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Āryavaidyan

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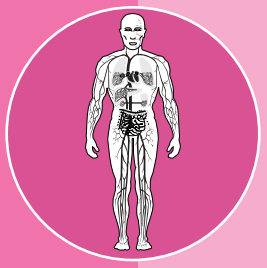
Of all the gifts,
the most precious is health



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āryavaidyan

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FROM THE PAGES OF VĀGBHAṬA - LXXXVII

Ramankutty C.*

Abstract: The fourth chapter of Nidānasthānam viz. Śvāsahidhmānidānam is explained here. The aetiology, symptamatology, prognosis, etc. of śvāsa (shortness of breath) and hidhmā (hiccup) are detailed in this chapter.

अथातः श्वासहिध्मानिदानं व्याख्यास्यामः।
इति ह स्माहुरात्रेयादयो महर्षयः।

(Athātaḥ śvāsahahidhmānidānam
vyākhyāsyāmaḥ।
Iti ha smāhurātreyādayo maharṣayaḥ।)

Let us discuss the chapter regarding the diagnosis of shortness of breath and hiccup. Thus spoke the sages Ātreya, etc.

कासवृद्ध्या भवेच्छ्वासः पूर्ववा दोषकोपनैः।
आमातिसारवमथुविषपाण्डुज्वरैरपि।।१।।
रजोधूमानिलैर्मर्मघातादिहिमाम्बुना।

(Kāsavṛddhyā bhavecchvāsaḥ pūrvairvā
doṣakopanaiḥ ।
Āmātisāravamathuviṣapāṇḍujvarairapi ।। 1 ।।
Rajodhūmānilairmarmaghātādihimāmbunā।)

Shortness of breath occurs due to chronic cough and by previously described vitiated tridoṣas. The other causes for shortness of breath are acute diarrhoea, vomiting, food poisoning, anaemia, fever, inhalation of dust and smoke, exposure to wind, vital organ trauma and intake of very cold water.

क्षुद्रकस्तमकश्छिन्नो महानूर्ध्वश्च पञ्चमः।।२।।

(Kśudrakastamakaśchinno
mahānūrdhvaśca pañcamaḥ ।। 2 ।।)

This is classified into five viz. kṣudraśvāsa, tamaka-śvāsa, chinnaśvāsa, mahāśvāsa and ūrdhvaśvāsa.

कफोपरुद्धगमनः पवनो विष्वगास्थितः।
प्राणोदकान्नवाहीनि दुष्टः स्रोतांसि दूषयन्।।३।।
उरस्थः कुरुते श्वासमामाशयसमुद्भवम्।

(Kaphoparuddhagamanaḥ
pavavo viṣvagāsthitaḥ ।
Prāṇodakānnavāhīni
duṣṭaḥ srotāmsi dūṣayan ।। 3 ।।
Urasthaḥ kurute śvāsa-
māmāśayasamudbhavam।)

When the flow of the downward course of vāta is hindered by kapha it spreads throughout the body and the channels of prāṇavaha, udakavaha and annavaha are blocked resulting in shortness of breath, which arises from the stomach.

प्राग्रूपं तस्य हृत्पार्श्वशूलं प्राणविलोमता।।४।।
आनाहः शङ्खभेदश्च.....

(Pragrūpam tasya hṛt-
pārśvaśūlam prāṇavilomatā ।। 4 ।।
Ānāhaḥ śaṅkhabedaśca.....)

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The prodromal symptoms of shortness of breath are pain over the thorax and ribs proximity, upward thrust of prāṇavāyu, flatulence and excruciating pain in the temporal region.

..... तत्रायासातिभोजने।
प्रेरितः प्रेरयेत् क्षुद्रं स्वयं संशमनं मरुत्।।५।।
(..... tatrāyāsātibhojane
Preritaḥ prerayet kṣudram
svayam samśamanam marut ।। 5 ।।)

Excessive labour/exercise and over eating cause kṣudraśvāsa which, relieves spontaneously.

प्रतिलोमं सिरा गच्छन्नुदीर्य पवनः कफम्।
परिगृह्य शिरोग्रीवमुरः पार्श्वे च पीडयन्।।६।।
कासं घुर्घुरकं मोहमरुचिं पीनसं तृषम्।
करोति तीव्रवेगं च श्वासं प्राणोपतापिनम्।।७।।
प्रताम्येत्तस्य वेगेन निष्ठ्यूतान्ते क्षणं सुखी।
कृच्छाच्छयानः श्वसति निषण्णः स्वास्थ्यमृच्छति।।८।।
उच्छ्रिताक्षो ललाटेन स्विद्यता भृशमर्तिमान्।
विशुष्कास्यो मुहुःश्वासी काङ्क्षत्युष्णं सवेपथुः।।९।।
मेघाम्बुशीतप्राग्वातैः श्लेष्मळैश्च विवर्द्धते।
स याप्यस्तमकः, साध्यो नवो वा बलिनो भवेत्।।१०।।
(Pratilomam sirā gaccha-
nudīrya pavanaḥ kapham ।
Parigṛhyaśirogrīvamuraḥ
pārśve ca pīḍayan ।। 6 ।।
Kāsam ghurghurakam moha-
marucim pīnasam tṛṣam ।
Karoti tīvravegam ca
śvāsam prāṇopatāpinam ।। 7 ।।
Pratāmyettasya vegena
niṣṭhyūtānte kṣaṇam sukhī ।
Kṛcchācchayānaḥ śvasati
niṣaṇṇaḥ svāsthyamṛcchati ।। 8 ।।
Ucchritākṣo lalāṭena
svidyatā bhṛśamartimān ।
Viśuṣkāsyo muhuḥśvāsī
kāṅkṣatyuṣṇam savepathuḥ ।। 9 ।।
Meghāmbuśītaprāgvātaiḥ
śleṣmaḷaiśca vivardhate ।
Sa yāpyastamakaḥ, sādhyo
navo vā balino bhavet ।। 10 ।।)

Vāta deviates from its normal course and moves in the opposite direction and disturbs kapha, which in turn results in manifestations like heaviness in the head, stiffness of the neck, pain in the chest and sides, cough, ruffling sound in the throat, confused state of mind, loss of appetite, chronic rhinitis and thirst; which causes tamakaśvāsa with breathing difficulty and severe distress. But he gets a momentary relief when he is able to bring out some sputum. The patient feels better when he is sitting. Breathing is difficult while lying. He will be looking up with his eyes wide open. His forehead will be perspiring because of the distress. His mouth will be dry. Breathlessness is frequent and the patient would desire for warmth. He would have tremors. Moreover, a change of climate would worsen the condition, for e.g., overcast condition, humidity, cold, easterly wind and dietary articles which are kapha vitiating.

This condition is curable with medicines if the patient is healthy and the disease is detected in its early stage.

ज्वरमूर्च्छायुतः शीतैः शाम्येत्प्रतमकस्तु सः।
(Jvaramūrcchāyutaḥ śītaiḥ
śāmyetpratamakastu saḥ ।)

Again this condition with a slight variation is termed as pratamakaśvāsam. This occurs with fever and swoon and the disease is cured with the applications of cold items.

छिन्नाच्छ्वसिति विच्छिन्नं मर्मच्छेदरुजार्दितः।।११।।
सस्वेदमूर्च्छः सानाहो वस्तिदाहनिरोधवान्।
अधोदृग्विप्लुताक्षश्च मुह्यन् रक्तैकलोचनः।।१२।।
शुष्कास्यः प्रलपन् दीनो नष्टच्छायो विचेतमः।
(Chinnācchvasiti vicchinnam
marmacchedarujārditaḥ ।। 11।।

Sasvedamūrcchaḥ sānāho
vastidāhanirodhavān ।
Adhodṛgvipḷutākṣaśca
muhyan raktaikalocanaḥ ।। 12 ।।
Śuṣkāsyaḥ pralapan dīno
naṣṭacchāyo vicetamaḥ ।)

Intermittent breathing is seen in chinnaśvāsam. The patient experiences excruciating pain as if the vital spots are being cut off. He will be in distress. The other symptoms of chinnaśvāsam are perspiration, swooning, distention of abdomen, burning sensation in the groins, strangury, eyes wide open and turned downwards, fainting, reddishness in one eye, dryness in the mouth and delirium. He becomes dull looking because the skin lacks lustre.

महता महता दीनो नादेन श्वसति क्रथन्।।१३।।
उद्धूयमानः संरब्धो मत्तर्षभ इवानिशम्।
प्रणष्टज्ञानविज्ञानो विभ्रान्तनयनाननः।।१४।।
वक्षः समाक्षिपन् बद्धमूत्रवर्चा विशीर्णवाक्।
शुष्ककण्ठो मुहुर्मुह्यन् कर्णशङ्खशिरोतिरुक्।।१५।।

(Mahatā mahatā dīno
nādena śvasati krathan ।। 13 ।।
Uddhūyamānaḥ samrabdho
mattarṣabha ivāniśam ।
Praṇaṣṭajñānavijñāno
vibhrāntanayanānanaḥ ।। 14 ।।
Vakṣaḥ samākṣipan
baddhamūtravarcā viśīrṇavāk ।
Śuṣkakaṇṭho muhurmuhyan
karṇaśaṅkhaśirotiruk।। 15 ।।)

Mahāśvāsa leaves the patient in distress because of strain he undergoes while breathing. It is noisy as well. The patient here is compared to a rutting bull trying to get up with difficulty though in vain. He is dull and confused. The patient's breathlessness is visibly understood when his chest is withdrawn and released. Such patients also suffer from constipation, strangury, dry throat, breaking voice, spells of swooing and severe pain in the ears, temple and head.

दीर्घमूर्ध्वं श्वसत्यूर्ध्वान्न च प्रत्याहरत्यधः।
श्लेष्मावृतमुखस्रोताः क्रुद्धगन्धवहार्दितः।।१६।।
ऊर्ध्वदृग्वीक्षते भ्रान्तमक्षिणि परितः क्षिपन्।
मर्मसु च्छिद्यमानेषु परिदेवी निरुद्धवाक्।।१७।।

(Dīrghamūrdhvam śvasatyūrdhvā-
nna ca pratyāharatyadhaḥ ।
Śleṣmāvṛtamukhasrotāḥ
kruddhagandhavahārditaḥ
Ūrdhvadṛgvīkṣyate bhrānta-
makṣiṇī paritaḥ kṣipan
Marmasu cchidyamāneṣu
paridevī niruddhavāk)

Prolonged inhalation without exhalation is termed as ūrddhvaśvāsam. Kapha obstructs the air passage and perturbed vāta leaves the patient in distress. He is in a confused state with his eyes moving in all directions especially upwards. He suffers excruciating pain in the vital spots as if they are being torn apart. Though the patient tries to yell out in pain, the voice is obstructed by kapha, hence leaves him unheard.

एते सिद्ध्येयुरव्यक्ता व्यक्ताः प्राणहरा ध्रुवम्।
इति श्वासनिदानम्।

(Ete siddhyeyuravyaktā vyaktāḥ
prāṇaharā dhruvam ।
Iti śvāsanidānam ।)

With early detection and timely treatment, the three foresaid śvāsa, viz. chinnaśvāsa, mahāśvāsa and ūrddhvaśvāsa are somewhat manageable . When they are fully manifested there is no chance of recovery.

Among the five śvāsa, kṣudraśvāsa is curable; tamakaśvāsa is incurable but manageable on early detection and the last three viz. chinnaśvāsa, mahāśvāsa and ūrddhavaśvāsa are said to be fatal. But if their clinical features are not clearly manifested, there is a remote chance of recovery.

Kṣudraśvāsa needs no treatment because it is not a

disease. The other three do not manifest themselves because they combine with other diseases and are considered as the death knells. This clearly states that tamaka alone is considered as a disease.

Thus ends the aetiology, symptamatology, prognosis, etc. of śvāsa.

अथ हिध्मानिदानम्।

श्वासैकहेतुप्राग्रूपसङ्ख्याप्रकृतिसंश्रयाः।।१८।।

हिध्मा .....

(Atha hidhmānidānam।

Śvāsaikahetuprāgrūpa-
saṅkhyāprakṛtisamśrayāḥ ।। 18 ।।

Hidhmā.....)

Now let us discuss the aetiology, etc. of hidhmā (hiccup).

It is similar to shortness of breath in aetiology, etc.

.....भक्तोद्भवा क्षुद्रा यमळा महतीति च।

गम्भीरा च.....

(..... bhaktodbhavā kṣudrā yamaḷā mahatīti ca Gambhīrā ca.....)

It is classified into five viz. annaja or bhaktodbhava, kṣudra, yamaḷa, mahatī and ganbhīrā.

.....मरुत्तत्र त्वरयाऽयुक्तिसेवितैः।।१९।।

रूक्षतीक्ष्णखरासात्म्यैरन्नपानैः प्रपीडितः।

करोति हिध्मामरुजां मन्दशब्दां क्षवानुगाम्।।२०।।

शमं सात्म्यान्नपानेन या प्रयाति च साऽन्नजा।

(.....maruttatra tvarayāऽyuktisevitai: ।। 19 ।।

Rūkṣatīkṣṇakharāsātmyair-
annapānaiḥ prapīḍitaḥ ।

Karoti hidhmāmarujām
mandaśabdām kṣavānugām ।। 20 ।।

Śamam sātmyānnapānena
yā prayāti ca sāऽnnajā।)

Normally when one takes incompatible food, especially dry, spicy and hard, which vitiates vāta, one gets hiccups. It is mild and is low sounding. This is known as annajahidhma. When one takes compatible food, it subsides.

आयासात्पवनः क्षुद्रः क्षुद्रां हिध्मां प्रवर्तयेत्।।२१।।

जत्रुमूलप्रविसृतामल्पवेगां मृदुं च वा।

वृद्धिमायास्यतो याति भुक्तमात्रे च मार्दवम्।।२२।।

(Āyāsātpavanaḥ kṣudraḥ
kṣudrām hidhmām pravartayet ।। 21 ।।

Jatrumūlapravisṛtā-
malpavegam mṛdum ca vā ।

Vṛddhimāyāsyato yāti
bhuktamātre ca mārdavam।। 22 ।।)

Over exertion vitiates vāta and triggers hiccup. It starts from the throat. It is mild and is less painful. This subsides on having food but continues on exertion.

चिरेणयमळैर्वेगैराहारे या प्रवर्तते।

परिणामोन्मुखे वृद्धिं परिणामे च गच्छति।।२३।।

कुप्ययन्ति शिरोग्रीवमाध्मातस्यातितृष्यतः।

प्रलापच्छर्द्यतीसारनेत्रविप्लुतिजृम्बिणः।।२४।।

यमळा वेगिनी हिध्मा परिणामवती च सा।

(Cireṇayamaḷairvegair-
āhāre yā pravartate ।

Pariṇāmonmukhe vṛddham
pariṇāme ca gacchati ।। 23 ।।

Kupyayanti śirogrīva-
mādhmātasyātitṛṣyataḥ ।

Pralāpacchardyatīsāra-
netravipḷutijṛmbiṇaḥ ।। 24 ।।

Yamaḷā veginī hidhmā
pariṇāmavatī ca sā ।)

Yamaḷa gradually manifests when the process of

digestion begins and increases as digestion progresses. It occurs in doubles. The head and neck of such patients shake all the time and other symptoms are flatulence, polydipsia, irrational talk, vomiting, diarrhoea, tremors and yawning. Veginīhidhmā and pariṇāmavatī are the synonyms of yamaḷa-hidhmā.

स्तब्धभ्रूशङ्खयुग्मस्य सास्रविप्लुतचक्षुषा।।२५।।
स्तम्भयन्ति तनुं वाचं स्मृतिं सज्ञां च मुष्णति।
रुन्धती मार्गमन्नस्य कुर्वती मर्मघट्टनम्।।२६।।
पृष्ठतो नमनं शोषं महाहिध्मा प्रवर्तते।
महामूला महाशब्दा महावेगा महाबला।।२७।।

(Stabdhabhrūśaṅkhayugmasya
sāsravipḷutacakṣuṣā ।। 25 ।।
Stambhayanti tanum vācam
smṛtim sajñām ca muṣṇati ।
Rundhatī mārgamannasya
kurvatī marmaghaṭṭanam ।। 26 ।।
Pṛṣṭhato namanam śoṣam
mahāhidhmā pravartate ।
Mahāmūlā mahāśabdā
mahāvegā mahābalā ।। 27 ।।)

The symptoms of mahatī are stiffness of eyebrows and temples; eyes will be wide open with tears and moving in all directions as if in fear, stiffness of the body and speech, impaired memory, difficulty in swallowing food, excruciating pain in the vital spots, opisthotonus and emaciation. This type of hiccup will be deep rooted with great sound, force and strength.

पक्वाशयाद्वा नाभेर्वा पूर्ववद्या प्रवर्तते।
तद्रूपा सा मुहुः कुर्य्याज्जृम्भामङ्गप्रसारणम्।।२८।।
गम्भीरेणानुनादेन गम्भीरा

(Pakvāśayādvā nābhervā
pūrvavadyā pravartate ।
Tadrūpā sā muhuḥ
kuryājjṛmbhāmaṅgaprasāraṇam ।।28।।
Gambhīreṇānunādena gambhīrā.....)

Similar to mahāhidhmā, arises from the intestine or umbilical area. As the name denotes, it comes with very great sound associated with yawns and stretching the entire body.

तासु साधयेत्।
आद्ये द्वे, वर्जयेदन्त्ये सर्वलिङ्गं च वेगिनम्।।२९।।
सर्वाश्च सञ्चितामस्य स्थविरस्य व्यवायिनः।
व्याधिभिः क्षीणदेहस्य भक्तच्छेदक्षतस्य वा।।३०।।
इति हिध्मानिदानम्।

(.....tāsu sādhayet ।
Ādye dve, varjayedantye
sarvaliṅgam ca veginam ।। 29 ।।
Sarvāśca sañjitāmasya
sthavirasya vyavāyinaḥ ।
Vyādhibhiḥ kṣīṇadehasya
bhaktacchedakṣatasya vā ।। 30 ।।
Iti hidhmānidānam।)

Out of these, annaja and kṣudra are manageable. Whereas mahā and gambhīrā are not to be treated, because they are incurable. Yamaḷa also incurable, hence, refuse treatment. So also the under-mentioned conditions are to be avoided because of their incurable nature. For eg: where there is accumulation of undigested food, dependent old man, excessive indulgence in sexual activity and emaciated because of other diseases.

सर्वेऽपि रोगा नाशाय न त्वेवं शीघ्रकारिणः।
हिध्माश्वासौ यथा तौ हि मृत्युकाले कृतालयौ।।३१।।

(Srveऽpi rogā nāśāya
na tvevam śīghrakāriṇaḥ ।
Hidhmāśvāsau yathā tau hi
mṛtyukāle kṛtālayau ।। 31 ।।)

All diseases may lead to death. But shortness of

breath and hiccup make it quicker because they play a vital role at the time of death. Almost all the diseases damage the human body and can cause death. Whereas shortness of breath and hiccup do it easily because of the involvement of the two vital factors - food and breath - the unprocessed food and the thoracic regions are affected. Whichever disease it may be, when death approaches, either of these, or both affect the individual. In short, shortness of breath and hiccup are to be considered as the lords of Death and not the causative factors of death.

इति श्रीवैद्यपतिसिंहगुप्तसूनुश्रीमद्वाग्भटविरचितायामष्टाङ्गहृदयसंहितायां तृतीये निदानस्थाने श्वासहिध्मानिदानं नाम चतुर्थोऽध्यायः।।४।।

(Iti śrīvaidyapatisimhaguptasūnuśrīmadvābhaṭaviracitā-yāmaṣṭāṅgahṛdayasamhitāyāyām tritīye nidānasthāne śvāsahidhmānidānam nāma caturthoऽdhyāyaḥ।)

Thus ends the 4th chapter named Śvāsahidhmānidānam of Aṣṭāṅgahṛdayam composed by Śri Vāgbhaṭa, the son of Simhagupta.

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ANATOMICAL FINDINGS OF *MORINGA OLEIFERA* SEED

Shivaprasad N.P., Mallya Suma V. and Sunil Kumar K.N.*

Abstract: *Moringa oleifera* Lam. is a commonly found food plant. Its different parts i.e leaves, fruits, seeds and flowers are consumed as a source of nutrition. Fruits hold inside trigonous seeds, which, apart from having therapeutic properties, are rich source of vitamins and minerals. The seeds are antitoxic, pH correcting and antimicrobial. In view of lack of macro-microscopic records of the seeds, a study was carried out. Matured fruits were collected from their natural habitat, shade dried, seeds separated and used for the study. Macro-microscopic characters and powder microscopic features were recorded using standard methodology.

Introduction

Moringa oleifera Lam. is one of treasured gifts of the nature. Its leaves, fruits, bark, gum and flowers are used as food and medicine, especially in Indian system of medicine.[1] It is a medium sized, soft wooded tree, found/ cultivated throughout India. The fruit is commonly termed as drumstick/horse radish.[2] The trigonous seeds possess neutraceutical and water purifying potential along with a long list of therapeutic benefit.[3]

The seed can be consumed fresh as peas or pounded, roasted or pressed into sweet, non-desiccating oil, commercially known as 'Ben oil' of high quality. The seeds offer nutrients including amino-acids, protein and wide range of vitamins and minerals providing a rich source of nutrition.[3] Śigrubījataila, a formulation documented in Suśrutasamhita, which is indicated in inflammatory diseases, depicts its therapeutic benefits.[4] Besides, the seeds are used in rheumatism, gout, sexually transmitted diseases, epilepsy, etc.[5] Classical texts such as Bhāvaprakāśa, advocates the seeds as good for eyes, antitoxic and non-aphrodisiac. It is described as śvetamarica (white pepper) in the classics.[6]

The seeds are also reported to be used as water purifying agents, instead of alum by some rural people in Sudan. They found effective against high turbid water, pH correcting and antimicrobial.[7] Specific protein fractions of seeds are found good for the skin and hair care. It is said to be protective for human skin from environmental influences and premature aging.

As this seed that possesses multiple benefits has not yet examined macro-microscopically, an attempt was made to record its pharmcognostic features.

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Materials and methods

Plant material

Matured fruits of *Moringa oleifera* Lam. were collected from the cultivated trees of Udupi district, Karnataka, in the month of April 2010. Photographs of tree were taken and the morphological features noted. The fruits were authentified and voucher specimen deposited at department of pharmacognosy, SDM Centre for research in āyurveda and allied sciences, Udupi, Karnataka. (Voucher no. 227/13031101). The fruits were shade-dried and seeds sepertaed.[8]

Macroscopy

The macroscopic features of the seed were documented using Canon IXUS digital camera.[9]

Microscopy

The sample was preserved in fixative solution. The fixative used was FAA (Formalin-5ml + Acetic acid-5ml + 70% Ethyl alcohol-90ml). The materials were left in FAA for more than 48 hours. The preserved specimens were dehydrated with graded series of tertiary-butyl alcohol as per the schedule (Sass, 1940). After dehydration, paraffin infiltration was carried out till super saturation of tertiary butyl alcohol was achieved. Following super saturation, the materials were transferred to pure paraffin wax for two times and the materials were cast into paraffin blocks. The paraffin wax embedded specimens were sectioned with the help of rotary microtome. The thickness of the sections was 10 to 12 µm. The sections were stained with toluidine blue as per the method introduced by O'Brein *et al.,* 1964. Transverse sections were photographed using Zeiss AXIO trinocular microscope attached with Zeiss AxioCam camera under bright field light. Magnifications of the figures are indicated by the scale-bars.[10]

Powder microscopy

A pinch of seed powder was warmed with drops of chloral hydrate on a microscopic slide and mounted in glycerine. The slides observed under microscope and diagnostic characters were further observed and photographed using Zeiss AXIO trinocular microscope attached with Zeiss AxioCam camera under bright field light. Magnifications of the figures are indicated by the scale-bars.[11]

Observations and results

Macro-microscopy was carried out as mentioned in Quality Standards of Indian Medicinal Plants (ICMR), Vol. 1., P 131.

Macroscopy

The seeds are sub-globose, three angled, 10 to 15 mm in diameter; angles extending as wings which are equidistantly placed, white, papery, thin, 2 to 3 cm in length and 0.5 to 1 cm width. The hilum is seen as a white protruding spot at the base of the seed; testa corky, brittle, dark brown in colour; taste bitter and slightly sweet; odour charcteristic (Fig. I & IIa-h).

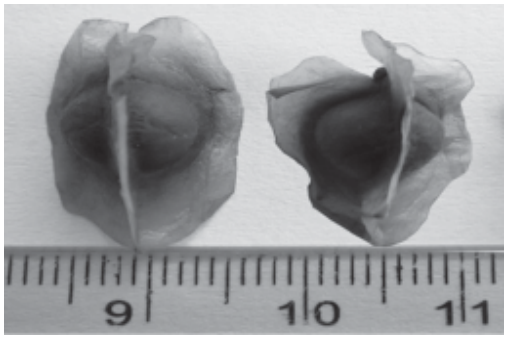

Fig. I
Macroscopy of seeds of *Moringa oleifera*

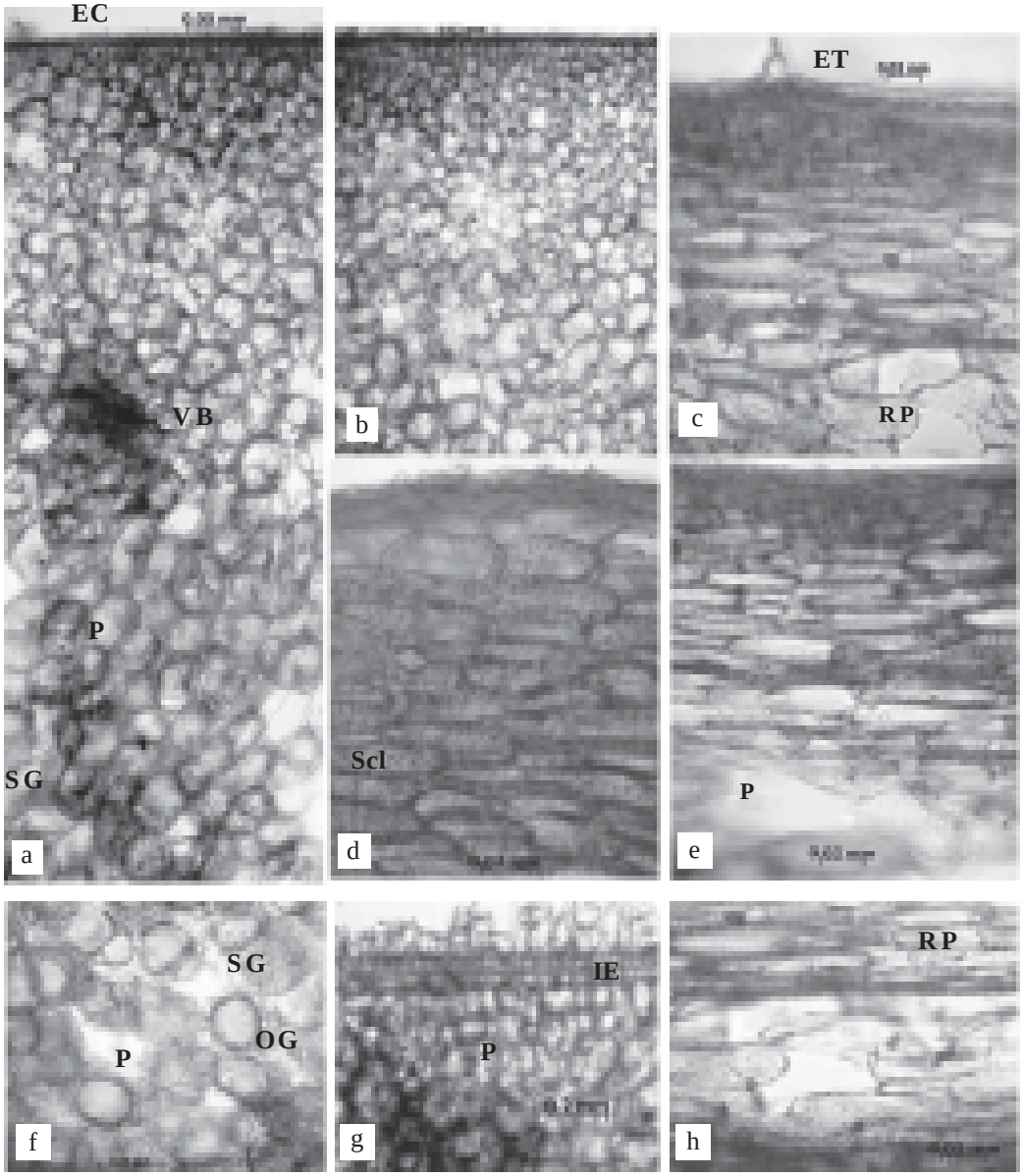

Fig. IIa-h : Microscopy of transverse section of seed of *Moringa oleifera*

a - Cotyledon; b - Outer cotyledon; c - Outer testa
d - Inner testa; e - Middle testa; f - Parenchyma cotyledon; g - Inner epidermis of cotyledon;
h - Reticulate parenchyma

EC - Epidermis of cotyledon; **ET** - Epidermis of testa; **IE** - Inner epidermis; **OG** - Oil globules;
P - Parenchyma; **RP** - Reticulate parenchyma; **Scl** - Sclereids; **SG** - Starch grains; **VB** - Vascular bundle

Microscopy

Transverse section passing through the winged region of seed consists of an outer layer of epidermis covered with thick papillose cuticle. Below epidermis lies a wide zone of various types of parenchyma cells arranged compactly one above the other. These can be divided into three regions as i) Outer testa - consisting of angular pitted criss-crossing thick walled reticulated parenchymatous cells. ii) Middle testa - consisting 10-12 rows of thick walled beaded cells. iii) Inner testa - comprising 6-8 rows of annular tangentially running sclerenchymatous cells.

TS of cotyledon shows small sized upper epidermis and bigger sized lower epidermis with fixed oil globules and starch grains. Inner epidermis of cotyledon shows the presence of vascular bundles (Fig. III).

Powder

Characteristic features of the powder are abundant isolated and groups of sclerides of various sizes and shapes, row of fibres and parenchymatous cells. Parenchymatous cells are of different shapes occasionally overlapping with spherical lignified and reticulately and spirally thickened from the wings. Reticulated and pitted parenchymatous cells found abundantly. Mesophyl cells in surface view embedded with oil globules and aleurone grains were also found (Fig. IV).

Discussion

Lack of quality standards of the raw material has been one of the major lacuna in the wider acceptance of plant based drugs. Herbal drug standardization is massively wide and deep. According to WHO guidelines identification/ authentication of crude drug form a first step in herbal drug standardization. Botanical identity, macroscopy, microscopy and histological analysis form different steps in this evaluation procedure.

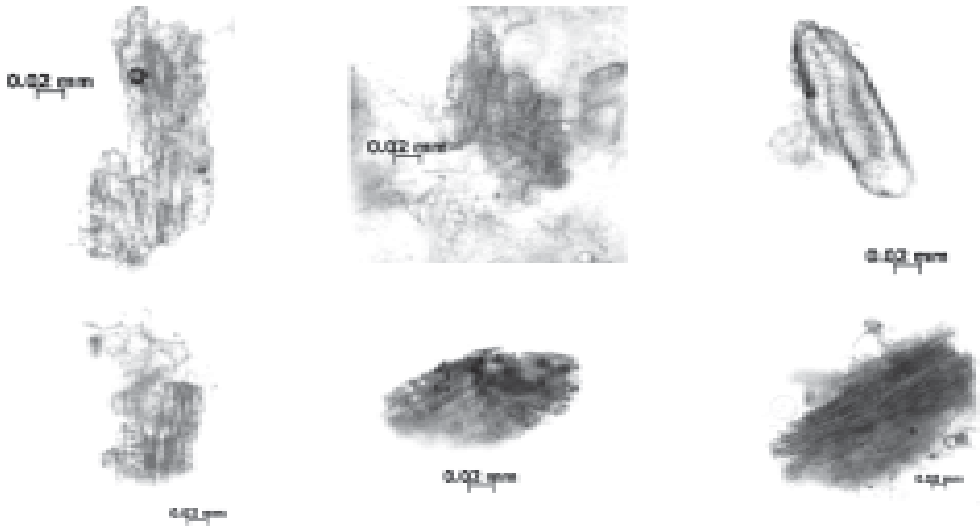

Fig. III. Powder microscopy of fruit of *Moringa oleifera*

Śigrubīja (seeds of *Moringa oleifera* Lam.) has great medicinal, nutritional and commercial value. Apart from a rich source of nutrition, the seeds are used for eye diseases, rheumatism, etc. Besides, they are water purifying agent, pH correcting and antimicrobial.

Thick papillose cuticle with an outer epidermis is the main findings on seed TS. Three regions of compactly arranged parenchymatous cells lie below the epidermal layer. Outer testa, middle and inner testa are these three regions from periphery to centre. Reticulated pitted parenchymatous cells, beaded cells and sclerenchymatous cells are the main cells observed in these three layers respectively. Lower epidermis of the cotyledon exhibited the presence of fixed oil globules and starch grains. Abundant isolated or groups of sclerides along with different parenchymatous cells are the unique features of powder microscopy.

Conclusion

Standardization of herbal drugs is a great topic of concern with respect to their high market demand and less availability. Authentication, macro-microscopic records of herbal drugs forms a first step in pharmacognostic standardization. The above findings help in identification and standardization of *M. oleifera* Lam. seeds besides preventing their adulteration.

Acknowledgement

The authors are grateful to revered President, Dr. D. Veerendra Heggade and Dr. B. Yashovarma, Secretary, SDM Educational Society for encouragement. Guidance by Dr. U.N. Prasad, Former Principal SDM College of Ayurveda, Kuthpady, Udupi is gratefully acknowledged. The authors are also indebted to Dr. B. Ravishankar, Director; SDM Centre for Research in Āyurveda and Allied Sciences,

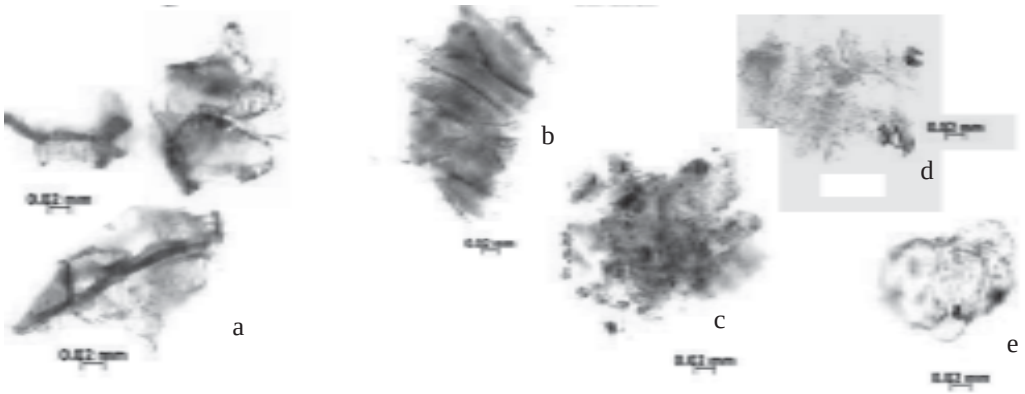

Fig. IV. Powder microscopy of fruit of *Moringa oleifera*

a Reticulate parenchyma from testa; b Longitudinally cut ret. parenchyma; c Cells of cotyledon; d Oil and starch in cotyledon; f Pitted parenchyma

CORRIGENDUM

A mistake inadvertently happened in the address of the authors of article '*Standardisation of Panchakola curna - An ayurvedic formulation*' published in the Vol. XXVIII, No. 2 issue of Aryavaidyan is hereby rectified as follows:

1. Radhika Rani R.K., Roganidana Department, Govt Ayurveda College, Thiruvananthapuram
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Editor

Udupi and Dr. T. S. Bayari, HOD, Deaprtment of Dravyaguna, SDM College of Udupi for providing facilities.

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EVALUATION OF NIMBAṢAṬKACŪRṆA ON PURĪṢAJAKṚMI WITH SPECIAL REFERENCE TO *ASCARIS LUMBRICOIDES*

Poornima N., Chethan Kumar V.K. and Ravishankar K.*

Abstract: Worm infestation is one of the main problems of child development. Greater incidence is seen in preschool and early school-going children. *Ascaris lumbricoides* can be considered as one of the type of purīṣajakṛmi (parasites born of feces) due to similarities in habitat, morphology, colour, clinical manifestation and treatment. The present clinical trial was carried out to evaluate the effect of Nimbaṣaṭkacūrṇa on purīṣajakṛmi. A total of 30 patients, clinically diagnosed as purīṣajakṛmi (parasites born of feces) infested, were administered with Nimbaṣaṭka cūrṇa. The result found to be significant.

Introduction

Worm infestation is one of the most common manifestations found in pediatric practice due to poor hygienic conditions, ignorance, non-availability of good drinking water, use of uncooked or improperly cooked food, poverty and poor nutritional status.[1, 2] The description of kṛmi (worm infestation) explained in āyurvedic classics like jvara (fever), vivarṇata (discolouration), udaraśūla (abdominal pain), sadana (general debility), brama (giddiness), bhakta-dveṣa (aversion towards food), gudakaṇḍu (anal itching) correlates with *Ascaris lumbricoides*. It is estimated that more than 1.4 billion people are infected with *Ascaris lumbricoides* representing 25% of the world's population.[3] Although *Ascariasis* occurs at all ages, it is most common in pre-school and school-going children.[4] *Ascaris lumbricoides* being the largest nematode has the most prominent intestinal manifestations.[5] It is rarely fatal but it is the major cause of ill health. Studies have shown that chronic infection with *Ascaris lumbricoides* impairs growth, physical fitness and cognitive development. Adult worms may produce intestinal obstruction or may migrate into the peritoneal cavity.[6] Most of the anthelminthics are active against specific parasites and hence parasites must be identified before starting treatment. Hence, an ideal and unique drug combination Nimbaṣaṭkacūrṇa[7] was selected for the clinical trial.

Objectives of the study:- To evaluate the efficacy of Nimbṣaṭkacūrṇa on purīṣajakṛmi w.s.r. to *Ascaris lumbricoides*.

Materials and methods

Source of data:- A total of 30 cases who fulfilled the diagnosis criteria of purīṣaja kṛmi (parasites born of feces) infestation, were selected from the O.P.D of Kaumārabhṛtya, S.D.M. Āyurvedic

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Hospital, Udupi, Karnataka, India. Institutional Ethical clearance was obtained from Institutional Ethical Committee (IEC) with Reference number SDMCAU/ACA-49/ECO5/13-14.

Research design:- 40 children between the age group of 3 to 9 years who showed positive stool samples of *Ascaris lumbricoides* were registered for the randomized clinical trial; of which, 30 children completed the trial and 10 were dropout at various stages. Complete history and clinical examination of all patients were carried out and recorded in a specially designed case proforma.

Diagnostic criteria:- The diagnosis of purīṣaja kṛmi was made on the basis of presence of two or more lakṣaṇas (symptoms) as mentioned in symptomatology of worm infestation.[8] Positive stool sample of *Ascaris lumbricoides* ova/cyst was considered for diagnosis.

Inclusion criteria

- Children of either gender between the age group of 3 to 9 years, presenting with any of two or more symptoms as described in the context of purīṣaja kṛmi (parasites born of feces).
- Children who passed the *Ascaris lumbricoides* worms through mouth or anus and present with such complaints.
- Those who showed ova of *Ascaris lumbricoides* in microscopic stool examination.

Exclusion criteria

- Kṛmi as associated features in other systemic diseases.
- Infestation other than purīṣaja kṛmi.
- History of recent anthelminthic medications.

Drug preparation:- The drug was prepared at SDM Ayurveda Pharmacy, Kuthpady, Udupi. The ingredient drugs viz. nimba (*Azadirachta indica*), vatsaka (*Holarrhena pubescense*), vidaṅga (*Embelia ribes*), hiṅgu (*Ferula assa-foetida*), saindhava (NaCl) and ajamoda (*Apium graveolans*) were taken in equal quantity and the mixture finely powdered and packed in an airtight glass container of 12 grams each.

Dosage:- 3 grams twice daily for the age group of 3-6 years and 6 grams twice daily for the age group of 6-9 years with honey.

Duration:- The drug was administered for 7 days and follow up was done from the day of completion of the treatment for every fifteen days for a period of one month.

Assessment criteria:- Assessment was done on the basis of improvement in the clinical signs and symptoms, laboratory parameters, absence or recurrence during follow up and improvement in general health parameters. The gradings of subjective criteria is shown in Table 1.

Laboratory investigations:- i) Routine blood examination (Hb%, TC, DC, ESR), ii) AEC (Absolute Eosinophil Count) and iii) Macroscopic and Microscopic stool examination.

Statistical analysis:- Statistical analysis was carried out using the software birdpad. The frequency calculations performed along with parametric and non-parametric test procedures. Differences of paired samples e.g. comparison between beginning and end of a treatment were tested with Dependent 't' test with regard to significance.

Observations and result

All the patients (n=30) showed positive ova/cyst in microscopic stool examination. Distribution of patients according to age, sex, socio-economic status and prakṛti are shown in Table 2.

TABLE 1
Assessment criteria of Purīṣajakṛmi

Parameters	Score	Parameters	Score
1. Jvara (fever)		- Dislikes but takes food	1
- Absent	0	- Forcefully fed	2
- Present	1	- Refuses feed	3
2. Vivarṇata (discoloration)		7. Atisāra (loose stool)	
- Normal	0	- No loose motion	0
- Only on face	1	- 1-2 times	1
- Any half of the body and evident patches	2	- 3-5 times	2
- All over the body with distinct patches	3	- More than 6 times	3
3. Udaraśūla (abdominal pain)		8. Guda kaṇḍu (anal itching)	
- Normal	0	- No anal itching	0
- Occasional pain	1	- Occasional itching	1
- Constant pain	2	- Frequent itching	2
- Cries due to pain	3	- Constant itching	3
4. Sadana (general debility)		10. Kāsa (cough)	
- No sadana	0	- No cough	0
- Mild	1	- Coughs without strain	1
- Moderate	2	- Coughs with strain	2
- Severe	3	- Coughing out worms	3
5. Bhrama (giddiness)		11. Passing of worms in the stool	
- Absent	0	- Absent	0
- Present	1	- Present	1
6. Bhaktadveṣa (aversion towards food)		12. Parameters like Mucus, Ova/Cyst, Undigested food Particles	
- Likes to take food	0	- Absent	0
		- Present	1

Results

The effect of the drug was assessed periodically with regards to subjective and objective parameters like Hb gm%, ESR, AEC, microscopic and macroscopic stool examination.

The trial drug provided relief in all the cardinal symptoms of purīṣajakṛmi. An increase of 4.2% body weight was also observed. All the changes were statistically highly significant except in parameters like jvara (fever), bhrama (giddiness), atisāra (loose stool) and passing of worms in stool. (Table 3). On hematological parameters, A.E.C and E.S.R counts decreased and also the Hb gm% improved. All the changes were statistically highly significant. (Table 4). On stool examination, the trial drug showed a decrease in mucus and undigested food particles and the change were statistically significant (Table 5). The overall effect of the therapy is shown in Table 6.

Discussion

An effective, easily available, palatable and easily administrable remedy on parasites is one of the important parts in the management of kṛmiroga (parasitic infection). Hence, Nimbaṣaṭkacūrṇa was selected by considering

TABLE 2
Distribution of patients according to age, sex, etc.

Description	No. of patient	%
1. Age (years)		
- 7-9	19	47.5
- 3-5	10	25
- 5-7	11	27.5
2. Sex		
- Male	23	57.5
- Female	17	42.5
3. Scio-economic status		
- Lower class	28	70
- Middle class	11	27.5
- Upper class	1	2.5
4. Habitat		
- Urban area	2	5
- Semi urban area	21	52.5
- Rural area	17	42.5
5. Dietary habit		
- Mixed diet	38	95
- Vegetarian	2	5
6. Agni (digestive fire)		
- Viṣamāgni (iiregular fire)	22	55
- Mandāgni (mild fire)	13	32.5
7. Bowel habit		
- Krūrakoṣṭha (hard)	13	32.5
- Madhyamakoṣṭha (normal)	26	65
- Mṛdukoṣṭha (soft)	1	2.5
8. Prakṛti (constitution)		
- Vātakaphaja	25	62.5
- Vātapittaja	13	32.5
- Pittakaphaja	2	5
9. Hygienic condition		
- Poor	21	52.5
- Moderate	11	27.5
- Good	8	20

TABLE 4
Effect of the therapy on hematological parameters

Parameter	Mean		SD	SEM	't'
	BT	AT			
Hb%	11.153	11.318	1.37	0.25	2.76*
ESR	21.5	13.323	8.99	1.64	6.64
AEC	423.1	341.2	148.96	27.19	4.59**

n = 30; * p <0.0097; ** <0.001

TABLE 5
Effect of the therapy on stool examination

Parameter	Mean		SD	SEM	't'
	BT	AT			
Mucus	0.266	0.1	0.44	0.08	1.98*
UFP***	0.4	0.166	0.49	0.09	2.97**

***UFP - Undigested food particle; n = 30
* p <0.0573; ** <0.059

TABLE 6
Overall effect on subjective parameters

Zones based on % relief	No. of patients
Remarked improvement (100%)	00
Marked improvement (75-99%)	12
Moderate improvement (50-74%)	17
Mild improvement (25-49%)	01
Unchanged (<24%)	

its unique combination of 6 herbal drugs.

In purīṣaja kṛmiroga, kapha is the main doṣa involved and most of the ingredient drugs in the Nimbaṣaṭkacūrṇa are tikta (bitter), kaṭu (pungent) and kaṣāya (astrinent) in popery which mitigates kaphadoṣa.

Nimba (*Azadirachta indica*) possesses tikta, kaṣāya rasa; laghu guṇa and kaphapittahara action. It acts as kṛmighna (anti-helminthic), kuṣṭhaghna (anti-dermatosis), kaṇḍughna (anti-prurities), vedanāthāpana (analgesic), yakṛt-uttejaka (hepato-stimulant), raktaśodhaka

TABLE 3
Effect of the therapy on various parametrs

Parameters	No	Mean value		% of relief	Paired 't' test			
		BT	AT		SD	SEM	't'	P
1. Jvara	3	1	0	100	0.0	0.0	-	-
- After 15 days			0	100	0.0	0.0	-	-
- After 30 days			0	100	0.0	0.0	-	-
2. Vivarṇata	30	2	1.43	28.5	0.50	0.09	6.158	<0.0001
- After 15 days			0.93	53.5	0.25	0.04	23.028	<0.0001
- After 30 days			0.3	85.0	0.46	0.08	15.624	<0.0001
3. Udaraśūla	30	1.6	0.3	81.25	0.53	0.09	15.277	<0.0001
- After 15 days			0.03	98.12	0.18	0.03	17.026	<0.0001
- After 30 days			0	100	0.0	0.00	15.559	<0.0001
4. Sadana	22	1.18	0.5	57.69	0.51	0.10	6.708	<0.0001
- After 15 days			0.36	69.53	0.35	0.07	13.073	<0.0001
- After 30 days			0	100	0.00	0.00	14.042	<0.0001
5. Brama	4	1	0	100	0.0	0.0	-	-
- After 15 days			0	100	0.0	0.0	-	-
- After 30 days			0	100	0.0	0.0	-	-
6. Bhaktadveṣa	21	1.8	0.76	58.91	0.53	0.11	16.68	<0.0001
- After 15 days	0.23	87.51	0.43	0.09	14.91	<0.0001		
- After 30 days	0	100	0.00	0.00	17.80	<0.0001		
7. Atisāra	12	1	0	100	0.0	0.0	-	-
- After 15 days			0	100	0.0	0.0	-	-
- After 30 days			0	100	0.0	0.0	-	-
8. Gudakaṇḍu	30	1.56	0	100	0.504	0.092	17.026	<0.0001
- After 15 days			0	100	0.504	0.092	17.026	<0.0001
- After 30 days			0	100	0.504	0.092	17.026	<0.0001
9. Kāsa	12	0.83	0.3	60.38	0.49	0.14	2.171	<0.0527
- After 15 days			0	100	0.0	0.0	7.416	<0.0001
- After 30 days			0	100	0.0	0.0	7.416	<0.0001
10.Weight	30	19.01	19.0	0.26	4.75↑	0.86	1.795	<0.0831
- After 15 days			19.3	1.78	4.650↑	0.84	4.130	<0.0003
- After 30 days			19.8	4.20	4.587↑	0.83	9.401	<0.0001
11.Passing worms in stool	8	1	0	100	0.0	0.0	-	-
- After 15 days	0	100	0.0	0.0	-	-		
- After 30 days	0	100	0.0	0.0	-	-		

(blood purifier), and jvaraghna (antipyretic). The bark of nimba contains Nimbin[9] as chemical constituent, which is antipyretic in action.

Vatsaka (*Holarrhena pubescense*) is kapha-pittahara due to its tikta, kaṣāya rasa; laghu rūkṣa guṇa; śīta vīrya; and kaṭu vipāka. The stem bark contains alkaloid conessine; it is used as a therapeutic drug for treatment of dysentery and helmintic disorders.[10]

Viḍaṅga (*Embelia ribes*) is well known for its kṛmighna (anti-helminthic) action. It has paralytic effect on intestinal worms.[11] Due to its tikta and kaṭu tastes; laghu, rūkṣa and tīkṣṇa guṇa; śīta vīrya and kaṭu vipāka, the drug mitigates kapha.

Hiṅgu (*Ferula assa-foetida*), due to its kaṭu rasa; laghu, snigdha and tīkṣṇa guṇa; uṣṇa vīrya; and kaṭu vipāka properties,[12] pacifies kaphavāta; thereby it acts on kṛmi, ajīrṇa (indigestion), agnimāndhya (loss of appetite) and udaraśūla (abdominal pain). Saindhava-lavaṇa (rock salt) is laghu, uṣṇa and tridoṣaghna. Hence, enhances assimilation, acts as dīpana (appetizer) and anulomana (laxative). Researches[13] have shown that saindhava lavaṇa causes paralysis of worms. Thus acts as wormicidal and helps its expulsion.

The drug ajamodha (*Apium*)[14] is an excellent carminative and has antispasmodic activity. Hence helps in relieving bhaktadveṣa (aversion towards food) and udaraśūla (abdominal pain).

Probable mode of action of drug

Due to the āhāraja (food) and vihāraja (habits) nidānas (causative factors), there will be vitiation of doṣas and dūṣyas which forms āma (undigested substance). Further, it leads to rasa and purīṣavaha srotoduṣṭi (blocks the channels) and creates a favorable environment for the production of worms in pakvāśśaya (intestine). The properties of the trial drug created an unfavorable environment in the intestine. Also corrected the digestive fire by means of agni-dīpana and did the āmapācana and cleared the strotas. Hence, did the samprāpti vighaṭana (breaking the pathogenesis) in the form of prakṛtivighaṭa[15] (modifying the habitat) which is the main treatment principle in the kṛmiroga (worm infestation).

Conclusion

The clinical trial revealed highly significant result of Nimbaṣaṭkacūrṇa on purīṣajakṛimi with in a period of 7 days. The probable therapeutic action of the unique combination of 6 herbal drugs by their anthelminthic properties helped to modify the habitat (prakṛtivighaṭa). The drug was well tolerated by children and there were no untoward effects were observed. It is proved by the present clinical trial that the drug Nimbaṣaṭkacūrṇa is easily administrable, safe and one of the drug of choice for the management of purīṣajakṛmi.

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ANTI-ULCER ACTIVITY OF SOMANĀTHĪTĀMRABHASMA AGAINST PYLORUS LIGATED GASTRIC ULCER IN WISTAR STRAIN ALBINO RATS

Ashwath Pal,[1] Sudheendra Honwad,[1] Ashok Kumar B.N.,[1] Ravi M.[2] and B. Ravishankar[2]

Abstract: Somanāthītāmrabhasma is unique method of tāmrabhasma preparation used by śodhita tāmra, pārada, gandhaka, haratāḷa and manaśśila. It is indicated in several conditions like jvara, pāṇḍu, kāmala, yakṛtvikāra, udara, pariṇāmaśūla, kṣaya, etc. It also exhibits rasāyana properties. Symptoms of peptic ulcer closely resemble with pariṇāmaśūla. Anti-ulcer activity of Somanāthītāmrabhasma was studied on experimental albino rats. Ulcers were induced by Shay's method of pyloric ligation. The test drug showed cytoprotective activity by reducing ulcer index. It also showed anti-secretory effect and histopathological examinations revealed less tissue injury.

Introduction

Peptic ulcers constitute a major disease that affects human GIT. The common clinical feature of peptic ulcer is acid secretary abnormalities and ulcer formation in the stomach and the duodenal part of the intestine; this affects a major part of the community in their day today life.[1]

Many medicines are known to have ulcer preventive effect.[2] Some of these are believed to have their action on the gastric secretions while some are having gastro protective activity by enhancing gastric mucous secretions. Even after their proven efficacy they tend to produce some or other side effects. So there is need to discover a better medication for peptic ulcers.

Peptic ulcers can be correlated to pariṇāmaśūla[3] based on their clinical features. Somanāthī-tāmrabhasma[4] is said to be effective in pariṇāmaśūla. The present study was aimed to investigate the anti-ulcer activity of Somanāthītāmrabhasma to provide scientific validation.

Materials and methods

Test drug:- Somanāthītāmrabhasma was prepared as referred to in the Rasaratna-samuchchaya, at the Rasasastra and Bhaisajya Kalpana Department, SDM college of Ayurveda, Udupi.

Standard drug:- Pantoprazole tablets

Experimental animals:- Wistar strain albino rats of either sex weighing between 160 g to 220 g were selected for animal study. 18 such rats were selected. The animals were obtained from S.D.M. central animal house.

Somanāthītāmrabhasma was administered to experimental animals to evaluate its anti-ulcer activity by assessing ulcer index, volume of gastric contents, pH, total and free acidity, total

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carbohydrates and proteins content, peptic activity, histopathological and anti-oxidant study.

Animal grouping:- Group 1 - Control with 0.5% CMC; Group 2 - Standard drug solution with 0.5% CMC and Group 3 - Somānāthī-tāmrabhasma solution with 0.5% CMC

All the three groups had free access to food and water *ad libitum* for first five days, along with standard and test drugs were administered to the respective group. On 6th and 7th day along with fasting (had free access to water *ad libitum*) the standard and test drugs were administered to the respective groups.

The rats after 48 hours of fasting were anaesthetized with Ketamine hydrochloride and Xylazineinjection. The pyloric ligation was carried out by following the method of Shay *et al*. by opening anterior abdominal wall without disrupting blood vessels of the stomach. Stomach was replaced and suturing was done.

For standard and test group after 1 hour of drug administration, pyloric ligation was done. After 10 hours of pyloric ligation the animals were sacrificed by inhaling deep ether anaesthesia. (Fig. I)

The abdomen was opened and cardiac end of the stomach was tied. The entire stomach was cut and removed from the body. A small cut was given to the pyloric region just above the knot and the contents of the stomach were collected in a graduated centrifuge tube. The stomach was opened along the greater curvature and washed under the running tap water. The gastric contents were centrifuged at 2000 rpm for 10 min. The volume was noted. 1 ml of the supernatant liquid was pipetted out and diluted with 10 ml distilled water. For histopathological and antioxidant study, full thickness biopsy specimen was fixed.

Ulcer index:- The stomach was excised, cleaned and opened along its greater curvature. The inner surface was cleaned gently and rinsed with cold saline, spread on wax board and examined for ulceration with magnifying lens. Ulcer index was calculated by following the method described by Kulkarni and Goel.[5,6] The following descriptions of ulcer scores were noted; 0.5 -

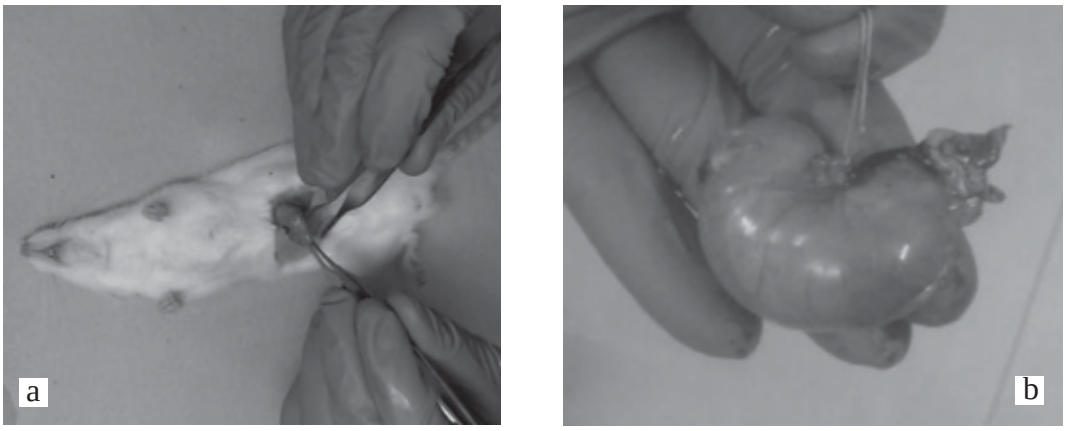

Fig. I: a) Pyloric ligation; b) Isolated stomach

red colouration, 1.0 - spot ulcers, 1.5 - haemorrhagic streaks, 2.0 - ulcers more than 3mm and less than 5mm and 3.0 - ulcers more than 5mm. Mean ulcer scores for each experimental group were calculated and expressed as the ulcer index. (Fig. II & III)

Volume, pH, etc.:- The gastric contents were subjected to centrifugation at 2000rpm for 10 min. The volume and pH of gastric juice were measured. The method employed by Srivastava *et.al* was employed in free and total acidity estimation. The free acidity was determined by titration of gastric juice with 0.01N NaOH with methyl orange indicator until the colour of solution became yellowish. The volume of alkali added was noted. Two to three drops of phenolphthalein indicator were added and solution was titrated until a definite red tinge appeared. The total volume of NaOH was noted and this corresponds to the total acidity.

Peptic activity:- Peptic activity was estimated by the method described by Debnath PK *et al*.[7] One ml of dilute gastric juice was mixed with 2% haemoglobin solution in 0.06M HCl and incubated for 20 min. 0.6M ice cold trichloroacetic acid was added to it. Later the solution was centrifuged and the supernatant fluid was mixed with reagent C and reagent E. The optical density was measured at 610 nm against a blank of distilled water.

Total protein & carbohydrate:- Dissolved mucosubstance was estimated in 90% alcoholic precipitate of the gastric juice. The precipitate obtained was dissolved in 1ml of 0.1N NaOH and used for total protein estimation. Another part of precipitate was dissolved in 1ml of 0.01N H_2SO_4 used for total carbohydrate estimation.[8,9]

Histopathological study:- Stomach tissue samples were collected after sacrificing the rats for histopathological examination. These tissue samples were fixed in 10% formalin solution embedded in paraffin wax, cut into 5µm thick sections and stained with H and E stain for examination under compound microscope.[10]

Antioxidant study:- Catalase activity and glutathione peroxidase activity was measured according to the procedures of Sinha *et al*. Lipid peroxidation activity was determined by following the procedure of Ohkawa *et al*.

Statistical analysis:- The experimental data was expressed as mean ± SEM. The statistical analysis was carried out by one way analysis of variance followed by Dunnet's multiple 't' test and the p value <0.05 implied statistical significance of results obtained.

Results

Decrease in ulcer index was seen in both standard and test groups. The result was statistically non-significant in the test group. Significant increase in pH of gastric juice was found in both standard and test groups. Decrease in volume of gastric juice was observed in standard and test group as compared to control group. The data related to the effect of Somanāthītāmrabhasma on various parameters is shown in Table 1.

Histopathological examination:- Sections from pyloric ligated control rats showed ulceration mainly confined to the epithelial layer (Fig. I a & b). In many of the sections it extended up to the whole length of this layer. In sections from reference standard group, ulceration in the superficial layers of epithelium was observed and frequency of ulceration was less. In case of sections from test drug administered group also the ulceration was seen only in epithelial layer (Fig. II & III).

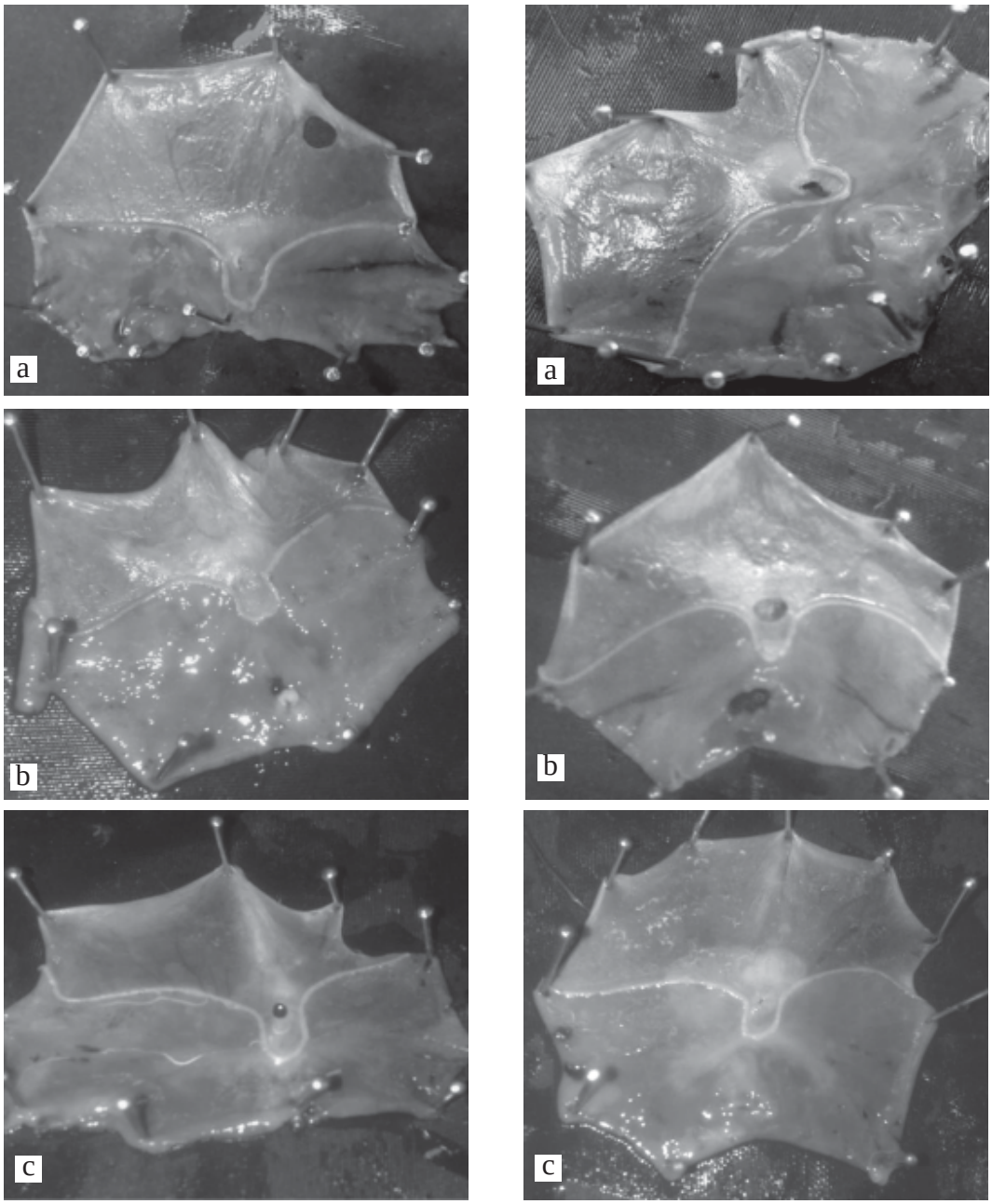

Fig. II: Ulcer Index
a) Control group; b) Standard group; c) Test group

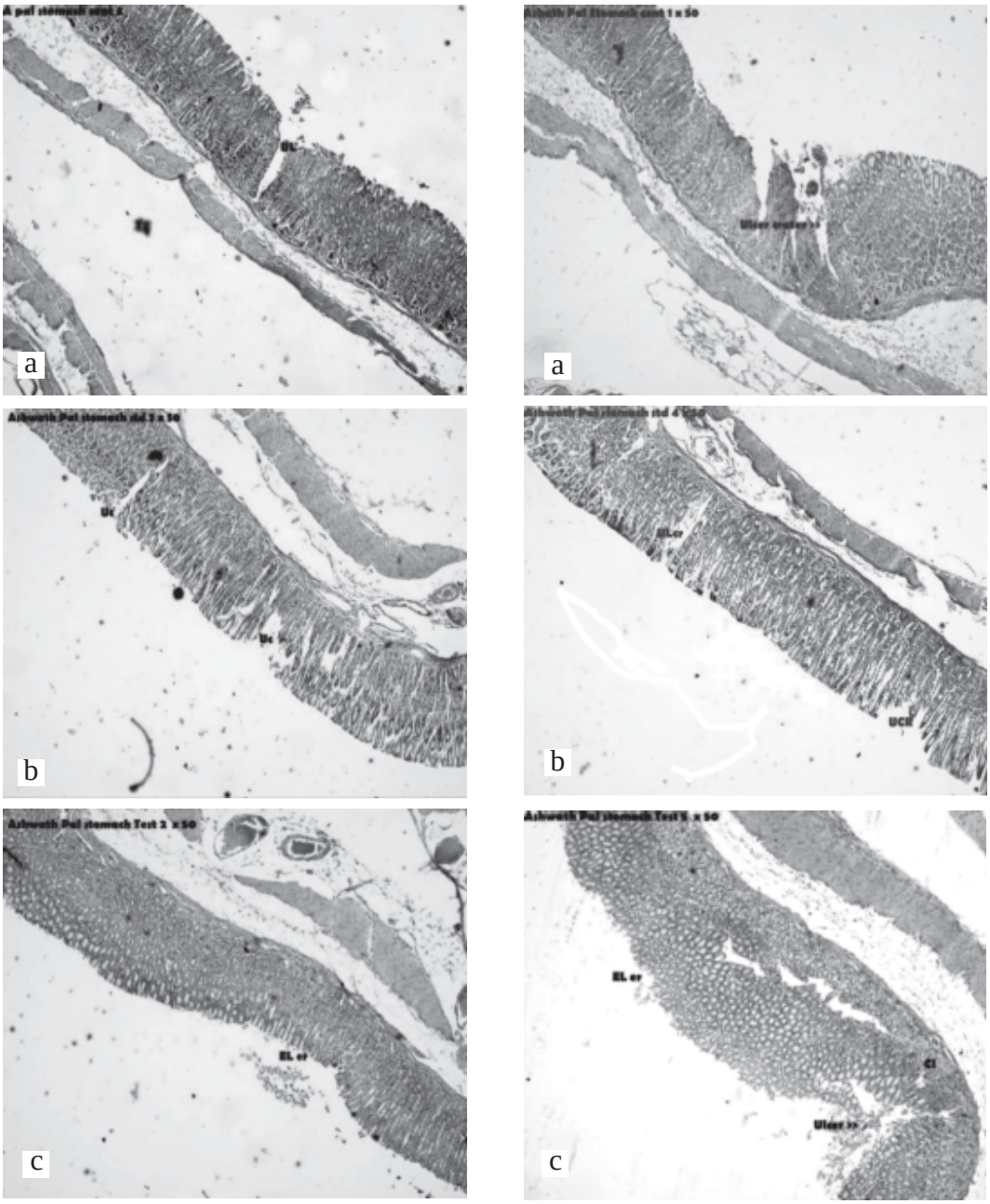

Fig. III: Photomicrographs of sections of stomach
a) Control group; b) Standard group; c) Test group

TABLE 1
Effect of Somanāthītāmrabhasma on various parameters

Parameters	GROUP		
	Control	Standard	Test
Ulcer index	24.83 ± 3.13	10.5 ± 2.31**	18.2 ± 3.96
pH	1.5 ± 0.50	6.5 ± 0.42**	3.6 ± 0.81*
Gastric juice volume (mL)	4.58 ± 1.01	2.46 ± 0.33	3.54 ± 0.97
Free acidity (mEq/L)	3.34 ± 0.69	0.26 ± 0.08**	2.04 ± 0.47
Total acidity (mEq/L)	8.33 ± 0.66	1.23 ± 0.16**	3.54 ± 0.62**
Protein content (µg/mL)	5196.66 ± 815.54	7427.33 ± 1436.9	6446.8 ± 1089.8
Carbohydrate content (µg/mL)	624.5 ± 112.70	348.66 ± 76.77	927.2 ± 138.92
Peptic activity (µmoles of Tyrosine released per ml) group. (Table 1)	600.33 ± 54.43	1091.5 ±160.64*	941.6 ± 140.42
Catalase activity (µmoles H2O2 consumed /mg protein /min)	2.71 ± 0.09	2.41 ± 0.19	1.94 ± 0.17**
Glutathione peroxidase (glutathione utilized per mg protein per minute at 37oC)	135.07 ± 15.59	105.42 ± 10.55	119.98 ± 14.34
Lipid peroxidation (MDA formed /g wet tissue)	0.50 ± 0.08	0.45 ± 0.08	0.38 ± 0.03

Data: MEAN ± SEM, **P<0.01

Discussion

Ulcer area is one of the most reliable and accurate factors to assess antiulcer activity of a drug. Reduction in ulcer index in the test drug shows its cytoprotective activity. This is because of the enhanced prostaglandin secretions which are important for gastro-duodenal defence mechanism.[11] The test drug helped to prevent tissue hypoxia by improving blood circulation, thus preventing damage to gastric mucosa.

Increase in pH of gastric juice and decrease in acidity suggests that the test drug helps in neutralizing gastric contents. This could be because of enhanced production of gastric bicarbonates, forming a base for buffer.[12] As pH moves away from acidic range, there are less chances of damage to gastric mucosa from aggressive factors.

The test drug showed anti-secretory effect by decreasing volume of gastric contents. Presence of anti-secretory effect enhances the healing process of peptic ulcers.[13] Increase in protein and carbohydrate content could be because of increased synthesis of mucin and glyco-proteins; which are main components of gastric mucosal barrier.

Oxidative stress initiates and aggravates many diseases including peptic ulcers. Catalase and glutathione peroxidase are natural scavengers of free radicals. Decrease in their count indicates decrease in anti-oxidant potential in the tissue. Decrease in lipid peroxidation indicates decreased cellular damage.[14]

The observed healing may involve many other mechanisms of actions. The exact mechanism of action needs further elucidation.

Conclusion

It can be concluded that, Somanāthī-tāmrabhasma has anti-ulcer effect against pyloric ligation induced ulcers. It would be beneficial to assess the test formulation at different dose level and also against other models of gastric ulceration.

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CLINICAL RELEVANCE OF LEPANA WITH SPECIAL REFERENCE TO JAṬĀMAYĀDI LEPANA IN ROTATOR - CUFF INJURY

Eswara Sarma M.P. and Devi R. Nair*

Abstract: Rotator - cuff pain along with swelling is increasing in clinical practice. Current approach to this condition depends upon anti-inflammatory medications, steroid therapy, etc. An alternative management in this current scenario which is more economic and feasible, without any reported side-effects is nothing other than 'lepa karma' explained in āyurvedic classics. The present study focuses to analyse the clinical relevance of lepa with special relevance to Jaṭāmayādi lepana in rotator-cuff injury.

Introduction

Śopha is a concept elaborately discussed in almost all of the āyurvedic classics. The depth and extent of the concept cannot be limited to the modern concept of swelling. It encompasses the pathologies ranging from a small localized swelling to life threatening malignancies as ācārya clearly stated that arbuda is nothing other than śopha. So, the treatment of these pathologies naturally includes the elements of treatment principle of śopha. Among treatment modalities of śopha, lepa occupies the premium position.

Rotator cuff pain along associated with swelling is increasing in āyurvedic OPDs and IPDs. Current management criteria consists of steroid medications with numerous adverse effects. An alternative management, which is more economic and feasible without any reported side-effects, is nothing other than 'lepa karma' explained in āyurvedic classics.

A huge spectrum of lepa is mentioned in classical literature for śopha according to doṣa predominance. From time immemorial, many lepa constituted by most available drugs proved to be very much effective in many clinical conditions associated with śopha. But, the efficacy of many of the lepa formulations are not clinically documented. Also, the mode of application of lepa, especially thickness, varies from physician to physician. The guidelines provided in classical literature are not properly converted into a standard operative procedure and has not gone through a scientific validation process. Hence, it is very high time to look into the spectrum of lepa and go into documentations in commonly encountering pathologies and practicing lepana procedure in the most authentic manner as per the guidelines obtained from āyurvedic classics.

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Objective:- To study the effect of Jaṭāmayādi lepa in rotator cuff injury

Materials and methods

Jaṭāmayādilepa cūrṇa[1] was purchased from SNA Oushadhasala [a GMP Certified Company]. The formulation contains the following ingredients: jaṭāmāñci (*Nardostachys jatamansi*), candana (*Santalum album*), kunturuṣka (*Boswellia serrata*), tagara (*Valeriana jatamansi*), aśvagandha (*Withania somnifera*), saraḷa (*Pinus roxburghii*) and rāsna (*Alpinia galanga*)

Participants between 20-60 years of age, presented with pain in shoulder joint with or without involvement of neck, were selected for the trial. The study was conducted as an open clinical trial with sample size 21. The setting used in the trial was Out Patient Department of Pañcakarma, VPSV Ayurveda College Kottakkal. Participants presented with systemic illness such as Rheumatoid Arthritis, external injuries were excluded from the study. Diagnostic criteria used in the study was, pain in the shoulder joint with any or one of the three tests are positive: Hawkin's test, Empty can test, Drop-arm sign. Assessment criteria used in the study was Visual Analogue Scale[3] for pain. Duration of the trial was upto complete subsidence of pain or maximum up to 5 days.

Jaṭāmayādi lepa was made into a thick paste by boiling it in rice water and applied with a thickness of ¼th angula (¼th thickness of index finger).[2] It was advised to retain the lepa in its position until it dries completely and then to wipe it out with clean dry towel dipped in hot water.

Results

Statistical analysis was done with the help of paired t-test. The reduction of pain shown in the VAS scale was statistically significant ($p<0.05$) (Table 1)

TABLE 1
Assessment of pain in VAS scale

Description	Mean	SD	%	't'	P
Before treatment	7.45	0.82	30.47	4.85	0.00
After treatment	5.18	1.72			

Discussion

Rotator cuff injury produces a localized sopha with vāta pitta vitiation. No śopha can occur without the involvement of kapha. Jaṭāmayādi lepa is a unique combination consisting of medicines like rasna having potent vātahara property and medicines that are tīkṣṇa in property like aśvagandha, nata, kunturuṣka, etc. These drugs help to pacify the associated kapha leading to reduction in feeling of heaviness. Drugs like candana help to pacify pitta.

Lepana applied scientifically with appropriate thickness of ¼ aṅgula and optimum retention time helped in the complete absorption of medicinal property of lepana into the affected region. The trial concluded that lepana with Jaṭāmayādi lepa cūrṇa is proved to be effective in reduction of pain in rotator-cuff injury.

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EFFECT OF VAMANAKARMA WITH DHĀMĀRGAVABĪJAYOGA IN THE MANAGEMENT OF MEDOROGA WITH SPECIAL REFERENCE TO DYSLIPIDEMIA

Sangeeta Sharma and Santhoshkumar Bhatted*

Abstract: Cardiovascular diseases (CVDs) and diabetes mellitus are major diseases to which, dyslipidemia is one of the prime causative factors. Dyslipidemia is an established risk factor for atherosclerotic disease. In āyurveda dyslipidemia can be compared to medoroga, which is santarpaṇothavyādhi; and vamanakarma is the preferred line of management. As medodhātu is one of the substances belonging to the category of kapha, vamanakarma was selected for the treatment of dyslipidemia. Dhāmārgavabījacūrṇa is indicated mainly in kapha diseases, hṛdroga and similar condition arising out of excessive kapha and meda. So, this formulation was selected for vamanakarma in 15 patients. The results of the trial were highly significant in reducing lipid levels.

Introduction

Dyslipidemia is defined as a condition with abnormally elevated levels of any one or all lipids in the blood. It is one of the diseases caused by faulty lifestyle that leads to atherosclerosis of vessels (arterial walls) leading to vascular accidents (cerebrovascular/ cardiovascular disease). More than half of the Coronary Heart Disease is attributable to abnormalities in the levels and metabolism of plasma lipids and lipoprotein.

Abnormal cholesterol levels are estimated to cause 18% of the global CVDs and 56% of the global Ischemic Heart Diseases (IHD). For every 1% reduction in lipid level, the risk of heart diseases reduces by 2.5%. Dyslipidemia is an established risk factor for atherosclerotic disease.[1]

According to a study, there has been an alarming increase in the prevalence of CVD in India over the past two decades so much so that accounts for 24% of all deaths among adults aged 25-69 years.[1b] Asian Indians have been found to develop CVD at a younger age than other populations. Dyslipidemia is closely linked to the pathophysiology of CVD and is a key independent modifiable risk factor for cardiovascular disease. The significant finding of the study was that over three-fourth (79%) of the general adult population covered in this survey have abnormalities in at least one of the lipid parameters with no urban rural difference observed in any of the four regions.[2]

Need of the study:- As the available allopathic medication for the management of dyslipidemia

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is associated with side effects, a safe and effective āyurvedic medication has telling importance. Medodhātu is one of the substances belonging to kapha category and vamanakarma (therapeutic emesis) is the best therapy for the elimination of kaphadoṣa and related morbid factors. About 355 formulations by using six main drugs with other supporting drugs are described for inducing vamana, but clinically, mainly madanaphala *(Randia dumetorum)* is used in almost all the conditions. Hence there is need to work on other drugs and formulations which are specific to the underlying disease. So, dhamārgavabījacūrṇa (*Luffa cylindrica*), indicated mainly in kaphaja vikāras and hṛdroga, was selected for vamana.[3]

Aims and objectives:- To evaluate the effect of vamanakarma with dhamārgavabījayoga in the management of medoroga with special reference to dyslipidemia.

Materials and methods

Source of data:- 15 patients found fit for the trial were selected from the Outpatient and Inpatient Department of Panchakarma, National Institute of Ayurveda Hospital, Jaipur.

Drugs used:- Yaṣṭimadhu, (*Glycyrrhiza glabra*) vaca cūrṇa, (*Acorus calamus*) saindha-valavana, (rocksalt) and madhu (honey) were procured from the National Institute of Ayurveda Pharmacy, Jaipur. Dhāmārgava phala (*Luffa cylindrica*) was collected from Jalagaon Dist., Maharashtra (Fig. I).

Diagnostic criteria:- 1) Abnormal levels of serum lipid profile. 2) Clinical features of dyslipidemia and medoroga such as aśakta sarvakarmasu, (difficulty in doing routine work), kṣudraśvāsa, (exertional dyspnoea) svedādhikya (excessive sweating), utsāhahāni (lethargy) and aṅga-gaurava (heaviness in the body).

Inclusion criteria

- Age between 20-60 years
- S. lipid levels more than normal ranging from:
- S. cholesterol (201mg/dl or more)
- S. triglycerides (161mg/dl or more)

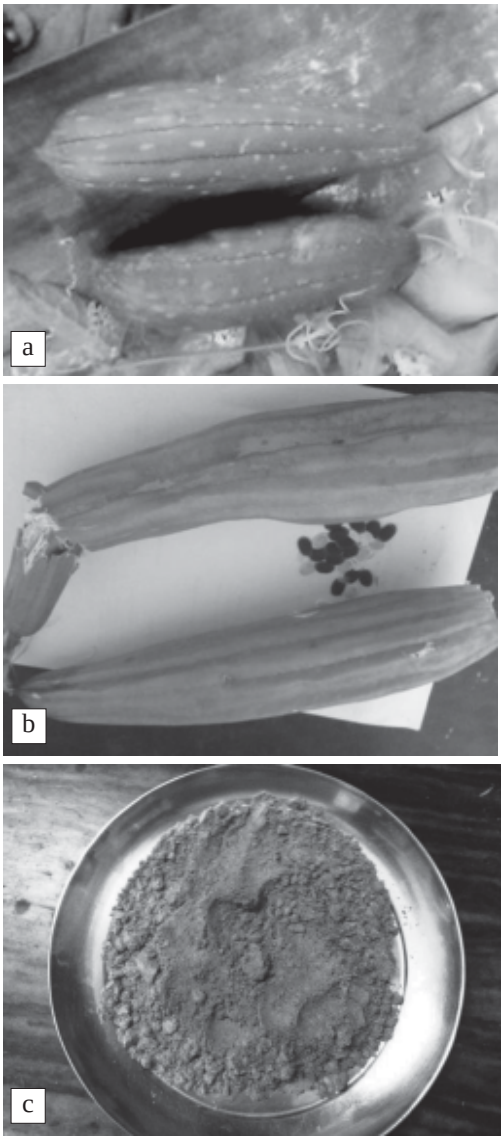

Fig. I. *Luffa cylindrica*
a Fruits; **b** Seeds; **c** Powder

- S. LDL (131mg/dl or more)
- S. VLDL (41mg/dlor more)
- Having clinical features of medoroga
- Fit for vamanakarma

Exclusion criteria

- Age below 20 and above 60 years.
- Associated with serious illness like Carcinoma, Cardiac Failure, Malignant Hypertension.
- Not fit for vamanakarma.

Lab investigation:- a) routine blood test, b) ECG to rule out cardiac pathology, d) lipid profile, e) routine urine analysis.

Vamanakarma

Pūrvakarma (preparatory procedure)

- Dīpana pācana:- Pañcakolacūrṇa 3 gms - twice a day before food till nirāma lakṣaṇas are obtained.
- Śodhanāṅga snehapāna (internal oleation):- Mūrcchita tilataila - 3 to 7 days.
- Sarvāṅga abhayaṅga (whole body oil massage):- Daśamūla tailam and mṛdu sarvāṅgasveda / baṣpasveda (steam bath) for 2 days after samyaksnigdha lakṣaṇa.

Pradhānakarma (main procedure)

- Vamakayoga:- Dhāmārgava cūrṇa (6 grams) with other conventional drugs viz. yaṣṭimadhu (*Glycyrrhiza glabra*), vaca (*Acorus calamus*), madhu and saindhava lavaṇa.

Paścātkarma (post procedure)

- Samsarjanakrama for 3 to 7 days according to śudhi.

Assessment criteria

Objective criteria:- Objective parameters were mainly assessed on the basis of biochemical investigations like lipid profile, body weight,

TABLE 1
Demographic data, data related to disease, etc.

Description	%
1. Demographic data:	
- Age 31-40 years	46.66
- Male	73.26
- Married	100
- Urban population	93.24
- Primary education	46.62
- Private service/business	33.3
- Lower and upper middle class	46.62
- Mixed diet	66.66
- Viṣamāgni	66.6
- Madhyamakoṣṭha	46.62
- Kapha-pitta prakṛti	46.62
- Madhyama satva	59.94
- Āvara samhanana	59.94
- Āvara sāra	66.66
- Habit of madhurarasa pradhāna āhara	46.62
- Addiction to tea	59.94
2. Data related to disease:	
- No positive family history	79.92
- Chronicity history of 1-1½ years	26.64
- Body weight between 81-100 kg	26.66
- BMI between 35-39.9	33.3
- Habit of snigdha ahara (milk products)	100
- Habit of day sleep	46.62
- Stressful nature	46.62
- Sedentary life style	73.26
3. Data related to treatment:	
- Dīpana pācana given for 3 days	46.62
- Snehapāna done for 4 days	79.92
- Snehapāna dose 30 m1 to 400 ml	66.6
- Pittāntaśuddhi observed	86.67
- Laiṅghiki śuddhi like yathākrama doṣadarśana observed	86.58
- Hṛdaya, pārśva, mūrdha and indriya śuddhi observed	100
- Madhyamaśuddhi attained	73.33
- Samsarjanakrama followed for 5 days	86.58
4. Data related to lipid profile	
- S. cholesterol above 240 mg/dl	33.33
- S. triglycerides 200-499 mg/dl	46.62
- S. HDL between 40-60 mg/dl	79.92
- S. LDL between 100-129mg/dl	33.33
- S. VLDL between 41-80 mg/dl	39.96

BMI, Waist Hip Ratio, before and after vamanakarma in terms of percentage relief and statistical evaluations.

Subjective criteria:- Symptomatic evaluation was done on the signs and symptoms of medoroga viz. a) sarvakarmasu aśaktata, b) kṣudraśvāsa, c) svedādhikya and d) daurbalya by giving a score before and after the treatment according to the severity of the symptoms.

Observation and result

Demographic data, data related to disease, treatment and lipid profile are shown in Table 1.

The data obtained in clinical study is subjected to statistical tests and analyzed in three parts: i) objective parameter, ii) subjective parameter and iii) overall assessment.

Assessment of the overall effect of the treatment was done based on objective parameter. As dyslipidemia is not characterized by any signs or symptoms and that it can only be diagnosed by means of Lipid profile. Lipid profile was given a total score of 100 and each of its parameter i.e. S. cholesterol, S. triglycerides, S. HDL, S. LDL, and S. VLDL, was given a score of 20. The individual scores were decided as per the lipid profile limits set by the American Journal of Lifestyle Medicine specifications (Andon M, American Journal of Lifestyle, Jan- feb 2008, Volume II, 51 – 57).

Statistical methods:- Student 't' test (two tailed, dependent) was used to find the significance of objective parameters. Wilcoxon test was used for the assessment of subjective parameters.

TABLE 2
Statistical analysis on objective parameters (n=15)

Parameters	Mean		Dif.	% change	SD	SE	't'	P
	BT	AT						
S. Cholesterol	213.40	188.27	25.13	11.78	22.97	5.93	4.24	.0008 ES
S. Triglycerides	233.13	152.60	80.53	34.54	121.68	31.42	2.56	.02 S
S. HDL	44.60	43.60	1.00	2.24	5.53	1.43	0.70	.49 NS
S. LDL	120.87	114.13	6.73	5.57	23.06	5.95	1.13	.27 NS
S. VLDL	45.80	30.80	15.00	32.75	25.69	6.63	2.26	.04 S
Body Weight	89.87	85.73	4.13	4.60	1.19	0.31	13.48	.0001 ES
Body Mass Index	31.57	30.24	1.33	4.21	0.40	0.10	12.83	<.0001 ES
Waist Hip Ratio	0.95	0.94	0.01	0.98	0.01	0.00	4.53	.0005 ES

TABLE 3
Statistical analysis on Subjective parameters (n=15)

Parameters	Mean		Dif.	% change	SD	SE	't'	P
	BT	AT						
Sarvakarmasu aśaktata	1.73	0.80	0.93	53.85	0.46	0.12	91	.0002 ES
Kṣudraśvāsa	1.20	0.53	0.67	55.56	0.49	0.13	55	.002 VS
Svedādhikya	2.07	1.00	1.07	51.61	0.26	0.07	120	<.0001 ES
Daurbalyata	2.20	1.13	1.07	48.48	0.26	0.07	120	<.0001 ES

TABLE 4

Scoring of individual lipid parameters before and after the treatment (n=15)

Parameters	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT	BT	AT
Cholesterol	00	10	10	20	00	20	20	20	20	20	00	20	20	20	10	20	00	10	10	10	05	10	20	20	05	20	05	20	00	00
Triglycerides	05	05	10	10	00	20	10	20	20	20	05	20	10	10	05	10	20	20	10	20	05	20	10	20	05	20	05	20	05	05
HDL	05	00	10	-05	10	10	10	10	00	00	15	-10	00	00	15	-05	15	-10	05	10	00	10	10	-05	05	20	05	10	10	10
LDL	05	10	10	20	20	20	20	20	20	20	10	20	20	20	20	20	05	05	20	20	20	20	20	20	20	20	20	20	10	20
VLDL	10	10	20	20	05	20	20	20	20	20	10	20	20	20	20	20	20	20	20	20	10	20	20	20	10	20	10	20	10	10

TABLE 5

Overall effect of treatment.

Description	No. of patient	%
No Improvement	06	39.96
Mild improvement	06	39.96
Moderate improvement	02	13.32
Good Improvement	01	6.66
Excellent Improvement	00	00

The mean Cholesterol, Serum Triglyceride and S. VLDL found to be significantly reduced after the treatment; whereas S. HDL and S. LDL reduced statistically not significant. The mean body weight (BW), BMI and WHR were found to be reduced extremely significant after the treatment. (Table 2)

The mean value of the subjective parameters viz. sarvakarmasu aśaktata, kṣudraśvāsa, svedādhikya and daurbalyata were found to be statistically significant (Table 3).

Overall result:- Out of 15 patients, 06 patients showed mild improvement, 02 patients showed moderate improvement, 1 patient showed good improvement and 6 patients showed no improvement. The overall result of the therapy is shown in Tables (4 & 5).

Discussion

Vamanakarma is one of the classical bio-cleansing therapies which eliminate the morbid material, like vitiated doṣa, metabolic waste, unwanted excessive accumulated substance from the body. It is specific for kaphadoṣa which belongs to the category of medodhātu (fat), thereby having its direct effect on fat tissue which is one of the reasons for reduction in lipid levels. Vamana also corrects pittadoṣa to a moderate extent and indirectly improves functioning of liver which plays an important role in the lipid metabolism. The therapy helps

for the mobilisation of peripheral fat by subsequently eliminating through liver.

Vamanakarma also improves digestion and metabolism thereby corrects the lipid metabolism and regulates endogenous production of lipids. In Dhamārgavakalpa it has been indicated for hṛdroga. As dyslipidemia is a direct factor of atherosclerosis leading to heart diseases, dhamārgavabīja was selected for vamanakarma. A study done[4] on seed oils of *L. cylindrica*, which proved its efficacy in reducing serum cholesterol levels, supports this finding.[4]

Conclusion

Dyslipidemia is an abnormal amount of lipids in the blood due to impaired lipid metabolism and a major risk factor for many life threatening diseases like Coronary artery disease, Diabetes mellitus, etc. Medoroga is a santarpaṇajanya/ kaphapradhāna vyādhi for which samśodhanakarma, especially vamana, is indicated. In Dhamārgavakalpa, it has been indicated for hṛdroga. As dyslipidemia is a direct factor of atherosclerosis leading to heart diseases, it was selected for vamanakarma. In different parameters of lipid profile, the mean reduction of Serum Cholesterol showed better results statistically.

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EFFECT OF *BARLERIA PRIONITIS* AND *HYPTIS SUAVEOLENS* EXTRACTS ON GLUCOSE TOLERANCE IN GLUCOSE INDUCED HYPERGLYCAEMIC RATS

Azmath Unnisa Begum,[1] Sama Venkatesh[1] and Jaya Prakash[2]

Abstract: *Barleria prionitis* Linn. (Acanthaceae) and *Hyptis suaveolens* (L.) Poit. (Lamiaceae) are reported to be useful traditionally in the treatment of diabetes. The aqueous ethanolic extract of aerial parts of both plants and their fractions were tested for its effects on blood glucose levels in glucose challenged diabetic rats, at an oral dose of 200 and 400 mg/kg. Petroleum ether extract (48.98%), chloroform extract (39.63%) and aqueous ethanol extract (38.24%) of *Barleria prionitis* produced a significant hypoglycaemic property at 60 min after glucose administration. The effect shown on glucose tolerance was also remarkable. The results of present investigation reveal the scientific basis for the utility of both plants in treatment of diabetes in traditional system of medicine.

Introduction

Plant species are persistently being studied for the identification of novel therapeutic agents. Although insulin therapy and oral hypoglycaemic agents are the mainstay of treatment of diabetes and are effective in controlling hyperglycemia, they have prominent side effects and failed to significantly alter the course of diabetic complications.[1] In India indigenous remedies have been used in the treatment of Diabetes Mellitus (DM) since the times of Caraka and Suśruta. Many plants have been reported to have hypoglycaemic properties in traditional system of medicine.[2]

Barleria priontis Linn. (Family - Acanthaceae) is a much branched, spiny, prickly shrub, distributed throughout India. In traditional medicine the plant is reported to be useful in inflammation, expectorant, cough, pain, diuretic, for rheumatic pains[3,4] and diabetes.[5] Flavonoids, iridoid glucosides and fatty acids were reported.[6,7] The extract of plant is reported to be a potent hepatoprotective agent,[8] respiratory infections[9] and tuberculosis.[10] The juice of leaves is useful in fungal infections,[11] wound healing and joint pain.[12,13] Similarly, *Hyptis suaveolens* (L.) Poit. (Lamiaceae) (HSL) is a fast growing perennial herb found in dense clumps along road side and distributed in the tropical and sub tropical region. It is used traditionally for the treatment of respiratory tract infections, cold, pain, inflammation, fever, skin diseases and diabetes.[14,15] The leaves are reported to be rich in essential oils[16] and useful in antifungal,[17] antibacterial[18] and anti-convulsant activities.[19] The aerial parts are reported to contain antiplasmodial diterpe-noids[20] and triterpenoid heptadienic acid.[21] The leaves are reported to

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possess antihyper-glycemic activity in the management of DM.[22] Phytochemically, *H. suaveolens* leaves are reported to contain hentriacontane, hentriacontanone, lupeol and its acetate and friedelin.[23]

Scientific evaluations on the hypoglycaemic effects of *B. prionitis* have not been reported so far and limited reports available on the antihyperglycemic activity of *H. suaveolens* are with an unknown mode of action and not in scientific way. Therefore, a study was conducted to test and compare the hypoglycaemic effects of both plants by preparing the aqueous ethanolic extract followed by its partitioning with various organic solvents and resultant extract screening for the antihyperglycemic activity in glucose induced hyperglycaemic rats.

Materials and methods

Plant material:- The aerial parts of *Barleria priontis* (BPA) were collected in the month of September 2013 from the Attapur, Hyderabad, Telangana and the aerial parts of *Hyptis suaveolens* (HSL) were collected in the month of October 2013 from Rajendra Nagar, Hyderabad. The plants were identified and authenticated by Scientist & Taxonomist of the Botanical Survey of India, Hyderabad, Telangana. [Voucher specimens of BPA (AUB-BPA-2013) and HSL (AUB-HSL-2013) are maintained in the Department of Phytochemistry and Pharmacognosy G. Pullareddy College of Pharmacy, Hyderabad, Telangana]. The aerial parts were cut, air dried and grounded into powder.

Preparation of ethanolic extract:- The dried aerial part powder of BPA (1.4 kg) and HSL (1.3 kg) were extracted with 80% ethyl alcohol by maceration process for 5 days. The percentage yield of crude aqueous ethanolic extract of BPA is 10.71 and HSL is 9.23.

Fractionation of extract:- To the concentrated aqueous ethanolic extracts of both plants, 500 ml of water were added and fractionated with petroleum ether (4x500 ml), chloroform (4x500 ml), ethyl acetate (4x500 ml) and n-butyl alcohol (4x500 ml). The percentage yields of petroleum ether, chloroform,ethyl acetate, n-butanol and remaining aqueous extract of BPA were 0.46, 0.65, 0.29, 0.64 and 6.86 whereas the percentage yield of HSL is 0.56, 0.59, 0.2, 0.55 and 5.74 respectively.

Animals:- Wistar rats of either sex were used in the experiment and were maintained under standard conditions of temperature, relative humidity, dark:light cycles with free access to standard diet (Hindustan Unilever, India) and water. The aqueous ethanolic extract and its fractions of BPA and HSL were administered orally as a fine suspension using 0.5% (w/v) aqueous carboxy methyl cellulose (CMC). All extracts were tested at 200 and 400 mg/kg, whereas standard glibenclamide was administered orally at a dose of 10 mg/kg.

Acute toxicity studies:- Acute toxicity studies were performed according to OECD 425. The test uses a maximum of 5 animals. A test dose of 2000 mg/kg was used. First animal was dosed and observed continuously for the initial period of 2 hours intermittently for the next 6 hours and then 24 hours for death and abnormality in behavioural changes, the animal survived then next four animals dosed sequentially. All the animals survived - LD_{50} was >2000 mg/kg.[24]

Glucose tolerance test (GTT):- Fasted rats were divided into 14 groups of 6 rats each. Group 1 served as control, received vehicle. Group 2 to 13 received various CMC suspensions of BPA extracts at an oral dose of 200 and 400 mg/kg.

Group 14 received glibenclamide as standard at an oral dose of 10 mg/kg. After 30 min of extract administration, the rats of all groups were orally loaded with 2 g/kg of glucose. Blood samples were collected from the retro orbital plexus just prior to glucose administration and at 30, 60 and 90 min after glucose loading.[25, 26] Plasma was separated and blood glucose levels were measured immediately by glucose-oxidase method.[27] Similarly in a separate set of animals, all extracts of HSL were tested at an oral dose of 200 and 400 mg/kg and glibenclamide (10 mg/kg) as standard. The scheme of treatment for BPA and HSL are given in Table 1 and 2.

Statistical analysis:- All the values were expressed as mean ± SEM and the results analysed statistically by using analysis of variance (ANOVA) followed by Dunnetts test. Values of $p<0.05$ were considered significant.

Results

In oral acute toxicity studies, no mortality and abnormal behavioural changes observed in mice upto a dose of 2 g/kg body weight. All extracts of both plants was considered to be safe and further antihyperglycemic activity was tested at an oral dose of 200 and 400 mg/kg body weight.

A peak increase in glucose concentration was observed at 60 min in control animals after glucose load in both sets of GTT. The blood glucose concentrations remained high during 90 min of experiment in control rats.

The effect of *Barleria prionitis* in glucose tolerance test is given in Table 1. The group received the extracts of BPA showed significant ability to utilise the external glucose load at both test dose levels at 60 min after glucose loading (90 min after drug administration). The petroleum ether and chloroform extracts produced a significant ($p<0.001$) dose dependent activity. The animals received 400 mg/kg shown maximum activity. Petroleum ether extract at a dose of 400 mg/kg produce maximum protection (48.98%) followed by chloroform and aqueous ethanol extracts at 60 min after glucose administration. The protection was sustained up to 90 min after glucose load in petroleum ether and chloroform extract treated animals at a dose of 400 mg/kg. The decrease glucose level in comparison to control rats were 38.24, 48.98, 39.63, 12.9, 8.84, 10.75 of 400 mg/kg extracts of aqueous ethanol, petroleum ether, chloroform, ethyl acetate, butanol and left over aqueous extract, respectively at 60 min after glucose charge. The standard glibenclamide (10 mg/kg) produced a significant maximum protection at 60 min (59.44%). At any course of experiment the activity produced by BPA extracts was not comparable with standard glibenclamide activity. Butanol, ethyl acetate and left over aqueous extracts not produced a considerable hypoglycaemic properties.

The effect of HSL extracts and glibenclamide on glucose tolerance is presented in Table 2. The control animals received CMC, produced a peak increase in blood glucose concentration after 30 min. The blood glucose concentration remained high over next 90 min. In contrast, the groups received the extracts of HSL showed significant activity to utilise the external glucose load. The remarkable effect on glucose tolerance was shown by butanol extract followed by aqueous ethanol and ethyl acetate extracts at 60 min. These three extracts produced significant ($p<0.001$) dose dependent activity. Butanol and aqueous ethanol extracts produced glucose tolerance fairly constant at 60 and 90 min.

TABLE 1
Effect of *Barleria prioinitis* extracts on Oral Glucose Tolerance in Rats

Group	Treatment	Dose mg/kg	Fasting	30 min	60 min	90 min
1	Control	-	81.96 + 1.15	157.16 + 1.33	196.3 + 1.27	164.75 + 1.37
2	Aq.ethanol ext	200	95.14 + 1.2*	132.06 + 1.17*** (15.97)	139.19 + 0.87*** (29.09)	129.10 + 1.28*** (21.50)
3	Aq.ethanol ext	400	86.41 + 1.41*	120.12 + 1.06 *** (23.56)	121.22 + 1.51*** (38.24)	130.08 + 1.07*** (21.04)
4	Pet. Ether ext	200	74.87 + 1.26**	129.79 + 1.31*** (17.41)	147.32 + 1.01*** (24.95)	121.12 + 1.00*** (26.48)
5	Pet. Ether ext	400	70.82 + 1.12***	114.10 + 0.68*** (27.39)	100.14 + 1.22*** (48.98)	93.41 + 1.32*** (43.30)
6	Chloroform ext	200	93.88 + 1.17*	124.81 + 0.88*** (20.58)	136.40 + 0.95*** (30.51)	111.44 + 0.98*** (32.35)
7	Chloroform ext	400	70.96 + 1.36***	118.76 + 0.99*** (24.43)	118.5 + 0.99*** (39.63)	98.33 + 0.71*** (40.31)
8	Ethyl acetate ext	200	93.51 + 1.03*	140.78 + 1.14** (10.4)	173.15 + 0.93** (11.70)	147.46 + 0.75** (10.49)
9	Ethyl acetate ext	400	76.16 + 1.40**	135.63 + 1.39*** (13.6)	170.96 + 1.10** (12.9)	145.57 + 0.93** (11.64)
10	Butanol ext	200	70.09 + 0.97***	148.36 + 0.90** (5.59)	182.02 + 1.24** (7.27)	150.44 + 1.0** (8.68)
11	Butanol ext	400	82.7 + 1.37*	147.72 + 0.98** (6.64)	178.93 + 0.92** (8.84)	148.75 + 1.0** (9.71)
12	Leftover aq ext	200	80.55 + 1.44*	156.40 + 1.13* (0.48)	179.74 + 0.96** (8.43)	165.65 + 1.26* (0.54)
13	Leftover aq. ext	400	79.02 + 1.11*	151.5 + 1.43* (3.60)	175.18 + 1.42** (10.75)	163.60 + 0.80* (0.69)
14	Glibenclamide	10	70.87 + 0.77***	73.50 + 0.55*** (53.23)	79.60 + 1.54*** (59.44)	79.1 + 1.25*** (51.98)

Figures in the parenthesis indicate the percentage decrease in plasma glucose; Mean ± SEM; n=6; P<0.001***; 0.01**; 0.05* vs control

Glibenclamide activity was remained high throughout the experiment in lowering the glucose concentration. Petroleum ether, chloroform and left over aqueous extracts produce a very less significant glucose tolerance. The decrease in glucose levels in comparison to control rats were 35.52, 8.89, 9.6, 33.29, 41.65 and 1.76 of 400 mg/kg of aqueous ethanol, petroleum ether, chloroform, ethyl acetate, butanol and left over aqueous extract at 60 min.

Discussion

The results indicate that *Barleria prionitis* and *Hyptis suaveolens* help to reduce the glucose level in glucose loaded animals. The activity of

TABLE 2
Effect of *Hyptis suaveolens* extracts on Oral Glucose Tolerance in Rats

Group	Treatment	Dose mg/kg	Fasting	30 min	60 min	90 min
1	Control	-	106.10 + 1.23	158.30+1.30	175.76+1.2 3	160.71+1.12
2	Aq.ethanol ext	200	69.49 + 1.13***	125.48+1.55*** (18.83)	141.29+1.51*** (19.61)	110.15+1.27*** (31.46)
3	Aq.ethanol ext	400	56.27 + 0.95***	102.06+1.35 *** (35.52)	113.32+1.41*** (35.52)	98.27+1.25*** (38.85)
4	Pet. Ether ext	200	98.63 + 1.16**	150.17+0.99* (5.13)	162.86+0.98* (7.33)	149.48+1.05** (6.98)
5	Pet. Ether ext	400	83.52 + 1.34***	148.39+0.85* (6.26)	160.13+1.18* (8.89)	146.05+1.06** (9.12)
6	Chloroform ext	200	54.75 + 1.09***	144.49+1.09** (8.72)	160.87+0.93* (8.4)	147.17+0.91** (8.4)
7	Chloroform ext	400	88.5 + 0.91***	140.37+1.08*** (11.32)	158.78+0.95* (9.6)	145.69+0.94** (9.3)
8	Ethyl acetate ext	200	110.28 + 0.87*	127.26+0.77*** (19.6)	132.02+1.16*** (24.88)	123.11+1.15*** (23.39)
9	Ethyl acetate ext	400	66.99 + 1.35***	124.45+0.97*** (21.38)	117.24+1.20*** (33.29)	119.76+0.93*** (25.48)
10	Butanol ext	200	100.39 + 0.94*	123.48+1.02*** (21.99)	125.18+0.83*** (28.77)	121.47+1.01*** (24.41)
11	Butanol ext	400	72.78 + 1.08*	105.54+0.95*** (33.32)	102.55+0.91*** (41.65)	102.80+0.81*** (36.03)
12	Leftover aq. ext	200	94.63 + 1.27***	156.77+0.95* (0.96)	173.01+1.2* (1.56)	160.12+1.16* (0.36)
13	Leftover aq. ext	400	86.12 + 1.18*	156.5+ 0.92* (1.13)	172.65+1.03* (1.76)	159.98+0.80* (0.45)
14	Glibenclamide	10	70.23 + 1.37***	73.21+1.46*** (53.75)	79.92+1.06*** (54.52)	79.28+1.09*** (50.66)

Figures in the parenthesis indicate the percentage decrease in plasma glucose; Mean ± SEM; n=6; P<0.001***; 0.01**; 0.05* vs control.

petroleum ether extract of BPA is more or less comparable to the glibenclamide activity. Aqueous ethanol and butanol extracts of HSL sustained the protection at 90 min of experiment. The values obtained after infusion of BPA and HSL were significant (p<0.001) at 60 and 90 min of glucose load. Glucose 2 g/kg ingested 30 min after extract is a good testing study[28] to prove the hypoglycaemic activity of antidiabetic plants. Statistically highly significant (p<0.001) reduction in blood glucose concentration produced by glibenclamide at every point of GTT, shows the sensibility of experimental model in researching hypoglycaemic substance. The effect of *Barleria prionitis* on glucose tolerance significantly higher than *Hyptis suaveolens*

suggests that *Barleria prionitis* is more effective in controlling the blood glucose level following a heavy carbohydrate diet.

The efficacy of *Barleria prionitis* and *Hyptis suaveolens* to improve the utilisation of glucose following an external glucose load, throws light on the possible mechanism of hypoglycaemic activity of the extracts. The mechanism of action of these plants could be speculated partly to increase peripheral utilisation of glucose either by direct stimulation of glucose uptake[29] or via the mediation of enhanced insulin secretion.[30]

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EFFICACY OF KAṬĪVASTI AND ŚAMANAUṢADHI IN THE MANAGEMENT OF GṚDHRASI (SCIATICA) - A COMPARATIVE CLINICAL STUDY

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Abstract: Sciatica is a syndrome characterized by radiating pain from low back region to lower limbs associated with tingling sensation and sensory impairment occasionally. In āyurvedic classics, a similar presentation is seen explained as gṛdhrasi. A clinical trial was carried out in 30 patients suffering from gṛdhrasi (sciatica). Kaṭīvasti (local treatment on lumbo-sacral region) and oral medications like Yogarājaguggulu and Rāsnāsaptaka kvātha found to be safe and effective in gṛdhrasi.

Introduction

The 2010 Global Burden of Disease Study has estimated that low back pain is one among the top 10 diseases. It is difficult to estimate the incidence of low back pain as, now a days, the incidence of first episode is by the early adulthood and symptoms tend to recur over time. The lifetime prevalence of non-specific (common) low back pain is estimated at 60% to 70% in industrialized countries (one-year prevalence 15% to 45%, adult incidence 5% per year). The prevalence rate in children and adolescents is lower than that of adults but is rising. Prevalence increases and peaks between the 35 and 55 of ages.[1] Most commonly, the diagnosis is done with a syndrome named sciatica. The term sciatica is commonly used to describe pain radiating along the distribution of the sciatic nerve; travels from the low back through the buttocks downward into the leg and sometimes into the foot; affects only one side of the lower body or both; may be constant and vary from mild to severe shooting pain down to leg; sometimes described as electricity, associated with burning and tingling sensations and partial leg numbness or weakness.[1]

Severity in symptoms can cause difficulty in sitting, standing and walking and may disturb the routine day to day activities.

Common causes of low back pain include lumbar strain, nerve irritation, lumbar radiculopathy, bony encroachment and conditions of the bone and joints.[2] The principles of treating low backache caused by lumbar disc disease are explained by three 'R's i.e. Relieve pain in acute cases, Restore normal movements in chronic cases and Recurrence is to be prevented.[3] Management of sciatica includes use of analgesics, NSAIDs for pain, which are having several adverse reactions and surgical corrections at last, which are associated with complications.

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In the āyurvedic view sciatica can be correlated to gṛdhrasi. It is a vātavyādhi characterized by stamba (stiffness), ruk (pain), toda (pricking pain) and spandana (twitching). The symptoms primarily start from the region of sphikpradeśa (gluteal region) and radiate downwards from the pṛṣṭhabhāga to kaṭi (lumbo sacral region), uru (thigh), jānu (knee) and jaṅgha (heel) in the order.[4]

The management principle is administration of vātaśāmaka dravya (vāta alleviating drugs), snehana (oleation) and svedana (sudation) therapy. Drugs which are disease-specific and acts on vātadoṣa is also helpful in reliving the symptoms.

Snehana and svedana are considered as prime in the treatment of vāta.[5] Snehana includes both external and internal oleation. External snehana and svedana are done by kaṭīvasti (local treatment over lumbo-sacral region), abhyaṅga (massage), pariṣeka (pouring the medicated oil), avagāha (tub bath), etc. These therapies act on sparśanendriya (touch sensory organ) which is the seat of vāyu.[6] Snehana and svedana by virtue of their vātaśāmaka and dhātupoṣaka (nourishment of body elements) properties relieve the symptoms. Svedana relieves śīta (cold sensation), śūla (pain) and stambha (stiffness), thus helps in alleviating the sign and symptoms of gṛdhrasi.[7]

Kaṭīvasti, an external, simple, non-invasive, economic and palatable treatment is found to be effective in clinical practice; and oral medicines like Yogarājaguggulu and Rāsnāsaptakakvātha are also found to be safe in general practice. In view of the limitations of the allopathic medication, higher incidence of the disease and its effect on the routine activities of the victims, a study was conducted to evaluate the efficacy of these simple and safe treatments in the management of gṛdhrasi (sciatica).

Aim & objective:- i) To evaluate the efficacy of Yogarājaguggulu and Rāsnāsaptakakvātha in gṛdhrasi and ii) to evaluate the efficacy of Yogarājaguggulu, Rāsnasaaptakakvātha and kaṭīvasti in the management of gṛdhrasi.

Materials and Methods

Total 30 patients who fulfilled the diagnostic criteria of gṛdhrasi (sciatica) were selected from the OPD and IPD of NIA Jaipur, irrespective of sex, religion, socio economic status.

Diagnostic criteria

1) Patients having the symptoms like pain and stiffness in low back region, tingling sensation and radiating pain from low back region to lower limbs; and 2) Positive SLR test, Bragard's sign, Schobar's test.

Bragard's sign:- In this test, the physician passively lowers the patient's leg about an inch from the straight leg raising position in which pain was elicited and then passively dorsiflexes the patient's foot. The test is positive if pain is reported.

Schobar's test:- Make a mark approximately at the level of L5 (fifth lumbar vertebra). Then examiner should places one finger 5 cm below this mark and another finger 10 cm above this mark. The patient is asked to touch his/her toes without bending at knee. By doing so, the distance between the two fingers of the examiner increases. However, a restriction in the lumbar flexion of the patient reduces this increase; if the distance increases less than 5 cm, then there is an indication that the flexion of the lower back is limited.

Lab investigations: - Routine hematological and urine investigations were carried out before the treatment to exclude other pathology.

Inclusion criteria

Patients between 25 to 60 years of age; having the sign and symptoms of gṛdhrasi i.e. ruk (pain), toda (pricking sensation), stambha (stiffness) and muhurspandana (twitching) in the sphik, kaṭi (lumbo sacral), uru (thigh), jānu (knee), jaṅgha (heel) in order and śaktikṣepanigraha i.e. restricted lifting of the legs.

Exclusion criteria

Patients age below 25 years and above 60 years of age; and those having severe systemic disorders, infections like tuberculosis of spine, renal disorders and cardiac diseases.

Assessment criteria:- The Assessment parameters with its gradations are explained in the Table 1

Treatment modalities

Internal:- i) Yogarājaguggulu[8] (The ingredients of this formulation are: nāgara, pippali, cavya, pippalīmūla, citraka, hiṅgu, ajamoda, sarṣapa, jīrakadvaya, reṇuka, indrayava, pāṭha, viḍaṅga, kaṭuki, vaṅga, raupya, nāga, loha, abhraka, maṇḍūra, rasasindūra and guḍapāka); and ii)

TABLE 1

Assessment criteria parameters with scoring pattern

Parameters	Severity of sign & symptoms	Score
1. Pain	No pain	0
	Occasional pain (1 to 2 hours per day)	1
	Mild pain (able to tolerate)	2
	Moderate pain (hampers the routine activities)	3
	Severe pain which requires medication	4
2. Tingling sensation	No tingling sensation	0
	Present sometimes	1
	Present most of the time	2
	Present in all the time requires medication	3
3. Tenderness	No tenderness	0
	Bearable tenderness	1
	Wincing of face on pressure	2
	Wincing of face and withdrawal of the affected part on pressure	3
	Resist - touch	4
4. Forward bending	Can bend completely	0
	Can bend with slight pain	1
	Can bend with moderate pain	2
	Can bend with severe pain	3
	No movement	4
5. SLR test	$< 30^0$	4
	30^0 - 45^0	3
	45^0 - 60^0	2
	60^0 - 90^0	1
	$> 90^0$	0

Rāsnāsaptakakvātha[9] (The ingredients are: rāsna, gokṣura, eraṇḍa, devadāru, punarnava, guḍūci and āragvadha).

External:- Kaṭīvasti with Daśamūlataila.[10]

Kaṭīvasti:- The patients are prepared in prone position; a circular ring about 5-6 cm height and 10-12 cm diameter using black gram powder paste is made over the lumbo-sacral region and fixed properly by pressing its edges from outside and inside. Warm Daśamūla oil is poured in the ring so as to cover the whole skin surface area. The temperature of the oil is maintained by changing it repeatedly and according to the heat tolerance capacity of the patient. The duration of the procedure is 30 minutes.

Grouping:- The patients were equally divided into two groups - Group A and B i.e. 15 patents in each group.

Treatment:- Group A was administered Yogarājaguggulu - 500 mg (2 tablets thrice a day) and Rāsnāsaptakakvātha - 40 ml (twice a day after food) for a period of 2 months. Patients in Group B were treated with Kaṭīvasti using 400 ml of Daśamūlataila for 15 days (conducted in between 11-12 noon) and with oral administration of Yogarājaguggulu 2 tablets (thrice a day) and Rāsnasaptakakvātha 40 ml (twice a day) after food for a period of 2 months.

Observations and result

Of 30 patients, maximum (63.33%) were male; 83.33% in between the age group of 25-50 years; 76.66% married; 80% were engaged on strenuous work; 53.33% vāta-kaphaprakṛti; 53% krūrakoṣṭha and 78% were non vegetarians.

Statistical analysis was done using Z–Test as both the groups were symmetrical. The patients treated with Rāsnasaptakakvātha and Yogarājaguggulu (Group A) showed moderate improvement whereas in Group B, i.e. patients treated with treated with Rāsnasaptakakvātha, Yogarājaguggulu and kaṭīvasti showed marked improvement on the sign and symptoms of gṛdhrasi (Table 2).

Discussion

Due to modernization and sedentary life style, incidences of 'vātika disorders' affecting the locomotor system are increasing. Gṛdhrasi (sciatica), enumerated among the 'nānātmaja vyādhi of vāta' in the classics,[11] is high on the list.

The ingredient drugs of the formulations that administered orally have uṣṇavīrya and kapha-vāta śāmaka properties. This helped to correct vāta and kapha which are the main factors involved in the samprāpti (pathogenesis) of gṛdhrasi. The drug combination in Yogarāja-guggulu acts as vātahara, śūlahara (relieves pain) and śrotośodhaka (cleanses body channels); Rāsnāsaptakakvātha acts as vātahara, āmahara (relieves indigestion), śotha (relieves swelling) and śūlahara.

Snehana due to its snigdha and guru properties overcomes the rūkṣa and laghu properties of vāta and helps in vātaśamana. Svedana due to its uṣna property overcomes the śīta property of vāta and relives śīta (cold), śūla (pain) and stambha (stiffness).

Modern physiology and pharmacology supports the transdermal absorption of therapeutic agent. Lipids are easily permeable through the skin. Lipid soluble substances like vitamins are easily absorbed through the skin particularly when the local temperature is increased. Sweat glands and hair follicles act as shunt i.e. easy pathway for diffusion through the rate limiting stratum corneum.[12] Kaṭīvasti, a kind of heat application through oily substances, have penetration through the skin and reaches

TABLE 2
Effect of treatment in Group A & B

Parameters	Mean				SD	SE	't'	p
	BT	AT	Diff.	%				
A. Group I								
- Pain	2.533	1.4	1.133	44.73	0.3518	0.090	12.47	<0.001
- Tenderness	1.866	1	0.866	46.42	0.3518	0.090	9.539	<0.001
- Tingling Sensation	2.133	1.266	0.867	40.62	0.3518	0.0908	9.539	<0.001
- Forward Bending	2.46	1.33	1.13	45.94	0.351	0.09	12.47	<0.001
- SLR Test	2.2	1.066	1.13	51.51	0.35	0.09	12.47	<0.00
B. Group B								
- Pain	3.13	1.2	1.86	59.57	0.516	0.133	14	<0.001
- Tenderness	2.866	1	1.866	65.11	0.351	0.90	20.54	<0.001
- Tingling sensation	2.733	0.866	1.866	68.29	0.516	0.133	14	<0.001
- Forward bending	2.86	0.53	2.33	81.39	0.723	0.1868	12.48	<0.001
- SLR Test	3.333	1	2.33	70	0.617	0.159	14.64	<0.001

to the site of lesion. Daśamūlataila used in kaṭīvasti is vedanaśāmaka (pain reducing) and balya (increases strength) in property, which is effective for the correction of vāta. The combined effect of the drug and the procedure (kaṭīvasti), a combination of snehana and svedana, helped in relieving the sign and symptoms.

Conclusion

Based on the clinical sign and symptom gṛdhrasi can be compared with sciatica.The main treatment modality is sanehana, svedana and administration of vātaśāmaka dravya. Application of Daśamūlataila kaṭīvasti along with Yogarājaguggulu and Rāsnāsaptakakvātha proved to be better in the management of gṛdhrasi.

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EFFECT OF TRIPHALĀDI KĀLAVASTI IN THE MANAGEMENT OF ESSENTIAL HYPERTENSION

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Abstract: Hypertension is one of the grave conditions accounts 6% of death of worldwide. Increased blood pressure was the cause of an estimated 9.4 million deaths. According to āyurveda, hypertension is a tridoṣaja vāta-pittapradhāna disorder with duṣṭi of rasa, rakta and meda. Vastikarma is the best treatment for vitiated vāta as it regulates the movement of vāta. Further, the drugs of Ttriphalādi kālavasti are raktaprasādaka, śrotaśśodhaka and kapha-pitta-medohara. A study was conducted on 15 patients to evaluate the effect of Triphalādi kālavasti in the management of essential hypertension. Vastikarma found to be highly effective in reducing both systolic and diastolic blood pressure level and extremely significant (P< 0.001) statistically.

Introduction

Hypertension is a prolong, excess of tension and stress caused by blood on arteries. It is an elevated arterial pressure level >140/90 mmHg. Essential hypertension affects 90-95% of hypertensive patients. It has been estimated that hypertension accounts 6% of death of worldwide.[1] About 800 million people in the world are suffering from hypertension. The most devastating aspect of this disorder is that it is not characterized by any of the cardinal symptoms and causes damage to vital organ over a period time. Persistent hypertension doubles the risk of cardiovascular disease, including coronary heart disease (CHD), ischemic and haemorrhagic stroke, renal failure and peripheral arterial disease.[2] National Health and Nutrition Examination Survey (NHANES) reported that, about 16 million take medicine, but still don't have their blood pressure under control. Increased blood pressure was the cause of an estimated 9.4 million deaths. Although antihypertensive therapy clearly reduces the risk of cardiovascular and renal disease, long term use of antihypertensive drugs associated with adverse effect.[3]

According to āyurveda hypertension is tridoāja vāta-pitta pradhāna disorder and duṣṭhi of rasa, rakta and meda with mārgāvarodha. Āyurveda through its holistic approach and radical treatment like pañcakarma, corrects the basic pathology by eliminating the chief causative factors. Vastikarma is the best treatement for vitiated vātadoṣa. It regulates the activity and movement of vāta . The cleansing effect of vasti in the colon have its effect on all over the body in general and in particular on the rasa-raktavaha śrotas; apart from this the drug like triphala

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having lekhana, śrotośodhaka, rakta-pitta-śodhaka properties which help to reduce the blood pressure.

Aims and objectives:- To evaluate the effect of Triphalādi kālavasti in the management of essential hypertension.

Materials and methods

Source of data:- 15 diagnosed cases of essential hypertension as per 7th JNC & WHO criteria for Diagnosis of Hypertension were randomly selected from the OP & IP Department of Panchakarma, National Institute of Ayurveda, Jaipur. The study (Reg. No. RAU/ACa/622/12-13) was conducted at Dr. Sarvapalli Radhakrishnan Rajasthan Ayurveda University Jodhapur.

Inclusion criteria:- i) Patients of either sex, between the age group 20 to 60 years; ii) who are diagnosed of essential hypertension; iii) cases of mild and moderate grade of hypertension as per 7th JNC & WHO criteria; iv) those who are fit for the clinical trial.

Exclusion criteria:- i) Cases of secondary hypertension; ii) pregnancy induced hypertension; iii) those who are on oral contraceptive pills/steroids; iv) cases associated with serious illness like malignancy, HIV and tuberculosis.

Assessment criteria

Subjective parameters:- i) Śiraśūla (headache), ii) bhrama (giddiness), iii) kḷama (fatigue), iv) hṛdravata (palpitation), v) svedādhikyata (excessive sweating) and vi) anidra (insomnia). Assessment of the subjective parameters was done according to grading pattern (Table 1).

Objective parameters:- Assessment of change

TABLE 1
The scoring pattern of subjective parameters

Parameters	Grade
1. Śiraśūla (headache)	
- Nil	00
- Rarely (relieves without medication)	01
- Frequently (relives by rest doesn't disturb daily activities)	02
- Frequently (severe headache, disturbs daily activities requires medication)	03
- Continuous/severe headache disturbs sleep and daily activities and also not managed by the medication)	04
2. Bhrama	
- Nil	00
- Rarely (for some movement during change of posture)	01
- Often (for some movement during change of posture)	02
- Often (for each movement even in lying condition also)	03
- Unable to hold without any support.	04
3. Kḷama	
- Nil	00
- Rarely (feeling of tiredness without any exertion)	01
- Rarely (feeling of tiredness without any exertion with inability in concentration)	02
- Frequently (feeling of tiredness without any exertion with inability in concentration	03
- Continuous (feeling of tiredness without any exertion with inability in concentration)	03
4. Svedādhikya	
- Able to do both routine and special activities without discomfort	00
- Mild sweating by heavy work	01
- Sweating with moderate work (relieves soon)	02

- Severe sweating with mild work (but no disturbance to the routine) 03
- Severe sweating with mild work (disturbs the routine) 04

5. Hṛdravata
- No palpitation 00
- Occasionally 01
- Sometime 02
- Frequently 03
- Almost common 04
- Palpitation at rest 05

6. Anidra
- Sound Sleep. 00
- Disturbed sleep (wake up 1-2 times a night) 01
- Difficult to onset sleep remains disturbed in night 02
- Very less sleep in small intervals (makes patient irritable) 03
- Not getting sleep without medicine 04

in both systolic and diastolic blood pressure level in supine position. (Table 2)

Procedure:- Vasti was administered as kālavasti schedule as shown in Table 3.

Pūrvakarma

Preparation of the patient:- The patients were subjected to sarvāṅga abhyaṅga with Daśamūla taila followed by mṛdubāṣpa svedana and then asked to have rice with green gram dal in lesser

TABLE 2
7th JNC & WHO criteria for diagnosis hypertension

Category	BP (mmHg)	
	Systolic	Diastolic
Normal	<120	and <80
Pre-hypertension	120-139	or 80-89
Stage 1 hypertension	140-159	or 90-99
Stage 2 hypertension	>160	or >100
Isolated systolic hypertension	>140	and <90

TABLE 3
Kālavasti schedule

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Vasti	A	A	N	A	N	A	N	A	N	A	N	A	N	A	N	A

quantity than regular consumption, to attend the natural urges and walk a few steps before reaching the vasti room. On the day of nirūha vasti, they were asked to come in empty stomach.

After recording the vitals, the patients were advised to lie comfortably in left lateral position on the vasti table keeping the left leg straight and the right leg flexed at knee and hip joints and the head resting on the left hand with the right hand resting on the right leg.

Anuvāsanavastidravya:- 60 ml of Triphalā taila taken in a small container was made to lukewarm by keeping it in hot water; added śatapuṣpa cūrṇa and saindhavalavaṇa (1 gram each) and mixed with the help of a mortar till a homogenous mixture is obtained. Again the vastidravya made into lukewarm, filled into enema syringe fitted with rubber catheter (No. 08).

Nirūhavastidravya:- Honey (80ml) taken in a khalvayantra added with 5 gram saindhava lavaṇa was mixed well with the help of a mortar till the sound disappears. 120 ml of lukewarm Triphalā taila slowly poured into the khalva and continuously triturated till a homogenous mixture is formed and to which, 30 gram śatapuṣpa cūrṇa and kalka prepared by Triphala kvātha was added and mixed properly. Then 240 ml lukewarm Triphala kaṣāya was added little by little and stirred well to get homogenous mixture. This was filtered and made lukewarm by heating indirectly in hot water bath and poured into vasti-puṭaka.

Pradhānakarma

Method of administration:- Anuvāsanavasti and nirūhavasti were administered as per standard protocol. Time of administration and expulsion, samyaklakṣaṇa, vyāpad, if any, and vitals were noted on each day.

Paścātkarma

On the day of anuvāsana vasti, light food was advised after 9 hours of vasti administration or after the pratyāgamana. On the day of nirūhavasti, advised to take light warm liquid food like green gram soup, rice dal, daliya after vasti pratyāgamana.

Code and conduct:- In general, advised to - take lukewarm water, avoid heavy and oily food stuffs and suppression of natural urges, excess of travelling, exercise, excessive speech, sitting and lying in improper posture, exposure to wind, cold, heat and dust.

For the right evaluation of the effect of therapy on objective parameters (B.P) subjective parameters (signs and symptoms) under assessment criteria special scoring pattern was designed.

Observations

Demographic data and data related to disease and treatment are shown in Table 4.

Results

The effect of vastikarma on chief complaints (Wilcoxon match paired signed rank test) is shown in Table 5. The effect of treatment on systolic and diastolic blood pressure (paired 't' test) is shown in Table 6.

Discussion

Hypertension is tridoṣajavyādhi with the dominance of pitta and vāta doṣas, duṣṭi of rasa, rakta and meda with śrotorodha. Vastikarma,

TABLE 4
Distribution of patients according to sex, age, prakṛti, disease and treatment

Description	% of patients
1. Demographic data	
- 41-50 years of age	60
- Female	66.66
- Married	86.66
- Graduates	46.66
- Housewives	66.66
- Middle class	73.33
- Vegetarian	80
- Mandāgni	86.66
- Madhyama koṣṭha	73.33
- Vāta-kapha prakṛti	46.66
- Madhyama satva	53.33
- Madhyama samhanana	53.33
- Āvara vyāyāma śakti	66.66
- Habit of intake of madhura-rasarasapradhāna āhāra	53.33
- Addicted to tea	60
2. Data related to disease	
- No positive family history	53.33
- Chronicity between 4-10 years	60
- Habit of day sleep	80
- History of anxiety and tension	26.66
- Taking anti-hypertensive drugs regularly	66.66
- Not on antihypertensive therapy	26.66
3. Data related to treatment (after anuvāsanavasti)	
- Passed śaṣakṛt taila	93.33
- Attained indriya prasādana	86.66
- Samyaklakṣaṇa of nirūhavasti like prasṛsta vit, mūtra, samīraṇa	100
- Agnidīpti	100
- Āśayalaghuta	80
- Śiraśūla	6.66
- Atisāra	20

TABLE 5
Effect of vastikarma on chief complaints (Wilcoxon match paired signed rank test)

Chief complaint	Mean			% relief	S.D.	S.E.	'w'	'p'
	BT	AT	Diff.					
Hṛtdravatva	2.533	1.600	0.9333	36.84	0.5936	0.1533	78	0.0005
Bhrama	1.867	1.133	0.7333	39.27	0.4577	0.1182	66	0.0010
Kḷama	1.733	1.067	0.6667	38.47	0.4880	0.1260	55	0.0020
Śiraśūla	1.333	0.6667	0.6667	50.01	0.4880	0.1260	55	0.0020
Anidra	1.467	0.8667	0.6000	40.89	0.5071	0.1309	45	0.0039
Svedādhikyata	1.267	0.8667	0.4000	31.57	0.5071	0.1309	21	0.0313

TABLE 6
Effect of vasti on systolic and diastolic blood pressure (paired 't' test)

BP	Mean BP in mmhg			% relief	S.D.	S.E.	't'	'p'
	BT	AT	Diff.					
Systolic	154.00	132.14	20.714	13.45	16.723	4.470	6.792	< 0.0001
Diastolic	102	85.333	16.667	16.34	8.997	2.323	7.174	< 0.0001

though considered as the best remedy for morbid vāta, it is advised in the treatment of pittadoṣa, kaphadoṣa and sarvadhātu āśrita vyādhi.[4] Combinations of the ingredients is considered good even in other doṣa and dūṣya involvement and also beneficial in diseases of all the three mārga namely śākha, koṣṭha, marma, asthi and sandhi āśrita.

Vastikarma with a drug like triphala having śrotośodhaka, raktaprasādaka, pittaśāmaka and rasāyana properties help to reduce mārgāvarodha, eliminates the vitiated doṣa and mala and thereby causes vātānulomana and reduces blood pressure level.

Conclusion

Vasti regulates the activity and movement of vāta. The cleansing effect of vasti in the colon has its effect on all over the body in general and on the rasa-raktavahaśrotas in particular. Apart from this, the drugs are having lekhana property which helps to reduce atherosclerosis thereby helps to reduce blood pressure. Anuvāsana vasti with Triphala taila and Triphala kvātha with other conventional drugs given in kālavasti schedule was effective in reducing both systolic and diastolic blood pressure.

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ROLE OF EYE EXERCISES IN OVERALL COMPUTER PERFORMANCE OF I.T. PROFESSIONALS

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Abstract: Computer Vision Syndrome (CVS) remains an underestimated and poorly understood condition at the workplace. About 70% of computer workers worldwide report having vision problems and there is an alarming increase in the number of people affected. The initial symptoms of the condition are seen described under pūrvarūpa of netrarogas. Dryness of eye, being the major symptom of CVS, is explained as śuṣkākṣipāka under Sarvagatarogas in Aṣṭāṅgahṛdayam. Eye exercises are types of relaxing techniques that can be used for relaxing the eye muscles and reduce fatigue during long hours of work and improve their performance at the work place. An observational study was conducted on 50 patients to determine the effect of the eye exercises on CVS. The result was encouraging.

Introduction

Computer Vision Syndrome (CVS) is caused by the eye and brain reacting differently to characters on the screen than they do to printed characters. The computer screen constantly refreshes at a certain rate whereas paper is steady and the characters on a computer screen lack the contrast or well defined edges that printed characters have. Therefore, the colour intensity of digital characters diminishes around the edges making it difficult for eyes to remain focused. Having to continuously refocusing on digital text fatigues the eyes can lead to burning or tired.

The condition is marked by symptoms such as eyestrains, burning sensation, blurred vision, gritty sensation, headache and neck pains. Some computer users may experience reduced visual abilities such as blurred distant vision even after work. The symptoms may be aggravated by poor lighting, glare, improper work station set up and uncorrected refractive errors. Evidence shows that CVS can significantly harm workplace productivity, as it places an unusual strain on the human physical well-being thereby reducing the quality of life. CVS is therefore a significant public health problem as it affects computer users from all walks of life.

CVS in āyurvedic perspective

Pūrvarūpa:- The initial symptoms of CVS are seen to be explained under pūrvarūpa of netrarogas.

तात्रविलं ससंरम्भमश्रुकण्डूपदेहवत्।
गुरूषातोदरागाद्यैर्जुष्टं चाव्यक्तलक्षणै:।।
सशूलं वर्त्मकोशेषु शूकपूर्णाभमेव च।

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विहन्यमानं रूपे वा क्रियास्वक्षि यथा पुरा।।
दुष्टैव धीमान् बुध्येत दोषेणाधिष्ठितं तु तत्। (सु.उ.१)

Turbidity (dirty), swelling, fall of tears, itching, increase of exudates (waste products), feeling of heaviness, burning, pricking pain, redness, etc. are the symptoms; features well manifested are pain in the eyelids, feeling as if the eye is full of thorns, changes in seeing (vision) and functioning of the eyes unlike previously; noticing these only, the intelligent physician should understand the presence of aggravated doṣas in the eyes.

Śuṣkākṣipāka:- The major symptoms i.e dryness of eye, etc. seen in CVS are described śuṣkākṣipāka under sarvagatarogas.

वातपित्तातुरं घर्षतोदमेदोपदेहवत्।
रूक्षदारुणवर्त्माक्षि कृच्छ्रोन्मीलनिमीलनम्।।
विकूणनविशुष्कत्वशीतेच्छाशूलपाकवत्।
उक्तः शुष्काक्षिपाकोऽयं ..... (अ.हृ. उ. १५)

Manifestation of the symptoms of vātapitta (increased together) in the eyes i.e. friction, pricking and piercing pain, increased thickness, dryness, fearful appearance of the lids and the eye, difficulty in opening and closing of the lids, severe dryness, desire for cold comforts, pain and ulceration - this is called śuṣkākṣipāka

Nidāna: The following are the etiologies: i) atiyoga of darśanendriya (excessive usage of eyes), ii) mithyayoga of darśanendriya (improper usage of eye), iii) sūkṣmanirīkṣaṇāt (seeing very small objects) and iv) ati sāmipyat (from very close distance).

Management in āyurveda

Nidāna parivarjana:- Since computers have become an inevitable part of life, a complete abstinence is not feasible and only a judicious usage can be advised.

Netrakriyākalpas:- The line of treatment of pūrvarūpa and śuṣkākṣipāka viz. āścotana, seka, piṇḍi, biḍālaka followed by nasya and tarpaṇa are prescribed.

Eye exercises: In order to counteract the various effect of computer on the eye muscles a set of eye exercises is formulated.

Internal/topical medicines:- Various internal medicines and topical medicines to treat, rejuvenate and strengthen the eye are described. Internal medicines can be selected by assessing the prakṛti, etc. of the patient, Triphala for eye wash, Candanādi, Eḷanīrkuzhambu are few prescription for topical application.

Regimen:- A five minute break at every hour is advised during which the patient is asked to do certain exercises to negate the effect of computer.

Āyurveda has much to offer like kriyākalpas, eye exercises and medication as compared to modern medicine. Since nidānaparivarjana is not possible, the result of treatment is varied. So in this study, eye exercises were advised to improve the CVS in computer professionals to help to improve their performance.

Aims and objectives:- 1) To assess the effect of eye exercises in improving the eye health and thereby the performance of IT professionals; 2) to evaluate the effect of eye exercises in CVS like eye strain, tearing of eyes, dryness of eyes, headache, neck pain, etc.

Materials and methods

Research design

- Observational Study
- Pre-test - Degree of eye strain and performance
- Intervention (eye exercises)
- Post-test - Degree of eye strain and performance

Details of intervention

Eye relaxing techniques such as palming, blinking, etc. were advised (Table 1).

TABLE 1
Eye relaxing techniques schedule

Palming	twice daily	20 counts
Blinking	twice daily	20 counts
Eye movements	twice daily	18 times
Neck movements	twice daily	12 times

- Palming - 5 minutes after one hour work. (Here, the patient is asked to close the eyes gently and bent the chin towards chest; simultaneously, keep the elbow on the table and cover the eye gently by the palm) (Fig. I)
- Blinking - Frequently (the patient is suggested to purposefully increase the rate of blinking without affecting the work).
- Closing the eyes gently. As the IT professionals are prone to open the eyes for a longer period, they were asked to increase the blinking rate.
- Eye movements - Move eyes towards right, left, up and down. This is a good technique to relax the eye muscles.

Fig. I. Palming

- Neck movements - Every 3 hours. Move the neck right, left, up and down; rotate clockwise and anticlockwise. Continuous sitting posture causes strain to the neck and scalp muscles. Movements of the neck help to relax the neck muscles. (Fig. II)

Sample size:- 50 computer users working for more than one year from Kerala.

Fig. II. Neck movements

Inclusion criteria

- Those who are working with computer for more than six hours per day and at least for more than one year.
- Cases of suffering from eyestrain, watering of eyes, headache, dryness of eye, blurred vision.

Exclusion criteria

- Computers users with eye disorders such as refractory errors, cataract, glaucoma, trachoma, etc.
- Persons who have already undergone any interventional program on eye exercises
- Those having painful neck movements.

Assessment criteria

- Eye strain - pain or discomfort was considered

as eye strain. It was measured using VAS scale before and after intervention.

- Head ache was assessed using VAS scale and the severity noted before and after intervention.
- Dryness of eye - It is the symptom developed due to lack of tear in the eye. The person develops minimal gritty feeling and pricking pain in severe cases. According to the severity it was graded as: 0 - Nil, 1- minimal, 2 - moderate and 3 - severe.
- Tearing of eyes was assessed by asking the persons regarding the severity.
- Neck pain was assessed using VAS scale and the severity was noted before and after intervention.

Instruments used:- Self administered structured questionnaire on eye fatigue during long hours of work and duration of working hours and performance; planned and structured materials on eye exercises.

Observation and results

Eye strain:- Of 50 computer professionals, 80% were with eye strain, 36% got eye fatigue after 4 hours of work, 32% after 2-4 hours and the remaining 12% after 1-2 hours of works. Since most of the professionals were freshers, 60% of them were with minimal strain and 12% with moderate strain and 8% with severe strain.

Tearing:- Since most of samples were new to this field, only 24% were having tearing of eyes; of this, 16% got tearing after 4 hours of work and 8% after 1-2 hours; among them 16% of were having only minimum tearing and 8% moderate tearing.

Dryness:- Dryness was present in 48% of the cases; 28% of them got dryness after 2-4 hours of work and 12% after 4 hours of work; the remaining 8% got dryness with 1-2 hours of work.

Headache:- 48% cases found to be suffered from headache. Of them, 28% got headache after 4 hours of work, 12% after 2-4 hours and 12% after 1-2 hours. Of them, 8% were having severe headache during their work, 12% with moderate headache and 32 % with affordable or minimum headache.

TABLE 2
Effect of the therapy in various parameters of CVS

Parameters	Mean		Standard Deviation	
	BT	AT	BT	AT
Eye strain	0.84	0.32	0.509502	0.471212
Tearing	0.24	0	0.431419	0
Dryness	0.68	0.4	0.843704	0.494872
Headache	0.88	0.04	1.081194	0.197949
Neck pain	0.84	0.24	0.933722	0.431419

$p = <0.001$

Neck pain:- Since computer professionals sit in front of the computers for long hours, their posture may affect the neck muscles. Of 50 cases, 44% had neck pain; of this, 28% got neck pain after 2-4 hours, 20% after 4 hours and 8% after 1-2 hours.

There was significant change in eye strain in duration and severity after the intervention. Significant change was observed in severity and duration of tearing of eyes, dryness, head ache and neck pain after the intervention (Table 2).

Discussion & conclusion

From the statistical analysis it was found that the eye and neck exercises are very effective in reducing the eye strain and neck pain; hence can affectively be followed by all computer users. It is concluded that the therapy makes significant change in asthenopia and relives symptoms of CVS.

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EFFECT OF IKṢURĀDI LEHYA IN THE MANAGEMENT OF ŚUKRAKṢAYA WITH SPECIAL REFERENCE TO OLIGOSPERMIA - A CLINICAL STUDY

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Abstract: Infertility is a global problem in field of reproductive health. In India, infertility is a social stigma, particularly in rural areas, which affects the couples' psychological harmony, sexual life and social functioning. The recent incidence shows that male factor is partly responsible in about 50% of infertile couples. Considering this an open labelled clinical study with pre and post tests was carried out on 20 male patients to evaluate the efficacy of Ikṣurādi lehya in a dose of 48 grams with 200 ml milk as anupāna for 60 days. The result showed better improvement in the seminal parameters and sexual parameters.

Introduction

Reproduction is the singular important phenomenon as the sole determinant of the continuation of species. Since the beginning of recorded history, the human race has placed a great emphasis on fertility. Therefore, the capacity of reproduction may be an essential ingredient of the sense of well-being, mediated by gender in equalities and sexual differences.[1]

Male infertility has received less attention, even though it is widely reported. In 1992 it was first reported in the study of decrease in semen quality in last 50 years. It showed a significant decrease in mean sperm count from 113 million/ml to 66 million/ml and in seminal volume from 3.4 ml to 2.75 ml (1940 to 1990). The Indian reports, both from the Institute for Research in Reproduction, Mumbai and from Mehta *et al*, Bangalore, seem to agree with this decline trend of semen quality over the years. The incidence of infertility varies in different regions. Almost 15% of couple worldwide are infertile. Of them, the pathology of approximately 45% cases found in man alone and in another 20% both man and women. Therefore, male-factor is at least partly responsible in about 50% of infertile couples.[2] New infertility prevalence calculation as per WHO is one in every four couples in developing countries has been found to be affected by infertility. According to a survey done in 2010, 48.5 million couples are affected by infertility.[3]

Vājīkaraṇa, one among the aṣṭāṅga āyurveda, deals with the fertility, potency and healthy progeny. There is the detailed description of aṣṭavidhaśukraduṣṭi and its management by

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different types of Vājiīkaraṇayoga in the classics.[4] Śukrakṣaya is a type of śukraduṣṭi resulting in infertility in which oligospermia is one of the presentations. Oligospermia is the condition where the sperm density less than 20 million/ml. Different sorts of Vājīkaraṇayoga are explained in the management of the same.

In view of the above, an effort was made to evaluate the effect of Ikṣurādi lehya in the patients suffering from śukrakṣaya/ oligospermia.

Objectives:- 1) To study the kṣīṇaśukra with possible correlation to oligospermia and 2) to evaluate the clinical efficacy of Ikṣurādi lehya on seminal parameters in patients suffering from kṣīṇaśukra/oligospermia.

Materials and methods

Design & data source:- The study was an open labelled clinical study with pre and post test designs. 20 male patients diagnosed as kṣīṇaśukra/oligospermia were selected from the IPD/OPD of Shri Dharmasthala Manjunatheshwara Ayurveda Hospital, Udupi. A special proforma was prepared with details of history and symptoms as mentioned in our classics and allied sciences.

Drug:- Ikṣurādi lehya was prepared in the pharmacy of the Institution.

Diagnostic criteria:- 1) Male patient complaining of infertility with minimum of one year of married life; 2) Seminogram with sperm count less than 20 million/ml.

Inclusion criteria:- 1) Male patients between 22-45 years of age and 2) with sperm count less than 20 million/ml

Exclusion criteria: - 1) Patients below 22 years and above 45 years, 2) cases with absolute azoospermia and 3) cases with major systemic disorders like Tuberculosis, AIDS and STD, etc.

Plan of study:- Of 20 male patients, 2 were dropped out and the remaining were subjected to semen analysis. The patients were treated by oral medication with Ikṣurādi lehya in a dose of 1 pala (48 grams) once daily before breakfast with milk as anupāna. All the patients were administered orally with Harītaki cūrṇa 12 gms for 3 days for koṣṭhaśuddhi to fulfil the minimum pre-requisition for vājīkaraṇa therapy. The duration of the treatment was 60 days followed by 30 days of follow up.

Assessment criteria:- 1) Semen analysis and 2) Sexual parameters to assess the total effect of the drug. The gradation of subjective/sexual functional parameters is shown in Table 1.

TABLE 1
Subjective parameters and gradation

Parameters	Gradation
1. Sexual desire	
- No desire at all	0
- Lack of desire	1
- Desire but no activity	2
- Desire only on demand of partner	3
- Normal desire	4
- Excess desire	5
2. Orgasm	
- No enjoyment	0
- Lack of enjoyment	1
- Enjoyment in 25% of sexual intima	2
- Enjoyment in 50% of sexual intima	3
- Enjoyment in 75% of sexual intima	4
- Enjoyment in every act	5

3. Rigidity	
- Unable to maintain erection or continue sexual act	0
- Some loss in erection but able to continue sexual act	1
- Able to maintain erection and continue sexual act	2
4. Erection	
- No erection by any method	0
- Erection by artificial methods	1
- Erection but unable to penetrate	2
- Initially difficult but able to penetrate	3
- Erection with occasional failure	4
- Erection whenever desire	5
5. Ejaculation	
- No ejaculation at all	0
- Delayed ejaculation without orgasm	1
- Ejaculation before penetration	2
- Ejaculation with penetration	3
- Ejaculation with own satisfaction	4
- Ejaculation with own and partners satisfaction	5
6. Śukravega (time taken for ejaculation)	
- Within/before pelvic thrusting	0
- Between 1-5 pelvic thrusting	1
- Between 5-10 pelvic thrusting	2
- Above 10 pelvic thrusting	3
7. Post act exhaustion	
- No exhaustion at all	0
- Slight exhaustion occasionally	1
- Exhaustion in 25% of occasions	2
- Exhaustion in 50% of occasions	3
- Exhaustion in 75% of occasions	4
- Exhaustion after every encounter	5

Observations

50% of the patients belonged to the age group of 31-40 years. Majority were from the rural area. All the patients reported with history of no issues with minimum of one year marital life-span with regular unprotected intra vaginal coitus which indicates the primary infertility. Distribution of patients according to age, profession, prakrti, etc. is shown in Table 2.

TABLE 2
Distribution of patients according to age, prakṛti, etc.

Description	% of patient
1. Age group:	
- 31-40 years	50
- 21-30 years	33.30
2. Occupation	
- Driver, business, agriculture	16.70
- Labour, service, engineer	11.10
- Salesman, fisherman, carpenter	5.50
3. Habitation	
- Rural area	55.60
- Urban area	44.40
4. Habits	
- Alcoholic	33.30
- Smoking	22.20
- Coffee	11.10
- No habits	22.20
5. Prakrti	
- Pitta-kapha prakrti	55.55
- Vata-pitta prakrti	27.78
- Kapha-vata prakrti	16.67
6. Practice of masturbation	
- Only in adolescence	38.90
- Occasionally	27.80
- Regularly	5.50
- Never	27.80
7. BMI range	
- Between 18-25 (normal)	61.10
- More than 25 kg/m2 (obesity)	38.90
8. Infertility ratio	
- Both male and female	27.80
- Male	72.20
9. Others	
- Non-tender, palpable epididymis	100
- Normal n on-tender spermatic cord	88.90
- Tenderness of spermatic cord	11.10

Results

Effect on seminal parameters:- Administration of Ikṣurādi lehya was found to be effective in increasing the sperm count, active motility and semen volume. The results of the therapy after 60th and 90th day on various parameters are shown in Table 3.

Effect on sexual parameters:- The effect of Ikṣurādi lehya on parameters such as sexual desire, orgasm, erection, etc. was found to be highly significant statistically (P <0.001). The improvement on various parameters is shown in Table 4.

The effect of the treatment on sperm count at various levels and the over all effect of the therapy are shown in Tables 5 & 6.

Discussion & conclusion

Ikṣurādi lehya is mentioned as vājikara and indicated in śukrakṣaya. The formulation contains kokilākṣa, gokṣura, kapikacchu, śatāvari,

TABLE 3
Effect of the therapy on seminal parameters

Parameters	Mean BT	60 days				90 days			
		AT	Mean Diff.	% of increase	P	AT	Mean Diff.	% of increase	P
1. Sperm count (million/ml)	8.094	9.700	1.606	19.84	0.016	15.846	7.752	95.77	<0.001
2. Sperm active motility	30.833	33.056	2.222	7.20	0.036	35.941	5.412	17.55	0.019
3. Sperm sluggish motility	20.611	23.444	2.833	13.74	0.056	25.056	4.444	21.56	0.072
4. Sperm non motility	48.556	43.500	5.056	10.41	0.002	37.667	10.889	22.42	0.012
5. Semen volume (ml)	2.247	2.303	0.0556	2.47	0.172	2.425	0.178	7.92	0.014
6. Liquefaction time	19.167	20.000	0.833	4.34	0.187	21.389	2.222	11.59	0.042

TABLE 4
Effect of the therapy on sexual parameters

Parameters	Mean BT	60 days				90 days			
		AT	Mean Diff.	% of increase	P	AT	Mean Diff.	% of increase	P
1. Sexual desire	3.722	4.611	0.889	23.88	<0.001	4.722	1.000	26.86	<0.001
2. Orgasm	3.333	4.000	0.667	20.01	<0.001	4.278	0.944	28.32	<0.001
3. Rigidity	2.00	2.00	00	00	1.000	2.00	00	00	1.000
4. Erection	3.833	4.222	0.389	10.14	0.015	4.444	0.611	15.94	<0.001
5. Ejaculation	3.833	4.222	0.389	10.14	0.015	4.556	0.722	18.83	0.002
6. Sukravega (time taken for ejaculation)	1.889	2.833	0.944	49.97	<0.001	2.889	1.000	52.65	<0.001
7. Post act exhaustion	2.500	1.556	0.944	37.76	<0.001	1.222	1.278	51.12	<0.001

TABLE 5
Effect of the therapy on oligospermia

Description	60th day		90th day	
	No	%	No	%
Sperm count (million/ml)				
- Severe (0 to 5 million/ml)	4	22.20	2	11.10
- Moderate (5 to 10)	7	38.90	1	5.60
- Mild (10 to 20 million/ml)	7	38.90	11	61.10
- Normal (< 20 million/ml)	0	00	4	22.20

TABLE 6
Overal effect of the therapy

Description	% after 60th day	% after 90th day
No change	11.10	11.10
Mild improvement	50	5.60
Marked improvement	38.90	61.10
Complete remission	0	22.20

śvetamusali, māṣa and tila. These drugs have madhurarasa, snigda-guruguṇa, śītavīrya, madhuravipāka and vātapittaśāmaka properties. These qualities are attributed to that of śukra and tend to cause śukravṛddhi. Śukraḷa, balya, rasāyana and vṛṣya are the qualities of the prabhāva of śukravṛddhi. Kokilākṣa does śukraśodhana. Gokṣura and kapikacchu are having action of improving sexual vigour.

The research proved that śvetamusali, kapikacchu, kokilākṣa, māṣa and tila have spermatogenetic effect; so this particular formulation is effective in improving the semen quality and sexual parameters.

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