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लाभानां श्रेय आरोग्यम्

Of all the gifts,
the most precious is health

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FROM THE PAGES OF VĀGBHAṬA - LXXVI

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Abstract: After describing the bodily vital points, the chapter on vikṛti is dealt. Major traumas on these vital parts do even cause death. Vikṛti, in short, is the signs and symptoms seen in a person on advent of his death.

अथातो विकृतिविज्ञानीयं शारीरं व्याख्यास्याम: ।
इति ह स्माहुरोत्रेयादयो महर्षय: ।

(Athāto vikṛtivijñānīyaṁ
śārīraṁ vyākhyāsyāma: ।
iti ha smāhurotreyādayo maharṣaya: ।)

Now we shall discuss the chapter regarding the knowledge about vikṛti, a part of śārīram; thus explained the sages like Ātreya.

Vikṛti - an introduction

Vikṛti usually means abnormal state. But here it is meant the abnormal state of pṛakṛti (vide Chapter III of Śārīrasthānam) of a person whose bodily configuration is deranged on the advent of death. These derangements are to be observed; and an experienced physician can predict death of a normal person or of a patient on anlaysing these derangements. This will also increase the fame of a physician.

पुष्पं फलस्य धूमोऽग्नेर्वर्षस्य जलदोदय: ।
यथा भविष्यतो लिङ्गं रिष्टं मृत्योस्तथा ध्रुवम् ।। १ ।।

(Puṣpaṁ phalasya dhūmoऽgner-
varṣasya jaladodaya: ।
yathā bhaviṣyato liṅgaṁ
riṣṭaṁ mṛtyostathā dhruvam ।। 1 ।।)

The phenomenon of riṣṭam can be regarded as the harbinger of death (of a person) as the flower is for the fruit, fume is for fire and clouds for rain.

Riṣṭam means the premonitory symptoms of death. This is like a blossoming flower indicating the formation of fruit; appearance of fume indicating the fire inside and arousal of darkish clouds in the sky as a sign of imminent rainfall. So, if one can observe and confirm symptoms of riṣṭam in a particular person, then he can predict the death of that person.

However, from these examples, we can also ponder that the appearance of riṣṭam would not firmly predict ones death, as a flower may not turn to be a fruit always; clouds may not be rain in all conditions.

अरिष्टं नास्ति मरणं दृष्टरिष्टं च जीवितम् ।
अरिष्टे रिष्टविज्ञानं न च रिष्टेऽप्यनैपुणात् ।। २ ।।

(Ariṣṭaṁ nāsti maraṇaṁ
dṛṣṭariṣṭaṁ ca jīvitam ।

*"Amṛtālayam", Thozhupadam (PO), Chelakkara (Via), Thrissur - 680 586, Kerala

ariṣṭe riṣṭavijñānaṁ
na ca riṣṭeऽpyanaipuṇāt ।। 2 ।।)

Death would not ccur without manifesting specific death-predicting signs (in an individual) and one would not live long after the appearance of these signs. Due to the lack of skill and experience regarding these death-predicting signs, physician deceives others by predicting death of a healthy person and vise versa.

It is certain that death occurs when riṣṭam features manifests. However, every riṣṭam might not bring death. Vāgbhaṭācārya indicates this by using the word 'ca'. Riṣṭam features are nothing but some symptoms of disease. Only a wise and experienced physician can differentiate these symptoms.

Divisions of riṣṭam

केचित्तु तद्विधेत्याहु: स्थाय्यस्थायिविभेदत: ।
दोषाणामपि बाहुल्याद्रिष्टाभास: समुद्भवेत् ।। ३ ।।
स दोषाणां शमे शाम्येत्स्थाय्यवश्यं तु मृत्यवे ।

(Kecittu tadvidhetyāhu:
sthāyyasthāyivibhedata: ।
doṣāṇāmapi bāhulyād-
riṣṭābhāsa: samudbhavet ।। 3 ।।
Sa doṣāṇāṁ śame śāmyet-
sthāyyavaśyaṁ tu mṛtyave ।)

According to some scholars, these death-predicting symptoms are of two categories viz. stable and unstable. Unstable death-predicting symptoms occur sometimes in a body, which is impure with the vitiated bodily humors in one major level, will disappear on the decrease of humors. The stable manifestations are certainly for the death.

Here, Vāgbhaṭācārya quotes the opinion of Kṛṣṇātṛeya the two categories of riṣṭam by using the word केचित् (some scholars). According to Kṛṣṇātṛeya death is of two kinds i.e. kālamṛtyu and akālamṛtyu. The former occur when lifespan ends and the latter by some accidents. The stable symptoms of riṣṭam manifest for the former one.

रूपेन्द्रियस्वरच्छायाप्रतिच्छायाक्रियादिषु ।। ४ ।।
अन्येष्वपि च भावेषु प्राकृतेष्वनिमित्तत: ।
विकृतिर्या समासेन रिष्टं तदिति लक्षयेत् ।। ५ ।।

(rūpendriyasvaracchāyā-
praticchāyākriyādiṣu ।। 4 ।।
Anyeṣvapi ca bhāveṣu
prākṛteṣvanimittata: ।
vikṛtiṛyā samāsena
riṣṭaṁ taditi lakṣayet ।। 5 ।।)

Generally, death-predicting symptoms are to be accounted by the manifestation of abnormalities occurring, without sufficient reasons, in one's rūpa (form or appearance of body or body-parts), indriya (sensory organs including mind), svara (voice), chāya (complexion), pṛaticchāya (image) and kṛiya (activities).

To detect any abnormality in a person, a physician must be familiar with the normal features of that person. A sudden change in certain familiar features without any reason is called riṣṭam. These are to be noted by observing his appearance, voice, etc. Examples of riṣṭam found in rūpa (rūpariṣṭam), in senses (indriyariṣṭam), etc. are explained now.

Examples of rūpariṣṭam

Common examples of rūpariṣṭam are detailing now. In this category, the features of riṣṭam appear from head to bottom, occur in particular body parts, specific features found in the whole body, features on analyzing sensory objects and excreting material are explained respectively.

केशरोम निरभ्यङ्गं यस्याभ्यक्तमिवेक्ष्यते ।
यस्यात्यर्थं चले नेत्रे स्तब्धान्तर्गतनिर्गते ।। ६ ।।
जिह्मे विस्तृतसङ्क्ष्मिे सङ्क्ष्मिविनतभ्रुणी ।
उद्भ्रान्तदर्शने हीनदर्शने नकुलोपमे ।। ७ ।।
कपोताभे अलाताभे स्रुते लुळितपक्ष्मणी ।
नासिकाऽत्यर्थविवृता संवृता पिटिकाचिता ।। ८ ।।
उच्छूना स्फुटिता म्ळाना यस्यौष्ठो यात्यधोऽधरः ।
ऊर्ध्वं द्वितीयः स्यातां वा पक्वजम्बूनिभावुभौ ।। ९ ।।
दन्ताः सशर्कराः श्यावास्ताम्राः पुष्पितपङ्क्तिताः ।
सहसैव पतेयुर्वा जिह्वा जिह्मा विसर्पिणी ।। १० ।।
शूना शुष्का गुरुः श्यावा लिप्ता सुप्ता सकण्टका ।

(Keśaroma nirabhyaṅgaṁ
yasyābhyaktamivekṣyate ।
yasyātyartam cale netre
stabdhāntargatanirgate ।। 6 ।।
Jihme vistṛtasaṅkṣipte
saṅkṣiptavinatabhruṇī ।
udbhṛāntadarśane hīna-
darśane nakulopame ।। 7 ।।
Kapotābhe alātābhe
srute luḷitapakṣmaṇī ।
nāsikāऽtyarthavivṛtā
saṁvṛtā piṭikācitā ।। 8 ।।
Ucchūnā sphuṭitā mḷānā
yasyauṣṭho yātyadhoऽdharaḥ ।
ūrdhvam dvitīyaḥ syātāṁ vā
pakvajambūnibhāvubhau ।। 9 ।।
Dantāḥ saśarkarāḥ śyāvāst-
āmrāḥ puṣpitapaṅkitāḥ ।
sahasaiva pateyurvā
jihvā jihmā visarpiṇī ।। 10 ।।
Śūnā śuṣkā guruḥ śyāvā
liptā suptā sakaṇṭakā ।)

Hairs on the head and other body parts of a person (whose death is nearer) look like oily though they are not smeared with oil; the eyes quiver frequently or do not move at all, shrunken or protruded, curved, expanded or constricted, contracted; bent down eyebrows, viewing the objects hazy or short, and the eyes resemble those of a mongoose, looks grayish (the colour of dove) or reddish (as burnt firewood), with profuse tears, having down and fallen eye-lashes.

Nose widened or constricted surrounded with boils, swollen upper areas, cracked and lusterless. Lower lips fallen with other stretched up colouring darkish blue as that of a ripened jambhuphala (fruit of *Syzygium cumini*).

The teeth with full of tartar, blackish or coppery colour, afflicted with flower-like spots (by fungal infection), coated with dirt and falls suddenly. The tongue immovable or moves everywhere inside the mouth, swollen, much dried, heavy, blackish coated, having numbness and thorn-like eruptions.

These are some signs seen in the body.

शिरः शिरोधरा वोढुं पृष्ठं वा भारमात्मनः ।। ११ ।।
हनू वा पिण्डमास्यस्थं शक्नुवन्ति न यस्य च ।
यस्यानिमित्तमङ्गानि गुरूण्यति लघूनि वा ।। १२ ।।
विषदोषाद्विना यस्य खेभ्यो रक्तं प्रवर्तते ।
उत्सिक्तं मेहनं यस्य वृषणावतिनिःसृतौ ।। १३ ।।
अतोऽन्यथा वा यस्य स्यात् सर्वे ते कालचोदिताः ।

(śiraḥ śirodharā voḍhuṁ
pṛṣṭhaṁ vā bhāramātmanaḥ ।। 11 ।।
Hanū vā piṇḍamāsyasthaṁ
śaknuvanti na yasya ca ।
yasyānimittamaṅgāni
gurūṇyati laghūni vā ।। 12 ।।
Viṣadoṣādvinā yasya
khebhyo raktaṁ pravartate ।

utsiktaṁ mehanaṁ yasya
vṛṣaṇāvatini:sṛtau ।। 13 ।।
Atoऽnyathā vā yasya
syāt sarve te kālacoditā: ।)

Those, whose neck cannot bear the weight of the head, the back the weight of the whole body, and the lower jaws the weight of a bolus inserted into the mouth; body-parts become very heavy or light without any reason; all body-orifices bleed even without any affliction of poisons; penis stretches up while both the scrotum move down or both are in opposite manner - are to be considered nearing their death.

यस्यापूर्वा: सिरालेखा बालेन्द्वाकृतयोऽपि वा १४ ।।
ललाटे वस्तिशीर्षे वा षण्मासान्न स जीवति ।
पद्मिनीपत्रवत्तोयं शरीरे यस्य देहिन: ।। १५ ।।
प्लवते प्लवमानस्य षण्मासास्तस्य जीवितम् ।
हरिताभा: सिरा यस्य रोमकूपाश्च संवृता: ।। १६ ।।
सोऽम्लाभिलाषी पुरुष: पित्तान्मरणमश्नुते ।

(yasyāpūrvā: sirālekhā
bālendvākṛtayoऽpi vā ।। 14 ।।
Lalāṭe vastiśīrṣe vā
ṣaṇmāsānna sa jīvati ।
padminĪpatravattoyaṁ
śarĪre yasya dehina: ।। 15 ।।
Pḷavate pḷavamānasya
ṣaṇmāsāstasya jīvitam ।
haritābhā: sirā yasya
romakūpāśca saṁvṛtā: ।। 16 ।।
SoऽmḷābhilāṣĪ puruṣa:
pittānmaraṇamaśnuute ।)

One, who shows unusual veins and lines; of which, some are curved (like a crescent-shaped moon) in the forehead, or in the inferior part of navel, he would not survive even for 6 months.

If the water particles would not sustain in the body as if over the lotus leaf, even just after dipped in water, he will survive only for 6 months. When the veins of a person become green, hair follicles being constricted and becomes desirous to sour-articles, will die by the affliction of pitta doṣa.

यस्य गोमयचूर्णाभं चूर्णं मूर्ध्नि मुखेऽपि वा ।। १७ ।।
सस्नेहं, मूर्ध्नि धूमो वा, मासान्तं तस्य जीवितम् ।
मूर्ध्नि भ्रुवोर्वा कुर्वन्ति सीमन्तावर्तका नवा: १८ ।।
मृत्युं स्वस्थस्य षड्रात्रात्त्रिरात्रादातुरस्य तु ।
जिह्वा श्यावा मुखं पूति सव्यमक्षि निमज्जति १९ ।।
खगा वा मूर्ध्नि लीयन्ते यस्य तं परिवर्जयेत् ।
यस्य स्नातानुलिप्तस्य पूर्वं शुष्यत्युरो भृशम् ।। २० ।।
आर्द्रेषु सर्वगात्रेषु सोऽर्धमासं न जीवति ।

(yasya gomayacūrṇābhaṁ
cūrṇam mūrdhni mukheऽpi vā ।। 17 ।।
Sasnehaṁ, mūrdhni dhūmo vā,
māsāntaṁ tasya jīvitam ।
mūrdhni bhruvorvā kurvanti
sīmantāvartakā navā: ।। 18 ।।
mṛtyuṁ svasthasya ṣaḍrātrāt-
trirātrādāturasya tu ।
jihvā śyāvā mukhaṁ pūti
savyamakṣi nimajjati ।। 19 ।।
Khagā vā mūrdhni līyante
yasya taṁ parivarjayet ।
yasya snātānuliptasya
pūrvam śuṣyatyuro bhṛśam ।। 20 ।।
Ārdreṣu sarvagātreṣu
soऽrdhamāsaṁ na jīvati ।)

Appearance of oil-smeared cow-dung-coloured powder on the head or face; or appearance of smoke on the vertex suggest that a person's end is near, say for one month.

Crest-lines or hair-whirl (round hairy spots) when appear afresh on the head or on the brows it may be noted that the person, if he is healthy,

will die within 6 days, and if he is ailed, will die within 3 days.

Avoid the person, for whom death is confirmed within no time, whose tongue appears blue, mouth with foul smell, left eye shrunken, and if birds alight on the head.

One will live only a fortnight whose cosmetic application (like sandalwood paste applied after taking bath) in the chest area dries up suddenly, whereas on the other body parts it remains moistened.

अकस्माद्युगपद्गात्रे वर्णौ प्राकृतवैकृतौ ।। २१ ।।
तथैवोपचयग्ळानिरौक्ष्यस्नेहादि मृत्यवे ।
यस्य स्फुटेयुरङ्गुल्यो नाकृष्टा न स जीवति ।। २२ ।।
क्षवकासादिषु तथा यस्यापूर्वो ध्वनिर्भवेत् ।
ह्रस्वो दीर्घोऽति वोच्छ्वासः पूतिः सुरभिरेव वा २३
आप्ळुतानाप्ळुते काये यस्य गन्धोऽतिमानुषः ।
मलवस्त्रव्रणादौ वा वर्षान्तं तस्य जीवितम् ।। २४ ।।
भजन्तेऽत्यङ्गसौरस्याद्यं यूकामक्षिकादयः ।
त्यजन्ति वाऽतिवैरस्यात्सोऽपि वर्षं न जीवति २५ ।।
सततोष्मसु गात्रेषु शैत्यं यस्योपलक्ष्यते ।
शीतेषु भृशमौष्ण्यं वा स्वेदः स्तम्भोऽप्यहेतुकः २६
यो जातशीतपिटिकः शीताङ्गो वा विदह्यते ।
उष्णद्वेषी च शीतार्तः स प्रेताधिपगोचरः ।। २७ ।।

(akasmādyugapadgātre
varṇau prākṛtavaikṛtau ।। 21 ।।
Tathaivopacayagḷāni-
raukṣyasnehādi mṛtyave ।
yasya sphuṭeyuraṅgulyo
nākṛṣṭā na sa jīvati ।। 22 ।।
Kṣavakāsādiṣu tathā
yasyāpūrvo dhvanirbhavet ।
hrasvo dīrghoऽti vocchvāsa:
pūti: surabhireva vā ।। 23 ।।
Āpḷutānāpḷute kāye
yasya gandhoऽtimānuṣa: ।
malavastravraṇādau vā
varṣāntaṁ tasya jīvitam ।। 24 ।।
bhajanteऽtyaṅgasaurasyād-
yaṁ yūkāmakṣikādaya: ।
tyajanti vāऽtivairasyāt-
soऽpi varṣam na jīvati ।। 25 ।।
Satatoṣmasu gātreṣu
śaityaṁ yasyopalakṣyate ।
śīteṣu bhṛśamauṣṇyaṁ vā
sveda: stambhoऽpyahetuka: ।। 26 ।।
Yo jātaśītapiṭika:
śītāṅgo vā vidahyate ।
uṣṇadveṣī ca śītārta:
sa pretādhipagocara: ।। 27 ।।)

In a person, when normal and abnormal body colours appear together with spontaneous nature; and thus nourishment as well as emaciation, roughness as well as unctuousness appears together, he can be considered as nearing to death.

In a person, when the fingers on dragging would not produce cracking sound in the joints indicates his sudden death. A peculiar sound on sneezing, coughing, etc., either longer or shorter inspiration of air in the lung along either with aromatic smell or foul smell, are the symptoms of sudden death.

In a person, if an abnormal smell (either sweet or bad) emanates from the body (whether taken bath or not), or from faecal materials, clothes, wounds, etc., it might be considered that he will live only for one year He, whose body is attracted by bee, flies, etc. due to over sweetness or if he is avoided by these beings due to unpleasant smell, do live only for 1 year.

One who feels sudden cold on his body parts

which are warm always and feels severe hot on the body parts that are cold always, thus the manifestation of unreasonable perspiration or rigidity, feels severe sense of cold and hot all over the body; and the hot of warm things on cold affliction - all are leading him to the subservience of pṛetādhipa (god of death)

उरस्यूष्मा भवेद्यस्य जठरे चातिशीतता ।
भिन्नं पुरीषं तृष्णा च यथा प्रेतस्तथैव स: ।। २८ ।।
मूत्रं पुरीषं निष्ठ्यूतं शुक्रं वाऽप्सु निमज्जति।
निष्ठ्यूतं बहुवर्णं वा यस्य मासात्स नश्यति ।। २९ ।।

(Urasyūṣmā bhavedyasya
jaṭhare cātiśītatā ।
bhinnaṁ purīṣaṁ tṛṣṇā ca
yathā pretastathaiva sa: ।। 28 ।।
Mūtraṁ purīṣaṁ niṣṭhyūtaṁ
śukraṁ vāऽpsu nimajjati ।
niṣṭhyūtaṁ bahuvarṇaṁ vā
yasya māsātsa naśyati ।। 29 ।।)

One can be considered as dead (death is nearer) when his chest is hot, belly cold, faecus watery and afflicted with fatal thirst. One whose urine, faecal matter, sputum or semen if sink in water, or sputum appears in various colours, can be considered as he will die within one month.

Here ends the examples of riṣṭam occurring in the rūpa of dying person

Indriya riṣṭam

In this context, death-predicting symptoms occurring in sight, hearing, olfaction, gesticulation, tactile sensation and mental perception are emphasized respectively.

घनीभूतमिवाकाशमाकाशमिव यो घनम् ।
अमूर्तमिव मूर्तं च मूर्तं चामूर्तवत्स्थितम् ।। ३० ।।
तेजस्व्यतेजस्तद्वच्च शुक्लं कृष्णमसच्च सत् ।
अनेत्ररोगश्चन्द्रं च बहुरूपमलाञ्छनम् ।। ३१ ।।
जाग्रद्रक्षांसि गन्धर्वान् प्रेतानन्यांश्च तद्विधान् ।
रूपं व्याकृति तत्तच्च य: पश्यति स नश्यति ।। ३२ ।।

(Ghanībhūtamivākāśa-
mākāśamiva yo ghanam ।
amūrtamiva mūrtam ca
mūrtam cāmūrtavatsthitam ।। 30 ।।
Tejasvyatejastadvacca
śuklaṁ kṛṣṇamasacca sat ।
anetrarogaścandraṁ ca
bahurūpamalāñchanam ।। 31 ।।
Jāgradrakṣāṁsi gandharvān
pretānanyāṁśca tadvidhān ।
rūpaṁ vyākṛti tattacca
ya: paśyati sa naśyati ।। 32 ।।)

One, who (though does not have any eye disease), perceives the sky as cloud and vice versa, materials as immaterial, statures as statureless and vice versa, illuminating things as darkish, white as black, non-beings as beings, moon multi-numbered as well as without any marks in it; who does see abnormal extra terrestrial bodies like demons and gandharvas (supernatural beings and evil spirits) - all these indicate the imminence of his death.

सप्तर्षीणां समीपस्थां यो न पश्यत्यरुन्धतीम् ।
ध्रुवमाकाशगङ्गां वा स न पश्यति तां समाम् ३३

(Saptarṣīṇāṁ samīpasthāṁ
yo na paśyatyarundhatīm ।
dhruvamākāśagaṅgāṁ vā
sa na paśyati tāṁ samām ।। 33 ।।)

When one cannot see the arundhati star or dhṛuva star or milky way adjacent to saptarṣis, his life is getting to an end within one year.

मेघतोयौघनिर्घोषवीणापणववेणुजान् ।
शृणोत्यन्यांश्च य: शब्दानसतो न सतोऽपि वा ३४ ।।

निष्पीड्य कर्णौ शृणुयान्न यो धुकधुकास्वनम् ।
तद्वद्गन्धरसस्पर्शान् मन्यते यो विपर्ययात् ।। ३५ ।।
सर्वशो वा न यो, यश्च दीपगन्धं न जिघ्रति ।

(Meghatoyaughanirghoṣa-
vīṇāpaṇavaveṇujān ।
śṛṇotyanyāṁśca ya: śabdā-
nasato na satoऽpi vā ।। 34 ।।
Niṣpīḍya karṇau śṛṇuyā-
nna yo dhukadhukāsvanam ।
tadvadgandharasasparśān
manyate yo viparyayāt ।। 35 ।।
Sarvaśo vā na yo, yaśca
dīpagandhaṁ na jighrati ।)

Those - who cannot hear the sound of thunder, musical instruments like vīṇa, mṛdaṅga, flute and such other things; and in contrary, can do hear such sounds in their absentia, and cannot hear the particular humming sound audible on closing both ear holes with own fingers - are to be considered as nearing to death. Those who perceive sweet smell as foul, sweet taste as acrid, soft materials/articles as hard and their reverse are suggestive of a person's death within a year. One, who cannot sense the particular smell emanates from a lamp when it blows out, is also to be accounted as ariṣṭa symptom.

विधिना यस्य दोषायस्वास्थ्यायाविधिना रसा: ३६
य: पांसुनेव कीर्णाङ्गो योऽङ्गे घातं न वेत्ति वा ।
अन्तरेण तपस्तीव्रं योगं वा विधिपूर्वकम् ।। ३७ ।।
जानात्यतीन्द्रियं यश्च तेषां मरणमादिशेत् ।

(vidhinā yasya doṣāya-
svāsthyāyāvidhinā rasā: ।। 36 ।।
Ya: pāṁsuneva kīrṇāṅgo
yoऽṅge ghātaṁ na vetti vā ।
antareṇa tapastīvraṁ
yogaṁ vā vidhipūrvakam ।। 37 ।।
Jānātyatīndriyaṁ yaśca
teṣāṁ maraṇamādiśet ।)

A person who sticks to healthy meal with the prescribed rasas if seems to be unhealthy and vice versa again indicates his imminent death. One, whose skin looks smeared with dust, and who does not feel pain even being beaten up, is also indicates his approaching death.

Those who predict the super-sensual things without observing tedious penances or scheduled practice of higher levels of yoga, are also to be considered nearing to sudden death.

Note: The āyurvedic theory regarding food and medicine is rasapṛadhānam āhāram and vīrya pṛadhānam auṣadham. This means the edible articles in the world, which have efficacy to influence or make a drastic change in the doṣa level inside, are considered as medicines as these act by their potency whereas that have no potency but dominant of particular taste are considered food articles. These rasas of both auṣadham and āhāram are capable to influence on doṣa level but a meager change can be made by them. Therefore, in āyurvedic terms, doṣa level is maintained by the regular use of six rasas, three of which while increasing one doṣa, other three mitigate it. That level is disturbed on the advent of death showing some opposite responses.

Svararişṭam

हीनो दीन: स्वरोऽव्यक्तो यस्य स्याद्गद्गदोऽपि वा ३८
सहसा यो विमुह्येद्वा विवक्षुर्न स जीवति ।
स्वरस्य दुर्बलीभावं हानिं च बलवर्णयो: ।।३०।।

रोगवृद्धिमयुक्त्या च दृष्ट्वा मरणमादिशेत् ।
अपस्वरं भाषमाणं प्राप्तं मरणमात्मन: ।। ४० ।।
श्रोतारं चास्य शब्दस्य दूरत: परिवर्जयेत् ।

(hīno dīna: svaroऽvyakto
yasya syādgadgadoऽpi vā ।। 38 ।।
Sahasā yo vimuhyedvā
vivakṣurna sa jīvati ।
svarasya durbalībhāvaṁ
hāniṁ ca balavarṇayo: ।। 30 ।।
Rogavṛddhimayuktyā ca
dṛṣṭvā maraṇamādiśet ।
apasvaraṁ bhāṣamāṇaṁ
prāptaṁ maraṇamātmana: ।। 40 ।।
śrotāraṁ cāsya śabdasya
dūrata: parivarjayet ।)

If the sound of a person is feeble, very weak, not lucid or stammered and he gets fainting while trying to talk indicates his imminent death. The death of a patient can be predicted after seeing the feebleness of his sound, diminished body strength and complexion and unreasonable increase of the disease.

A physician should avoid two persons as they are going to die suddenly: one who talks with feeble sound that he is going to die and the other one who hears the same sound.

Note: Regarding the prediction of death, knowledge about the nature of sound of the patient is important. In olden days, physicians, who were also family doctors, were familiar with patient's nature.

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ANTIFERTILITY EFFECT OF *LINDENBERGIA INDICA* IN MALE ALBINO RATS: A MORPHOMETRIC APPROACH

Ashok Purohit, Jyoti Rathore and Keshav Bihari Vyas*

Abstract: *Lindenbergia indica*, belongs to the Scrophulariaceae family, is a small genus of annual or perennial herb distributed throughout tropical Asia and Africa. This study evaluates the effect of the whole plant extract of *L. indica* (70% Et.OH) on spermatogenesis in male rats. It is observed that *L. indica* extract possesses anti-spermatogenic constituents and may be developed into a male fertility control agent.

Introduction

A number of synthetic drugs and devices have been reported to prevent spermatogenesis and conception but most of them are unsuitable for human use due to the toxic effects of the drugs. There are many indigenous plants possessing the property of preventing conception, when administered orally. A search can be made for finding the effective agent for fertility control from plant sources because of the ease and cheapness with which the plants are procurable. A number of studies are available on the antifertility effect of plants[1-3]. In recent years, emphasis is being laid on male antifertility agents rather than female especially due to the availability of more contraceptive methods for females than males.

Lindenbergia indica Linn. (Family: Scrophulariaceae) is an annual herb[4]. The juice of this plant is used in chronic bronchitis and it is also used externally in skin eruptions in combination with the juice of coriander[5-6]. In the present study, an attempt has been made to evaluate contraceptive efficacy of *Lindenbergia indica* whole plant extract.

Materials and methods

Preparation of extract: - The plants were collected from the field in and around Ajmer (Rajasthan) during July. The identification was confirmed by the Department of Botany, J.N. Vyas University, Jodhpur. The whole plant was shade-dried, powdered and subjected to soxhalation with 70% ethanol (B.P. 60-80^0 C, AR grade) for 36 hrs. The extract was then concentrated to dryness in an evaporator under reduced pressure and controlled temperature (50-60^0 C). The dose of extract was determined by LD_{50} test.

Experimental design: - Matured fertile male albino rats (20 Nos) weighing 170-220g,

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maintained on a standard diet and water *ad-libidum*, were distributed into 2 groups of 10 each i.e. group I (vehicle treated control) and group II (animals of this group received plant extract at a dose of 500 mg/kg body weight orally for 60 days.) (Table 1)

From 55th day to 60th day, all animals i.e. control and treated were kept for fertility test with fertile females in ratio 1:3. All rats were sacrificed on 61st day by ether anaesthesia. The testes and accessory sex organs were dissected out, freed from surrounding tissue and weighed. Sperm motility in cauda epididymis and sperm density in cauda epididymis and testis was estimated[7]. Testis, cauda and caput epididymis were fixed in Bouin's solution, embedded in paraffin, sectioned at 5µ and stained with haematoxylin and eosin for histological studies.

Histometry was carried out for seminiferous tubule, Leydig cell nuclear diameter and epididymis (caput & cauda) for seminal vesicle epithelial cell heights with the help of Camera lucida. The data were reported as mean ± SEM (Standard error of mean). The significance was observed by applying student's 't' test. The evaluation of testicular cell population dynamics was based on the calculations made for each cell types per cross-tubular section. All row counts were transformed to nuclear point by using Abercrombie's formula[8]. Interstitial cells (Leydig cells) types such as fibroblast, immature, mature and degenerating Leydig cells were estimated applying a differential counts over 200 cells. This cell population was statistically verified by the binomial distribution[9].

Results

The weight of the testes and accessory reproductive organs decreased significantly ($P<0.001$) in the treatment group. A sharp decline in fertility of treated male was also observed (90%). The sperm density in testis and cauda epididymis was reduced by 73% and 85% in treatment groups when compared to control. The sperm motility in cauda epididymis was decreased by 90% in rat treated with plant extract (Group II).

The seminiferous tubules of treated rat's testes were shrunken. As a result, the interstitium was enlarged. The Leydig cell nuclei were shrunken. The spermatogenesis arrested at

TABLE 1

Body and organ weights of *L. indica* extract treated rats

Group	Bodyweight (g)		Testes*	Epididymis*	Seminal vesicle*	Ventral prostate*
	Initial	Final				
I	185.2±6.38	192.0±35.75	1295.12±39	410.18±20.12	365.62±16.2	220.42±9.3
II	180.0±9.7	210.75±10.6	878.39±17.21[a]	237.28±10.20[a]	241.12±12.42[a]	124.89±5.28[a]

Group II compared with group I; Values are mean ± SEM from 10 animals in each group.

*Mg/100gm of body weight; [a]P = 0.001

primary spermatocyte stage (Fig. 2), when compared with the control (Fig. 1). Caput and cauda epididymis from the experimental animals revealed reduce epithelial cell height and enlarged lumen with few Spermatozoa. Many of the epithelial cells were necrotic compared with control (Fig. 3 to 6).

The administration of the whole plant extract (70% EtOH) caused a significant alteration in testicular cell population. The germinal cell population i.e. spermatocytes (primary and secondary) and spermatids were reduced to significant level (P<0.001). Similarly, the immature and mature Leydig cells number was also reduced (P<0.01). However, the degenerating cells number was significantly increased (P<0.001). Fibroblast and spermatogonia number were not altered significantly (Table 2).

The epithelial height of caput, cauda and seminal vesicle found significantly reduced in the treatment group (P<0.001). The diameter of the seminiferous tubule and nuclei of Leydig cell was also reduced (Table 3).

Discussion

Reduction in sperm density in testes and cauda epididymis and sperm motility in cauda epididymis suggested the antiandrogenic nature of *L. indica* extract. Possibly, this effect is caused due to selective androgen deprivation. Reduction in the weights of testis and accessory sex organs also supported the view of decreased androgen level, as these organs are androgen-dependent[10-12]. The decrease androgen level is responsible for testicular dysfunction[13]. The process of spermatogenesis and accessory reproductive organs functions are androgen dependent. Similarly antiandrogenic nature of extract affected on the secretion of gonadotrophins. Depletion in biosynthesis of FSH and testosterone blocked spermatogenesis[14]. The blockage in spermatogenesis is reflecting in Leydig cell dysfunction. The impairment of Leydig cell function was evidenced by lower

TABLE 2

Testicular cell population dynamics of *Lindenbergia indica* extract treated rats

Group	Germinal cell types				Interstitial cell types			
	Sp	Ps	Ss	S	F	ILC	MLC	DC
I	22.2 ± 0.28	17.0 ± 0.29	62.6 ± 1.26	140.7 ± 0.37	61.0 ± 1.37	59.0 ± 1.33	69.60 ± 1.24	17.40 ± 2.59
II	16.90 ± 4.51[c]	12.91 ± 0.19[b]	8.91 ± 0.40[b]	13.12 ± 0.15[b]	57.10 ± 0.64[c]	41.36 ± 1.36[a]	31.90 ± 1.37[b]	72.10 ± 3.65[b]

Group II compared with group I; Values are mean ± SEM from 10 animals in each group.

[a] P = 0.01, [b] P = 0.001 and [c] P - Non significant

Sp. Spermatogonia; Ps. Primary spermatocytes; Ss. Secondary spermatocytes; S. Spermatids; F. Fibroblast; ILC. Immature Leydig cell; MLC. Mature Leydig cell; Degenerating cells

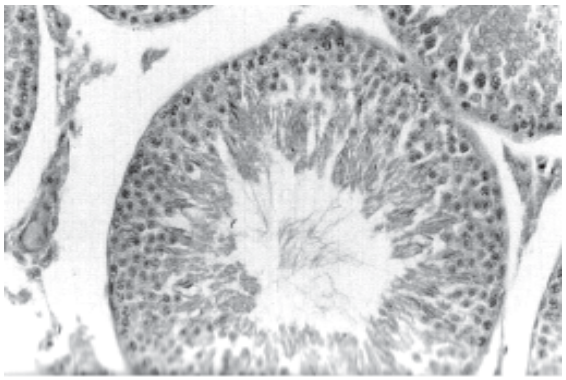

Fig. 1: Testis of control rats with all spermatogonial elements (HE x 200)

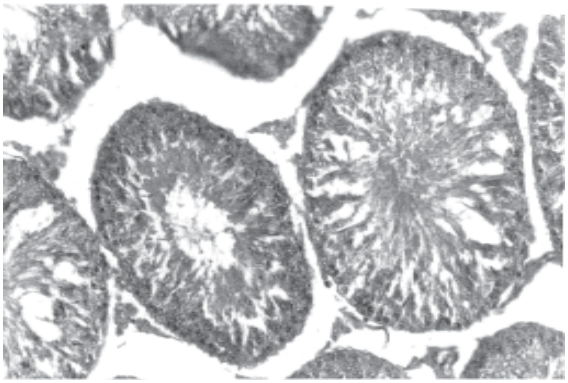

Fig. 2 Rat testis treated with 70% EtOH extract of *L. indica* revealing arrest of spermatogenesis at early stage, atrophied Leydig cells and a few spermatozoa in the lumen of few tubules only (HE x 200)

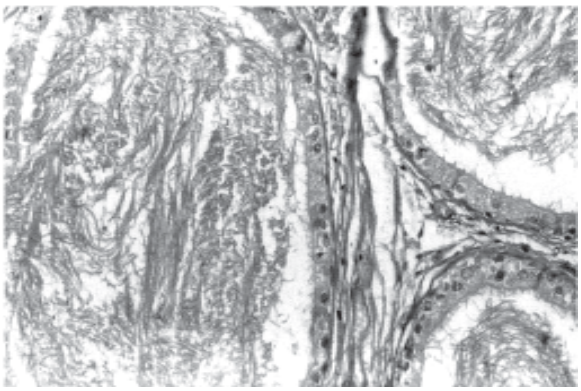

Fig.3: Cauda epididymis of control rat revealing columnar epithelium with stereocilica and humen full of spermatozoa. (HE x 200)

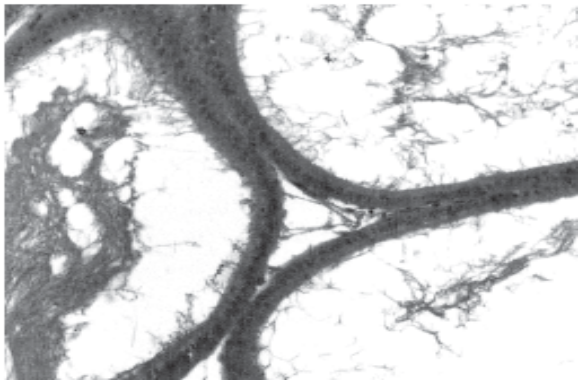

Fig.4: Cauda epididymis of *L. indica* extract treated rat showing secretary epididymal epithelial cells. Lumen is filled with secretary material with spermatozoa. (HE x 200).

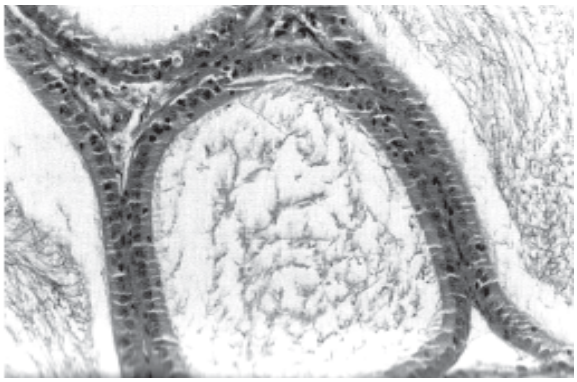

Fig.5: Caput epididymis of control rat showing normal tubules with spermatozoa. (HE x 200)

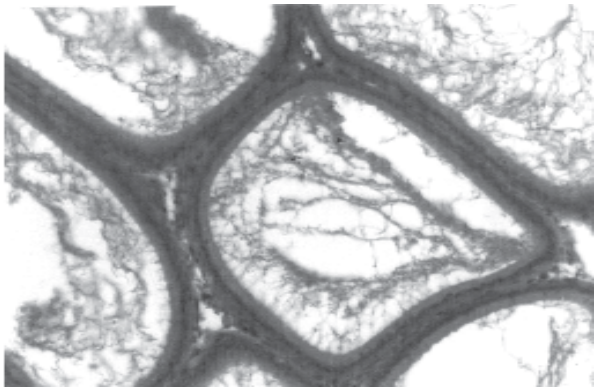

Fig. 6: Caput epididymis of ethanol extract treated rat showing shrunken epithelium and lumen is filled with few spermatozoa. (HE x 200)

TABLE 3

Histometry, fertility test and sperm dynamics of *L. indica* extract treated rats.

Group	SD (million/ml)		SM %	FT %	STD	LND	Epithelial cell height		
	Testis	Cauda					CE	Cau. E	SV
I	4.01 ± 0.14	76.66 ± 4.73	76.4 ± 4.6	90 (+)	273.3 ± 4.23	5.23 ± 0.04	45.12 ± 0.08	3486 ± 0.36	21.24 + 0.32
II	1.05 ± 0.02[a]	11.40 ± 0.47[a]	7.18 ± 1.14[a]	90 (-)	151.3 ± 3.06[a]	2.35 ± 0.03[a]	12.50 ± 0.41[a]	21.60 ± 0.22[a]	12.2 + 0.31[a]

SD - Sperm Density; SM - Sperm motility; FT - Fertility test; STD - Seminiferous tubule diameter; LND - Leydig cell nuclear diameter; CE - Caput Epididymis; Cau.E - Cauda Epididymis; SV - Seminal vesicle

Group II compared with group I; Values are mean ± SEM from 10 animals in each group.
*Mg/100gm of body weight; [a]P = 0.001

number of mature Leydig cells and increase in degenerating Leydig cells. The number of mature Leydig cells has a direct bearing on spermatogenesis[15]. It is further confirmed by decreased number of spermatocytes (primary and secondary) and spermatids as these stages are completely androgen dependent[16]. Depletion in the number of spermatids and spermatocytes may affect androgen binding protein on sertoli cells via its action in FSH with subsequent interference in sperm maturation and release[17]. The histometry of reproductive organs further confirmed androgen depletion.

Conclusion

Lindenbergia indica Linn. whole plant (70% EtOH) extract possesses strong contraceptive/ antispermatogenic compound or principles.

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IMPORTANCE OF BREAST-FEEDING IN TODAY'S WORLD

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Abstract: There are two aspects why breastfeeding is important for the mother as well as for the child. One is the nutritional aspect while the other is the psychological aspect. While the nutritional aspect is no doubt very important, the psychological bonding, which develops between the child and the mother is unparalleled and does not have any alternative. This paper discusses the importance and various factors of breastfeeding.

Breast milk is a complete food for the baby. Soon after the exhaustive descent from the birth canal mother's milk is the most suitable energy-feed for the baby. The composition of breast milk is such that a normal baby does not require any supplementary food, not even water, in the first 4-6 months of life for his energy and growth requirements. According to āyurvedic classics, breast milk helps in nourishment of breast and development of baby; milk is a complete food, having all necessary vital nutrients[1]

Physiological consideration

Suśrutasamhita describes the process of production of milk in the mother[2]. According to it, after proper digestion the vital part of the food i.e. āhārarasa (pṛasādāmśa), sweet in taste, comes to breast circulating through the entire body that constitutes the breast milk hence this pṛasādāmśa has proper vitality for the baby.

Modem science consider that the interaction of hormones and reflexes result in the production of milk. There are two main hormones that help in the process viz. Prolactin and Oxytocin.

Prolactin reflex (milk secretion reflex)

The prolactin is secreted from the anterior pituitary and its main action is on the glandular cells to secrete milk. There are enhancing and hindering factors for the prolactin reflex. The enhancing factors are:

- Emptying of breast
- Suckling
- Expression of milk
- Night feeds
- Prolactin in blood
- Sensory impulse from nipple

The hindering factors are:

- Prelacteals
- Feed with bottles
- Incorrect positioning during breast-feeding
- Painful breast conditions

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Oxytocin reflex (milk ejection reflex)

Oxytocin is secreted by the hypothalamus. It is responsible for the contraction and secretion of milk. The enhancing factors for oxytocin reflex are:

- Sensory impulses from nipple
- Oxytocin in blood
- Confidence
- Sound of baby
- Sight of baby

The hindering factors are:

- Worry
- Stress
- Embarrassment
- Pain
- Doubt

Suśrutasamhita refers to the various hindering and enhancing factors for production and ejection of breast-milk. According to it, the factors which help in ejection of milk from the breast are: touch, sight and thought of baby by holding the baby in lap by hands[3]. It also refers to the hindering factors like anger, stress, negligence towards baby, etc. that cause decrease in milk production and ejection as well[4].

The main reflexes in baby which helps in feeding are: i. rooting, ii. sucking and iii. swallowing.

Rooting: - When breast is touched on the baby's upper lip check or side of the mouth, the baby opens his mouth and search for the nipple.

Sucking:- With the help of suckling reflex the baby draws out milk from mother's breast.

Swallowing:- When the mouth of the baby is filled with milk he swallows the milk and then takes breath. The whole cycle of suckle, swallow, breath lasts for about 1 second.

Technique of breast-feeding

The techniques described in āyurvedic classics are quite scientific and matches well with the modern view of breast-feeding. Suśrutasamhita explains that on the auspicious date, after bathing the child from head to toe, he should be clothed with new garments and made to sit facing towards north, over the lap of dhātrī (wet nurse), who should sit facing east. First of all, she should clean the right breast and express a little quantity of milk; and then feed the child enchanting proper hymens[5]. Expression of little milk before feeding helps in control of unwanted disorders, which may develop due to congestion in child's mouth e.g. kāsa (cough), śvāsa (dyspnea), vomiting, etc.

Breastfeeding has benefits in all respects so every effort should be made to popularize it. Any anatomical or functional aberration in breast or nipples e.g. inverted nipples, sore nipple, breast engorgement etc. should be managed properly.

Position of mother and baby: - Mother can take any position which is comfortable for both mother and baby; it may be sit down or lie down position with a good support at her back. The baby should be placed such that his whole body should face mother and be as closer to the mother as possible. The baby's head and neck should be supported such that they lie in a straight line with his body and should face the breast. After proper positioning, the nipple should be touched to the baby's check, the baby will soon open his mouth (rooting) and quickly the nipple and areola are given into his mouth to start sucking. The attachment of baby to the breast can be judged by the following signs:

- Mouth wide open
- Chin touching the breast
- Baby's lower lip is curled outwards
- Areola is not visible, mostly lower portion as most part is in baby's mouth.
- Baby's cheek is full and not hollow.
- The baby suckles, pauses and suckles again in regular slow deep sucks.
- No pain in the nipples
- Mother can hear sound of swallowing
- Baby is calm and relaxed

Time and duration of breast-feeding

Breastfeeding should commence as soon as possible after giving birth. Carakasamhita advices to start breast feeding from the right breast on the same day of delivery soon after jātakarma, as after a normal delivery, most babies will suckle during the first half or one hour[6].

Regarding starting time of breast-feeding, there are different views in our āyurvedic classics. Suśruta and Vāgbhaṭa advocate starting of breastfeeding from third or fourth day, because after delivery, the dhamanis or siras situated in cardiac region get dilated and initiate milk ejection on the third or fourth day[7].

After delivery, the baby should be handed over to mother as early as possible. If the delivery is by cesarean section, breast-feeding can only be started after mother is completely recovered from the effect of anesthesia i.e. approximately 4 hours after operation. The first milk that is produced is called clostrum and technically it is best for the infant. Giving clostrum has been called as the first immunization of the child. It has a yellow tinge and is thick in consistency. Its nutritional qualities are high in protein, and low in fat and sugar. It is rich in immunity factors. It also acts as a natural laxative.

The baby must be breast fed as often as he wants. Babies have irregular feeding intervals in initial days; they may feed 6 to 12 or as many as 18 times in 24 hours period. Most babies take 15 to 20 minutes to take an adequate feed. Most babies demand a midnight feed during the first 6 weeks after which their feeding schedule is established satisfactorily and they are satisfied with one late night feed and an early morning feed. Baby must be allowed to suckle as much as he wants from one breast first and then, after emptying one breast, the other breast in order to provide hindmilk. If baby does not takes the other breast this time, then, next time, start from the other breast and later on come to the first one so that milk remains flowing.

Signs of proper breast feeding

The following are the signs of proper breast-feeding:

- Gains weight regularly
- No anatomical aberration in the breast or nipple
- Urinates 6 times or more a day with colourless or light yellow urine, feeds and sleeps well.
- Remain clam for at least 2 hours before he starts demanding for the next feed

Care after breast-feed

The art of burping, by putting the child on the shoulder after each feed, should be taught to the mother. Breast should not be washed before or after each feed as it removes the natural oil from the breast making the skin dry and cause damage.

When to stop breast-feeding

Vagbhata says that when dentition starts in child breast-feeding should be gradually discouraged and other milk, e.g. of goat or cow,

should be included in the diet along with laghu (easily digestible) and bṛmhaṇa (anabolic) cereals[8]. Preferably breast-feeding must be continued in addition to the complementary foods till the baby is 2 years old[9]. Nutritional profile of breast milk in terms of calories, vitamins, and minerals is the best for the infant as it has the perfect proportion of them all.

Care of the lactating mother

The lactating mother should be given extra fluids, additional 450 kcal/day and supplements of micronutrients so that her health and the nutritional quality of milk are maintained. She should consume more green leafy vegetables and avoid use of caffeine, tobacco and alcohol.

Characteristics and importance

The characteristic features of breast milk have well explained in our āyurvedic classics. According to Kāśyapasamhita, pure milk provides unobstructed, easy, and promotes growth of body parts, strength, longevity as well as good health to the child and does not cause any trouble to the mother and child. Breast milk is sātmya (appropriate), nutritive, anabolic, increases vitality and helps in proper growth and development of baby[10]. Breast milk is species specific, have lubricating property, sweet in essence, kaṣāyānurasa, cold in nature, suitable for body channels, increase digestion[11].

Breast milk has therapeutic benefits and it can be used for nasya karma in epistaxis, tarpaṇa karma in eye disorders and for aścyotana-karma (eye-drops). The chemical constituents of breastmilk and cow's milk are detailed in Table (1).

Advantages of breastfeeding

It can be divided as 1) advantages to the child, 2) to the mother 3) to both mother and child and 4) the social benefits.

To the child

a. Complete nutrition: - Breast milk contains suitable protein and fats rich in essential fatty acids Linolenic acid and linoleic acid; it has more lactose, enough vitamins, iron, water and correct proportion of salt, calcium and phosphate.

b. Protection against infection: - A breast fed baby is 14.2 times less likely to die of diarrhoea, 3-6 times less likely to die of respiratory infections. Some other anti-infective factors and their role are:
   - Immunoglobulins IgA and IgM antibodies
   - Lysozymes, complements, interferon, lactoperoxidase, macrophages, T and B Lymphocytes
   - Lactoferrin: Binds iron and checks the growth of harmful iron feeding bacteria
   - Bifidus factor: Helps in growth of lactobacillus bifidus which checks the growth of other harmful bacteria causing diarrhoea.
   - Anti-viral factor.
   - Anti-streptococcal factor.

c. Other benefits includes:
   - Decreased risk of allergic disorders e.g. asthma and eczema.
   - Lipase enzyme present in breast milk helps in easy digestion of fat
   - Due to suckling at the breast the jaw configuration is improved
   - Breast fed preterm babies have better IQ than those who were artificially fed.
   - Reduced risk of dental caries

TABLE 1

Comparison between breast milk and unprocessed cow's milk

Parameters	Breast milk	Cow's milk
Anti-infective substance	Antibodies, leukocytes lactoferrin, Bifidus factor etc.	Not active
Contamination	DDT?	Strontium pesticide and antibiotics, adulteration etc.
Protein		
Total	1%	4% (too much)
Caesin	0.5%	3% (Too much)
Amino acid		
Cystine	Enough for growing babies	Not enough
Taurine	Enough for brain, retina and bile acid conjugation	Virtually absent
Fat		
Total	4% (average)	4%
Saturation of fatty acids	Enough saturated	Too much saturated
Linolic acid (essential)	Enough for brain growth	Not enough
Cholesterol	Enough	Not enough
Lipase to digest fat	Present	None
Lactose	7% (enough)	3-4% (not enough)
Salts (mEq/1)		
Sodium (Na)	6.5 (correct amount)	25 (too much)
Chloride (CI)	12 (correct amount)	29 (too much)
Potassium (K)	14 (correct amount)	35 (too much)
Minerals (mg/I)		
Calcium	250 (correct amount)	1,400 (too much)
Phosphate	150 (correct amount)	900 (too much)
Iron	0.29 - 0.45 mg/100 ml (small but well absorbed)	0.01-0.35 mg/100 ml (small amount and poorly absorbed)
Folic acid	0.14 - 0.36µg/100 ml	0.01 - 0.06 µg/100 ml
Vit B_{12}	0.0008 - 0.45 µg/100 ml	0.07 - 1.15 µg/100 ml
VitC	1.2 -100 mg/100 ml	1.2 - 1.5 mg/100 ml
VitA	0.5 -10.0 IU/100 ml	70 -220 IU/100 ml
VitD	0.5 -10.0 IU/100 ml	0.5 - 4.5 IU/100 ml
VitK	1.5 µg/100 ml	6.0 µg/100 ml
Energy provided	640 -720 Kcal/litre	650 Kcal /litre

2. **To the mother**

The advantages of breastfeeding to the mother are:

- Convenient
- Reduces risk of CA breast and ovary and osteoporesis in later life
- Uterine involution process is hurried up
- Causes contraction of uterus soon after delivery and helps in easy expulsion of placenta and minimizes risk of post partum haemorrhage
- Improves the figure of the mother by mobilizing the extra fat laid down during 3rd trimester of pregnancy
- Provides a sense of calm and satisfaction

3. **To both mother and child**

- Comforting baby: Close body contact during breast-feeding helps in building a bond of love between mother and baby.
- Child spacing: It provides 98% protection against pregnancy if the baby is exclusively breast fed during first 6 months of life and the mother has amenorrhoea.

4. **Social benefits**

- It is apparently free of cost though lactating mother needs additional 450 kcal/day to maintain lactation and her own health.
- It leads to national cost saving amounting to about Rs. 8,500 crores/annum in India alone.
- Reduces need for hospitalization and improved child survival.
- It promotes family planning.

Contraindications

According to ācārya Suśruta, those who is hungry, worried, tired, pregnant, emaciated, obese, having vitiated dhātus, consumed diet that produce vidāha (burning sensation) or the edibles opposite in character, who is suffering from fever, should not breastfeed the child[12]. The child who has taken medication and medicine and is not assimilated till the feeding time, should not fed, because at this stage the force of doṣa, auṣadhi (drug) and mala would be too much. Some other contraindications are:

- Acute febrile maternal illness
- Breast abscess
- Mother receiving anti-thyroid drugs and anti-cancer agents.
- Serious debilitating chronic illness

Alternate arrangement

Importance of mother's milk as species specific was felt very early, which gave birth to the concept of dhātri (wet nurse). In conditions where the mother is unable to provide breast-feed, the wet nurse has been advised as an alternate to the mother in āyurvedic classics. Vāgabhaṭa has advised arrangement of two wet nurses, while other ācāryas have not specified the number. Specific qualities of the wet nurse have been described by our ācāryas which signify the assessment of physical and psychological status of wet nurse before her appointment.

In case the mother is employed and is unable to take baby with her, she can express her milk by hand and leave it for a helper to feed the baby. The expressed milk can be stored at room temperature for about 8 hours and up to 24 hours if refrigerated.

Breast-feeding has an overall beneficial effect on mother, child and society and should be popularized.

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कृत्स्नदेहात् स्तनौ प्रातः स्तन्यमित्यभिधीयते ।।
(सु. नि. १०/१८)

3. तदेवापत्यसंस्पर्शाद्दर्शनात् स्मरणादपि ।
ग्रहणाच्च शरीरस्य शुक्रवत् सम्प्रवर्त्तते ।।
स्नेहो निरन्तरस्तत्र प्रस्रवे हेतुरुच्यते ।
(सु नि. १०/२२,२३)

4. क्रोधशोकावात्सल्यादिभिश्च स्त्रियाः स्तन्यनाशो भवति । (सु. शा. १०/३०)

5. ततः प्रशस्तां तिथौ शिरःस्नातमहतवाससमुदङ्मुखं शिशुमुपवेश्य धात्रीं प्राङ्मुखीं चोपवेश्य दक्षिणं स्तनं धौतमीषत्परिस्रुतमभिमन्त्र्य मन्त्रणानेन पाययेत् ।।
(सु. शा. १०/२५)

6. अतोऽनन्तरं जातकर्म कुमारस्य कार्यम् । तद्यथा – मधुसर्पिषी मन्त्रोपमन्त्रिते यथाम्नायं प्रथमं प्राशितुं दद्यात् । स्तनमत ऊर्ध्वमेतेनैव विधिना दक्षिणं पातुं पुरस्तात् प्रयच्छेत् । (च. शा. ८/४६)

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चतूरात्रात्त्रिरात्राद्वा स्त्रीणां स्तन्यं प्रवर्तते ।।
(सु. शा. १०/१४)
सिराणां हृदयस्थानां विवृतत्वात् प्रसूतितः ।।
तृतीयेऽह्नि चतुर्थे वा स्त्रीणां स्तन्यं प्रवर्तते ।
(अ.हृ. उ. १/११)

8. अथैनं जातदशनं क्रमेणापनयेत्स्तनात् ।
पूर्वोक्तं योजयेत्क्षीरमन्नं च लघु बृंहणम् ।।
(अ.हृ. उ. १/३७)

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शिशुधात्र्योरनापत्तिः शुद्धक्षीरस्य लक्षणम् ।।
(का. सू. १९)

क्षीरं सात्म्यं हि बालानां क्षीरं जीवनमुच्यते ।
क्षीरं पुष्टिकरं वृद्धिकरं बलविवर्धनम् ।।
(का. खि. २२)

11. जीवनं बृंहणं सात्म्यं स्नेहनं मानुषं पयः ।
नावनं रक्तपित्ते च तर्पणं चाक्षिशूलिनाम् ।।
(च. सू. २७/२२४)

नार्यस्तु मधुरं स्तन्यं कषायानुरसं हिमम् ।।
नस्याश्च्योतनयोः पथ्यं जीवनं लघु दीपनम् ।
(सु. सू. ४५/५७)

12. न च क्षुधितशोकार्तश्रान्तप्रदुष्टधातुगर्भिणीज्वरिता–तिक्षीणातिस्थूलविदग्धभक्तविरुद्धाहारतर्पिताया: स्तन्यं पाययेत्, नाजीर्णौषधं च बालं, दाषौषध–मलानां तीव्रवेगोत्पत्तिभयात् ।। (सु.शा. १०/३१)

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ROLE OF ŚIROVASTI IN THE MANAGEMENT OF KAMPAVĀTA VIS-A-VIS PARKINSONISM

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Abstract: Kampavāta is one of the vāta disorders described under the 80 types of nānātmaja vyādhis of vāta. The features of kampavāta have striking degree of similarity with Parkinsonism, an extra-pyramidal disorder related to dysfunction of basal ganglia in the brain. Pañckarma therapy offers a ray of hope in the management of Parkinsonism for which no effective treatment is available in modern medicine. The paper is a clinical study along with an objective scale for the assessment of kampavāta.

Introduction

Kampavāta is one of the common disorders found in geriatric population. Patients of this disease show tremor all over the body, especially of the head and upper limbs. It is primarily due to vitiated vāta. Caraka defines 80 types of vātavikāras, places of vātavyādhi (that are extensive and may involve any part of the body), dūṣya, koṣṭha and dhātu. Kampavāta can be correlated with Parkinsonism on the basis of clinical presentation.

Parkinsonism is an extra-pyramidal disorder, related to dysfunction of the basal ganglia in the brain. It is divided into akinetic rigid syndrome (Parkinsonism), in which there is paucity of movement (akinesia or bradykinesia) often accompanied by an increase in muscle tone (rigidity) and hyperkinesias or dyskinesias, which are associated with excessive abnormal involuntary movements.

There is no specific and effective treatment for this debilitating disorder in modern medicine. Though some remission is obtained by taking the dopamine agonists and cholinergic medication, patients do not return to the normal state.

Pañcakarma therapy offers a ray of hope for such debilitating conditions. The symptoms start insidiously and tend to be unilateral or symmetrical at the onset. The initial manifestations may be tremors, slowness, stiffness or clumsiness of arm or less commonly of leg. The clinical features are summarized as: mask face, stooped posture/flexed attitude; slurred, indistinct speech, bradykinesia (difficulty/slowness in initiating voluntary movements), impaired fine movements of hands (fingers), poor precision of repetitive movements, gait, posture, difficulty in maintaining balance, rapid short steps, tendency to run (festinated gait, difficulty in

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stopping suddenly), reduced swinging of arms, loss of balance on turning, slow turning movements, tremors, resting 4-6Hz/sec, diminished with movements and attention and fingers are most commonly affected.

Rigidity of the lead-pipe type (more in lower limbs and trunk) and cogwheel type (more in upper limbs) is seen. Depression and anxiety are frequently seen in Parkinson's disease and they often coexist. The most consistent pathological finding is degeneration of the nigrostriatal tract. The degenerating neurons contain Lewybodies and neurofibilliary tangles. Lewybody is a highly sensitive marker for Parkinson's disease. Besides the nigrostriatal tracts, Parkinson disease also affects other parts of the brain.

Depletion of the dopaminergic neurons of the substantia nigra results in reduction of striatal dopamine, which is thought to be the main biochemical, exists between acetylcholine and dopamine. With dopamine deficiency, there is acetylcholine hyperactivity. This may be a mechanism for Parkinson symptoms.

Norepinephrine, serotonin, somatostatin, substance P, and the encephalins are also found to be depleted in varying degrees. The cause of Parkinson's disease is not known. Environmental factors have been implicated. MPTP, a toxic product of heroin, to cause an acute clinical syndrome which was identical to Parkinson's disease, possibly even with formation of lewybodies; chronic exposure to an MPTP like toxin in the environment has also been suggested.

TABLE 1

Effect of trial treatment on symptom score

Symptom	Mean + SD					't' value
	BT	F1	F2	AT	BT-AT	
1. Speech						
Group A	2.63 + 0.49	1.90 + 0.65	1.17 + 0.65	0.63 + 0.61	2.00 + 0.74	14.75
Group B	2.43 + 0.57	1.67 + 0.76	1.03 + 0.67	0.43 + 0.50	2.00 + 0.64	17.03
2. Tremors						
Group A	2.80 + 0.48	1.80 + 0.66	1.07 + 0.74	0.50 + 0.63	2.30 + 0.65	19.34
Group B	2.70 + 0.47	1.97 + 0.76	1.80 + 0.56	0.70 + 0.53	2.00 + 0.59	18.65
3. Gait						
Group A	2.30 + 0.47	1.57 + 0.63	0.80 + 0.61	0.47 + 0.51	1.83 + 0.53	18.92
Group B	1.87 + 0.35	1.30 + 0.60	0.83 + 0.75	0.53 + 0.57	1.33 + 0.55	13.36
4. Rigidity						
Group A	2.60 + 0.50	1.83 + 0.79	1.20 + 0.66	0.63 + 0.56	1.97 + 0.61	17.52
Group B	2.43 + 0.50	1.70 + 0.60	1.03 + 0.49	0.63 + 0.49	1.80 + 0.71	13.80
5. Emotional liability			.			
Group A	2.87 + 0.68	1.97 + 0.72	1.30 + 0.70	0.63 + 0.56	2.23 + 0.77	15.81
Group B	2.47 + 0.51	1.73 + 0.64	1.13 + 0.73	0.67 + 0.61	1.80 + 0.66	14.84

*p = <0.001 Highly significant

Material and methods

In this study, 60 cases of Parkinsonism were selected from the Kāyacikitsa OPD/IPD, Sir Sunder Lal Hospital, IMS, BHU. A total of 30 cases in each group (Group A & B) were studied fully in 3 follow-ups after 21 days' interval. All the cases were assessed and the results analysed with appropriate methods.

The cases of kampāvata (Parkinson's disease) were evaluated for the effect of śirovasti with Maṇḍūkaparṇi ghṛta (Group A) and with Kampavātāri Rasa - 250 mg BD and Kapikacchu cūrṇa - 5g BD (Group B). Maṇḍūkparṇi ghṛta consisted only the Maṇḍūkaparṇi pañcāng with the goghṛta (cow' ghee) prepared according to Snehakalpana.

Being a clinical syndrome, there is a long felt need to prepare an objective criterion for assessment of clinical severity and grading of the salient features of kampavāta. With this in view, a 10 point scale was prepared:

Parameters	Score
1. Vākśakti (speech)	
- Normal speech	0
- Mild slurring of speech	1
- Moderate slurring of speech	2
- Moderately severe slurring speech	3
- Indistinct speech	4
2. Vepathu (tremors)	
- No tremors	0
- Fire tremors	1
- Fire and distinct tremors	2
- Moderate/Pillroling tremors	3
- Excessive tremors	4
3. Ceṣṭa sthiti (posture)	
- Normal during walk	0
- Mildly flexed posture	1
- Moderately flexed posture	2
- Stooped posture	3
- Excessive stooping	4
4. Calanasvarūpa (gait)	
- Normal gait	0
- Mild difficulty in walking	1
- Moderate difficulty in walking / Moderate propulsion	2
- Rapid short steps/tendency to run	3
- Completely festinant gait	4
5. Stambhatva (rigidity)	
- No rigidity	0
- Mild rigidity	1
- Moderate rigidity	2
- Moderately severe rigidity	3
- Typical lead pipe/cogwheel rigidity	4
6. Avyavasthitacittatva (emotional liability)	
- No fluctuation	0
- Mild fluctuation in emotional state	1
- Moderate fluctuation in emotional state	2
- Moderately severe fluctuation	3
- Severe degree of emotional fluctuations	4
7. Ānanasvarūpa (facial appearance)	
- No change	0
- Mildly obliteration of labial folds	1
- Moderate obliterated of labial folds	2
- Mask type appearance	3
- Completely mask facies	4
8. Ceṣṭamandatā (bradykinesia)	
- No difficulty in initiating movement	0
- Slowness in initiating movements	1
- Difficulty in initiating movement	2
- Poor precision of repetitive movement	3
- Extreme difficulty to initiate movement	4
9. Cittāvasāda (depressive features)	
- Not present	0
- Mild	1
- Moderate	2
- Moderately severe	3
- Severely depressive features	4
10. Cittodvega (features of anxiety)	
- Not present	0
- Mild	1
- Moderate	2
- Moderately severe	3
- Severely depressive features	4

Observations and results

The effect of trial drugs on speech, tremor and gait was found statistically highly significant in both the groups. There was significant change observed in speech, posture, emotional liability and bradykinesia in both the Group A & B. However, the changes were more marked in the Group A (sirovasti with Mandukaparni ghrita). On the depressive features, which are very commonly associated with kampavata in the chronic state, and on HDRS score, the effects of trial drugs were highly significant in both the Groups (Tables 1&2).

Parkinson symptoms: - An inter-group comparison revealed that statistically there was not much change in the different clinical aspects in both the groups. However, patients in Group 'A' showed better effect in the areas of emotional liability, bradykinesia and gait (Table 3).

Conclusion

Vāta is the predominant doṣa during old age, and kampavāta is a type of vātavyādhi. In āyurveda, Maṇḍūkaparṇi is described as a medhya drug. Śirovasti with Maṇḍūkaparṇi ghṛta is indicated in the treatment of mental diseases, which pacifies vāta doṣa and improves memory and will power and reduces anxiety and elevates the mood. Kapikacchū cūrṇa and Kampavātāri Rasa have got vāta-alleviating property. They have also been found to reduce anxiety and induce healthy sleep. Śirovasti with Maṇḍūkaparṇi ghṛta was significantly effective in alleviating the symptoms of parkinsonism. Thus there appears to be plenty of scope for using this āyurvedic regimen in the management of kampavāta.

TABLE 3

Comparison between Group A & B on difference BT-AT (unpaired 't' test)

Items	't'	'p'
Speech	0.00	P>0.05 NS
Trem0rs	1.85	P>0.05 NS
P0stures	0.00	P>0.05 NS
Gait	3.59	P<0.0I HS
Rigidity	0.97	P>0.05 NS
Em0ti0nal liability	2.33	P<0.05 S
Facial appearance	1.61	P>0.05 NS
Bradykinesia	3.33	P<0.01 HS
Depressive features	1.48	P>0.05 NS

NS-Not significant, HS-Highly significant, S-Significant

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TABLE 2

Effect of trial treatment on the mean of the total scores of Hamilton Depression Rating Scale (HDRS)

Group	Mean + SD					't' value
	BT	F1	F2	F3	BT-AT	
Group A (n = 30)	22.73 + 2.62	16.46 + 3.01	11.8 + 2.20	6.733 + l.964	16.0 + 2.612	33.55
Group B (n = 30)	23.7 + 1.556	18.76 + 1.65	13.793 + 2.610	9.333 + 3.133	14.7 + 3.57	22.55

*p = <0.001 Highly significant

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CHRONIC VENOUS ULCER - A CASE REPORT

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Abstract: A patient, diagnosed of chronic venous ulcer and advised to do surgery, was treated with the classical line of management of vātarakta. The procedures like samyakmṛdu virecana and formulations like Mahāmañjiṣṭādi kaṣāya, Kaiśoraguggulu, etc. were proved to be effective in this case. The patient was completely cured and recurrence of suppurative uttānavātarakta was prevented by the āyurvedic line of treatment.

Presentation

A 50 year-old female, house keeper by profession in a corporate hospital, with a history of chronic venous insufficiency of lower limbs and with a 25 days' history of painful venous ulcer of 5 cm x 5 cm over the right medial malleolus, was seen in the Department of Āyurveda, Kasturba Medical College, Manipal[1]. In addition, she had severe pain, pitting edema, burning sensation, erythema, tenderness, itching and hyper pigmentation around the ulcer. She had a medical history of bronchial asthma. No history of ischemic heart disease, hypertension, hyperlipidemia, renal pathology, cerebro vascular accident, obesity, diabetes mellitus, deep venous thrombosis, vascular surgery, leg fracture, smoking or alcohol.

One week earlier, she had been admitted to the hospital and surgery was advised. The patient declined conventional surgical treatment and took an alternative decision to try āyurvedic treatment.

Assessment

Examination revealed a 5 cm by 5 cm venous ulcer with serous fluid discharge over the right medial malleolus which was foul smelling. The skin around the ankle joints was hyperpigmented. She had varicose veins on the medial aspect of both the legs. Pulse were present on examination of the right lower limb. The patient was afebrile with a blood pressure of 130/80 mm Hg and a pulse of 80 bpm. Cardiovascular, neurological and abdominal examinations were unremarkable, but occasional bilateral ronchis were found on auscultation. No clinical symptoms of ischemic ulcer, gangrene, intermittent claudication or neuropathic ulcer were present.

Laboratory value on admission was significant for an erythrocyte sedimentation rate of 126 mm/hr. White blood cells count was 5,700 cells/mm3 with differential count of 69% neutrophils, 27% lymphocytes, 9% monocytes, 5% eosinophils and the hemoglobin level was 11 gm%. Biochemical examination revealed fasting and

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postprandial glucose level within normal limits.

A colour doppler of lower limbs showed minimal reflux across the right saphenofemoral junction and incompetence of left saphenofemoral and saphenopoplitial junction. An ultrasound of the abdomen showed mild hepatomegaly with fatty infiltration.

Diagnosis

A known case of Chronic Venous Ulcer (CVI) was re-diagnosed according to the clinical, etiological, anatomical and pathological classification i.e. chronic venous disease, Class 6 (skin changes with active ulceration), Evv (varicose veins), As (anatomically superficial) and PR (pathophysiological reflux)[2].

Venous leg ulceration is due to sustained venous hypertension, which results from chronic venous insufficiency. The venous valves prevent retrograde flow, and it is the failure of the valves that leads to reflux and associated symptoms. Up to 10% of the population in Europe and North America has valvular incompetence, with 0.2% developing venous ulceration. Forty to fifty percent of venous ulcers are due to superficial venous insufficiency and/or perforating vein incompetence alone with normal deep venous system[3].

The lower limb venous system made up of deep veins of the calf and thigh has a sophisticated series of muscle pumps that act as peripheral hearts to pump the blood. In addition, there is foot pump that ejects blood from the plantar veins as pressure is placed on the foot during walking. On exercise, the calf and thigh muscle contract, compressing the veins and ejecting blood towards the heart[4]. Since the patient was a housekeeper, sukumāraṇam[5] acaṅkṛamaṇaśīlinām[6a] and poor calf muscle function[3] were excluded from pathogenesis and direct risk factors respectively. The case was an exceptional one to say that people who sit and walk are at less risk of developing varicose veins[4]

Examination of lower limbs and colour doppler revealed varicose veins as visible risk factors of chronic venous ulceration in this patient. The failure of valves of veins of lower limbs is one of the most common problems, resulting in varicose veins. The mechanisms that cause the superficial vein valves to fail have not been fully understood. In the failed condition of venous valves, the ability of the muscle pumps to reduce the pressure in the leg decreases. This condition allows retrograde flow of blood, resulting in venous hypertension followed by venous ulcer as a complication.

Ninety five percent of venous ulceration is in the gaiter area of the leg, characteristically around the malleoli. Ulcers occurring above the mid-calf or on the foot are likely to have other causes. Pitting edema is often present and may predate the ulcer. It is often worse towards the end of the day[3]. According to the ancient Indian system of medicine, the case was diagnosed as suppurative[6b] uttānavātarakta[6c].

Management

Compression is the mainstay of venous ulcer management. Graded compression with greatest pressure (about 40 mm Hg) at the ankle, tapering off to lower pressure (about 18 mm Hg) below the knee, increases the limb hydrostatic pressure and concomitantly reduces the superficial venous pressure. Surgery is normally indicated to correct superficial venous disease in an attempt to prevent ulcers from recurring[3].

According to the management of vātarakta, the

patient was not given purificatory ghee (śodhanāṅgasnehapāna) in the beginning because of obstruction to the channels (mārgāvarodha)[6d-f]. As a first step of treatment, 30 ml of bark decoction[7] of sacred fig (*Ficus religiosa*) mixed with equal quantity of honey orally[6g,8], Kaiśora guggulu[9] 1 tablet two times a day, Mahāmañjiṣṭādi Kaṣāya[9] 15 ml two times a day for 42 days and wound wash with decoction of pañcavalkala (bark of *Ficus religiosa*, *Ficus benghalensis*, *Ficus glomorata*, *Ficus microcarpa*, *Ficus arnottiana*) and bark of neem (*Azadirachta indica*)[8] were advised for 21 days to remove the obstruction by which the wound was completely healed. But she still had mild pain and swelling around the ankle joint.

As the condition was pitta and rakta predominant, oleaginous purgation (snigdha virecana)[6h] was planned in the second step of treatment. Śodhanāṅgasnehapana with Mahātiktaka ghṛta[9] was given till manifestation of some signs of sufficient oleation (irṣat samyagsnigdhalakṣaṇas) followed by three days of oil massage (abhyaṅga) and mild sweating (mṛdu sveda). On the day of virecana, abhyaṅga and mṛdusvedana followed by sufficient mild oily purgation (samyakmṛdusnigdhavirecana) with 100 ml of milk + 20 ml of castor oil + 20 grams of Tṛvṛtleha[0] was given[6h].

Then patient was kept on 30 ml of sacred fig decoction with 30 ml of honey[6g] two times a day for 6 months without even compression bandage followed by one year observation. An alternative decision of a patient who was advised surgery gave complete and non-recurrent cure, except for the hyper pigmentation. Comparative baseline and post treatment Doppler study did not show much change in the pathology of veins.

Conclusion

The classical line of management of vātarakta can cure chronic venous ulcer (CVI). Deep vein insufficiency can be prevented or even eliminated by proper treatment of CVI[10]. Sufficient mild purgation (samyakmṛdu virecana) and pacifying medicines (śamanauṣadis) have proved curative effect and it is assumed that the strongest[6i] properties of decoction of sacred fig has curative as well as preventive effect by strengthening weakened valves of veins.

Acknowledgements

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OCCURRENCE OF GMELINOL IN THE STEM BARK OF *GMELINA ARBOREA* ROXB.

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Abstract: This paper deals with the phytochemical characterisation of the stem bark of *Gmelina arborea* using TLC and HPTLC profiling. The methanolic extract of the dried bark showed the presence of a lignan, gmelinol which has not reported earlier in the stem bark. Identification and quantification were performed and the percentage of gmelinol ranges from 0.11 to 0.17 in the samples analysed.

Introduction

Gambhārī (*Gmelina arborea* Roxb.) belongs to the family Verbenaceae (Fig.1). It is an important ingredient in the group of daśamūla and used for the preparation of many āyurvedic formulations. The useful parts of the plant are root, stem bark and fruits. It is a medium sized to rarely large deciduous tree reaching a height of 15-20m and found distributed in deciduous forests, in the lower Himalayas, the Nilgiris and the East and West costs of India. It is astringent, bitter, digestive, cardiotonic, diuretic, laxative and pulmonary and nervine tonic. It promotes digestive power, improves memory, helps to overcomes giddiness, and is useful in burning sensation, fever, heart diseases, nervous disorders and piles (Warrier *et al*., 1995). The antifungal activity of constituents from heartwood was reported by Kawamura *et al*., 2004. The extracts of heartwood has yielded a number of noval lignans, including arboreol (Govindchari *et al*., 1972), isoarboreol, methyl arboreol, gummadiol and gmelanone, gmelinol (Anjaneyalu *et al*, 1972,1975,1977), arborone and 7-oxo dihydrogmelinol (Sathyanarayanan and Rao 1986) gmelofuran a-sesqueterpene (Joshi *et al*., 1978). Joshi *et al*., (1971) isolated and identified *n*-hexacosanol, *n*-octacosanol and *n*-hentriacontanol along with β sitosterol from the benzene extract of heartwood and gmelinol from aquous extracts. Gmelenosides A-L, twelve acylated iridoid have been isolated from *G. arborea* leaves by Hosany and Rosazza (1998). A thorough literature survey indicates that no compound have been reported so far in the case of stem bark, which is one of the useful part of *G. arborea*. This study deals with the phytochemical analysis of the dried stem bark of *G. arborea,* to find out the major chemical compounds. To the best of our knowledge this

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is the first instance of reporting the occurrence of a lignan-gmelinol in the methanolic extract of dried bark powder of *G. arborea.*

Materials and methods

The bark of *Gmelina arborea* Roxb. was collected from the Herb Garden, Arya Vaidya Sala, Kottakkal. Methanolic extract was subjected to preliminary phytochemical tests for the detection of major chemical groups. Precoated silica gel F_{254} plate (E. Merck) of 0.2 mm thickness was used for the TLC profiling. HPTLC was performed using CEMAG Linomat V sample applicator and plates were scanned using Cannon 3 scanner. UV values measured using Shimadu UV 1700 double beam spectrophotometer.

a

b

Fig. 1. *Gmelina arborea*
a.Twig with fruits; **b** Dried stem bark

Experiments and results

Dried powdered bark of *Gmelina arborea* (500g) successively extracted with *n*-hexane (b.p.64-67°) and methanol in a soxhlet extractor. The hexane extract was discarded. The dark brown methanol extract was concentrated to one liter and kept overnight. The waxy material deposited was filtered off. From the dark brown filtrate solvent was removed under reduced pressure. The residue was warmed with several small lots of ethyl acetate and separated. The ethyl acetate soluble portion was washed thoroughly with 5 per cent aqueous NaOH solution to remove the phenolic components. The ethyl acetate layer was diluted with 500 ml ether; cooled and left overnight. Separated thick mass of colourless plates of gmelinol has m.p. 120-124°. Total yield obtained was 350 mg. The isolated gmelinol was characterized using UV and FTIR (Fig.2).

TLC identity test

Refluxed 1g of the powdered drug with 50 ml of chloroform for 6 hours. Filtered and removed

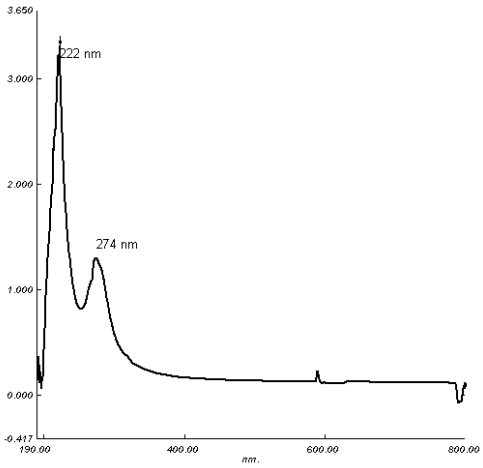


Fig 2. UV spectrum of isolated Gmelinol

the solvent under reduced pressure. Test solution was prepared by dissolving the residue so obtained (0.0680g) in 25 ml of chloroform. Standard solution was prepared by dissolving 1 mg of the isolated gmelinol in 10 ml chloroform. 10 µl each of standard solution and the test solution was applied on a precoated silica gel 60 F_{254} plate (E. Merck) of 0.2 mm thickness and the plate in the solvent system developed, Toluene: Acetone (9:1), in a twin trough chamber till the solvent rises to a distance of 8 cm. Derivatised the plate with antimony trichloride reagent and heated at 120° for 5 min. Colour and the R_f values are given (Table 1, Fig.3). A band (R_f 0.24) corresponding to gmelinol was visible in both standard and test solution tracks.

Assay/analytical methods

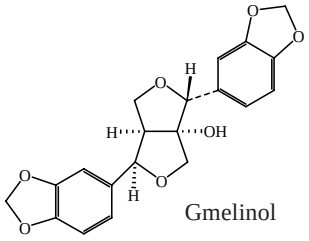
HPTLC of gmelinol

10 mg of gmelinol was dissolved in chloroform in a 10 ml volumetric flask and made up the volume to obtain standard solution. 10 µl of each of the standard solution (10 to 100 ng) was applied on precoated silica gel 60 F_{254} TLC plate; the plate was developed in a twin trough chamber till the solvent system [Toluene: Acetone (9:1)] roused to a distance of 8 cm. Sprayed the plate with antimony trichloride reagent and heated at 130° for 5 min., and scanned the plate densitometrically at 365 nm. (Fig.4).

TABLE 1

TLC details of chloroform extract of *Gmelina arborea* bark after derivatisation

R_f value	Colour of the band
0.18	Black
0.24	Light Blue (Gmelinol)
0.62	Pale Yellow
0.81	Pale Yellow



Gmelinol

The peak area was recorded and the calibration curve prepared by plotting peak area *vs* applied gmelinol concentration.

Estimation of gmelinol in the drug

1g of the powdered drug was refluxed with 50 ml of chloroform for 6 hrs.; filtered, and removed the solvent under reduced pressure. The test solution was prepared by dissolving the residue (0.0680 g) in chloroform in a 25 ml volumetric flask. 10 µl of the test solution in triplicate was applied on a precoated silica gel

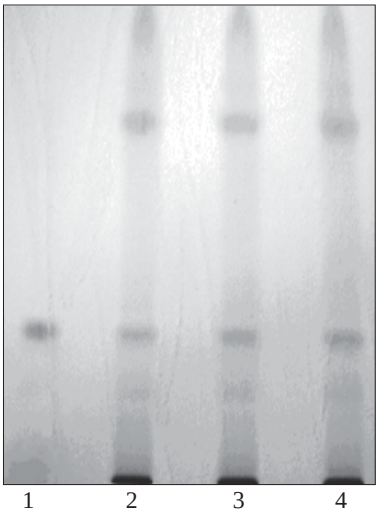


Fig.3. TLC profile of chloroform extract of *Gmelina arborea* bark.

1: Gmelinol standard; 2- 4: Test solutions

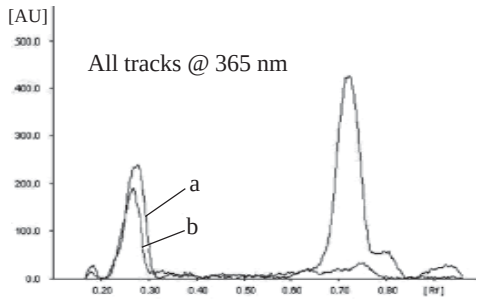


Fig.4. TLC densitometric chromatogram scan at 365 nm of test solution of bark
a Gmelinol standard; **b** Test solution.

60 F_{254} TLC plate. The plate was developed in the above solvent system and the peak area of gmelinol recorded as described above for calibration curve. The amount of gmelinol present in the sample was calculated from the calibration curve. The percentage of gmelinol ranges from 0.11 to 0.17 in the samples was analysed.

Conclusion

From the phytochemical studies of stem bark of *G. arborea*, it is evident that, the aforementioned study is helpful in identifying the marker compound gmelinol from the methanolic extract of powdered stem bark. This is found to be a useful marker to achieve the quality standard of the particular raw drug. Further this method can be used to find out the genuine bark from the spurious adulterants and lead to better quality of medicine.

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ECZEMA - AN ĀYURVEDIC PERSPECTIVE

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Abstract: The term eczema means 'to erupt' in Greek. It is a universally encountered skin disease, mostly acute and less frequently chronic and recurrent. This paper briefly discusses the aeitiological factors, clinical features and the āyurvedic management of eczema.

Introduction

Skin, which covers the entire body, has much importance in terms of physiological and cosmetological view. Unfortunately, when the skin is afflicted, we have to suffer for a long time to cure it. Eczema is a skin lesion that has become more prevalent. In addition to the physical involvement, the disease also affects the person psychologically and socially. Eczema, which means 'to erupt' in Greek, is a universally encountered, mostly acute and less frequently chronic, recurrent skin disease. Āyurvedic classics describe all the skin disease under kuṣṭha. Āyurvedic texts refer to a disease called 'vicaṛchika' that has more co-relation with eczema. Some describe vicarchika as kṣudra kuṣṭha while others include it among mahākuṣṭha.

Aeitiology

Āyurveda always emphasizes on a balanced lifestyle, in other words, the need of following a harmonious behavioral regimen and balanced dietary regimen for maintaining a good health. While describing vicarchika, āyurvedic classics highlight incompatible diet as the root cause of the disease. Intake of milk with fish, curd, honey, black-gram, banana with buttermilk or curd, etc. are described as contradictory foods (virudhāhāra) in āyurveda. Those who practice such a food habits may suffer from the disease in the course of time. Also, intake of putrefied and stale food, ingestion of food before digesting the previous one, lack of drinking sufficient water, intake of oil and spicy food, etc. also may cause to develop vicarchika in long run. Suppressing the natural urges, immediate intake of cold water after exposure to sunlight or hot climate, taking water after exercise or hard work, etc. are also included under the aetiological factors of eczema. Contact with some external agents like detergents, alkali, acids and abrasive dusts may also be the cause for this disease.

Napkin-eczema in babies is a common problem.

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Strong irritants may beget acute reaction at the site of contact, whereas some irritants often cause chronic eczema. Some common allergens may cause contact allergic eczema. There are many patients afflicted with eczema in earlobes, wrists and back due to contact with nickel in costumes, jewelry, watches, bra clips, etc. This disease may also occur due to the use of rubber gloves, clothes, shoes, hair dye, leather and cement.

Clinical features

The following are the common clinical features of eczema:

- The affected site may develop redness and swelling, usually with ill-defined margin. The skin may also be rough, hard and black with severe itching.
- There may be papules, vesicles and more rarely large blisters. Exudation and cracking may happen.
- Scaling of skin occur in the affected area. At times, it may be severely infected causing purulent discharge with foul smell and tenderness or throbbing type pain. Eczematous ulceration may develop, and that gives a hatred look to the skin.
- Initially rubbing the affected skin may feel good, but gradually it becomes difficult to withdraw the rubbing, which leads to burning sensation and point bleeding.
- In chronic type, a dry leathery thickening with increased skin marking is seen. Fissure, scratch marks and pigmentation may develop.

The patients may develop different clinical features depending on various types of eczema. In atopic type, there may be itching, scratching and dryness of the skin. Seborrhoeic eczema affects the scalp with marked scaling (dandruff), the ears, central face, eyebrows, the axillae, umblicus, breasts, groin and in the space between shoulder blades.

Discoid eczema, discrete coin-shaped lesions, may develop in those having a habit of excessive alcohol consumption. Gravitational eczema may develop in the lower legs associated with oedema, loss of hair, red or bluish discolouration and ulceration. Repeated rubbing and scratches, as a habit to respond stress, may cause to develop a plaque or lichenified eczema in neurodermatitis. Chronic patients may undergo psychological depression and often try to avoid social gathering.

Treatment

Maintaining a proper dietary and behavioural regimen is the most important factor in the management of eczema. Giving reassurance and encouragement to the patient are also important. Avoidance of contact with irritants and other aetiological factors play vital role in the management of eczema. One must avoid using soap and detergents over the affected part. Intake of prawn, egg, dry fish, brinjal, stale and rotten food, excessive salty or sweet items are to be avoided.

Treatment of eczema by āyurvedic methods may take some time to give relief, but it provides a complete and promising cure. Application of a paste made out of gram-flour, turmeric, curd and rosewater on the affected part is effective. The patient should be advised to take green vegetables, non-spicy, non-oily foods and sufficient water. Purificatory and palliative

measures for vitiated doṣas and raktadhātu are important in the treatment of eczema.

Nimba tailam or Karañja tailam or Gandhaka tailam can be used for external application. Intake of Guḍūcisvarasa (2 tablespoonful) or Paṭolapatṛapacana or Nimbapacana (4 table-spoonful) in the empty stomach twice daily is effectual. The medicines, proper dietary and behavioural regimen should be prescribed taking into account the bodily temperament and humoral status of the patient.

Conclusion

Undoubtedly, eczema, treated with proper method detailed in āyuṛvedic texts, can completely be cured. The following are some prescriptions for eczema, but they must be used under supervision of an āyuṛvedic physician.

- Kaiśoravaṭakam - 2g
  Madhusnuhī tiktaka kvātham - 20 ml } Once daily in empty stomach
- Vidaṅgādi louham 500 mg x 2
  Bṛhat Copacīni Rasāyanam - 10 g } Once daily in empty stomach
- Khadirāriṣṭam-15 ml +
  Śāribādyāsavam - 15 ml
  with plain water - 30 ml } After lunch and dinner
- Guḷūcyādi tailam or
  Maricādi tailam or
  Vicarchika lepam } For local application

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STANDARDIZATION OF SVARṆAMĀKṢIKA BHASMA - A PHARMACEUTICAL STUDY

Mohapatra Sudhaldev* and C.B.Jha**

Abstract: Svarṇamākṣika is a mineral described under various Rasa vargas in Rasaśāstra. Chemically, it is a Sulphide-compound of copper and iron (chalcopyrite, $CuFeS_2$). According to Rasa literature, it is an important material used in the form of bhasma for therapeutic purposes. For the preparation of Mākṣika bhasma it is subjected to śodhana and māraṇa (detoxification). There are various methods of processing of the Svarṇamākṣika described in different Rasa literature. This study was planned to identify the best process for making the bhasma. In this paper, the material identification, processing technique, temperature and the control parameters for standardization of Svarṇamākṣika bhasma are discussed.

Introduction

Rasaśāstra mainly deals with the processing of metals and minerals to make them suitable for therapeutic purposes. Mākṣika is one of the important minerals consisting of copper, iron and sulphur having high therapeutic and alchemical importance. It is used in the form of bhasma in therapeutics; and for making bhasma, it is subjected to śodhana and māraṇa processes

Many scholars have contributed to this field of Rasaśāstra and a large number of papers are recorded. Many processes such as śodhana, māraṇa, satvapātana have been described. It is the need of the day to identify the best śodhana and māraṇa processes that can save land, labour and capital as well as to obtain the best quality of Mākṣika bhasma.

Various processing of śodhana (purification) like bharjana, svedana, nirvāpa, pacana, mardana and puṭa with plant extracts, animal products and mineral products like nimbusvarasa, kadḷīkandasvarasa, kṣāradravya, amḷadravya, takṛa, ghee, gomūtṛa, saindhavalavaṇa, etc. are described in the classics. Various puṭa system of heating like gajapuṭa, varāhapuṭa, bhūdharapuṭa with plant extractives and animal products like nimbu svarasa, kulatha decoction, eraṇḍa taila, ghee, gomūtṛa have been described for the processing of māraṇa. After completion of all the processing, the svarṇamākṣika becomes bhasma-form, which is highly efficacious in various diseases like pāṇḍu, anidra, meha and hṛddaurbalya. To achieve the desired medicinal property, the process should be a standard one with genuine raw material. The svarṇamākṣika

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process has to be standardized with respect to material, method and temperature.

Materials and methods

Raw materials: - Svarṇamākṣika - 700g (procured from Āyurvedic Pharmacy, IMS, BHU), Gandhaka 1.5 kg, nimbusvarasa and śudha gandhaka.

Equipments: - Iron mortar with pestle, charcoal furnace, upala (cow dung cake), frying pan, jambīrarasa (lemon juice), iron plate, sarava (casseroles), cotton cloth, multani miṭṭi (clay), pyrometer and glass container.

Śodhana

The principle adopted for śodhana process was bharjana with nimbusvarasa. Svarṇamākṣika was made into a coarse powder with the help of iron mortar. A clean and dry frying pan was taken and heated, then the svarṇamākṣika powder was poured and subjected to intense heat with frequent adding of lemon juice and continuous stirring till the evolution of sulphur fume stops. During this process, an iron plate was covered over the iron pan while adding the nimbu svarasa to avoid the loss due to dusting of svarṇamākṣika. The process was continued for three days to achieve the desired colour and to complete ceasing of the evolution of sulphur fumes.

Observations

- During the heating of svarṇamākṣika, Sulphur odour was observed which might be due to the oxides of Sulphur.
- A heavy dusting was observed while adding lemon juice into the heating svarṇamākṣika.
- At first the colour of svarṇamākṣika was greenish black, and after the process, it became brownish red.
- Total duration for shodhana was 3 days.
- After the process, the initial weight of svarṇamākṣika i.e. 700g became 675g with a loss of 25g

Māraṇa

300g of śudha svarṇamākṣika was taken for the process of māraṇa by puṭa system of heating with 4 kg cow dung cake.

Śudha svarṇamākṣika and śudha gandhaka (1:1), were made into powder form and mixed well in an iron khalva (mortar with pestle), and subjected to bhāvana with lemon juice (quantity sufficient); cākrika (pellets) were prepared and dried in sun shine. Then the same pellets were kept inside the sampuṭa. The sampuṭa was sealed, dried and subjected to puṭa system of heating (with 4 kg cow dung cake). The procedure was repeated nine times. From the 2nd puṭa onwards, the śudha gandhaka was reduced half the amount of svarṇamākṣika.

Observations

- During the firing, a fume of sulphur odour observed.
- The flame appeared gradually and it went up to 1 foot high and then slowly declined.
- The temperature recorded through the pyrometer every 15 minutes. 960^{0}C was the highest peak temperature and the same retained for 2 minutes.
- The colour of the sampuṭa changed from light red to blackish. The colour of the kapadmiṭṭi changed from faint yellow to reddish black.
- Greenish black pellets turned to brown after 1st and 2nd puṭa. Testing parameters did not sustain.
- From 3rd to 5th puṭa, the colour of bhasma was greenish black. After the 6th and 7th firing, the colour of the bhasma was greenish black. But all the parameters for Bhasmaparīkṣa, other

than the colour, sustained with the prepared bhasma.

- After the 8th firing, the colour of the bhasma was observed to be reddish brown, and after 9th firing, it was dark brown; the bhasma passed all the tests, including amḷa (lemon juice and āmla dadhi) parīkṣa.
- Weight gain recorded after every puṭa. After process, the initial weight of svarṇamākṣika i.e. 300g became 320g with a weight gain of 20g. (Fig I&II, Table 1)

Conclusion

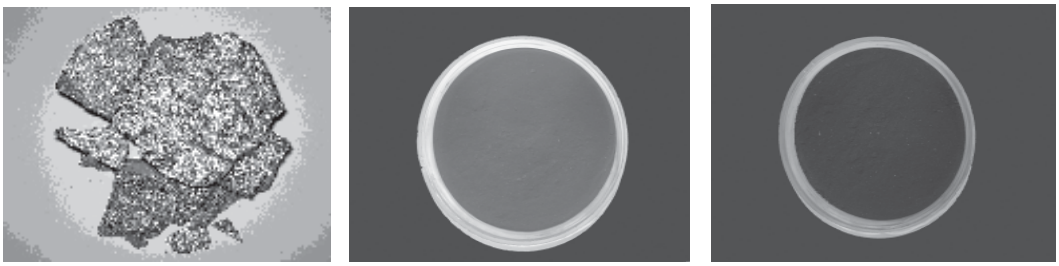
The process to convert the inert metals/minerals to highly efficacious medicaments has great importance in every stage. The process of bharjana (roasting) of svarṇamākṣika in a charcoal furnace with frequent addition of lemon juice till the complete cessation of sulphur fumes and appearance of brownish-red colour is the standard process for śodhana.

For the process of māraṇa, triple purified gandhaka (½ times) and lemon juice are used as the associate drugs (reducing agent) to make the bhasma particle finer. Earthen casseroles are used for the sampuṭa. Various amounts of cow dung cakes were tried to make the process easier and the māraṇa by 4 kg cow dung was found

TABLE 2

Temperature pattern observed in puta system of heating, for 4 kg cow dung cake

Sl. No.	Time (minutes)	Temperature (^{0}C)
1.	0	40
2.	15	100
3.	30	780
4.	45	960
5.	60	800
6.	75	740
7.	90	700
8.	105	680
9.	120	650
10.	135	600
11.	150	500
12.	165	380
13.	180	380
14.	195	300
15.	210	250
16.	225	220
17.	240	180
18.	255	150
19.	270	80
20.	285	60
21.	300	40



a b c

Fig. I: **a** Raw svarṇamākṣika, **b** Śudha svarṇamākṣika **c** svarṇamākṣika bhasma

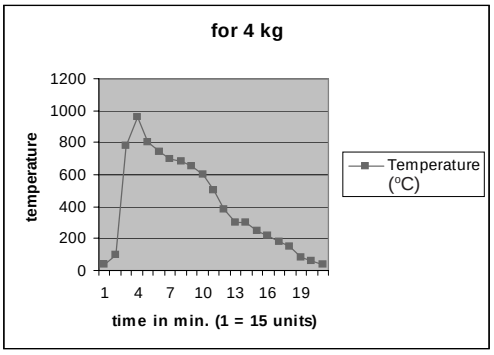


Fig. II:

Graph showing the pattern of temperature in puṭa system of heating (with 4 kg cow dung)

the best for making the bhasma in least number of puṭas.

All the āyurvedic parameters like vāritara, rekhāpurṇa were strictly followed to confirm the finished product. As the initial material contains copper as an ingredient, the dadhi parīkṣa and amḷa parīkṣa were also followed and found negative. This indicates the proper preparation of the bhasma.

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A COHERENT VIEW ON ANUPĀNA

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Abstract: Food is mainly divided into two types i.e. drava (liquid) and adrava (solid). After intake of adrava food, liquids taken to digest or facilitates the digestion are called Anupāna. Liquids which should have qualities opposite to the foods taken before and should not be opposite to the body tissues can be considered as proper Anupānas. In this paper, selection and benefits of different types of anupāna are described.

Introduction

Water covers 75 percent of the earth's surface in which 97 percent is in oceans and the remaining 3 percent in lakes, rivers, ponds and streams. Water is the main substance in our body, which makes up two-thirds of the body. Although a person can live without food for more than a month, he will die in a week if drinking water is not given. Life itself originated from water. A single cell has 70% of water content.

Food is mainly divided into two types drava (liquid) and adrava (solid). The dravāhāras are 5 types i.e. i. water, ii. milk, iii. sugarcane juice, iv. oils and v. wine.

Liquids being taken after food to facilitate digestion are called anupāna. Liquids, which should have opposite qualities to the foods that taken before, and should not be opposite to the body tissues, can be considered as proper anupāna. To maintain a normal health, the āhāra (food) should not be similar to doṣas or dissimilar to dhātus.

Selection of anupāna

Cold or hot water, āsava, madhya (wine) yūṣa (soups), phalāmḷa, dhānyāmḷa, milk and meat soup can be taken as anupāna. Anupāna can be decided by the physician depending on disease, time, substance and food.

Water brings improvement of ojus (immunity - essence of all tissues), satisfaction and pleasantness. It stimulates intellect and is wholesome to the heart, having a thin unexplained taste. Pleasant if it is taken in cool; it is light and equal to nectar in qualities for touch and effect (prabhāva). Hence it can be digested easily. The rainwater, which has contact with sun, moon and air, can be considered as the best anupāna and is used according to place (deśa) and time (kāla).

Conditions and effects

It is said that those who are suffering from vāta predominant disorders above the neck regions (jatru), and those suffering from

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hiccups (hikka), shortness of breath (śvāsa) and cough (kāsa) should not drink water after food. Singers, speakers and those who are suffering from chest injuries (ura:kṣata) should not drink water after food. If they drink water after food, it is difficult to digest fat properly and produces different diseases.

- To maintain normal body weight water should be taken at the middle of the food.
- To increase the weight, water can be taken at the end of the food.
- To reduce body weight water can be taken at the beginning of food.

Anupāna according doṣas

In vāta predominant disorders anupāna should be unctuous and hot, in pitta predominant disorders it is to be sweet and cool and in kapha predominant disorders it should be dry and hot. Meat soups (māmsarasa) are considered as the best anupāna for emaciated persons. Milk is considered as best anupāna for those who are fasting or tired with excess of walking, talking, coitus, exposure to wind and exposure to heat.

Sura (one type of wine) can be considered as the best anupāna to increase body weight. Honey and water can be considered as best anupāna to reduce body weight. Madya (alcohol) can be considered as best anupāna in persons who are suffering from low digestive fire, sleeplessness, drowsiness, sorrow, fear and tiredness.

The following are the benefits of anupāna:

- It gives satisfaction.
- Fulfill bṛmhaṇa (improvement of tissues)
- Sends the taken food in the downward direction easily (prevents reflex action or vomiting).
- Breaks the solid food-materials into pieces.
- Brings smoothness and wetness in the food and body.
- Digests the food, eliminates malas (waste products) and pacifies doṣas.
- Facilitates heavy foods to digest easily.
- Spreads the nutrients in the different portions of the body.
- If taken in proper method, it is vṛṣya (improves taste, brings satisfaction, and digests the food to increase the body strength, complexion and protection).

Śītajala guṇa (properties of cold water)

Cold water relives dryness, pitta diseases, poisonous conditions, giddiness, etc. and is useful in burning sensation, indigestion, tiredness, vomiting, delusion, syncope, alcoholic intoxication, diarrhoea, vomiting on movement and ūrdhvaja raktapitta (expelling of blood from mouth, nose, etc).

Contraindications

Water boiled during the daytime becomes heavy by night, similarly water boiled in the night also becomes heavy by next morning, therefore this water should not be used for drinking purposes. Śītāmbu i.e. cold water should not be consumed in the following conditions:

Parśvaśūla (pain in the flanks), pratiśyāya (common cold), vāta disorders, gaḷagraha (stiffness in the throat), ādhmāna (abdominal distension) and staimitya (weak). Intake of cold water immediately after koṣṭha śuddhi (cleansing process related to gastro intestinal tract), in navajvara (fevers of recent origin), hiccups and after snehapāna (drinking of oils and ghee) is contraindicated.

Drinking of cold water in small quantity is recommended in certain diseases like arocaka

(loss of taste), pratiśyāya (common cold), pṛaseka (excessive salivation), śoṭha (swelling), kṣaya (emaciation), mandāgni (low digestive fire), udara (accumulation of fluids in abdomen), koṣṭhagataroga (diseases related to gastrointestinal tract), jvara (fever), netṛarogas (eye disorders), vṛaṇa (ulcer) and madhumeha (diabetes).

Qualities of hot water

It destroys kapha, meda (fat), vāta and āmadoṣa (disorders related to indigestion). It is dīpana (appetizer), vasti śodhana (cleanses the bladder by flush out process), helps digestion, good for throat, easily digestible, relives hiccups, flatulence, cough, running nose, dyspnea and pain in the flanks; it is considered always salutary (pathya). Hot water consumed during night, breaks the fecal matter, relieves vāta and improves digestion.

Water, which is slow, froth-less, clear, light and boiled to one-fourth is considered as good. Water, boiled till it becomes ¾th of its original quantity is considered as pathya (salutary) and destroys vāta predominant disorders; boiled till it becomes ½, destroys vāta and pitta predominant disorders; boiled ¼th it pacifies all the three doṣas.

Śṛtaśītajala

Śṛtaśītajala is that which is boiled and cooled; it is indicated in diseases due to intake of madya (alcohol) and vitiation of tridoṣas. It is recommended in dāha (burning sensation), atisāra (diarrhea), raktapitta (bleeding disorders), mūrccha (syncope), mada (intoxication due to toxic substances), viṣavyādhis (poisonous bdisorders), tṛṣṇa (thirst), chardi (vomiting) and bhrama (giddiness).

Drinking of water in the early morning

Drinking of water in the early morning enables one to win over old age (jara), and such a person is said to be free from doṣaduṣṭi and mandāgni, and lives over hundred years of age with pleasurable sexual life.

Contraindications

Those who consumed sneha (oil or ghee) and who are under samśodhana (cleansing) process, or suffering from ulcers (vraṇa), or having abdomen distension (ādhmāna), low digestive fire (mandāgni), hiccups, vāta-kapha-related diseases should not drink water in the early hours.

Conditions where less/no water should be taken

Those who are suffering from poor digestive function, tumors of the abdomen, anemia, diarrhoea, hemorrhoids, diseases of the duodenum, dislike for food, excessive salivation, edema, abdominal disorders, leprosy (kuṣṭha), fevers, eye disorders, vraṇa (ulcers) and madhumeha (diabetes) should drink very little quantity of water.

Intake of water according to seasons

It is said that even a healthy person should drink less quantity of water except in autumn and summer seasons. Āyurveda says that during autumn and rainy seasons water should be boiled up to aṣṭamāmśa ($^1/_{8}{}^{th}$); during hemanta (winter) it is to be boiled up to ¼th and up to ½ in śiśira (cold), vasanta (spring) and grīṣhma (summer) seasons.

Different types of anupāna

Narikela jala (coconut water): - Tender coconut water is demulcent (snigdha), sweet, cold and good for the heart. It improves digestive fire (dīpana), clears bladder (vastiśodhana), reduces

pitta and thirst; it is aphrodisiac (vṛṣya) and light (laghu) in nature.

Generally, quite opposite rasas are considered as pathya for anupāna. In other words, a person satisfied with food of amḷarasa has to be taken madhurarasa (sweet foods) as anupāna and vice versa.

Cold and hot water: - Cold water can be used as anupāna after intake of Bhallātaka taila and Tuvaraka taila. Hot water can be used as anupāna in other snehas (oils or ghee), According to some authors, yūṣa, amḷa or kañji can be given as anupāna after snehapāna. Cold water is recommended as anupāna after intake of honey, foods prepared with flour, curd, milk and alcohol and in poisonous conditions. According to some, use of lukewarm water after intake of substances made out of flour is good.

Milk and meat soup: - Milk and meat juice can be used as anupāna after intake of sali rice, mudga (green gram); it is also good for those who are tired due to fighting, walking, exposure to heat, fire, intake of poison and alcohol.

Others:- Dhānyāmḷa or curd water can be used as anupāna after intake of black gram. For those who are having the habit of consuming madya (alcohol), it is recommended as good anupāna after māmsa bhojana (non vegetarian foods). Water or fruit juice can be taken for those who are not habituated to drink alcohol. Milk can be considered as best anupāna in those who are tired due to exposure to sun, walking, talking, and coitus. For those who are suffering from raktapitta disorders, milk and sugarcane juice can be considered as anupāna. Āsavas of arka (*Calotropis gigantia*), selu (*Cordia dichotoma*) and śirīṣa (*Albizia lebbeck*) can be used as anupāna in persons who are affected by poisons.

The curative effects of water

Drinking of water in the early hours of the day, say before sunrise, gives some relief in conditions like arśas (piles), śotha (swelling), grahaṇi (sprue syndrome), jvara (fever), udara (ascites), koṣṭhagatarogas (abdominal disorders), medovikāra (diseases related to lipids), mūtraghata (urine retention), raktapitta (bleeding disorders), netraroga (eye disorders), galaroga (throat disorders), śiraśśūla (head ache), karṇaśūla (ear ache) and other tridoṣa-kṣataja related problems. Water mixed with jaggery, relieves mūtrakṛcchra (scanty and burning urination) but causes increase of kapha and pitta.

Water boiled with śuṇṭhi (dry ginger) is beneficial in diseases related to kapha doṣa. Similarly, water processed with ajamodā (*Trachyspermum roxburghianum*) is useful in vāta disorders. However, boiled water is not advisable in pittaja disorders, and cold water is not good in any diseases.

Digestion of different waters

Raw water is digested in one prahara (3 hours) time. Boiled water is digested in half of one prahara time. Improperly boiled one digests disorderly. Drinking of excessive quantity of water leads to formation of āma (undigested food materials circulating in the blood); it causes mandāgni (low digestive fire) that leads to indigestion, and indigestion causes jvara (fever) which weakens the body tissues and thus a vicious cycle sets in.

The effects of sugar added water: - Drinking of water mixed with sugar causes kahpa vṛddhi and vātahara. Drinking of water added with sugar candy improves śukradhātu (reproductive tissue) and corrects vitiated doṣas.

Conclusion

To follow suitable anupāna described in our āyurvedic classics helps one to prevent diseases and promote good health. Foods and drinks nourish body tissues. Human beings are called rasaja, because they form from the rasa. Hence, to maintain the puruṣa (human being) the rasa should be maintained in a proper manner. Maintenance of rasa can be done through food, drinks and regimens; especially, drinks help in the maintenance of rasadhātu in the body. If rasadhātu (first tissue of the body) is in proper quantity, the remaining tissues will be nourished in a proper manner. Hence one should maintain the rasa by following proper anupāna.

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DETERMINATION OF MINIMAL INHIBITORY CONCENTRATION OF METHANOL EXTRACT OF *FICUS RELIGIOSA* LEAF EXTRACT AGAINST SOME PATHOGENIC BACTERIA

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Abstract: The study was carried out to assess antibacterial activity of aqueous and organic extracts viz. acetone, chloroform, ethyl acetate and methanol cold extracts of *Ficus religiosa* leaves against pathogenic strains of *Esherichia coli*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, *Proteus mirabilis* and *Klebsiella pneumoniae* using extract impregnated disc by determining the Minimal Inhibitory concentration method. The present study revealed that, out of five extracts methanol extract was effective against all bacteria as compared to all other leaf extracts.

Introduction

Ficus religiosa is commonly known as Peepal or sacred fig and claimed to possess astringent, aphrodisiac, anthelmentic, alexipharmic and expectorant medicinal properties. It is recommended for the treatment of diseases of the blood, vagina, uterus, diarrhoea, scabies, dermatitis and neuralgia[1-3].

When extracts with different solvents viz. aqueous, acetone, chloroform, ethyl acetate and methanol were screened for the antibacterial activity by disc diffusion and tube dilution method, it was found that methanol extract showed potent antibacterial activity.

Therefore methanol extract was subjected for determination of Minimal Inhibitory Concentration (MIC) against some pathogenic bacteria.

Materials and method

The leaves of *Ficus religiosa* were collected from in and around the Udgir city. The fine powder of leaves were used for preparation of different cold extracts namely aqueous, acetone, chloroform, ethyl acetate and methanol; and extractability percentage for each extract was determined as per the method suggested by Rosenthaler[5].

Extract impregnated disc

The sterile blank disc was obtained from M/S, Hi-media Laboratory Ltd, Mumbai. Extracts impregnated discs were prepared using dissolved extracts in the respective solvents and impregnated on to the disc, until the discs get fully saturated and was air dried. The extract impregnated discs were collectively weighed

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before and after impregnation of the extract. The amount of the extract actually got absorbed on to the disc was recorded.

Test organisms

The typed pathogenic bacterial culture of *Escherichia coli* (MTCC 723), *Staphylococcus aureus* (MTCC 96), *Streptococcus pyogenes* (MTCC 442), and *Proteus mirabilis* (MTCC 1429) were obtained from Department of Microbiology, College of Veterinary and Animal Sciences, Udgir. The pathogenic bacterial culture was sub-cultured and maintained on nutrient agar (MM 012) and in nutrient broth (M 088).

The extract-impregnated disc was subjected to disc-diffusion and tube-dilution method for screening the antibacterial activity. It is found that methanol extract showed higher antibacterial activity as compared to other extracts. Therefore effective antibacterial concentration (MIC) of methanol extract of *Ficus religiosa* leaves was determined as per method suggested by Pelczar *et al*[4].

Minimum inhibition concentration (MIC)

A set of cultural tube containing broth medium inoculated with test organism was placed with increasing amount of methanol extract (2, 4, 6, 8 and 10 mg/ml). Two tubes in each set were kept as control i.e. one as bacterial control and other for extract control. The smallest amount of the extract that inhibits the growth of bacteria *in vitro* is referred to as MIC.

All cultured tubes treated with methanol extract were incubated at 37^0C for 24 hours. The concentration of methanol extract required to inhibit the growth of the organism was assessed spectrophotometrically by recording optical density (O.D.) and observing absence of growth or change in turbidity.

Results and discussion

Among the aqueous, acetone, chloroform, ethyl acetate and methanol extracts of *Ficus religiosa* leaves, the methanol extract revealed better antibacterial activity as observed from Disc diffusion and Tube dilution method. Therefore,

TABLE 1
Minimum Inhibitory Concentration of methanol extract

Test Tube	Mean optical density ± S.E.[a]					
	E. coli.	*S. aureus*	*S. pyogens*	*P. aeurgniosa*	*P. mirabilis*	*K. pnumoniae*
Extract control	0.32 ± 0.005	0.32 ± 0.002	0.32 ± 0.006	0.32 ± 0.005	0.32 ± 0.002	0.32 ± 0.04
Bacterial control	0.84 ± 0.02	0.87 ± 0.005	0.73 ± 0.02	0.61 ± 0.004	0.60 ± 0.003	0.75 ± 0.03
2 mg/ml	0.81 ± 0.003	0.82 ± 0.009	0.61 ± 0.006*	0.59 ± 0.003	0.59 ± 0.004	0.69 ± 0.002
4 mg/ml	0.79 ± 0.003	0.74 ± 0.006*	0.64 ± 0.004	0.57 ± 0.002	0.57 ± 0.002	0.67 ± 0.003
6 mg/ml	0.74 ± 0.003	0.76 ± 0.003	0.67 ± 0.005	0.47±0.005*	0.54 ± 0.005	0.62 ± 0.005*
8 mg/ml	0.70 ± 0.005	0.79 ± 0.005	0.69 ± 0.006	0.49 ± 0.004	0.49 ± 0.003*	0.65 ± 0.005
10 mg/ml	0.69±0.003*	0.82 ± 0.002	0.71 ± 0.003	0.52 ± 0.005	0.52 ± 0.005	0.67 ± 0.002

a - Mean of three observations; * Minimal Inhibitory Concentration

the minimal inhibitory concentration of methanol extract against the four bacteria was determined.

The minimal inhibitory concentration in terms of the mean optical density values of the four bacteria in extract control, bacterial control and extract treated tubes (2,4,6,8 and 10 mg/ml) is detailed in Table 1. The lowest amount of the extract required to inhibit bacterial growth *in vitro* is considered as MIC value of the extract. It is evident from the results that the minimal inhibitory concentration of methanol extract was 10, 4, 2 and 8 (mg/ml) against *E.coli, Staphylococcus aureus, Streptococcus pyogenes* and *Proteus mirabilis* respectively. The MIC for *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* was 6 mg/ml. Hence, it indicates much higher susceptibility of *Streptococcus pyogenes* and *Staphylococcus aureus* to the methanol extract of *Ficus religiosa* leaves as compared to the bacteria *Esherichia coli, Proteus mirabilis, Pseudomonas aeruginosa* and *Klebsiella pnumoniae*

Summary

The study was carried out to assess effective antibacterial concentration of methanol extract of *Ficus religiosa* leaves against pathogenic strains of *E.coli* (MTCC 723), *Staphylococcus aureus* (MTCC 96), *Streptococcus pyogenes* (MTCC 442), *Proteus mirabilis* (MTCC 1429) by Pelczar method. The present study revealed that *Streptococcus pyogenes* and *Staphylococcus aureus* are highly susceptible to the methanol extract of *Ficus religiosa* leaves as compared to other bacteria viz. *Esherichia coli, Proteus mirabilis, Pseudomonas aeruginosa* and *Klebsiella pnumoniae.*

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HYPOGLYCEMIC AND ANTIOXIDANT ACTIVITIES OF *COSTUS MEXICANUS* (COSTACEAE)

S.P Dhanabal *et al.**

Abstract: *Costus mexicanus* (DC.) Greene (*Costus pictus* D. Don) commonly known as Spiral ginger, Stepladder or Insulin plant is originated in Mexico. This species is similar to *Costus speciosus* (Koenig) Sm., which is commonly known as caṇṇakkūva in Malayalam, and many people in Kerala use the leaves of both these species for diabetes mellitus. The hypoglycemic activity of ethanolic extract was evaluated by two methods viz. i. in normoglycemic rats and ii. in hyperglycemia induced by glucose loading in rats at 200 and 400 mg/kg. The results indicate that, the leaves of *Costus mexicanus* showed significant hypoglycemic activity.

Introduction

Diabetes mellitus is a group of metabolic disorders characterised by chronic hyperglycaemia due to relative insulin deficiency or resistance or both. There is defect in insulin production, its action or both. In the modern system of medicine, diabetes is treated by oral hypoglycaemic agents or insulin injection, which may cause hypoglycaemia in the case of overdosing. This hypoglycaemia if severe, may be fatal. In indigenous system of medicine, a number of plants have been reported to have hypoglycaemic effect[1-4]. Hence an ideal anti diabetic drug will be one which lowers hyperglycaemia to normal level without causing hypoglycaemia at any stage.

Costus mexicanus (DC.) Greene syn. *Costus pictus* D. Don commonly known as Spiral ginger, Stepladder or Insulin plant which has origin in Mexico. In India, it is grown in gardens as an ornamental plant especially in Kerala exclusively. The species is similar to *Costus speciosus* (Koenig) Sm., which is commonly known as caṇṇakkūva in Malayalam and leaves of both these species are used by many people in Kerala for diabetes mellitus[5-7]. So far this species has not been scientifically evaluated for hypoglycemic activity and this prompted us to investigate it for hypoglycemic and antioxidant potential.

Materials and methods

Experimental screening[8]

The hypoglycemic activity of the extract was

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evaluated in two models i.e. i. normoglycemic rats and ii. hyperglycemia induced by glucose loading in rats

Effect (normoglycemic rats)

Hypoglycaemic activity of elthonolic extract of *Costus mexicanus* was evaluated at a single dose treatment. Healthy adult albino rats of Wistar strain weighing 160-180g body weight were used for the study.

The animals were divided into 6 groups having 4 rats in each. Group I rats received CMC at dose 1ml/kg, Group II rats received Glibenclamide and were treated as the positive control group. Group III and IV rats received ethanolic extract of *Costus mexicanus* at the dose levels of 200 mg and 400 mg/kg. The test drugs were administered to the unfasted rats, and blood was withdrawn at 0, 1, 2, 3, 4, 5 and 24 hrs to estimate the plasma glucose levels.

Effect (hyperglycemic rats)

In this category, group I rats received 0.1 ml/ 100g of 0.5% CMC and group II rats received 400 mg/kg of ethanolic extract of *Costus mexicanus*

The overnight fasted rats were administered with glucose (3 mg/kg; p.o.) and the test substances too. The blood was withdrawn at 0, 1, 2, 3, 4, 5 and 24 hrs for the estimation of plasma glucose levels.

Blood collection

A small amount of blood was collected from the animals by orbital sinus puncture. The rats were made unconscious with anaesthetic ether, and using the sterile capillary tube, punctured the orbital sinus at the inner canthes of the eye; rotated the capillary tube with sufficient but not excessive pressure, two or three times. As bleeding starts, the animals were held close to the eppendraff tube to which anticoagulant (0.1 ml of 11% sodium citrate) was added and blood was collected; pressure was applied on the inner canthus for a while to stop the bleeding.

Preparation of plasma: - The collected blood was centrifuged at 2000 rpm for 10 minutes to separate plasma.

Photometric determination: - The glucose concentration of the plasma was measured by GLU PAP test using glucose diagnostics kit of Ecoline Merck Inc. Glucose concentration was expressed as mg /dl.

Statistical analysis: - The values in all the groups were expressed as Mean+SEM. Unpaired students 't' test and one way ANOVA was used to arrive at the statistically significant changes associated with the various treatments using Graph Pad Prism Version 4.

Antioxidant studies

In vitro

The principle of this assay is based on the measurement of the scavenging ability of antioxidants towards the stable radical Diphenyl Picryl Hydrazyl (DPPH)[9]. The free radical DPPH is reduced to the corresponding hydrazine when it reacts with hydrogen donors. This ability is evaluated by more frequently used descoloration assay.

Diphenyl Picryl hydrazyl solution (DPPH, 100 µM), 22 mg of DPPH (2, 2, Diphenyl-l-picryl hydrazyl) was accurately weighed and dissolved in 100 ml of methanol. From this stock solution, 18 ml was taken and diluted to 100 µl using methanol to obtain 100 pM DPPH solution.

1. Dimethyl sulfoxide (DMSO), distilled
2. Methanol, distilled

Preparation of test solutions: - 21 mg of each of

the ethonilic extract of *Costus mexicanus* was weighed and dissolved in distilled Dimethyl sulfoxide (DMSO) separately to obtain a solution of 21 mg/ml concentration. Each of these solutions was serially diluted separately to obtain lower final concentration ranging from 1,000 µg/ml to 0.9765 µg/ml.

Preparation of standard solution: - 10 mg of each of Ascorbic acid and Rutin were weighed separately and dissolved in 0.95 ml of DMSO to get 10.5 mg/ml concentrations. This solution was serially diluted with Dimethyl sulfoxide to get lower concentrations.

Method:- The assay was carried out in a 96 well microtitre plate. To 200 µl of DPPH solution, 10 µl of each of the test sample or the standard solution was added separately in wells of the microtitre plate. The final concentration of the test and standard solutions used are 1000 to 1.95 µl/ml. The plates were incubated at 37^0C for 20 minutes, and the absorbance of each solution was measured at 490 nm using ELISA reader against the corresponding test and standard blanks, and the remaining DPPH was calculated. IC_{50} (inhibitory concentration) is the concentration of the sample required to scavenge 50% of DPPH free radicals.

$$\% \text{ inhibition} = \frac{\text{Control - Sample}}{\text{Control}} \times 100$$

Results and discussion

Pharmacological studies

Effect of ethanolic extract in Normoglycemic rats: - Ethanolic extract of *Costus mexicanus* at 200 and 400 mg/kg did not significantly reduce the blood glucose levels at all time intervals except at 5h, wherein ethanolic extract at 200 mg/kg showed significant ($P<0.05$, 58.25 ± 5.48) when compared to control (74.25 ± 4.42) while standard drug glibenclamide showed significant decrease in blood glucose level at 2, 4, 5 and 24h when compared to the controls respective hours. (Table 1)

TABLE 1

Effect of ethanol extract of *Costus mexicanus* on normoglycemic wistar rats

Treatment (n=4)	Dose	Blood glucose (mg/dl) at						
		0 hr	1 hr	2 hrs	3 hrs	4 hrs	5 hrs	24 hrs
Vehicle Control	-	64.5 ± 1.66	66.75 ± 5.79	65.75 ± 10.92	64.25 ± 2.02	68.50 ± 4.33	74.25 ± 4.42	63.25 ± 1.80
Glibenclamide	10 mg/kg	65.75 ± 6.17	50.25 ± 6.61	39.25 ± 2.63*	51.50 ± 5.52	45.00 ± 3.54**	55.25 ± 1.49*	46.00 ± 5.49*
Ethanolic extract	200 mg/kg	68.50 ± 7.03	62.75 ± 3.66	60.00 ± 3.14	61.75 ± 2.78	65.75 ± 5.66	58.25 ± 5.48*	58.00 ± 1.22
Ethanolic extract	400 mg/kg	57.0 ± 5.28	71.25 ± 2.36	61.00 ± 4.18	77.25 ± 5.51	70.25 ± 4.21	67.75 ± 3.75	NT

Values are Mean±SE; * P<0.05, ** P<0.01 Vs Control;
One way analysis of variance (ANOVA) followed by Dunnett's multiple comparison test.

Effect of ethanolic extract in Hyperglycemic rats:- Upon oral glucose administration, in the rat's respective group there was significant ($P<0.05$) increase in blood glucose level at 1 h. When compared to control group elevation of blood glucose (75.0 ± 1.47), ethanolic extract at 400 mg/kg did not elevate to such levels (66.50 ± 3.23), however the value was not significant. At 4h only ethanolic extract was able to produce significant ($P<0.05$) decrease in glucose level (53.25 ± 4.78) when compared to control (73.0 ± 5.87). (Table 2)

Subramoniam *et al.*, (1996)[10] reported that oral administration of methanol extract of the aerial parts of *Artemisia pallens* Wall., led to significant blood glucose lowering effect without inducing a hypoglycaemic state in glucose-fed hyperglycaemic rats. This effect of the extract was dose dependant and significant at 100 mg/kg level in glucose–fed rats. In fasted normal rats, the extract caused a moderate hypoglycaemic effect at a higher dose (1000 mg/kg).

Fathy K.El-Fiky *et al.*, (1996)[11] reported that the ethanolic extracts of *Luffa aegyptiaca* (seeds) and *Carissa edulis* (leaves) are devoid of significant hypoglycaemic effect in normal rats, i.e., in the animal model used to assess the hypoglycaemic effect of sulfonylureas.

Other plant extracts, such as *Euphorbia prostrata* and *Fumaria parviflora* were found to possess hypoglycaemic activity in normal animals. These plants contain some hypoglycaemic principles which act probably by initiating the release of insulin from the pancreatic beta cells of normal animals (sulfonyl urea like effect) (Akhthar *et al*., 1984)[12]. Similar mechanisms of hypoglycaemic responsse in normal animals have been proposed to explain the hypoglycaemic effects of *Momordica charantia*[12,13] and *Momordica foetida*[14]

The extract of *Bauhinia cheilandra* inhibited increase in blood glucose levels significantly after glucose administration. The maximum glucose tolerance was observed with the 30th min[15].

Oliver (1980)[16] listed glycosides, saponins, flavonoids and steroidal compounds as active ingredients in hypoglycemic plants. Thus the hypoglycemic effect produced by the ethanolic extract of *Costus mexicanus* may be due to glycosides, flavonoids, saponins and steroidal components present in the extract.

TABLE 2

Effect of ethanol extract of *Costus mexicanus* on glucose loaded (1 g/kg; p.o.) wistar rats

Treatment (n=4)	Dose	Blood glucose (mg/dl) at						
		0 hr	1 hr	2 hrs	3 hrs	4 hrs	5 hrs	24 hrs
Control	-	57.50 ± 5.38	75.00 ± 1.47*	51.50 ± 6.20	69.00 ± 5.21	73.00 ± 5.87	70.50 ± 9.24	60.33 ± 6.29
Ethanolic extract	400 mg/kg	51.00 ± 4.81	66.50 ± 3.23*	66.25 ± 3.77	61.75 ± 11.08	53.25 ± 4.78**	62.00 ± 7.49	46.00 ± 7.55

* $P<0.05$ Vs groups own ondata ; ** $P<0.05$ Vs control; Unpaired student's test.

Antioxidant studies

In the DPPH method, the alcoholic extract of leaves of *Costus mexicanus* showed moderate antioxidant activity with IC_{50}value of 131.88 ± 4.82 µg/ml when compared to standard drug ascorbic acid (IC_{50} = 2.69 ± 0.05 µg/ml).

Scavenging of H_2O_2 radical method, the alcoholic extract of *Costus mexicanus* showed moderate antioxidant activity with IC_{50} value of 405.00 µg/ml when compared to standard drug ascorbic acid. (IC_{50} = 187.33 ± 3.93 µg/ml).

DPPH is a relatively stable free radical and the assay determines the ability of the extract to reduce DPPH radical to the corresponding hydrazine by converting the unpaired electrons to paired ones. Antioxidants can act by converting the unpaired electrons to paired ones.

Susanta Kumar *et al*., (2006)[17] reported that, the antioxidant potential of methanol extract of *Diospyros malabarica* Kostel bark may be due to the presence of polyphenolic compounds (particularly flavonoids and tannins). Our study also reveals the presence of phenolic compounds in the ethanolic extract. Hence, the antioxidant activity may be attributed to the presence of polyphenolic compounds in the extract. Therefore, *Costus mexicanus* leaves could be used in the human diet as a source of natural antioxidants and also in the pharmaceutical and cosmetic industries for manufacturing products with potent oxygen radical scavenger activity.

Conclusion

The ethanolic extract of *Costus mexicanus* could be shown to possess a large safety profile as the extract did not reduce the normal blood glucose level. However, further investigations are required to evaluate the potential of this herb as an antidiabetic agent.

From this study, we can state that the tested ethanolic extract of *Costus mexicanus* has beneficial effects on blood glucose levels and antioxidant potential and may improve hyperlipidaemia and other metabolic aberrations. Hence, the claim of this plant species for its effect on diabetes mellitus has been scientifically evaluated and found to be active. Further chemical, pharmacological and biochemical investigations are underway to characterise the compounds responsible for the activity and also to elucidate the mechanism of action.

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EXCERPTS FROM CIKITSĀMAÑJARI - LV

P. Unnikrishnan*

Abstract: Treatment of pregnant woman continues.

Intake of powdered yavakṣāra (*Hordeum vulgare*) with ghee or warm water relieves headache, pain on the bladder and colic termed as makkalla. Drinking of water boiled with dhānyaka (*Coriandrum sativum*) mixed with fine powders of the following is also effective.

Guḍa	Jaggery
Vyoṣa	*Zingiber officinale*
	Piper nigrum
	Piper longum
Trijātaka	*Elettaria cardamomum*
	Cinnamomum verum
	Cinnamomum tamala

Intake of expressed juice of puṭayāvu (*Rhaphidophora laciniata*) warmed in fire or ember added with induppu (rock salt) and oil is prescribed. Expressed juice from the leaves of kūvaḷam (*Aegle marmelos*), mixed with boiled buttermilk and induppu is also effective. Alternatively, the leaf juice mixed with oil and rock salt can be taken. Consumption of a kaṣāya prepared with kottambālari (*Coriandrum sativum*) is also effective; before consumption, add fine powders of the seven drugs detailed above mixed together in the kaṣāya in a small quantity. Consume finely powdered tippali (*Piper longum*) and śatakuppa (*Anethum graveolens*) mixed with oil. Consume fine powder of jīraka (*Cuminum cyminum*) mixed with ghee after the first bath after delivery. To prevent colic, consume the expressed juice of the leaves of kumbaḷam (*Benincasa hispida*). In the cases where colic persists, the drugs given above can be repeated. Fine powder of jīraka mixed with ghee is to be consumed in the early morning for four to five days. These measures prevent colic and promote healing.

A kaṣāya prepared from śuṇṭhi (*Zingiber officinale*), eraṇḍa (*Ricinus communis*) and bala (*Sida rhombifolia* ssp. *retusa*) added with ghee and oil, on consumption in excess, prevents constipation and colic. From the next two to three days, intake of a kaṣāya prepared from the following is advised:

Ceṟu-pañcamūla	*Desmodium gangeticum* (root)
	Pseudarthria viscida (root)
	Solanum indicum (root)
	Solanum surattense (root)
	Tribulus terrestris
Kuṟuntōṭṭi	*Sida rhombifolia* ssp. *retusa*
Cukku	*Zingiber officinale*
Jīrakam	*Cuminum cyminum*

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During the first twelve days, drink water medicated with bala and vilva (*Aegle marmelos*) added with ghee, oil and jaggery; this medication is said to be like an ambrosia for the female.

Drinking of water medicated with pañcakola (*Piper longum*, *Piper longum* (root), *Piper brachystachyum*, *Plumbago indica* and *Zingiber officinale*) and daśāṅghṛi (daśamūla) relieves flatulence and other associated disorders. Drinking of water medicated with durālabha (*Tragia involucrata*), viśva (*Zingiber officinale*) and daśamūla relieves fever and diarrhoea.

Postnatal development of fever, burning sensation, diarrhoea and other disorders arising from deranged vāta are common. Kaṣāyas and oils are to be used in these conditions. If burning sensation and fever are present, drink a kaṣāya prepared from the following in the early morning.

Bala	*Sida rhombifolia* ssp. *retusa*
Koṭuttūva	*Tragia involucrata*
Parpaṭa	*Hedyotis corymbosa*
Abdam	*Cyperus rotundus*
Dhānyāka	*Coriandrum sativum*
Mudga	*Vigna radiata*
Ceṛu-pañcamūla	*Desmodium gangeticum* (root)
	Pseudarthria viscida (root)
	Solanum indicum (root)
	Solanum surattense (root)
	Tribulus terrestris
Śṛṅgivera	*Zingiber officinale*

A kaṣāya, prepared from the following, on consumption relieves severe burning sensation and fever.

Ṣaḍaṅga	*Cyperus rotundus*
	Santalum album
	Zingiber officinale
	Plectranthus vettiveroides
	Hedyotis corymbosa
	Vetiveria zizanioides
Iraṭṭimadhuram	*Glycyrrhiza glabra*

Alternatively, another kaṣāya prepared from nellikka (*Emblica officinalis*), aṭaptiyan-kizhaṅgu (*Holostemma ada-koedien*) and iraṭṭimadhuram can also be used. In the presence of fever, Ṣaḍaṅga kaṣāya can be used. A kaṣāya prepared from kuṛuntōṭṭi, iraṭṭi-madhuram and koṭuttūva can also be used. Flatulence caused by deranged vāta is relieved by consumption of cuṇṭavēr (*Solanum indicum* - root) in ripe coconut water. Jīrakappoṭi (*Cuminum cyminum* - powder) can also be consumed in a similar way.

Excessive use of warm water for bathing, consumption of hot and pungent medicines, etc. may precipitate burning sensation, fever, flatulence and anorexia. These conditions are to be managed by drinking milk or with other soothing medications with due consideration of the stage of disease, nature of patient, etc.

From the third day onwards, consume kañji medicated with the drugs included in the Vidāryādi group, detailed below:

Vidāri	*Pueraria tuberosa*
Pañcāṅgula	*Ricinus communis*
Vṛścikāḷī	*Heliotropium indicum*
Vṛścīva	*Boerhaavia diffusa*
Devāhvaya	*Cedrus deodara*
Sūpyaparṇī	*Vigna pilosa*
	Vigna radiata var. *sublobata*
Kaṇḍūkari	*Mucuna pruriens*
Jīvana-pañcamūla	*Asparagus racemosus*
	Coccinia grandis
	Holostemma ada-koedien

	Malaxis acuminata
	Malaxis muscifera
Hṛasva-pañcamūla	*Desmodium gangeticum*
	Pseudarthria viscida
	Solanum indicum
	Solanum surattense
	Tribulus terrestris
Gopasuta	*Hemidesmus indicus*
Tripādi	*Adinantum lunulatum*

Ghee may be added depending upon the digestion of the patient. Milk can also be drunk. From the seventh day onwards, drugs that increase body weight and thereby provide satiation can be used.

Grossly, these are the drugs and methods of management in postnatal cases. Thirst, fever, flatulence, etc. are to be managed with soft and non-irritant medicines. Medicate water with the following and drink the decant water.

Ōṙila	*Desmodium gangeticum*
Mūvila	*Pseudarthria viscida*
Ceṛuvazhutina	*Solanum indicum*
Kuṛuntōṭṭi	*Sida rhombifolia* ssp. *retusa*

Drink buttermilk medicated with fine powder of jīraka. Consume butter and rock salt in the evening. Severe thirst can be countered by drinking water medicated with cukku and kariṅṅāli (*Acacia catechu*). Vilvādi (*Aegle marmelos,* etc.) medicated water can be consumed. In the evening, drink milk medicated with the kaṣāya of koṭuttūvavēr, cukku and kuṛuntōṭṭi. These medicines relieve diseases such as burning sensation, fever, etc. They also promote lactation. Application of Veṇṇakkuzhampu (medicated paste in butter) is prescribed for relieving severe headache. Application of a fine paste prepared from the following mixed with ghee on the forehead is effective.

Koṭṭam	*Saussurea lappa*
Iraṭṭimadhuram	*Glycyrrhiza glabra*
Candanam	*Santalum album*
Iruvēli	*Plectranthus vettiveroides*
Rāmaccam	*Vetiveria zizanioides*
Kaṭukka	*Terminalia chebula*
Sahasṛavedhi	*Ferula asafoetida*

Application of Āṛukālādi oil on the head is recommended. A variation to the above oil in which the solid component replaced with koṭṭam (*Saussurea lappa*), iraṭṭimadhuram and candanam is also good.

In the cases of scarcity of breast milk, crush the following drugs, boil in water and apply on the breasts added with sugar.

Ōṙila	*Desmodium gangeticum*
Mūvila	*Pseudarthria viscida*
Ceṛuvazhutina	*Solanum indicum*
Veḷvazhutina	*Solanum xanthocarpum*
Gokṣuram	*Tribulus terrestris*
Karimpinvēr	*Saccharum officinarum*
Darbha	*Desmostachya bipinnata*
Śatāvari	*Asparagus racemosus*
Vīra	*Coccinia grandis*
Jīvanti	*Holostemma ada-koedien*
Madhukam	*Glycyrrhiza glabra*
Kuṛuntōṭṭi	*Sida rhombifolia* ssp. *retusa*

Iraṭṭimadhuram is very effective for releasing stagnated breast milk as well as for production of fresh milk. It also relieves breast abscess. Drink a kaṣāya prepared from ceṛupūḷavēr (*Aerva lanata*) and uzhunnu (*Vigna mungo*) added with milk. Milk extracted from the pulp of ripe coconut and warm fresh cow's milk can also be taken.

Intake of pieces of pālañcuraṅṅa (*Lagenaria siceraria* - sweet var.) cooked in cow's milk without salt is prescribed. Most of the drugs that included in the aphrodisiac (vṛṣya) group also promote lactation.

A kaṣāya prepared from the following consumed with sugar is lactogenic and aphrodisiac.

Abhīru	*Asparagus racemosus*
Vīra	*Coccinia grandis*
Ikṣu	*Hygrophyla auriculata*
Bala	*Sida rhombifolia* ssp. *retusa*
Payasya	*Holostemma ada-koedien*
Madhūka	*Madhuca longifolia*
Yaṣṭīmadhu	*Glycyrrhiza glabra*
Gopakanya	*Hemidesmus indicus*

Consumption a kaṣāya prepared from the following is advised. Drink milk in the night. Drink the supernatant part of a kañji medicated with ceṛupayaṛparippu (*Vigna radiata*) in small quantity in the empty stomach. These are galactagogues.

Ōrila	*Desmodium gangeticum*
Mūvila	*Pseudarthria viscida*
Darbha	*Desmostachya bipinnata*
Nannāṛi	*Hemidesmus indicus*
Kuṛuntōṭṭi	*Sida rhombifolia* ssp. *retusa*
Iraṭṭimadhuram	*Glycyrrhiza glabra*
Cukku	*Zingiber officinale*

The following group of drugs is capable of purifying breast milk.

Pāṭha	*Cyclea peltata*
Nagara	*Zingiber officinale*
Suratāru	*Cedrus deodara*
Ghana	*Cyperus rotundus*
Amṛta	*Tinospora cordifolia*
Śāriba	*Hemidesmus indicus*
Indrayava	*Holarrhena pubescens*
Mūrva	*Chonemorpha fragrans*
Kaṭukā	*Picrorhiza scrophulariiflora*
Kirātatikta	*Andrographis paniculata*

A paste prepared out of eḷḷu (*Sesamum indicum*) in raw milk on external application cures breast abscess. Fry avīrakkuru (*Cassia auriculata* - seed) and eḷḷu; drop them in milk and when cooled grind to a paste, mix with butter and apply on the abscess. Expressed juice of pannikkizhaṅṅu (*Dioscorea bulbifera* - rhizome) added with fried eḷḷu and āvaṇakkinkuru (*Ricinus communis* - seed) ground to a paste mixed with butter can also be applied. Prepare a paste with expressed juice of pannikkizhaṅṅu, milk and following drugs and apply over the abscess mixed with butter.

Amṛta	*Tinospora cordifolia*
Kaṛuka	*Cynodon dactylon*
Mañjal	*Curcuma longa*
Eḷḷu	*Sesamum indicum*

Application of ghee, medicated with the juice of kaṛuka as liquid component and fine powder of iraṭṭimadhuram as solid component, on cracked breast abscess is very effective. Cotton pad soaked in the above can also be applied. Application of Śatadhauta ghṛta, Gopātmajādi ghṛta as such or in cotton pad, irrigation, etc. are recommended.

External applications are to be done only at the right time. Aṭapatiyan (*Holostemma ada-koedien*) fried in ghee and made to a paste can be applied on the abscess. Application of kuzhampu (a preparation where equal quantities of oil, ghee and castor oil is the lipid component) prepared from nantyāṛvaṭṭam (*Tabernaemontana divaricata*), tuṭari (*Ziziphus oenoplea*) koṭippāla (*Holorrhena pubescens*), etc. is effective. Treatments detailed for Stanavidradhi in earlier chapter can also be done; consume Guggulupañcapala cūrṇam also. A kaṣāya prepared from valiya-pañcamūlam (roots of *Aegle marmelos*, *Gmelina arborea*,

Stereospermum colais, Oroxylum indicum and *Premna corymbosa*), on consumption relieves secretions from the vagina and fever. Consumption of a kañji medicated with the above kaṣāya is effective. Consumption of a kaṣāya or a kañji prepared with ceṛupañcamūla is also effective. Vidāryādi kaṣāyam is good; intake of this kaṣāya added with buttermilk is also effective. Consume a kañji prepared with water medicated with puṭayāvu (*Rhaphidophora laciniata*), added with buttermilk, mustard powder and ghee. Balākoṭuttūvādi kaṣāya is good for fever, debility and vaginal discharges in the postnatal stage. Reduce breast-feeding. In profuse discharge, oil medicated with the kaṣāya of puṭayāvu as liquid component and the following as solid component is effective.

Ativiṭayam	*Aconitum heterophyllum*
Kuṭakappālayari	*Holorrhena pubescens*
Ayamōdakam	*Trachyspermum roxburghianum*
Uḷḷi	*Allium sativum*
Kaṭurohiṇi	*Picrorhiza scrophulariiflora*

Those who cannot consume oil may be given Puḷimkuzhampu. All treatments shall be done considering the nature of the patient.

There can be abdominal pain, spotting or bleeding per vagina due to diseases or indulgence in forbidden diet, daily regimen, etc., during the period of pregnancy. Internal and external administration of cold-potent drugs is indicated in such conditions. Application of cotton pad, moistened with a paste of the following mixed with ghee, over the lower abdomen and vagina is indicated here.

Sevya	*Vetiveria zizanioides*
Ambhoja	*Nelumbo nucifera*
Hima	*Santalum album*
Kṣīrivalkam	Barks of *Ficus racemosa* *Ficus microcarpa* *Ficus religiosa* *Ficus benghalensis*

Application of Śatadhauta ghṛta on the body, and taking immersion-bath in the water containing the same ghṛta, are suggested. Consumption of a combination of ghee, honey and milk added with fine powders of the following is effective:

Kumuda	*Nymphaea nouchali*
Utpalakesaram	*Nymphea alba* - stamen
Kamalakesaram	*Nelumbo nucifera* - stamen

Consume śṛṅgāṭaka (*Trapa natans* var. *bispinosa*) and kaśeruka (*Cyperus esculentus*). Drink milk medicated with kānta (*Callycarpa macrophylla*), abja (*Nelumbo nucifera*), śālūka (*Nymphaea nouchali*) and bālodumbara (sprouts of *Ficus racemosa*). Intake milk medicated with śāli (*Oryza sativa*), kākoḷī (*Fritillaria roylei*), dvibalā (*Sida rhombifolia* ssp. *retusa* and *Sida rhombifolia*) madhuka (*Glycyrrhiza glabra*) and ikṣu (*Saccharum officinarum*) mixed with red śāli rice (*Oryza sativa* - red var.), added with honey and sugar. Meat soup of animals that inhabit dry land (jāṅgaḷa) can be used. All treatments of adhoga raktapitta excluding emetics and other purification therapy can be followed where there is bleeding per vagina. Swallowing fine paste of candana (*Santalum album*) mixed with butter is effective.

NOTE TO THE CONTRIBUTORS

Contributions to Āryavaidyan are requested to be made in the following format:

- The article should be authentic and not published earlier.
- Contributions in the form of a research paper, review article, clinical observation or a book review are welcome from the fields of Āyuṛveda and allied subjects, naturopathy, Siddha, Unani, Homoeopathy, Yoga, Modern medicine, drug research, pharmacognosy, botany, phytochemistry and pharmacology. Publication will be made on the basis of the recommendation of an expert body.
- The main title, indicative of the content, should be brief. An abstract, not exceeding two hundred words, be prefixed to the article. English equivalents may be provided to Sanskrit terms [e.g. vīrya (potency), guṇa (property), etc]. Correspondence address including e-mail, and affiliations, if any, of the author be attached to the text.
- Tables, minimized to the extent possible, with suitable reference to the context can be attached to the matter.
- Line drawings/pictures accompanied by descriptive legends may be submitted in original. Figures may be numbered and referred to in the text as “Fig 1” etc. (In the case of e-mail, the figures have to be attached as JPEG images)
- Reference matter may be arranged in the following order - Author, Text, Edition, Publisher, Pages and Year, etc. Example:

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

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