.41%) groups. A slight increase was noted in jaṭāmāmsi and Māmsyādi kvātha groups. None of the changes were statistically significant.

There was apparent increase in total number of tunnels entered during 5 minutes in Māmsyādi kvātha administered group (91.36%), pārasīkayavāni administered group (83.86%) as well as aśvagandha administered group (65.1%) and a slight increase was observed in jaṭāmāmsi administered group. The observed increase in all the groups were not statistically significant.

In third parameter i.e., number of different tunnels entered during 5 minutes, slight decrease was noticed in jaṭāmāmsi administered group (33.6%). There was marked increase in number of different tunnels entered during 5 minutes in the pārasīkayavāni administered group (100%),

TABLE 2
Effect of test drugs on exploratory behaviour of albino mice [chronic study]

Group	Dose (mg/kg)	Mean ± SEM		No. of different tunnels entered during five minutes
		No. of tunnels entered during first minute	Total no. of tunnels entered during 5 minutes	
1. Control	80	1.33 ± 0.614	5.33 ± 2.49	2.5 ± 1.335
2. Jaṭāmāmsi	80	1.66 ± 0.614	4.16 ± 2.797	1.66 ± 1.475
3. Aśvagandha	80	2.8 ± 0.66	8.8 ± 2.989	3.4 ± 0.447
4. Pārasīkayavāni	80	2.2 ± 0.734	9.8 ± 2.615	5 ± 2.549
5. Māmsyādi kvātha	80	2.0 ± 0.447	10.2 ± 2.989	4 ± 1.048

Māmsyādi kvātha administered group (60%) and aśvagandha administered group (36%). The changes were not statistically significant.

Data pertaining to the effect of test drugs on D-amphetamine stereotypy are presented in Table 3. All the test drugs i.e. jaṭāmāmsi, aśvagandha, pārasikayavāni and māmsyādi kvātha produced highly significant reduction ($P<0.001$) in D-amphetamine induced stereotypy.

Discussion

Anti amphetamine stereotype test was employed as the primary screening test for antipsychotic activity. Assessment of effect on exploratory behaviour was also undertaken. All the three ingredients and the test formulation produced significant inhibition of D-amphetamine stereotypy in mice. This suggests that they possess antipsychotic activity. However, they did not support exploratory behaviour in mice significantly.

D-amphetamine produces its stimulant effect on CNS by mainly releasing nor-adrenaline in brain. It also releases Dopamine and 5-hydroxy-tryptamine. Besides it inhibits reuptake of dopamine. At higher doses it has direct stimulant effect on central aminergic receptors. Administration of amphetamine causes exacerbation of schizophrenia, which is due to modulation of dopamine activity. In CNS at least two types of Dopaminergic receptors i.e., DA1 and DA2 have been identified. Considering that the test drugs produce significant anti-amphetamine activity, it can be suggested that they contain active principles that may interfere with Dopaminergic receptors. Based on the result it can be suggested that the test drug possesses anti psychotic activity but differs from the classical neuroleptics in that they do not suppress exploratory behaviour.

TABLE 3
Effect of test drugs and D-amphetamine induced stereotypy in albino mice

Group	Dose (mg/kg)	Peak intensity score (Mean + SEM)
1. Control	80	1.534 ± 0.09
2. Jaṭāmāmsi	80	0.548 ± 0.075*
3. Aśvagandha	80	0.53 ± 0.062*
4. Pārasīkayavāni	80	0.77 ± 0.058*
5. Māmsyādi kvātha	80	0.743 ± 0.058*

* $p < 0.001$

Conclusion

- Māmsyādi kvātha possesses anti psychotic activity.
- The anti psychotic activity is due to specific concentrations of individual components, a systematic processing technique and appropriate dosage administered.

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STRYCHNOX NUX-VOMICA (KUCALA) - PHARMACODYNAMIC ACTIONS AND INDICATIONS - AN OVERVIEW

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Abstract: *Strychnox nux-vomica*, an Indian herb, has been extensively studied in modern medicine and Indian system of medicine for the treatment of various ailments including functional forms of paralysis, gastrointestinal diseases like constipation, diarrhea and incontinence of urine. This paper discusses the effect of nux vomica in different ailments. The chemical composition, action, uses, doses, pharmacodynamics of strychnine and brucine has also been studied.

Introduction

Kucala (*Strychnox nux-vomica*) belongs to Loganaceae family, is a moderate-sized tree, with a short, pretty thick, often crooked trunk. Branches irregular, covered with smooth, ash-coloured bark; flowers small, greenish-white, funnel-shaped, in small, terminal cymes, with a disagreeable odour; fruit berry, round, about the size of a large apple, covered with a smooth, hard rind, of a rich-orange colour when ripe, and filled with a white, soft, gelatinous pulp; seeds nidulant, discoidal, with a central prominence, covered with a fine woolly substance, but whitish and hard like horn internally (Fig I a&b).

The nux vomica tree inhabits India, along the Coromandel coast, Ceylon and other parts of the East Indies. The wood is exceedingly bitter, especially that of the root, which is said to cure intermittent fevers and bites of venomous snakes.

The *Lignum colubrinum*, or snake-wood, which is generally referred to as the *Strychnos colubrina*, is also derived from the nux vomica wood. The bark contains a large proportion of brucine and some strychnine and is said to be identical with the false aṅgustura bark. The seeds are the parts used in medicine. Nux vomica is about 25 mm in diameter, orbicular, grayish or greenish-gray; soft-hairy, of a silky lustre, with a slight ridge extending from the center of one side to the edge; internally horny, somewhat translucent, very tough, with a large circular cavity, into which the heart-shaped, nerved cotyledons project. It is inodorous and persistently bitter.

The seeds are difficult to be powdered. Edinburgh Pharmacopoeia directs an efficient method, according to which, the seeds are to be softened well with steam and then sliced, dried, and ground. By another process, the seeds may

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be dried whole for a few days in a drying oven and, after breaking them into fragments, dried again in warm air and powdered. The powder has a fallow-gray colour, bitter taste and a peculiar odour similar to that of liquorice. Concentrated sulphuric acid blackens it; nitric acid renders it a deep, orange-yellow colour. Hot water and diluted alcohol dissolve the bitter, active ingredients; the last solvent acts most energetically. Ether takes up a concrete oil and some wax. The aqueous decoction is of a pale, grayish-yellow colour, and intensely bitter, and becomes orange-yellow on the addition of nitric acid, and emerald-green by sesquioxide of iron, the colour disappearing on the addition of hydrochloric acid. Tannic acid, or infusion of nutgalls, produces in the aqueous decoction a copious precipitate.

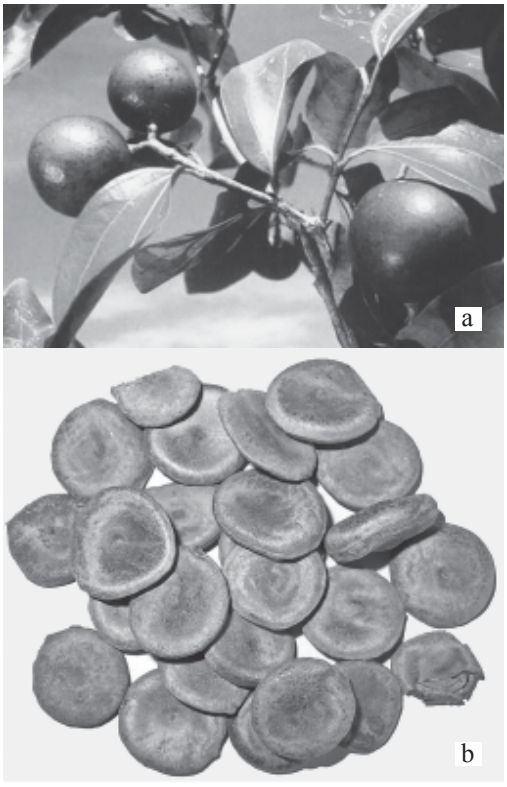

Fig. I a&b - *Strychnox nux - vomica*
a Fruits **b** Seeds

Chemical composition

The chief constituents of nux vomica are strychnine and brucine, both existing in combination with igasuric acid, a tannic principle identical with caffeo-tannic acid. A crystallizable glucoside (loganin, $C_{25}H_{34}O_{14}$) was discovered by Dunstan and Short, in the pulp surrounding the seeds, the dried pulp containing between 4 and 5 per cent. Loganin was also found in the seeds in small amounts. When boiled with diluted acids, it splits into glucose and loganetin.

Loganin is readily dissolved by alcohol or water, but is less soluble in ether, chloroform and benzene. A third alkaloid, igasurin, according to Shenstone, is probably nothing but impure brucine. The seeds also contain a fatty substance (3 to 4%), yellow colouring matter, nitrogenous matter (11%), gum, sugar, and about 1.5% of ash. The amount of total alkaloids in the seeds, usually containing strychnine and brucine in about equal proportions, has been found to vary from about 2 to 5%. Dunstan and Short found specimens of Ceylon nux vomica especially rich in alkaloids, the latter amounting on an average to 1.7% of strychnine and 3.2% of brucine; the total amount in one instance was 5.34%.

Action - pharmacodynamics

Strychnine

Strychnine ($C_{21}H_{22}N_2O_2$ = 331.73) is an alkaloid derived from the dried ripe seed of *Strychnox nux - vomica*.

Central nervous system: - Strychnine remarkably heightens synaptic conductivity in

the anterior columns of the spinal cord, extending motor response and disrupting normal co-ordinating influences. It also greatly intensifies sensory irritability. It increases cerebral reflexes, especially those of the special senses.

Muscular system: - Strychnine has no direct action on voluntary muscles, but indirectly stimulates involuntary muscles.

Respiration: - Strychnine slightly quickens and deepens respiration when administered in small doses. Poisonous doses produce asphyxia by spasm of respiratory muscles. Heart is not affected directly.

Blood pressure: - Strychnine stimulates the vasomotor centers, raising slightly the blood-pressure through constrictor action in the splanchnic area which is not offset by the peripheral dilatation.

Alimentary tract: - Strychnine stimulates the flow of saliva; Metabolism - Oxidation is augmented by strychnine; temperature is slightly increased from the advanced oxidation; absorption takes place rapidly from the alimentary tract and from the subcutaneous tissues; excretion is mainly via kidneys, and is much prolonged (2 to 8 days), though the greater part is eliminated in few hours; tolerance is not acquirable in fact, susceptibility to strychnine action seems to incease with its use.

Brucine ($C_{23}H_{26}N_2O_4+4H_2O$)

Brucine was discovered by Pelletier and Caventou in 1819 from false aṅgustura bark (formerly thought to be the bark of *Brucea antidysenterica*, Miller - hence the term brucine). It is obtained as a by-product in the preparation of strychnine from the bark and seeds of nux vomica. Shenstone (loc. cit.) prepared it pure by converting the base (contaminated with small amounts of strychnine) into the hydriodide, and recrystallizing the latter from alcohol repeatedly. Brucine slowly crystallizes in colourless, transparent, oblique, 4-sided prisms, or by rapid evaporation in pearly scales. It is odourless, intensely and persistently bitter, slightly efflorescing in the air, and fusible a little above 100° C. (212° F.). When anhydrous, it is soluble in alcohol (1.5 parts), chloroform (7 parts), and glycerin (70 parts), in 850 parts of cold water, and 500 parts of boiling water; the hydrous alkaloid ($4H_2O$) is soluble in 320 parts of cold and 150 parts of hot water and in aqua ammoniae; sparingly soluble in fixed and volatile oils, and insoluble in ether. Brucine forms crystallizable salts with acids. In chlorine water brucine entirely dissolves, assuming a rose colour, which ammonia converts to a dirty yellow. Nitric acid dissolves it, also with decomposition, forming a deep rose-scarlet or blood-red colour, which, on warming, becomes yellow; if stannous chloride is now added a purple-violet colour and precipitate is formed. This behavior toward stannous chloride distinguishes brucine from morphine.

Strychnine can be quantitatively separated from brucine by Gerock's process, which consists in converting the mixture of strychnine and brucine into picrates, and warming with nitric acid of specific gravity 1.056, which destroys the picrate of brucine only. Brucine may likewise be destroyed in its mixture with strychnine by merely warming it for half an hour with nitric acid of the strength mentioned.

Indications

Asthmatic paroxysm

M. Homolle has recommended nux vomica in asthmatic paroxysm and in suffocative catarrh,

as both in these affections, the difficulty lies in a want of proper contractility of the bronchial tubes and that nux vomica operates by restoring this contractility.[1] In asthma, nux vomica does good by affecting the nervous centres as to overcome the existing spasm of the tubes; and in suffocative catarrh, by giving increased tone to the mucous membrane, and thereby checking excess of secretion poured out from the relaxed vessels.

Erectile dysfunction

Seeing the effect of nux vomica in producing erections, and exciting the venereal propensity, M. Trousseau conducted a trial in defect of the generative function and found it useful in impotence in both sexes[2].

Nux vomica is indicated in sexual atony, as a remedy for impotence, spermatorrhoea, sexual frigidity in the female, etc. It has been recommended especially when erectile dysfunction is caused by excessive alcohol, cigarettes, or dietary indiscretion. In amenorrhoea it serves well with iron if there is weakness, constipation, anemia and torpor. It is also indicated when in dysmenorrhoea, the discharges are premature and associated with cramps and chilliness; or in menstrual colic with sharp, cramp-like pain and marked atony. Small doses benefit leucorrhoea with a heavy, yellow discharge, and great torpor of the system.

General nervous debility

Nux vomica is effective in general nervous debility manifested by tremulousness and unconnected with positive cerebral lesion particularly when dependant on intemperate drinking, abuse of opium, or excess in sexual indulgences, and in patients endeavouring to regain health after abstinence. If the indulgences referred to above are not abandoned, any apparent good arise from it might be temporary or do harm by further exhausting the excitability of the centres.

Paralysis

The keynote to its use is *atony*. It is said to be more beneficial in general paralysis and paraplegia than in hemiplegia, and also in local paralyses, as of the bladder, in amaurosis, impotence, spermatorrhoea, tremor of the muscles produced by habitual intoxication, etc. It has also been beneficially employed in neuralgia, chorea, prolapsus of the rectum, borborygmi of females, colica pictonum, etc. A small quantity added to cathartics frequently increases their energy. Rheumatism, hysteria, mania and worms have been successfully treated by the use of this agent.

Atony of the gastrointestinal tract

Nux vomica is effective in atony of the GI tract, where symptoms like irritation or inflammation, enfeebled spinal innervation; pallid tongue; nausea or vomiting, a yellow or sallow circle in the month; a yellow, pasty coating upon the tongue; yellowness of the conjunctiva; pain or fullness in the hepatic region; pain in shoulder, etc. are manifested. When nausea is due to irritating material in the stomach, nux vomica will not be apt to relieve, but if due to simple atony, it is a positive agent. Used as indicated above, it is very valuable in cholera infantum, cholera morbus, asiatic cholera, constipation, chronic dysentery, diarrhoea of atony, nervous debility of the stomach, the gastric irritability of the dipsomaniac (with good food and capsicum), and in chronic non-inflammatory infantile diarrhoea.

Constipation due to atony

It is especially used in obstinate and habitual constipation due to atony. Intake of a drop of

nux vomica in a glass of cold water in the early morning before going to toilet is very effective. Nux vomica relieves constipation due to spasmodic conditions of the bowels, and to some extent, that arising from the effects of lead. It relieves morning sickness in pregnancy, hysteria and phthisis pulmonalis. In chronic dyspepsia of an atonic character, or associated with dilatation, or flatulent distension, it is one of the best remedies. Drop doses are of great benefit in the dyspepsia of inebriates.

Eye disorders

Nux vomica has been indicated in amblyopia (caused by excessive use of tobacco or alcoholics), in nervous affections of the lids and in muscular asthenopia (Foltz). This is indicated where atony of the general system contributes toward the aggravation of eye and ear disorders. It often aids in the cure of conjunctivitis and phlyctenular keratitis. It is of some value in choroiditis. In purulent otitis media with general lack of tone, this is the best remedy (Foltz).

Urinal incontinence

Nux vomica is of great effect in urinal incontinence of children, when not due to irritation, and the same in the aged when due to a relaxed or paralyzed sphincter with feeble circulation. It is effective in paralytic retention of urine, catarrh of the bladder, uterine inertia and is said to lessen the liability to post partum hemorrhage.

Liver disorders

In stomach and liver disorders, there is always a feeble and sluggish circulation, and enfeebled spinal and sympathetic innervation. These conditions can overcome by nux vomica more quickly. Nux vomica is more largely used in disorders of the gastro-hepatic tract than strychnine, while strychnine is generally preferred in nervous, sexual, and bladder disorders. Nux vomica frequently acts as a sedative and antiperiodic. Thus it has been proved useful when nerve force was low, as in typhoid fever, and in asthmatic seizures, in both of which there was impaired spinal enervation and difficulty in breathing.

Poisonous symptoms

In poisonous doses, nux vomica produces violent tetanic convulsions, without impairing the functions of the brain, with asphyxia and death. When given in doses sufficiently large to influence the system, a sensation of debility and heaviness is experienced, the spirits become depressed, the limbs tremble, and a slight rigidity or stiffness comes on when it is attempted to move.

Dose

Nux vomica and its alkaloids should always be given by the physician with great care closely observing its effects.

The dose of powder: - ½ grain to 5 grains, three or four times a day, and gradually increased to 10 or until a slight influence is observed as indicated. Specific nux vomica, tincture, or alcoholic extract, are the best forms of administration.

The dose of extract:- From 1/15 to 1/20 of a grain as a tonic; and in paralytic affections from 1/2 grain to 2 grains in the form of a pill, and, as with the powder, gradually increased.

The saturated tincture doses:- From 5 to 30 drops, likewise gradually increased.

Contraindications

1. Though usually contraindicated by congestion, it is a remedy for hepatic and splenic congestion, or other parts supplied by the coeliac axis.
2. Urinal incontinence due to irritation.

3. Paralysis by the hemorrhage in the nervous centers or inflammatory condition in them.

Conclusion

Based on the main findings detailed above, *Strychnox nux-vomica* will lead to a promising treatment of various nervous diseases and other medical conditions due to atony like gastrointestinal diseases, constipation, diarrhea; and incontinence of urine, in eye disorders, etc.

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CLINICAL MANAGEMENT OF PĀṆḌU IN ĀMAVĀTA

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Abstract: Chronic iron deficiency anaemia (pāṇḍu) is very common in patients suffering from Rheumatoid arthritis (āmavāta). It is probably due to two reason: i) chronic gastrointestinal blood loss from anti arthritic medication and ii) the medulary causes or bone marrow changes in patients with prevent release of iron. With this back ground, a clinical study was conducted to evaluate the efficacy of a compound formulation Yogarāja in the treatment of pāṇḍu in āmavāta.

Introduction

Rheumatoid arthritis is such type of problem that belongs to immunological arthropathy, and in āyurveda, it is very much nearer to āmavāta.

Āmavāta is a clinical condition presenting the syndrome of āma and vāta. Initially the disease starts at the G.I. tract level, while the symptoms manifest in the articular, periarticular and extra articular areas. Jvara (fever), aruci (anorexia), vibandha (constipation), aṅgamarda (body-ache), ajīrṇa (indigestion), pāṇḍu (anaemia), etc. come under extra articular manifestation of the disease. Both western medical science as well as āyurveda gives maximum emphasis pointing out the relation between periodic fluctuations of disease as well as presence of pāṇḍu in patients of āmavāta.

Aims and objectives:- 1) To evaluate the efficacy of a compound formulation Yogarāja in the treatment of pāṇḍu in āmavāta and 2) To observe the said herbomineral formulation through clinical and haematological parameters.

Materials and method

Selection of cases: - Patients presenting with features of āmavāta with pāṇḍu, between 10-70 years of age, irrespective of sex and religion were selected from the OPD and IPD of Gopabandhu Ayurveda Mahavidalaya and Hospital at Puri, Odisha.

After clinical evaluation the patients were confirmed by the following hematological, biochemical and radiological tests.

Hematological test: - i.) Routine - Hb%, TC, DC, ESR; and ii.) Special - R.A factor, total serum iron estimation, renal profile i.e. urea and creatinine (to exclude renal anemia).

Routine test: - Stool examination for microscopic and macroscopic.

Radiological test: - Skiagraphy of the affected

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joints in selected cases only.

Exclusion criteria

Patients of āmavāta (R.A) with co-morbid condition like diabetes mellitus, peptic ulcer, leukemia, thalassaemia, bleeding piles, ischemic heart disease, heart failure, malignancy, chronic renal failure along with pregnancy and lactating mothers were excluded.

Inclusion criteria

The patients were selected on the basis of the features of pāṇḍuroga i.e. i) patients having dyspnoea, ankle odema and palpitation, ii) complain of general weakness, iii) general anemic appearance, iv) history of positive R.A. factor, v) Hb% below 10gm%, vi) R.B.C count below 3 million/cu.mm and vii) pallor of the mucus membrane of the mouth, conjunctiva, nails and skin creases.

Selection of drug

Yogarāja, a compound formulation, has been referred to in the chapter of Pāṇḍurogacikitsa (16/80-86) of Carakasamhita. It is a herbo-mineral formulation in the form of pill. It has a wide range of activities like dīpana, pācana, recana associated with bactericidal, haematinic, antipyretic, anti-poisonous and rasāyana properties. The drug is to be prescribed considering the digestive capacity (agnibala) of the patient.

Grouping, dose and duration

Total 50 patients were selected and divided into two groups: i) Trial group, consisted of 40 patients, treated with tablet Yogarāja (500mg) orally twice daily (16mg /kg body weight approx.) in empty stomach - morning and evening with honey for 45 days; ii) Control group, consisted 10 patients, treated with a standard heamatenic tab Ferrous sulphate given orally (200mg) twice daily after major meal for 45 days.

Assessment criteria

Description of clinical grade scale: - The scoring of presenting clinical features in terms of severity in patients of pāṇḍu in āmavāta is shown in Table 1.

Observation and result

The Mean (±SEM) value of hematological improvement of both trial and control groups are shown in Table 2. The over all percentage of relief of trial formulation is shown in Table 3.

Adverse effect: - No untoward effect was observed during the time of therapeutic trial.

Discussion

Presence of pāṇḍu in āmavāta giving rise to many added symptoms like joint swelling, recurrence of attack and poor muscle strength and vitality. Yogarāja is a herbo-mineral formulation with a large therapeutic action like haematinic, antipyretic and immuno-modulator

TABLE 1
Gradation of signs and symptoms

Sign & symptoms	Gradation
1. Palpitation	
- No palpitation on usual activity	0
- Occasional on heavy exertion	1
- On heavy exertion	2
- On light exertion	3
- During rest	4
2. Dyspnoea	
- No	0
- Occasional on exertion	1
- On walking upstairs/quick moving	2
- On light physical activity	3
- On bed	4
3. Fatigue	
- No	0
- Occasional on heavy activity	1
- Constant on heavy activity	2
- Occasional on light activity	3
- All the time	4

Cont....

Sign & symptoms	Gradation
4. Vertigo	
- No	0
- Occasional on heavy activity	1
- On heavy activity	2
- Oon light activity	3
- All the time	4
5. Weakness	
- No	1
- Occasional in normal activities	2
- Persistent in normal activities	3
- Occasional in heavy activities	4
- In rest	
6. Pāṇḍuta/waxy pallor	
- No	0
- On artificial light	1
- On day sunlight	2
- On bright sunlight	3
- On common/any light	4
7. Ankle oedema	
- Absent	0
- Intermittent	1
- Persistent	2
- Persistent ankle with paedal oedema	3
- Persistent ankle, paedal & facial oedema	4
8. Brittle hair and nails	
- Shiny (no abnormality)	0
- Dry	1
- Dry and rough hair with thin nails	2
- Dry and rough hair with thin and brittle nails	3
- Dry, rough and colour changed hair with spooning nails	4
9. Smooth tongue	
- Good papillated tongue	0
- Partially de-papillated	1
- Totally de-papillated	2
- Totally depapillated & small ulcerated	3
- Totally depapillated with big ulcerated	4
10. Chelosis/fissures	
- No at the corners of mouth	0
- Presence in either side of the corner	1
- Presence in both the angles of mouth	2
- Presence in either side of the corner and involvement of buccal mucous membrane	3
- Presence in any both sides of the angle of mouth and involvement of buccal mucosa	4
11. Loss of appetite	
- Very good	0
- Irregular appetite (alternate good & poor appetite)	1
- Persistent poor appetite	2
- Persistent very poor appetite	3
- Complete loss of appetite.	4
12. Pain in joints	
- Absent of joint pain	0
- Symmetrical multiple joint pain in upper and lower limb joints	1
- Involvement of both upper and lower limbs pain along with any lower limb jts.	2
- Both upper and lower limbs joint pain	3
- Both upper and lower limb joints including T.M.J, some spinal joints and sacro- iliac Joints	4
13. Cardiac murmur	
- No cardiac murmur on auscultation in mitral area	0
- Increase intensity of murmur in the mitral area	1
- Too much increase of murmur in the mitral area	2
- Too much increase of murmur in both mitral and tricuspid areas	3
- Too much increase of murmur in all four auscultator areas	4
14. Painful swelling in big and small joints	
- Absence	0
- Less than five in big and small joints	1
- More than five but less than ten joints	2
- More than ten	3
- More than ten along with constitutional symptoms	4
15. Puffiness of face	
- Absence	0
- Puffy and pale face	1
- Puffy, pale and lower eyelids swelling	2
- Puffy, pale and swelling around the orbit	3
- Puffy, pale and swelling around the orbit along with pedal oedema	4

TABLE 2
Hematological improvement in both the groups

Objective criteria	Trial Group		Control/standard Group	
	BT	AT	BT	AT
Hb% g/dl	7.61 ± 0.19	10.63 ± 0.18*	10.10 ± 0.27	10.95 ± 0.30
ESR (mm/hr)	61.25 ± 3.55	21.95 ± 0.886*	80.70 ± 2.67	57.50 ± 2.60
TRBC (million/cmm)	4.39 ± 0.11	5.33 ± 0.76*	5.26 ± 0.61	5.68 ± 0.51
TWBC (thousand/cmm)	7895.0 ± 333.81	9170.00 ± 156.98*	9755.0 ± 288.71	9755.00 ± 288.71
PCV (cmm/100ml)	33.35 ± .853	40.27 ± 0.525*	30.00 ± 0.816	36.60 ± 0.653
T Sr. Iron (microgm/100ml)	44.10 ± 1.45	77.85 ± 2.10*	63.20 ± 2.72	82.50 ± 3.69
Rh factor (iu/ml)	29.45 ± 1.31	25.27 ± 0.93*	35.30 ± 1.88	28.0 ± 0.51

Values are - Mean ± SEM; Trial group sample n= 40, Std control group sample n=10; Objective data analyzed by 't' test**; *** level of significance <0.00

TABLE 3
Over all % of both in trial and control group

Group	No. of patient	% of relief			
		Max.	Mod.	Min.	No
Trial	40	78.5	12.5	7.5	1.5
Control	10	17.33	19.33	27.33	36

properties. It probably corrects the two important pathophysiologic changes of the disease i.e. śrotorodha and vyādhikṣamatva-hrāsa. It is effective both in pāṇḍu and āmavāta. So, treatment of pāṇḍu in āmavāta by Yogarāja minimises joint swelling, infuse energy, increase vitality, prevent periodic fluctuation and increases muscle strength; and improves Hb%, lowers E.S.R level, increases serum iron level and R.B.C counts in hematological parameters significantly.

Conclusion

It can be concluded that the magnitude of the problem is āmavāta in chronic stage (jīrṇāvastha) precipitated anaemia i.e. pāṇḍu, thus invites attention to treat both. The present endeavor is pinpointed upon to evaluate the efficacy of a herbo-mineral formulation to work against both pāṇḍu and āmavāta.

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CARAKA'S VIEW OF ROGABALA AND ROGI BALA PARĪKṢA IN THERAPEUTIC MANAGEMENT

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Abstract: Caraka describes navavidha, daśavidha, dvādaśavidha and trayodaśavidha methods to assess the strength of a disease and patient, and thereby proper planning of the treatment. Prakṛti, vikṛti, sāra, samhanana, pramāṇa, satva, sātmya, āhāraśakti, vyāyāmaśakti and vaya are described under daśavidha parīkṣa. Caraka mentions that factors viz. doṣa, bheṣaja, deśa, kāla, bala, śarīra, sāra, āhāra, sātmya, satva, prakṛti, agni and vaya, must be taken into consideration before planning samśodhana, samśamana and laṅghana therapies. These factors are scattered in Carakasamhita with reference to its wider application in respect to the principles of the treatment. Here, an effort has been made to describe these points systematically for easy understanding of the concepts.

Introduction

In order to ascertain the strength and intensity of the morbidity, the patient should be examined in respect of prakṛti (constitution), vikṛti (morbidity), sāra (excellence of dhātus), samhanana (compactness of organs), pramāṇa (measurements of the organs of the body), sātmya (suitability), satva (psychic conditions), āhāraśakti (power of intake/digestion of food), vyāyāmaśakti (power of performing exercise) and vayas (age). Thus depending upon the above mentioned factors viz. prakṛti, sāra, etc. (except vikṛti) the strength of individuals can be classified as superior, mediocre and inferior. Three types of strength of doṣas are inferred from three types of intensity of morbidity. Thereafter, depending upon the nature of the doṣas involved, three types of medicaments viz. strong, mild and moderate should be administered. With a view to ascertain the life span of an individual, symptoms described in Indriyasthāna and also in the 8th chapter of Śārīrasthāna must be taken into account. Ten-fold examinations should be done to get an overview of the person in order to carry out the treatment scientifically and methodically to get a desirable result. Vikṛtiparīkṣa helps to elicit the strength of diseases viz. pravarabala (severe strength), madhyamabala (moderate strength) and avarabala (mild strength)[1]. The following examination tools are described for successful administration of principles of therapeutics and they help to assess the strength of the patient as well as the disease.

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1. Navavidha parīkṣa (nine-fold examination):- The following factors must be considered for successful administration of nirūha basti i.e. doṣa, auṣadha, deśa, kāla, sātmya, agni, satva, vaya and bala[2].
2. Daśavidha parīkṣa (ten-fold examination):- These are prakṛti, vikṛti, sāra, samhanana, pramāṇa, sātmya, satva, āhāraśakti, vyāyāmaśakti and vaya[3].
3. Dvādaśavidha parīkṣa (twelve-fold examination):- Doṣa, bheṣaja, deśa, kāla, bala, śarīra, sāra, āhāra, sātmya, satva, prakṛti and vaya[4].
4. Trayodaśa parīkṣa (thirteen-fold examination):- Doṣa, bheṣaja, deśa, kāla, bala, śarīra, sāra, āhāra, sātmya, satva, prakṛti, agni and vaya[4].

Prakṛtiparīkṣa

It is the inherent characteristic properties of an individual that refers to the genetically determined physical and mental makeup; and which is determined by (a) sperms and ovum (b) season and condition of the uterus (c) food and regimens of the mother and (d) nature of mahābhūtas comprising the foetus. Doṣas dominating the sperms and ovum during the time of conception and also those inhabiting the uterus at that time, determine the prakṛti of an individual. The doṣas that ultimately emerge as dominant factors actually determine the prakṛti. Seven types of prakṛti have been described viz. vātaja, pittaja, kaphaja, vāta-pittaja, vāta-kaphaja, pitta-kaphaja and sannipātaja and 16 varieties of mānasika prakṛti are described in the 4th chapter of Śārīrasthāna.

Kaphajaprakṛti

The following characteristic properties decide the kaphaja prakṛti:

Physical characteristics: - Unctuousness and smoothness of organs; firmness and roundedness of all organs; non slippery and stable gait with entire sole of the feet pressing against earth; firmness and compactness in joints; firmness, compactness and stability of the body.

Physiological and psychological characteristics:- Pleasing appearance; tenderness and clarity of complexion; increase in the quantity of semen; desire for sexual indulgence and number of procreation; slow in action, intake of food and movement and in initiating actions; getting irritated and morbid manifestations; lack of intensity in hunger, thirst, heat and perspiration; happiness in the look; happiness and softness of complexion and voice.

Due to the above characteristic qualities, a man having kaphaja type of constitution is endowed with the excellence of strength, wealth, knowledge, energy, peace and longevity.

Pittajaprakṛti

The following characteristics decide the pittajaprakṛti:

Physical characteristics: - Having hot face, tender and clear body; freckles, black moles, quick advent of wrinkles, greying of hair and baldness; presence of some soft and brown hair in the face, head and other parts of the body; looseness and softness of joints and muscles.

Physiological and psychological characteristics:- Intolerance for hot things, excessive hunger and thirst, sharp physical strength, strong digestive power, intake of food and drinks in large quantity, inability to face difficult situations, voiding of sweat, urine and faecal matter in large quantity, putrid smell of axilla, mouth, head and body in excess, insufficiency of semen, sexual desire and procreation.

Due to above characteristic qualities, a man having pittaja type of constitution are endowed with moderate strength, moderate span of life, moderate spiritual and materialistic knowledge, wealth and accessories of life.

Vātajaprakṛti

The following characteristics quality decides vātaja prakṛti:

Physical characteristics:- Unctuousness, emaciation and short body; light and inconsistent gait; unstable eyes, joints, eyebrows, jaws, lips, tongue, head, shoulder, hands and legs; abundance in tendons and veins; roughness in the hair of the head, face, and other parts of the body, nails, teeth, face, hands and feet.

Physiological and psychological characteristics:- Continuously rough, weak, low, adhered and hoarse voice and vigils, light and inconsistent action, food and movement; talkativeness, quick in initiating actions, getting irritated and the onset of morbid manifestation; quick in likes and dislikes; quick in understanding and forgetting the things, intolerance for cold things. Often getting afflicted with cold, shivering and stiffness, cracking of the limbs and organs and production of cracking sound in joints while moving.

Due to the above characteristics, a man having vātaja constitution are mostly possessed of strength, span of life, procreation, accessories of life and wealth in lesser quality.

Dvandvaja prakṛti

Individuals having constitution dominated by the combination of two doṣas are characterized by the combination of the manifestations of respective prakṛti.

Samaprakṛti

This person possesses all excellent qualities of all the three prakṛtis. It is due to equilibrium state of doṣas.

Mānasika prakṛti

The psyche is of three types: satva, rajas and tamas. Sātvika prakṛti person is said to be devoid of defects due to having beneficial fraction; whereas, rajas and tamas are defective because of the fractions of agitation and ignorance respectively.

Out of these three types of psyche, each one has got innumerable divisions due to relative degrees and variations in interaction of psyche and body according to species. Body follows psyche ands vice versa. Hence some of the types of psyche are described in detail in Śārīrasthāna[5].

Vikṛti parīkṣa

Morbid manifestations of the disease must be examined with respect to hetu, doṣas, dūṣyas, prakṛti, deśa, kāla, bala and lakṣaṇa. It is not possible to obtain knowledge regarding the intensity of the disease without determining the strength of the causative factors.

Pravarabala vyādhi:- Contributory factors (of diseases) such as doṣas, dūṣyas, prakṛti, deśa, kāla and bala of individual resemble that of the disease in quality, and the causative factors and symptoms are too strong and numerous, leads to the manifestation of pravarabala vyādhi.

Madhyamabala vyādhi: - If either of doṣas, dūṣyas, prakṛti, deśa, etc. has similarity in disease quality and causative factors or symptoms of the disease are of moderate nature, leads to manifestation of madhyamabala vyādhi.

Avarabala vyādhi:- Contributory factors (of the disease) like doṣa, dūṣya, prakṛti, deśa, kāla and bala of the individuals do not resemble that of

the disease in quality, and the causative factors and symptoms are too mild and less, leads to manifestation of avarabala vyādhi. Vikṛti parīkṣa also sheds light on the samprāpti ghaṭaka.

Sāraparīkṣa

There are 8 types of sāra viz. tvak, rakta, māmsa, meda, asthi, majja, śukra and satva.

Tvaksāra puruṣa

Physical characters: - Unctuous, smooth, soft, clear, fine, less numerous, deep rooted and tender hair along with lustrous skin.

Physio-psychological characteristics: - Endowed with happiness, good fortunes, power, enjoyment, intellect, knowledge, health, excitement and longevity and pleasure seeking.

Raktasāra puruṣa

Physical characters:- Ears, eyes, face, tongue, nose, lips, sole of the hands and feet, nails, forehead, genital organs are red in colour; beautiful and dazzling appearance along with unctuousness.

Physio-psychological characteristics: - These categories are endowed with happiness, great, genius, enthusiastic, tender; moderate strength and inability to face difficult situations and inability to face hot substance.

Māmsasāra puruṣa

Physical characters:- Stable, heavy, compact, beautiful, handsome and plumpness of temples, forehead, nape, eyes, cheeks, jaws, neck, shoulder, abdomen, axillae, chest; joints of upper and lower limbs being covered with flesh and concealed and well developed muscles observed all over the body.

Physio-psychological characteristics: - These individuals are endowed with forgiveness, patience, non-greediness, wealth, knowledge, happiness, simplicity, health, strength and longevity.

Medasāra puruṣa

Physical characteristics: - These categories possess abundance of unctuousness in complexion, voice, eyes, hair and head and other parts of body, nail, lips, urine and faeces.

Physio-psychological characteristics: - These individuals possess wealth, power, happiness, enjoyment, charity, simplicity and delicate habits. Their urine and sweat are unctuous, and are having pleasant voice.

Asthisāra puruṣa

Physical characteristics:- These people are characterized by robust heels, ankles, knees, fore-arms, collar bones, chin, head, joints, bones, nails and teeth.

Physio-psychological characteristics: - These individual are enthusiastic and active and are endowed with strong and firm bodies along with longevity.

Majjasāra puruṣa

Physical characteristics: - They are characterized by softness of organs, strength, unctuous, complexion and voice.

Physio-psychological characteristics: - This category possesses pleasant and deep voice and lustre endowed with longevity, strength, learning, wealth, knowledge, progeny and honour.

Śukrasāra puruṣa

Physical characteristics:- It is characterized by gentleness, gentle look, having eyes as if filled with milk and cheerfulness; teeth which are unctuous, round, strong, even; beautiful and dazzling appearance; large buttocks; clean and unctuous complexion and voice.

Physio-psychological characteristics: - These

individuals are loved by women having robust strength, endowed with happiness, power, health, wealth, honour and children.

Satvasāra puruṣa

These individuals possess excellence of mental faculties and characterized by good memory, devotion, greatfulness, wisdom, purity, excessive enthusiasm, skill, courage, valour in fighting, absence of sorrow, walks in proper gait, depth of wisdom and sincerity in action and virtuous acts.

Sarvasāra puruṣa

They are having excellence of all essence and are endowed with great strength and happiness, resistance to difficulties, self confidence in all enterprises, virtuous acts, firm and well built body, correct gait, resonant, melodious and high pitched voice, happiness, wealth, slowness of aging process, resistance for disease, large number of children with similar qualities and longevity.

Samhanana parīkṣa

Patient must be examined with reference to his samhanana or compactness of body. (Samhanana, samhati and samyojana are synonyms.) According to this, the person possesses compact body and reflects the quality of the overall body built. Clinically patient may be assessed as pravara, madhyama and avara-samhanana depending on the compactness of body organs

Pravarasamhanana persons possess symmetrical and well demarcated bones, well knit joints, well bound muscles and blood, strong built and excellent strength. Madhyamasamhanana persons possess moderate body structure, joints, muscles, blood, built and strength. Avarasamhanana persons possess weak body structure, joints, muscles, blood, built and strength.

Pramāṇa parīkṣa

One should examine clinically the measurement of the individual's organs to understand the superiority, mediocrity and inferiority of anthropometry in response to his/her age and sex. A body possessed of organs having proper measurement is endowed with longevity, strength, ojas, happiness, power, wealth and virtues. If the measurement is either on the high/low side, individual possesses qualities contrary to what are mentioned above. It may be scientifically understood by body mass index (BMI).

Sātmya

It stands for such factors that are wholesome to the individual when continuously used.

Pravarasātmya:- Those for whom ghee, milk, oil and meat soup as well as the drugs and diets having all the six tastes are wholesome, and are endowed with strength, power of facing difficult situation and longevity are pravarasātmyas.

Madhyamasātmya:- If there is one and a combination in the above, they are madhyamasātmyas and possess moderate strength.

Avarasātmya:- Those who are accustomed to unctuous things and diets, having one particular taste and are mostly possessed of less strength, less resistance to face difficult situations; reduced span of life and of meagre accessories like drugs for the treatment are avarasātmyas.

Satva parīkṣa

Satva is mind and it regulates the body. Depending on their mental faculties it is classified as three types: pravara, madhyama and avara satva.

Pravarasatva: - Individuals, having mental faculties of superior types, come under this

category. They are having excellent mental faculties and are capable to bear stronger therapies without producing any harmful effect to the body; weak physique person having excellent mental faculties, tolerate serious exogenous and endogenous disease without many difficulties. These persons adopt same sort of feeling towards happiness and sorrow, tolerates and adjust to pain very well; remain under self-control due to predominance of satvaguṇa.

Madhyamasatva: - These persons have moderate mental faculties and are able to bear stronger therapies without producing harmful effects to the body. Predominant of rajoguṇa, tolerates others; weak physique person having moderate mental faculties tolerates serious exogenous and endogenous disease with much difficulties and tolerates/adjusts to pain moderately.

Avarasatva: - They are having inferior type of mental faculties. Neither themselves nor through others can sustain their mental strength. In spite of having a sound physique, they are susceptible to fear, grief, greed, delusion and ego. When they hear even stories describing wrathful, fearful, hateful, terrifying and ugly situations or come across visions of flesh or blood of an animal or man, they fall victims to depression, pallor, fainting, madness, giddiness of falling on ground or such events may even lead them to death. These persons tolerate and adjust to pain very badly and possess predominant tamoguṇa.

Āhāraśakti parīkṣa

This can be examined from two angles: abhyavaharaṇaśakti and jaraṇaśakti. Strength and life span of the individual are determined by diet capacity. It all depends on the condition of agni (digestive fire). That's why ācāryas defined the role of agni in manifestation or aggravation of disease. If an individual possesses a good digestive power then he will be able to sustain stronger therapies and as a consequence he will recover quickly from the afflictions. Strength of agni is classified into three categories depending upon their ability to perform work normally.

Uttamabala jaṭharāgni: - Persons having excellent power of ingestion and digestion of food are claimed to be healthy persons. Such kinds of persons are endowed with: health, longevity, vital breath, complexion, enthusiasm, well built, luster, immunity (ojas), temperature, full of joy, superior mental faculties and power of resisting any sort of difficulties.

Digestion of food if taken in large quantity is indicative of excellent agni. Other agnis (bhūtāgni and dhātvāgni) and vital functions, all are dependent on jaṭharāgni. This favours the development, strength, complexion and happiness as well as growth of tissues. Dhātus remain in their normalcy after receiving respective nutrients from metabolized food substances (full of essence of dhātus). As per season and age functions of agni differs i.e. during hemanta (winter) and yauvana (young age), it is powerful.

Madhyamabala jaṭharāgni:- Individuals having moderate strength of ingestion and moderate digestive fire are claimed to be moderately healthy. These persons are unable to digest properly when consumes large amount of food. Moderate medicaments may be prescribed for the effective management. These persons possess moderate strength, longevity and immunity.

Avarabala jaṭharāgni: - Persons of this category are unable to digest even small quantities of food. These persons suffers from diseases very often and are with less strength, longevity, immunity and unable to sustain stronger medicaments. Mild medicaments are required for the effective management and medicines should be administered for longer duration to recover from diseases. Agni is mild during rainy season and old age.

Vyāyāmaśakti parīkṣa

The patient should be examined with reference to his capacity for exercise which determines his ability to perform works, heavily physical exercise, etc. Strength of an individual is classified into three categories depending upon their ability to perform work normally: a) pravarabala vyāyāmaśakti parīkṣa (excellent power of exercise), b) madhyamabala vyāyāmaśakti parīkṣa (moderate power of exercise) and c) avarabala vyāyāmaśakti parīkṣa (mild power of exercise).

Vaya parīkṣa

Vaya (age) is defined as the state of body corresponding to the length of time that has passed since birth. Age is broadly divided into 3 stages: bālya (childhood), madhya (middle) and jīrṇa (old).

Bālya:- It is determined up to 16 years when the dhātus are immature, sexual characters are not manifested, body is delicate, un-enduring, with incomplete strength and predominant in kapha. In this stage, dhatus are in a developing stage and an unstable mind remains up to thirty years of age. Mild medicament may be employed.

Madhya: - This age is characterized by strength, energy, virility, powers, acquisition, retention, recollection, speech, understanding and qualities of all dhatus having the normal limit, with proper physical and mental strength, without degeneration in qualities of dhātus with predominance of pittadoṣa and is up to 60 years of age. Stronger medicament may be employed to gain success.

Jīrṇa: - This is up to one hundred years and more. There is diminution of: dhātus, power of sense organs, energy, and valour, power of understanding, retention, memorizing, speech and analyzing fact. There is gradual diminution in the qualities of dhātus and dominance of vātadoṣa. There are persons who live longer or shorter than that, in such cases, one should determine the three divisions of age on the basis of strength of the factor's like prakṛti, sāra, etc. (except vikṛti), and also characters of different periods of life span. This period should be handled carefully with mild and moderate medicaments because of delicate nature of the old age.

Different mode of examinations

Caraka describes navavidha, daśavidha, dvādaśavidha, and trayodaśavidha parīkṣas[5] and emphasises the following factors i.e. doṣa, bheṣaja, deśa, kāla, bala, śarīra, sāra, āhāra, sātmya, satva, prakṛti, agni and vaya to be considered before planning suitable therapeutics. After ascertaining the characteristic features of aetiology, premonitory symptoms, symptomatology, homologation, number, dominance, permutation and combination and temporal strength the physician should arrive at a correct appraisal of the measurement and specific characteristics of doṣas, drugs, etc. The differences in variations of these factors are to be kept in view at the time of treatment. The variations related to different factors are as follows:[6]

Doṣas: - The quantity of doṣas may either get caya (diminished) or vṛddhi (aggravated) or samatva (homeostasis). The doṣas may vary according to their ūrdhva (upward), adha (downward) or tiryak (sideward) movements or according to their location in śākha (periphery), koṣṭha (central) and madhyama (middle path). Doṣas may also vary as they are aggravated in their svadeśa (place of origin) or paradeśa (elsewhere) or as their aggravation svatantra (primary) or paratantra (secondary). The aggravation of a doṣa might vary in terms of its particular aspects. For example, aggravation of vāta might sometimes be mainly related to the aggravation of coldness, lightness, etc. Doṣas may also vary and accordingly they vitiate different dhātus. Similarly these doṣas might vary according to season, constitution of the patient and the dhātus affected.

Bheṣaja (drug): - The drug may vary in its effect as it is young, old, green, dry, combined with some other drugs and different forms of preparation. They also vary as they are effective for the doṣas of the body by virtue of their rasa (taste), vīrya (potency), vipāka (transformation) and prabhāva (specific action).

Deśa (place): - Places vary as they are marshy, arid, ordinary or most suitable.

Kāla (time):- Time may vary according to the change of seasons or as it is fore-noon, noon, afternoon, etc. or according to the periodicity of the diseases like the duration of fever for eight days, etc.

Bala (strength):-The strength of a patient may vary as it is inherent, acquired or effected by time (season, age, etc.). It might also vary as superior, mediocre or inferior.

Śarīra (body): - The body may be obese, compact or lean. It may also be differentiated according to the vital organs, eyes, etc. It may also understand as with full of essence or absence, and the body may be soft, hard or tender.

Āhāra (diet): - It may vary according to its nature, method of preparation, combination, quantity, etc. as described under aṣṭavidha āhāra viśeṣāyatana[7].

Sātmya (homologation): - It may vary depending upon the age and season, disease, constitution, nature and habits.

Satva (mind): - It may vary as it is associated with fear, grief, sorrow, happiness, etc. It differs as per involvement of satva, raja and tama characteristics. There are diseases in which mind is vitiated by bodily humours.

Prakṛti (constitution): - Seven varieties of śārīrika prakṛti and sixteen varieties of sātvika prakṛti (mānasika prakṛti) are described in detail.

Vaya (age):- Age is broadly divided into three types i.e. young (bālya), middle (madhya) and old (jīrṇa).

Sāra (essence):- To determine specific measures of the strength they are classified into eight varieties depending upon the sāra.

Agni (digestive and metabolic constituents) - It may be broadly classified as viṣamāgni, tīkṣṇāgni, mandāgni and bhasmakāgni as the pathological condition of the agni.

Conclusion

Pratyakṣa, anumāna, āptopadeśa and yukti are the tools which help to diagnose the diseases; whereas, navavidha, daśavidha, dvādaśavidha and trayodaśavidha tools help to understand the rogibala (strength of the patient both physically as well as mentally) and rogabala (strength of the disease). Considering this if a

physician plans therapy it becomes successful. For example, if the strength of the patient is good both mentally and physically and if he/she is suffering from severe disease then such patient must be treated with samśodhana therapy to eliminate excessively accumulated doṣas. If the strength of the patient is inferior and if he/she is suffering from severe disease then such patients must be treated carefully because to eliminate the excessive doṣas samśodhana is required but due to inferior strength of the patient it is not possible to plan samśodhana therapy, in such circumstances gradual elimination of doṣas must be planned.

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NOTION OF BHASMĪKARAṆA IN ĀYURVEDA - A STUDY ON SVARṆAMĀKṢIKA

Sudhaldev Mohapatra and C. B. Jha*

Abstract: In āyurveda, when herbs were the chief source of medicine, five basic dosage forms were used. Therapeutic uses of metals and minerals came into practice with the indigenous convertible techniques like śodhana and mārana. Absorbable and less toxic/non-toxic form of metals and mineral compounds are known as bhasma in āyurveda. In this article an attempt is made to explore the thought of bhasma in āyurveda with special reference to Svarṇamākṣika.

Introduction

Svarṇamākāika is a mineral with copper, iron and sulphur as the main components. To achieve proper dosages form, this mineral is subjected to different processes like śodhana, mārana, etc. This admissible form of metals/minerals is popularly known as bhasma in āyurvedic practice. The word 'bhasma' is formed by 'bhas' + 'manin' (*Bhasmani hu*) which means to sacrifice in ashes.

Bhasmīkaraṇa (incineration)

Bhasmīkaraṇa (māraṇa) is the chief process to convert the toxic and rocky materials into suitable absorbable form. Before māraṇa, the materials are subjected to śodhana (purification) and then to bhāvana with herbal extractives (like nimbūsvarasa, kumārīsvarasa, etc.) and minerals (like gandhaka, manaśśila, saindhava, etc.). These vary according to the material taken for the process. Then small discs/pellets (approx. 2cm x 0.5 cm) are prepared and dried. The dried pellets are kept inside the earthen sampuṭa [(one earthen casserole is set fit into the other casserole from mouth to mouth and joint is sealed by kapadmiṭṭi (rag and mud)]. The sampuṭa is dried and subjected for different puṭa systems of heating like mahāpuṭa, gajapuṭa, kukkuṭapuṭa, etc. according to the material taken. The procedure is repeated till obtaining the desired characteristics in the material as described in the texts.

Puṭa

Puṭa is the quantum and pattern of heating to achieve the desired medicinal property of a particular material. Irregular quantum of heat leads to damage of the medicines prepared[2]. During the puṭa, oxidation and reduction processes occur, which are responsible for the formation of a desired compound[3]. If the quantum of heat is more, the pellets become hard, which might reduce the material to the original form; and if the heat is less, proper reaction does not occur and may require more number of puṭa[4]. More over, puṭa is used to

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eradicate the possible impurities, to induce the novel quality and to convert the material (lauha/dhātu) into the ash form[5]. Puṭa converts the materials into bhasma having the properties of apunarbhava (unconvertible to original form), vāritara (too light to float over the water), rekhāpūrṇa (very small, to enter into the lines of finger), laghutva (light), vyāpti (quick assimilation), dīpana (increasing appetite in subject), and induces more quality to the original material[6].

Use of different drugs for māraṇa: - There are certain minerals which easily break the internal structure of the metals or facilitate its bhasmīkaraṇa process. These are termed as māraṇa drugs.

- Pārada is used as the māraṇa drug for all most all metals and minerals to achieve the best quality of bhasmas[7]. Gandhaka and mākṣika are also used[8], but the bhasma so prepared is inferior in quality than that of prepared by pārada[9].
- Some specific drugs for māraṇa of specific materials are: vaṅga (tin) - haritāḷa (orpiment); tākṣṇa lauha (iron) - hiṅguḷa (cinnabar); svarṇa (gold) - nāga (lead); nāga - manaśśila (realgar); tāmra (copper) - gandhaka (sulphur); tāra (silver) - mākṣika (chalcopyrite)[10].
- Certain herbal juices and decoctions are used as associating drugs which facilitate the pounding process and make the particles finer. Herbals are also used as the media of māraṇa process, though the class of bhasma so prepared is of average quality[11]. Usually these herbals are selected according to the disease in which the bhasma is indicated[12].

Material and methods

Genuine raw material (svarṇamākṣika) was

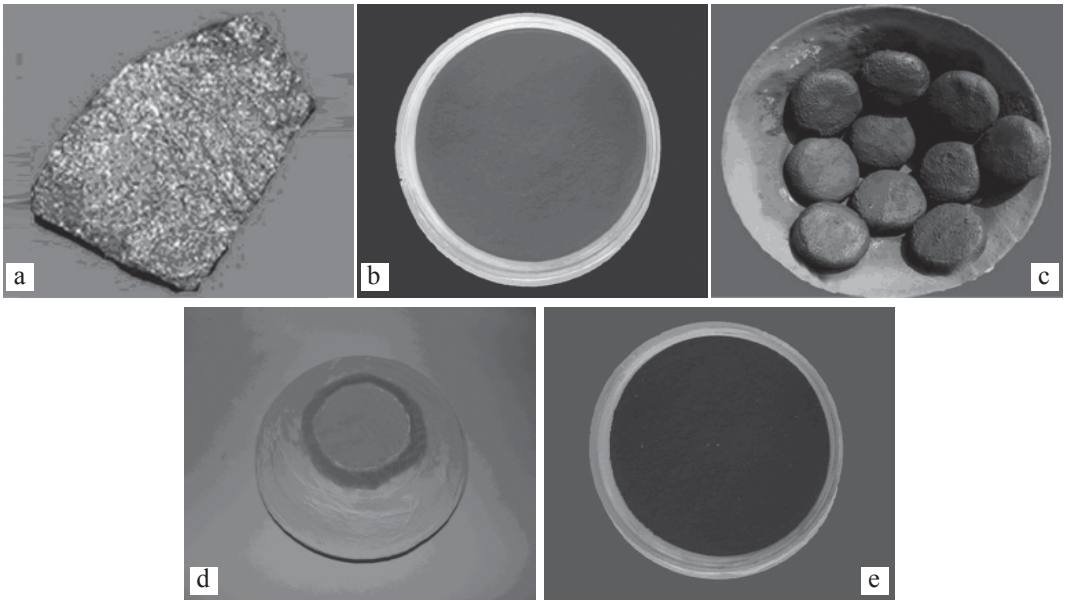

Fig. Ia-e: Different pharmaceutical stages of preparation of Svarnamaksikabhasma
a Raw material; **b** Sodhita material; **c** Sarava (earthen casserole) containing pellets; **d** Sarava samputa, ready for firing; **e** Prepared bhasma

collected from the Ayurvedic Pharmacy, Banaras Hindu University and processed in the Dept. of Rasasastra, IMS, BHU., Varanasi. Purified gandhaka was used as associated drug and lemon juice was used for bhāvana. The bhasma was prepared in 9 puta (4 kg cow dung cake was used for a single puṭa) and was examined by different parameters.[13] Different pharmaceutical stages of preparation of Svarṇamākṣika bhasma is shown in Fig Ia-e. Some puṭa and materials used in bhasmīkaraṇa[14] are given in Table 1. There are different tests described in the classics to ensure the quality of the prepared bhasma (Table 2). Svarṇamākṣika bhasma fulfilled all those parameters of the tests.

Bhasmīkaraṇa today

With the development of science and technology, the instruments have been modified so that it would be easier to prepare a bhasma without compromising with the traditional concept. Today, Electrical Muffle Furnace (EMF) is used to prepare bhasma quite easily and comfortably without harming the environmental factors. EMF makes the pharmaceutical processing quite easier because of its temeprature controlling device[15] (Fig. IIa-b).

Discussion

The significance of bhasmīkaraṇa/māraṇa (incineration) process are: i) conversion of metals into compounds or compounds into some other suitable compounds; ii) conversion of stony, hard and toxic materials into therapeutically potent medicinal form; iii) reduction of particle size of the initial material; iv) induction of organic quality into the inorganic material; v) induction of medicinal property into the toxic/ inert substances; vi) increasing of the essential trace element in quantity and quality into the final product.

The following features were observed in the material (svarṇamākṣika) due to incineration:

- The size of the material found to be reduced (raw svarṇamākṣika size - 6-8 micron; bhasma size - 1-2 micron)
- Conversion of compound into certain different compounds (raw svarṇamākṣika was characterised as chalcopyrite ($CuFeS_2$) through X-Ray diffraction study; bhasma was found to contain different compounds, chiefly Fe_2O_3, FeS, CuS and SiO_2)

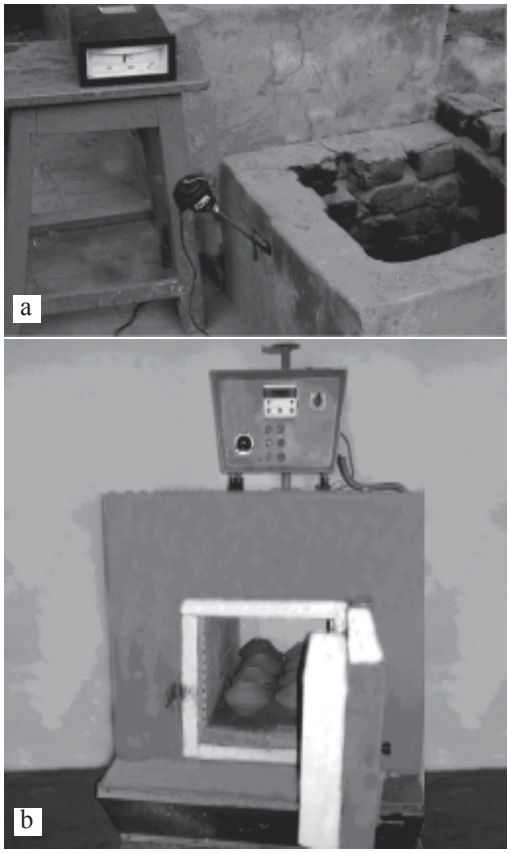

Fig. IIa-b: Puta systems of heating
a Traditional system (Measuring the temperature pattern through a pyrometer);
b Electric Muffle Furnace

TABLE 1
Different type of puṭa and materials used for bhasmīkaraṇa

Name of puta	Heating media/fuel	Bhasma
Mahā puṭa	Cow dung cake	Abhraka, Vajra, Lauha and Trivaṅga
Gaja puṭa	Cow dung cake	Abhraka, Lauha, Godanti, Śaṅkha, Varāṭika and Vaṅga
Varāha puṭa	Cow dung cake	Mākṣika, Rajata and Tāmra
Kukkuṭa puṭa	Cow dung cake	Svarṇa, Svarṇamākṣika, Tutha and Pārada
Kapota puṭa	Cow dung cake	Haritāḷa, Manaśśila and Svarṇa
Gobara puṭa	Coarse powder of cow dung cake	Pārada
Bhanda puṭa	Tusa (husk grain)	Haritāḷa and Somala
Bāluka puṭa	Hot sand	Haritāḷa and Somala
Bhūdhara puṭa	Cow dung cake	Pārada and Somala
Lāvaka puṭa	Cow dung powder or husk grain	Somala and Tutha

TABLE 2
Different tests of bhasma

Type of test	Description
1. Colour	Different bhasmas are different in colour depending upon the material; for e.g., Mākṣikabhasma is brownish red.
2. Rekhāpūrṇatvam	A pinch of bhasma is taken in between the thumb and index and rubbed. The bhasma enters into the lines of the finger cannot be easily washed out from the cleavage of lines.
3. Vāritaratvam	Small amount of the bhasma when sprinkled over the silent water, the bhasma particles move on the surface of the water.
4. Nisvādutvam	The bhasma is tasteless
5. Amḷa parīkṣa	A pinch of bhasma when mixed with dadhi (curd) or lemon juice, no colour change occurs.
6. Apunarbhava	Any dhātu bhasma mixed with Mitrapañcaka when subjected to fire, should not show any mettallic feature.
7. Nirutha	When any bhasma mixed with silver and subjected to intense fire, no part of bhasma is mixed with silver; then the bhasma is called nirutha.
8. Avami	A little amount of bhasma is tasted. If it is nauseating, the preparation is improper. The test is specially done in Tāmrabhasma and material containing tāmra (svarṇamākṣika).
9. Niścandratvam	There should not be any luster.
10.Dantagre ch kachkach bhava	When a small amount of bhasma placed between the teeth, no sandy feeling is observed.
11.Uttama	When a grain is placed over the floating bhasma, floats like a swan

- Induction of medicinal property (There is no reference to the therapeutic use of raw svarṇamākṣika; Svarṇamākṣika bhasma is indicated in many diseases; it is a potent anti anxiety drug and is indicated in insomnia. Also it rises the Hb% in experimental animal.)

Conclusion

- Bhasma is the ultimate therapeutic form of metals and minerals in āyurvedic practice.
- Processes have great impact on converting the toxic, hard rocky and macro materials into suitable therapeutic effective compounds.
- Reduced particle size causes a better absorption, hence better effect, which is achieved in a material by the process of māraṇa.
- Size reduction also facilitates quick absorption hence quick effect is achieved.
- As the indigenous process has a great role in particle size reduction, āyurvedic process will help the contemporary thought of nano-range particle size in the field of biomedical and industrial application.

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Clinical observation

REITER'S SYNDROME
- A clinical experience

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Reiter's syndrome, an auto-immune disease, is a combination of urethritis, reactive arthritis and conjunctivitis. There may also be uveitis. Men are more prone to this. It usually starts with a urethral discharge, which is followed by conjunctivitis and then arthritis. The arthritis usually affects 1 or 2 joints (usually the knee and/or ankle) and is often associated with fever and malaise. Attacks can last for several months. Tendons, ligaments and tissue in the soles may also become inflamed. Skin rashes are common. Diagnosis is made from the symptoms. Modern medicine depends on analgesic drugs and nonsteroidal anti-inflammatory drugs which have to be taken for a long period. Relapses occur in about 1 in 3 cases. At a later stage, the heart and the kidneys are impaired.

Case history

A man of 20 years came to the hospital on 16th March 2007. He was on a wheel-chair, with severe swelling over joints and peeling of skin with itching. He was a patient of a Medical College and the disease was detected a year before.

Symptoms

The pain started in the left big toe. Gradually almost all the joints were affected. Then skin rashes and peeling of skin were manifested followed by remittent or recurrent fever and conjunctivitis. He was not satisfied with the allopathic treatment, and came to the hospital.

The allopathic medicines used were: i) Omnacortil (10 mg) - 1 daily and ii) Indomethacin (25 mg) - 1-1-1-1. Apart from these, he was taking āyurvedic medicines which were mostly dīpana and pācana in nature. He was asked to withdraw these āyurvedic medicines.

Symptoms on presenttaion

Pain in almost all the major joints especially knees, hips and shoulder joints, and swelling on both knee joints. Skin rashes all over the body and the skin tends to peel which resulted in skin discolouration. Nail abnormality, scales on the head and recurrent fever. He was gloomy and was unable to stand on his own without support. His appetite and bowel movement were satisfactory; sleep was disturbed due to pain and urethritis.

Aṣṭāṅgahṛdaya mentions that perturbed vāta makes its site of onset in the feet or sometimes, in the hands and spread throughout the body quickly in the same fashion as the spread of rat's poison[1]. In the initial stage of uttāna type, skin develops severe itching with coppery red or black colour, severe

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burning sensation and heat; and in gambhīra type i.e. the next stage of vātaśoṇita, pain becomes very severe with the appearance of hard swelling and ulcers; vāta moves rigorously in the joints, bones and marrow producing cutting pain and curvatures of limbs (bones and joints) and then spread all over the body making the person lame by one leg or both the legs[2].

The vātarakta symptoms referred to in Aṣṭāṅgahṛdaya i.e. itching, throbbing and splitting type of pain in the joints of the legs, calves, thighs, waist, shoulders, hand, feet and other joints, sensation of heaviness and loss of touch[3], best describes this case. The patient had reached in a chronic stage (gambhīrāvastha) that exemplifies the predominance of vāta.

It is said that in vātarakta having the predominance of vāta, purāṇaghṛta (old ghee) is to be taken orally[4]. Considering this principle, the medicines prescribed were to alleviate vātarakta and to strengthen the patient. The prescription ran thus:

1. *Dadimadighritam* (10 - 20 ml) - in empty stomach followed by a glass of hot gruel. (On digestion and feel hungry, then only to have the next meal.)
2. *Guggulutikta kvatham* (3 tabs.) + *Chandraprabha vatika* (1 tab) - before lunch and at 5. p.m.
3. *Siddhamakaradvajam* (1 cap); *Valiya Madhusnuhi rasayanam* (10g) - at bed time
4. *Jivantyadiyamakam* - to apply on the head
5. *Jivantyadiyamakam* + *Kottamchukkadi tailam* - to be warmed and applied on the body. (Wash after an hour in hot water. Use a ground paste of neem leaves and coconut milk instead of soap.)
6. *Ayyappala keratailam* + *Tiktakaghritam* - to apply on the skin blemish after bath.
7. A paste of neem leaves ground in warm water to be applied on the painful area for one hour.
8. *Nimbadmritadi erandatailam* (1-2 tsp.) - at early morning if constipated
9. Boil 50g each of ñjeriññjil (*Tribulus terrestris*), tavizhāma (*Boerhaavia diffusa*), vayalccuḷḷi (*Hygrophyla auriculata*), nellikka (*Emblica officinalis*) and muntiri (*Vitis vinifera*) in one litre of water and drink its limpid portion intermittently.

Diet

Red-chillies, tamarind, oil, tubers and heavy food items were asked to avoid. Blackgram, horse-gram, fish and curd are unwholesome in this case of vātarakta. The following diet schedule was advised:

10.00 am - Lunch
2.00 pm - Fruit/vegetable soup
5.30 pm - Night food

Review after 21 days

"Alleviation of joint pain and skin rashes. No fever." - This was a telephonic conversation. He was asked to follow the same prescription and dietary schedule.

The patient continued the medicine for 3 months. Meanwhile he developed excess joint pain, abdominal discomfort and constipation, which were treated appropriately. The allopathic doctor treated him was satisfied with the progress and advised to taper the dosages: Omnacortil (5mg) 1 - SOS and Indomethacin ½ a tablet (earlier 4 tabs a day)

His next visit was on July 7th 2007. Though the joint pain and pain in the legs had alleviated, he needed support to walk. He had pain and tenderness on both sides of the chest. Itching reduced, but the nail deformity persisted.

He was advised to withdraw *Dadimadighritam* and *Siddamakaradvajam* because his general health had improved; instead, the following were advised:

1. *Guggulutiktakam kvatham* tablets (2) + *Balatailam* (15 drops) + boiled and cooled water (40 ml) - 6. am and 5 p.m.
2. *Rasasinduram* caps (2) - before lunch and dinner.
3. *Guggulutiktaghritam* (2 tsp) + *Samskritamadhu* (1 tsp.) - at bed time.
4. *Durvadi keratailam* - for head.
5. *Tiktakaghritam* - to be applied on the rashes.
6. Kizhi [ummattila (*Datura metal*)] to be done on the painful area for half an hour after applying *Kottamchukkadi tailam.*
7. A ground paste of ciṯtamṛtu (*Tinospora cordifolia*) and kaṭukkāttoṭu (*Terminalia chebula*) with gavya of 2 inches thickens to be applied on the sides for 2 hours.
8. Eḷḷu (*Sesamum indicum*) and śatakuppa (*Anethum graveolens*) ground to a paste with milk to be applied on the joints; wash with hot water after one hour.
9. *Cheriya Antrakutaram* (1) + *Dhanvantaram gulika* (1) - to be taken in hot water as and when required for abdominal discomfort.

Review after 1 ½ months

A sense of well being was observed. Skin rashes completely disappeared; tenderness and pain on both the sides of the chest were also relieved. A slight improvement in the condition of the nails was also noted. The important visible change observed was that the patient could stand himself and could walk on his own for a short distance. The prescription ran thus:

1. *Guggulutiktam kvatham tab* (2) + *Balatailam* (15 drops) + boiled and cooled water (40 ml) – at 6 am and 5 pm.
2. *Guggulutiktaghritam* (2 tsp) + *Samskritamadhu* (1 tsp) - at bed time.
3. Lepana and taila as before; dietary schedule to be followed.

The scales on the head had completely disappeared when he came for review on 29th Dec. 2007. The main complaint at that time was ankle oedema. He was able to move on his own. The same dietary schedule and prescription were advised.

His next visit was on 28th April 2008. He was found to be cheerful and was relieved of his major ailments. He complained slight pain while squatting as well as while getting up. Mild swelling over left knee was also observed. The pain on the chest-wall lessened. The same prescription was advised. Apart from the other medication, application of *Karpuradi tailam* on the painful area and *Kottamchukkadi tailam* on body were advised.

After a period of two months, he came on 28th June 2008. He looked to be a much relieved person. The

modern doctor had withdrawn all the medicines by then. The same prescription and dietary schedule were advised.

After 3 months, he visited on 27th September 2008. Application of warm *Mahamasha tailam* on the knees followed by a paste of ciṯṯamṛtu, kaṭukkāttoṭu and puḷiñjerambu were advised for the slight pain on the knee. *Dhanvantaram kuzhampu* replaced *Kottamchukkadi tailam*. *Kaisoraguggulu vatika* (1 tab) - twice a day was advised instead of *Balatailam*.

By December 2008 he showed great progress despite intermittent joint pain.

Varanadi kvatham tab (2 nos) and *Gavyam cap* (1) instead of *Guggulutiktakvatham* and *Varanadighritam* instead of *Guggulutiktaghritam* were advised. No other changes were made.

On 7th of February, 2009 he came here all by himself. He was altogether a changed person. The blemishes on the skin and joint inflammations had disappeared. He was completely cured of the irritation and scales on the head; hence thick hair growth. He enquired if he could engage in some job. He was advised to follow the dietary restrictions and earlier prescription and not to engage in laborious work.

After 6 months, in August 2009, he came here alone. He was an auto-rickshaw driver then. He seemed healthy but reported to be tired when cloudy. He was advised to follow the same remedial measures.

Aṣṭāṅgahṛdayam mentions that vātarakta cures just like how the practice of compassion remedies the anger[5]. Prolonged treatment with diet restriction is inevitable in chronic cases. At the same time the whole co-operation of the patient is again an important factor in the cure of a disease. Here, we can find a synchronisation of all these. So, a typical case, indeed.

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- The article should be authentic and not published earlier.
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- The main title, indicative of the content, should be brief. An abstract, not exceeding two hundred words, be prefixed to the article. English equivalents may be provided to Sanskrit terms [e.g. vīrya (potency), guṇa (property), etc]. Correspondence address including e-mail, and affiliations, if any, of the author should be attached to the text.
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  1. John Bernar Hentory, *Clinical diagnosis and management by laboratory methods,* 17th Ed., WB Saunders Company, Philadelphia, pp 172-175, 1989.

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