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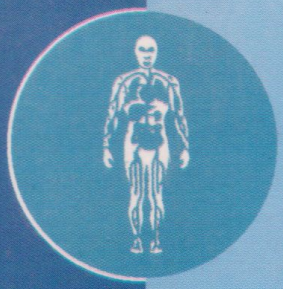
Āryavaidyan

लाभानां श्रेय आरोग्यम्

Of all the gifts,
the most precious is health



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August - October 2004

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āryavaidyan

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तद्विद्याचार्यसेवा च बुद्धिमेधाकरो गणः ॥

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learning other disciplines and
serving the preceptor-these factors
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FROM THE PAGES OF VAGBHATA - LXVI

N.V.K. Varier

Abstract: In this issue, features of *sopha* (inflammatory swelling) in different stages and its *dosha* predominance, different surgical procedures, post-operative regimen including food regimen, etc. are described.

अथात: शस्त्रकर्मविधिमध्यायं व्याख्यस्याम: ।
इति ह स्माहुरात्रेयादयो महर्षय: ।

(Athāta: śastrakarmavidhi-
madhyāyaṁ vyākhyasyāma: ।
iti ha smāhurātrēyādayō maharṣaya: ।)

Now we are to expound the chapter titled *Sastrakarmavidhi* - so said the sages Athreya and others.

व्रण: सञ्जायते प्राय: पाकाच्छ्वयथुपूर्वकात् ।
तमेवोपचरेत्तस्माद्रक्षन् पाकं प्रयत्नत: ।। १ ।।
सुशीतलेपसेकास्रमोक्षसंशोधनादिभि: ।

(Vraṇa: sañjāyatē prāya:
pākācchvyathupūrvakāt ।
tamēvōpacarēttasmād-
rakṣan pākaṁ prayatnata: ।।1 ।।
Suśītalēpasēkāsramōkṣa-
saṁśōdhanādibhi: ।)

Wounds are formed generally from inflammation caused by swelling; so treat the swelling cautiously, protecting it from inflammation, by application of cold ointments, irrigation, blood letting and purificatory techniques.

शाफोऽल्पोऽल्पोष्मरुक्साम: सवर्ण:
कठिन: स्थिर: ।। २ ।।

(śāphōऽlpōऽlpōṣmaruksāma:
savarṇa: kaṭhina: sthira: ।।2 ।।)

A swelling, which is slight and only with a little warmth and pain, with the same color as that of the skin, hard and stable, is to be diagnosed as immature (*sama*)

पच्यमानो विवर्णस्तु रागी वस्तिरिवातत: ।
स्फुटतीव सनिस्तोद: साङ्गमर्दविजृम्भिक: ।। ३ ।।
संरम्भारुचिदाहोषातृड्ज्वरानिद्रतान्वित: ।
स्त्यानं विष्यन्दयत्याज्यं व्रणवत्स्पर्शनासह: ।। ४ ।।

(Pacyamānō vivarṇastu
rāgī vastirivātata: ।
sphuṭatīva sanistōda:
sāṅgamardavijṛmbhika: ।।3 ।।
Saṁrambhārucidāhō-
ṣātṛḍjvrānidratānvita: ।
styānaṁ viṣyandayatyājyaṁ
vraṇavatsparśanāsaha: ।।4 ।।)

The swelling, when it is at the phase of maturation, becomes discolored, usually red,

extended as an inflated bladder; presents the symptoms like bursting and pricking pain, pain all over the body; feels repeated yawning, agitations, anorexia, burning sensation, smothering, thirst, fever and sleeplessness; when solidified ghee placed on swelling, it gets melted and feels intolerance to touch as in an ulcer.

पक्वेऽल्पवेगता म्ळानि: पाण्डुता वलिसम्भव: ।
नामोऽन्तेषून्नतिर्मध्ये कण्डूशोफादिमार्दवम् ।। ५ ।।
स्पृष्टे पूयस्य सञ्चारो भवेद्वस्ताविवाम्भस: ।

(Pakvēऽlpavēgatā mḷāni:
pāṇḍutā valisambhava: ।
nāmōऽntēṣūnnatirmadhyē
kaṇḍūśōphādimārdavam ।।5 ।।.
Spṛṣṭhē pūyasya sañcārō
bhavēdvastāvivāmbhasa: ।)

When matured, the agitation becomes less, the swelling fades, becomes pale and wrinkled with depressed surroundings and elevated centre, lessened itching and swelling; on palpitation, the movement of pus is felt, as the movement of water in a bladder.

शूलं नर्तेऽनिलाद्दाह: पित्ताच्छोफ: कफोदयात् ।। ६ ।।
रागो रक्ताच्च पाक: स्यादतो दोषै: सशोणितै: ।

(śūlaṁ nartēऽnilāddāha: pittā-
cchōpha: kaphōdayāt ।।6 ।।
Rāgō raktācca pāka: syā-
datō dōṣai: saśōṇitai: ।)

Pain does not occur without the involvement of *vata*, no burning sensation without *pitta*; no swelling without *kapha* and no redness without blood; so in suppuration and maturing, there is involvement of all the three *dosha*s and blood.

पाकेऽतिवृत्ते सुषिरस्तनुत्वग्दोषभक्षित: ।। ७ ।।
वलीभिराचित: श्याव: शीर्यमाणतनूरुह: ।

(pākēऽtivṛttē suṣirastanutva-
gdōṣabhakṣita: ।।7 ।।
Valībhirācita: śyāva:
śīryamāṇatanūruha: ।)

If suppuration exceeds, the flesh and skin are consumed by pus, and so holes are formed inside the swelling and the skin becomes very thin, furrowed, and darkened and the hairs fall out.

कफजेषु तु शोफेषु गम्भीरं पाकमेत्यसृक् ।। ८ ।।
पक्वलिङ्गं ततोऽस्पष्टं यत्र स्याच्छीतशोफता ।
त्वक्सावर्ण्ये रुजोऽल्पत्वं घनस्पर्शत्वमश्मवत् ।। ९ ।।
रक्तपाकमिति ब्रूयात्तं प्राज्ञो मुक्तसंशय: ।

(kaphajēṣu tu śōphēṣu gam-
bhīraṁ pākamētyasṛk ।।8 ।।)
Pakvaliṅgaṁ tatōऽspaṣṭaṁ
yatra syācchītaśōphatā ।
tvaksāvarṇyē rujōऽlpatvaṁ
ghanasparśatvamaśmavat ।।9 ।।
raktapākamiti brūyāttaṁ
prājñō muktasaṁśaya: ।)

In swellings due to the predominance of *kapha*, or swelling that originated in the body parts of *kapha* prominence, the blood becomes deeply inflamated and so the symptoms of maturing are not seen clearly. If the swelling is cold to touch, without any discoloration, and of less pain, hard to touch like a stone, a wise physician can diagnose it as *raktapaka*, without hesitation.

अल्पसत्त्वेऽबले बाले पाकाद्वाऽत्यर्थमुद्धते ।। १० ।।
दारणं मर्मसन्ध्यादिस्थिते चान्यत्र पाटनम् ।

(alpasattvēऽbalē bālē pākād-
vāऽtyarthamuddhatē ।।10 ।।)
Dāraṇaṁ marmasandhyā-
disthitē cānyatra pāṭanam ।)

In the case of those with poor tolerance and depilated, in children, or when the swelling is highly raised with suppuration, or if it is located in vital points or joints, then *darana* (splitting by application of alkalies) is preferred. In other cases, *patana* (cutting with instruments) can be done.

आमच्छेदे सिरास्नायुव्यापदोऽसृगतिस्रुतिः ।। ११ ।।
रुजोऽतिवृद्धिर्दरणं विसर्पो वा क्षतोद्भवः ।

(āmacchēdē sirāsnāyu-
vyāpadōऽsṛgatisruti: ।।11 ।।)
rujōऽtivṛddhirdaraṇaṁ visarpō
vā kṣatōdbhava: ।)

Cutting or splitting in early stages of maturing (in *ama* stage) may create troubles of veins and tendons, excessive bleeding and pain, tearing of the skin, or *kshata visarpa*.

तिष्ठन्नन्तः पुनः पूयः सिरास्नाय्वसृगामिषम् ।। १२ ।।
विवृद्धो दहति क्षिप्रं तृणोलपमिवानलः ।

(tiṣṭhannanta: puna: pūya:
sirāsnāyvasṛgāmiṣam ।।12 ।।
Vivṛddhō dahati kṣipraṁ
tṛṇōlapamivānala: ।)

If the cutting is not done in proper time, the pus remaining inside may get increased and may soon burn the veins, tendons, blood and flesh, just like a spark of fire burns away a stack of grass.

यश्छिनत्त्यामममज्ञानाद्यश्च पक्वमुपेक्षते ।। १३ ।।
श्वपचाविव विज्ञेयौ तावनिश्चितकारिणौ ।

(yaścchinattyāmamajñānā-
dyaśca pakvamupēkṣatē ।।13 ।।
Śvapacāviva vijñēyau
tāvaniścitakāriṇau ।)

Those who cuts a swelling before maturing or leaves a matured one without cutting, are considered as ignorant barbarians.

प्राक् शस्त्रकर्मणश्चेष्टं भोजयेदन्नमातुरम् ।। १४ ।।
पानपं पाययेन्मद्यं तीक्ष्णं यो वेदनाक्षमः ।
न मूर्च्छत्यन्नसंयोगान्मत्तः शस्त्रं न बुध्यते ।। १५ ।।

(prāk śastrakarmaṇaścēṣṭaṁ
bhōjayēdannamāturam ।।14 ।।)
Pānapaṁ pāyayēnmadyaṁ
tīkṣṇaṁ yō vēdanākṣama: ।
na mūrcchatyannasaṁyōgānmatta:
śastraṁ na budhyatē ।।15 ।।)

Before doing surgery the patient has to be fed with food he likes; alcohol can be given to those who cannot tolerate pain provided he is accustomed to it. As the alcohol is given with food, he does not get swooned; but due to intoxication he does not sense pain.

अन्यत्र मूढगर्भाश्ममुखरोगोदरातुरात् ।
(Anyatra mūḍhagarbhāśma-
mukharōgōdarāturāt ।)

But the food and alcohol are contra-indicated in cases of obstructed labour, renal calculi, stomatopathy and ascitis.

अताहृतोपकरणं वैद्यः प्राङ्मुखमातुरम् ।। १६ ।।
सम्मुखो यन्त्रयित्वाऽऽशु न्यस्येन्मर्मादि वर्जयन् ।
अनुलोमं सुनिशितं शस्त्रमापूयदर्शनात् ।। १७ ।।
सकृदेवाहरेत्तश्च .....

(atāhṛtōpakaraṇaṁ vaidya:
prāṅmukhamāturam ।।16 ।।)
Sammukhō yantrayitvāऽऽśu
nyasyēnmarmādi varjayan ।
anulōmaṁ suniśitaṁ
śastramāpūyadarśanāt ।।17 ।।
sakṛdēvāharēttaśca .....)

The physician, having collected all the

equipments, should make the patient seated facing the east. Sitting in front of the patient, the physician has to insert the sharp instrument speedily and downwardly, avoiding vital points, and deep enough till the pus is seen out; then withdraw the instrument at one stretch.

– पाके तु सुमहत्यपि ।
पाटयेत् द्यङ्गुलं सम्यग्द्यङ्गुलत्र्यङ्गुलान्तरम् ।। १८ ।।
एषित्वा सम्यगेषिण्या परित: सुनिरूपितम् ।
अङ्गुलीनाळवालैर्वा यथादेशं यथाशयम् ।। १९ ।।
यतो गतो गतिं विद्यादुत्सङ्गो यत्र यत्र च ।
तत्र तत्र व्रणं कुर्यात्सुविभक्तं निराशयम् ।। २० ।।
आयतं च विशालं च यथा दोषो न तिष्ठति ।

(- pākē tu sumahatyapi ।
pāṭayēt dyaṅgulaṁ samyag-
dyaṅgulatryaṅgulāntaram ।।18 ।।)
Ēṣitvā samyagēṣiṇyā
parita: sunirūpitam ।
aṅgulīnāḷavālairvā
yathādēśaṁ yathāśayam ।।19 ।।
yatō gatō gatiṁ vidyādut-
saṅgō yatra yatra ca ।
tatra tatra vraṇaṁ kuryāt-
suvibhaktaṁ nirāśayam ।।20 ।।
Āyataṁ ca viśālaṁ ca
yathā dōṣō na tiṣṭhati ।)

Even if the site of suppuration is broad, the incision should not extend more than two *angula*s*. If necessary, more cuts can be made at two or three *angul*s apart. The interior has to be thoroughly checked with a probe, finger, tube or hairs, according to the site and area of the swelling; wherever the course of the pus is detected or bulging of tissues is seen, there the incisions are to be made, wide and distended, so that there would not be any scope for accumulation of pus.

शौर्यमाशुक्रिया तीक्ष्णं शस्त्रमस्वेदवेपथु ।। २१ ।।
असम्मोहश्च वैद्यस्य शस्त्रकर्मणि शस्यते ।
(śauryamāśukriyā tīkṣṇaṁ
śastramasvēdavēpathu ।।21 ।।
Asammōhaśca vaidyasya
śastrakarmaṇi śasyatē ।)

Bravery, deft in action with sharp instruments without trembling or sweating or confusion, etc. are the required qualities for a surgeon.

तिर्यक्छिन्द्याल्ललाटभ्रूदन्तवेष्टकजत्रुणि ।। २२ ।।
कुक्षिकक्षाक्षिकूटौष्ठकपोलगळवङ्क्षणे ।
अन्यत्र छेदनात्तिर्थक् सिरास्नायुविपाटनम् ।। २३ ।।
(tiryakchindyāllalāṭabhrū-
dantavēṣṭakajatruṇi ।।22 ।।
Kukṣikakṣākṣikūṭauṣṭha-
kapōlagaḷavaṅkṣaṇē ।
anyatra chēdanāttirthak
sirāsnāyuvipāṭanam ।।23 ।।)

The incision should be performed obliquely in sites such as forehead, eyebrows, gums of the teeth, the clavicle, abdomen, axillae, eye sockets, lips, cheeks, throat and groins. In other sites oblique incision may create cutting of the veins and tendons.

शस्त्रेऽवचारिते वाग्भि: शीताम्भोभिश्च रोगिणम् ।
आश्वास्य परितोऽङ्गुल्या परिपीड्य व्रणं तत: ।। २४ ।।
क्षाळयित्वा कषायेण प्ळोतेनाम्भोऽपनीय च ।
गुग्गुल्वगुरुसिद्धार्थहिङ्गुसर्जरसान्वितै: ।। २५ ।।
धूपयेत्पटुषड्ग्रन्थानिम्बपत्रैर्घृतप्ळुतै: ।
तिलकल्काज्यमधुभिर्यथास्वं भेषजेन च ।। २६ ।।
दिग्धां वर्तिं ततो दद्यात्तैरेवाच्छादयेश्च ताम् ।
घृताक्तै: सक्तुभिश्चोर्ध्वे घनां कबळिकां तत: ।। २७ ।।
निधाय युक्त्या बध्नीयात्पट्टेन सुसमाहितम् ।

* one *angula* = 2.5 cm

पार्श्वे सव्येऽपसव्ये वा नाधस्तान्नैव चोपरि ।। २८ ।।

(Śastrēऽvacāritē vāgbhi:
śītāmbhōbhiśca rōgiṇam ।)
āśvāsya paritōऽṅgulyā
paripīḍya vraṇaṁ tata: ।।24 ।।
Kṣāḷayitvā kaṣāyēṇa pḷōtē-
nāmbhōऽpanīya ca ।
guggulvagurusiddhārtha-
hiṅgusarjarasānvitai: ।।25 ।।)
Dhūpayētpaṭuṣaḍgrnthā-
nimbapatraighṛtapḷutai: ।
tilakalkājyamadhubhirya-
thāsvaṁ bhēṣajēna ca ।।26 ।।
Digdhāṁ vartiṁ tatō dadyā-
ttairēvācchādayēśca tām ।
ghṛtāktai: saktubhiścōrdhvē
ghanāṁ kabaḷikāṁ tata: ।।27 ।।
Nidhāya yuktyā badhnīyāt-
paṭṭēna susamāhitam ।
pārśvē savyēऽpasavyē vā
nādhastānnaiva cōpari ।।28 ।।)

After withdrawing the sharp instrument, the patient is to be consoled by cheering words and cold water. Then the site around the wound has to be pressed and squeezed; wash the wound with decoction (*kashaya*) and wipe with a piece of cloth. Then fumigate the wound with *guggulu* (*Commiphora mukul*), *agarau* (*Aquilaria agallocha*), *sidhartha* (*Brassica juncea*), *hingu* (*Ferula asafoetida*), *sarjarasa* (*Shorea robusta*), *patu* (rock salt), *shad-grandha* (*Acorus calamus*) and *nimbapatra* (leaves of *Azadirachta indica*) mixed with ghee. Then place a *varti* (wick) prepared with pasted sesame, ghee, honey, and appropriate drugs suitable to the *dosha*s, inside the wound and cover with the same paste. Then place a thick plaster made out of roasted and powdered *yava* (Indian barley) mixed with ghee on the wound and bandage carefully with a cloth; the knot of the bandage should be on the sides, not on the top or bottom.

शुचिसूक्ष्मदृढा: पट्टा: कबळ्य: सविकेशिका: ।
धूपिता मृदव: श्ळक्ष्णा निर्वलीका व्रणे हिता: ।। २९ ।।
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kabaḷya: savikēśikā: ।
dhūpitā mṛdava: śḷakṣṇā
nirvalīkā vraṇē hitā: ।।29 ।।)

Clean, fine and strong bandage cloths, soft, smooth and wrinkleless plasters and wicks - all fumigated well, are recommended for the treatment.

कुर्वितानन्तरं तस्य रक्षां रक्षोनिषिद्धये ।
बलिं चोपहरेत्तेभ्य: ……
(Kurvitānantaraṁ tasya
rakṣāṁ rakṣōniṣiddhayē ।
baliṁ cōpaharēttēbhya: .....)

Then the patient should be protected from evil spirits by performing sacrificial rituals.

……सदा मूर्ध्ना च धारयेत् ।। ३० ।।
लक्ष्मीं गुहामतिगुहां जटिलां ब्रह्मचारिणीम् ।
वचां छत्रामतिच्छत्रां दूर्वां सिद्धार्थकानपि ।। ३१ ।।
(..... sadā mūrdhnā ca dhārayēt ।। 30 ।।
lakṣmīṁ guhāmatiguhāṁ
jaṭilāṁ brahmacāriṇīm ।
Vacāṁ chatrāmaticchatrāṁ
dūrvāṁ siddhārthakānapi ।।31 ।।)

The patient should always bear on his head herbs such as *lakshmi* (*Nervilia aragona*) *guha* (*Desmodium gangeticum*) *atiguha* (*Pseudarthria viscida*), *jatila* (*Nardostachys grandiflora*), *brahmacharini* (*Bacopa monnieri*), *vacha* (*Acorus calamus*), *chatra*

(*Anethum graveolens*), *atichatra* (*Gymnema sylvestre*), *durva* (*Cynodon dactylon*) and *sidharthaka* (*Brassica juncea*).

ततः स्नेहदिनेहोक्तं तस्याचारं समादिशेत् ।
(Tata: snēhadinēhōktaṁ
tasyācāraṁ samādiśēt ।)

Then the patient has to observe the order of restrictions prescribed in oleation therapy.

दिवास्वप्नो व्रणे कण्डूरागरुक्शोफपूयकृत् ।। ३२ ।।
(divāsvapnō vraṇē kaṇḍū-
rāgarukśōphapūyakṛt ।।32 ।।)

Day time sleep is causative of itching, redness, pain, swelling and formation of pus in the wounds.

स्त्रीणां तु स्मृतिसंस्पर्शदर्शनैश्चलितेसुते ।
शुक्रे व्यवायजान् दोषानसंसर्गेऽप्यवाप्नुयात् ।। ३३ ।।
(Strīṇāṁ tu smṛtisaṁsparśa-
darśanaiścalitēsrutē ।
śukrē vyavāyajān dōṣāna-
saṁsargēऽpyavāpnuyāt ।।33 ।।)

Thinking, touching or seeing of women that probe ejaculation of semen, may cause ill effects of mating, even though actual mating has not occurred.

(व्रणे श्वयथुरायासात् स च रागश्च जागरात् ।
तौ च रुक् च दिवास्वापात्ताश्च मृत्युश्च मैथुनात् ।।)
(Vraṇē śvayathurāyāsāt sa
ca rāgaśca jāgarāt ।
tau ca ruk ca divāsvāpāttāśca
mṛtyuśca maithunāt ।।)

(By straining, sweating is increased in wounds, swelling and redness by awakening at night, both these troubles and pain are increased by day time sleep, all these troubles increase and even death can happen by copulation.)

भोजनं च यथासात्म्यं यवगोधूमषष्टिकाः ।
मसूरमुद्गतुवरीजीवन्तीसुनिषण्णकाः ।। ३४ ।।
बालमूलकवार्ताकतण्डुलीयकवास्तुकम् ।
कारवेल्लककर्कोटपटोलकटुकाफलम् ।। ३५ ।।
सैन्धवं दाडिमं धात्री धृतं तप्तहिमं जलम् ।
जीर्णशाल्योदनं स्निग्धमल्पमुष्णोदकोत्तरम् ।। ३६ ।।
भुञ्जानो जाङ्गलैर्मांसैः शीघ्रं व्रणमपोहति ।
(Bhōjanaṁ ca yathāsātmyaṁ
yavagōdhūmaṣaṣṭhikāḥ ।
masūramudgatuvarī-
jīvantīsuniṣaṇṇakāḥ ।।34 ।।
Bālamūlakavārtāka-
taṇḍulīyakavāstukam ।
kāravēllakakarkkōṭa-
paṭōlakaṭuukāphalam ।।35 ।।
Saindhavaṁ dāḍimaṁ dhātrī
dhṛtaṁ taptahimaṁ jalam ।
jīrṇaśālyōdanaṁ snigdhamalpa-
muṣṇōdakōttaram ।।36 ।।
Bhuñjānō jāṅgalairmāṁsaiḥ
śīghraṁ vraṇamapōhati ।)

The patient should have food, which is accustomed to him such as barley, wheat, rice etc.; and *masura* (*Lens culinaris*), *mudga* (*Vigna radiata*) *tuvari* (*Cajanus cajan*) *balamulaka* (*Raphanus sativus*) *vartaka* (*Solanum melongena*), *jivanti* (*Holo-stemma ada-koedien*), *sunishannaka* (*Marsilea quadrifolia*), *tanduleeyaka* (*Amaranthus spinosus*), *vastuka* (*Chenopodium album*), *karavellaka* (*Momordica charantia*), *karkota* (*Cucumis melo*), *patola* (*Trichosanthes cucumerina*), *katukaphala* (*Lagenaria siceraria*) *saindhava* (rock salt), *dadima* (*Punica granatum*), *dhatri* (*Emblica officinalis*) ghee and boiled cooled water; if he takes food prepared with old rice made unctuous with

ghee, in a minimum dose and drinks warm water, will get relived from wounds speedily.

अशितं मात्रया काले पथ्यं याति जरां सुखम् ॥ ३७ ॥
अजीर्णात्वनिलादीनां विभ्रमो बलवान् भवेत् ।
तत: शोफरुजापाकदाहानाहानवाप्नुयात् ॥ ३८ ॥

(aśitaṁ mātrayā kālē
pathyaṁ yāti jarāṁ sukham ॥37 ॥
Ajīrṇātvanilādīnāṁ
vibhramō balavān bhavēt ।
tata: śōpharujāpāka-
dāhānāhānavāpnuyāt ॥38 ॥)

Wholesome food taken in proper quantity and at proper time undergoes easy digestion. By indigestion, serious upsetting of *tridosha*s is created which leads to swelling, pain, inflammation, burning sensation and distention of stomach.

नवं धान्यं तिलान् माषान् मद्यं मांसमजाङ्गलम् ।
क्षीरेक्षुविकृतीरम्ळं लवणं कटुकं त्यजेत् ॥ ३९ ॥
यच्चान्यदपि विष्टम्भि विदाहि गुरु शीतळम् ।
वर्गोऽयं नवधान्यादिर्व्रणिन: सर्वदोषकृत् ॥ ४० ॥

(Navaṁ dhānyaṁ tilān māṣān
madyaṁ māṁsamajāṅgalam ।
kṣīrēkṣuvikṛtīramḷaṁ
lavaṇaṁ kaṭukaṁ tyajēt ॥39 ॥
Yaccānyadapi viṣṭambhi
vidāhi guru śītaḷam ।
vargōSyaṁ navadhānyādir-
vraṇina: sarvadōṣakṛt ॥40 ॥)

New grains, sesame, black gram, alcohol, meat other than *jangala* animals, products of milk and sugarcane, food articles which are sour, salt and acrid - all these are to be avoided; other food articles that which cause misperistalsis and burning sensation, which are heavy and cold, are not allowed. The above mentioned group of substances as of new grains, etc. will vitiate all *dosha*s to a patient suffering from wound.

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CONCEPT OF *SARA* IN AYURVEDA

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Abstract: In ayurveda, the term *sara* has been described to denote the essence of *dhatu* with an excellent quality. According to Chakrapani *sara* is the purest form of *dhatu*. *Sara* can also be defined as सयते स्थिरी भवति यत्र सार: i.e. that becomes stable is called *sara*. Whereas, according to *Amarakosa*, *sara* has two meanings i.e. सारे बले स्थिरांशे च viz. *bala* (biological strength) and *sthiramsa* (part of *dhatu* which provides stability to the body). *Sara* in modern terminology can be considered as the optimum degree of genetic code of an individual's DNA with respect to a particular *dhatu*.

Every individual's DNA has a different code. So we can say the quality of *dhatu*s of every individual depends upon the genetic code of the individual's DNA. If the genetic code of the individual's DNA with respect to that *dhatu* is optimum, the formation of that particular *dhatu* in the body will be of very good quality, but if the genetic code of the individual's DNA is of low optimum degree with respect to that *dhatu*, the formation of that particular *dhatu* will not be of good quality. It is remarkable that genetic code of the individual's DNA never changes throughout life and so also the *sara* of an individual never changes in life span. Therefore, we can say, the particular *sara* of an individual depends upon the optimum degree of genetic code with respect to that particular *dhatu* and *sarvasara-purusha* has the optimum degree of genetic code with respect to all *dhatu*s.

According to Gupta S.P., the *vitality* is the *tone of system*, according to P.V. Sharma, it is the *constitutional essence*, to K.R. Shrikantha-murthy it is the *essence of excellence* or *purity of dhatu*s and to Desai Ranjeet Rai it is the *stamina*. All these different interpretations are interrelated and are very comprehensively delineated for the better understanding of the term *dhatu sara*.

Types

In ayurvedic classics, the concept *sara* is related to the quality of *dhatu*s of an individual. Although the body of an individual is composed of seven *dhatu*s, every individual differs at the level of the status of *dhatu*s because of the different genetic codes. All seven *dhatu*s of the body go through certain changes during *dhatupaka* and as a result *prasadakhya* and *malakhya* are produced.

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Prasadakhya is composed of *poshya* and *poshaka dhatu*s. *Poshyadhatu* is stable in nature and performs different functions including participation in the body-building. The ratio and quality of *dhatupaka* and quantity of its products (*dhatu*s) are not the same in every individual. Thus the body possesses seven *dhatu*s in different quality and quantity. *Sattva* is also nourished by the subtle part of *poshakadhatu*. Hence, on the basis of *sara*, individuals have been classified into various categories depending upon the quality and predominance of a particular *dhatu* and *sattva* (psyche factor) in the body. These *sara*s can be enumerated in sequence as shown in Table 1.

Kasyapa describes nine types of *sara* adding *ojus sara* whereas Varahmihira in *Brihatsamhita* mentions only seven *sara*s without any specific order omitting *sattva sara*.

In *sara* typology, the term *rasasara* is not mentioned anywhere, however it is descried as *tvaksara*. It may be because of the function of *rasadhatu* that chiefly manifests in the *tvak*. Dalhana clarifies in his commentary that the meaning of *tvak* here is the *rasa* residing in the *tvak*.

Characteristics of different *sara*s

1. *Tvaksarapurusha* are characterized by unctuous, smooth, soft, clear and lustrous skin. The hairs on skin are fine, less in number, deep rooted and soft. These persons are endowed with happiness, good fortune, prosperity, enjoyment, intellect, knowledge, health, enthusiasm and longevity. According to Kasyapa, *tvaksara* children never suffer from skin diseases and have the ability of rapid healing of wounds.
2. *Rakta sara purusha* have unctuous, red-coloured, lustrous and good looking ears, eyes, face, tongue, nose, lips, palms, soles, nails, forehead and genitals.. These persons are endowed with happiness; tendency to involve in dispute; good grasping and retention power; tenderness; moderate biological strength; lack of endurance; intolerance to heat; good sexual life, wealth and progeny.
3. *Mamsa sara purusha*'s temples, forehead, nape, eyes, cheeks, jaws, neck, shoulders, abdomen, axilla, chest, joints of hands and feet are well equipped with firm, heavy and good looking muscles. They are endowed with forgiveness, restraint, lack of greediness, wealth, knowledge, happiness, simplicity, health, biological strength and longevity.
4. The characteristics of *medas sara purusha* are - unctuousness in complexion, good voice and eyes, abundant hair in head and other parts of body, fine nails, teeth, lips, urine and faeces. The persons of this category would be endowed with wealth, prosperity, happiness, enjoyment, charity, simplicity, and delicacy in dealings. They may have large body but intolerant to exercises.
5. *Asthi sara purusha* is characterized by prominent heels, ankles, knees, elbows, collar bones, chin, head, joints of fingers, bones, nail and teeth. They would be very enthusiastic, active, capable of facing difficulties and have strong and firm body and longevity.
6. *Majja sara purusha* is characterized by softness of organs, strength, unctuousness in complexion and voice. They have prominent, long and rounded joints, big eyes

and good fortune. They are endowed with longevity, biological strength, wealth, textual and technical knowledge, progeny and honour.

7. The features of *sukrasarapurusha* are - gentle look, eyes as if filled with milk, full of enthusiasm and marked penile erection. Their teeth would be rounded, strong, uniform, firm with elevated margins and good looking; complexion and voice are clear and unctuous with lustrous and dazzling face. They have large buttocks and women love them. They are endowed with physical as well as mental strength, happiness, sound health, wealth, supremacy, honour and progeny.
8. *Sattvasarapurusha*s are characterized by good memory, devotion, gratefulness, wisdom, pious, high enthusiasm, skill, resolution, valour in war, free from anxiety and sorrow, proper and stable movement, depth of wisdom, sincerity in action and act beneficial to others.

Sarvasarapurusha have all the *dhatu*s in abundance and of good quality. They are endowed with great biological strength, absolute happiness, endurance against difficulties, self confidence in all enterprises, inclination to benevolent acts, firm and balanced body, well balanced gait; would be serious with high pitch voice; they are featured with happiness, supremacy, wealth, enjoyments, honour, delay of ageing; low degree of pathogenesis, minimal diseases, numerous offspring of identical qualities and longevity.

Madhyasarapurusha having moderate amount of different *sara*, possesses qualities of respective *sara*s in moderate degree, and shows the characteristics of *sarvasara* moderately. *Asara* individuals having least amount of different *sara* possess qualities of respective *sara*s in lowest degree and show least characteristics of *sattvasara*.

According to Charaka, the importance of *sara* is one of the ten heads (*dasavidha atura pareeksha*) under which a patient should be examined in order to determine his *ayu* (biological age), the status of *bala* (biological strength) and the amount of vitiated *dosha*s

TABLE 1
Classification of *sara* depending upon the quality and predominance of particular *dhatu* and *sattva*.

Charaksamhita	*Susrutasamhita*	*Ashtangahridaya*	*Kasyapasamhita*	*Brihatsamhita*
Tvaksara	*Sattvasara*	*Tvaksara*	*Tvaksara*	*Medassara*
Raktasara	*Sukrasara*	*Raktasara*	*Raktasara*	*Majjasara*
Mamsasara	*Majjasara*	*Mamsasara*	*Mamsasara*	*Tvaksara*
Medassara	*Asthisara*	*Medassara*	*Medassara*	*Asthisara*
Asthisara	*Medassara*	*Asthisara*	*Asthisara*	*Sukrasara*
Majjasara	*Mamsasara*	*Majjasara*	*Majjasara*	*Rudhirasara*
Sukrasara	*Raktasara*	*Sukrasara*	*Sukrasara*	*Mamsasara*
Sattvasara	*Tvaksara*	*Sattvasara*	*Ojussara*	
-	-	-	*Sattvasara*	

before prescribing the medicine and dosage. It is noteworthy that ayurvedic texts mention *sara* for the assessment of *bala*. *Bala* means biological strength and it may be correlated with the immunity of an individual. The number of *dhatusara* present in predominance in the body of an individual is directly in proportion to the immunity of that individual. That is why *sarvasara* individuals show relatively higher immunity in comparison to *madhyasara* or *asara* individuals. In a nutshell, it can be said that the greater the number of *dhatusara*, the better the immunity would be in an individual.

From the above discussion, it can be said that persons possessing all the *sara*s but having predominance of one or more *sara*s will possess more immunity against diseases which may arise due to vitiation of those *dhatu*s. This is corroborated by the statement of Kasyapa that *tvaksarapurusha* may not have skin diseases and that they possess the capacity for rapid healing of wounds.

Significance of *sara* examination

While describing the *sara* examination of a patient, Charaka emphasizes that sometime a physician may go wrong if his observations are based only on the outward physical appearance of the patient.

Any person may look strong or weak because of being corpulent or lean but physical appearance is not a true parameter for assessment of biological strength. Sometimes it is noticed that lean persons can have more strength than corpulent persons. For instance, lean lions show greater strength and agility than corpulent elephants. So it is obvious that inherent power of a person cannot be assessed by bulk and size of the body. It can be judged only by the *sara* examination of the patient.

Conclusion

Sara has been described to denote the essence of *dhatu* (body tissues) with excellent quality. In other words, *sara* is a central governing force responsible for optimum biological strength of the body tissues, which are genetically determined. Evaluation of *sara* provides an idea of the status of *dhatu*s in the body in relation to biological strength of the patient.

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STUDY OF HEPATOPROTECTIVE ACTION OF *TERMINALIA CHEBULA*

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Abstract: Liver is the vital organ of the body and is continuously exposed to a great variety of endogenous and exogenous substances including the toxic substances of metabolic and therapeutic nature. About 100 different medicinal plants in different combinations are almost regularly used in different liver ailments including hepatitis. *Terminalia chebula* (*haritaki*) is one of such medicinal plant used almost in every preparation. This paper studies the hepato-protectivc activity of the dry fruit of *Terminalia chehula* Retz. at different intervals on some bio-chemical parameters.

Introduction

Terminalia chebula is a wonderful drug known as long life elixir (Bakaru 1994). There is an old Indian proverb that "one who bites a piece of *haritaki* every day after meals and drinks its juice, he will remain free from all diseases." The physicians in ancient India had potentially used this herb in the treatment of diarrhoea, dysentery, heartburn, flatulence, dyspepsia and liver and spleen disorders.

Generally, as this drug is one of the common constituents of various herbal formulae for liver ailments, this study is aimed to evaluate the hepatoprotective action of *Terminalia chebula* on experimental animals.

Objectives

a) To evaluate the hepatoprotective action on rat liver and the induced affect of the extract of *Terminalia chebula* after hepatic injury through CCl_4 model.

c) To conduct histopathological study of liver tissue to correlate the functional changes of liver with structural changes.

d) To assess the effect of *Terminalia chebula* on liver system particularly on liver enzymes and other biochemical activities.

Materials and methods

Male Sprague Dawley rats (body wt. 120-150 gm) were taken as experimental animal. The rats were fed with basal diet, (Parries 1950) in the proportion of 12 gm per day and provided water *ad libitum*. The rats were treated with aqueous extract of *Terminalia chebula* dry fruit which was prepared by adopting a standard method (Gained et al. 1962).

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The experiment was conducted in two phases:

Phase: I

Two groups were used: a) Control group that received basal diet expanded to 28 days and b) Test group that received basal diet and oral dose of aqueous extract of *Terminalia chebula* 200 mg/kg body weight per day for a period of 7^{th}, 14^{th}, 21^{st} and 28^{th} day and was studied in four different sets.

The animal were sacrificed after the stipulated period and blood sample and liver tissue were collected for following biochemical parameters:

a) Blood glucose
b) Serum protein level, total protein and albumin
c) Serum bilirubin (direct and total)
d) Serum alkaline phosphatase
e) Transaminase of serum (SGOT and SGPT)
f) Transaminase of liver (LGOT and LGPT)

Phase: II

The extract was given in a concentration of 200 mg and 500-mg/kg body weight for 7 consecutive days and divided into 4 different group. In each group 6 numbers of rats were taken for the study.

a) Control group:- received liquid paraffin through i.p (2 mg/kg b.w.) in 3^{rd} and 6^{th} day.
b) CCl_4 treated group: received CCl_4 2 mg/kg b.w. on 3^{rd} and 6^{th} day.
c) Test group *Terminalia chebula*$_1$ (Tc_1):- received orally 200 mg/kg b.w. aqueous extract up to 7^{th} day. On 3^{rd} day and 6^{th} day two dose of CCl_4 2 mg/kg b.w. through i.p. route.
d) Test group *Terminalia chebula*$_2$ (Tc_2):- received orally 500 mg/kg b.w. aqueous extract up to 7^{th} day and on 3^{rd} and 6^{th} day CCl_4 2 mg/kg b.w. through i.p. route.

Each animal was sacrificed on the 8^{th} day and the weight and volume of wet liver computed and recorded (Reddy et at. 1993). The biochemical estimations were carried out according to standard biochemical methods. The following morphological and biochemical parameters were estimated in liver and serum for assessment of liver function.

a. Morphological:
   i. Liver volume
   ii. Liver weight
b. Biochemical:
   i. Serum total protein (STP)
   ii. Serum bilirubin (SRBN)
   iii. Serum Alkaline Phosphatase (SALP)
   iv. Serum Glutamic Oxaloacetic Transaminase (SGOT)
   v. Serum Glutamic Pyruvic Transaminase (SGPT)
c. Histopathological Study: The histological techniques (Luna, L.G. 1968) was followed and damaged produced in the liver structure in the form of degeneration necrosis and fibrosis was noted.

Result and observation

The mean value of Blood glucose, Serum protein, Serum bilirubin and Serum alkaline phosphatase were noted and these were without any significant variation with the control and test groups in phase I of the experiment.

Increase in the mean value of SGOT after 28 days of feeding were noted as 51.37 + 4.28 U/ml. against its control value of 27.71 + 3.29 U/ml. Variation in values in both the control and 28 days feeding were under normal range (17.00-40.00 V/ml. in control and 39.00-67.00 V/ml. in the 28 days of feeding groups).

An increase mean value of SGPT after the 28 days of feeding are also apparent mean values being 28.28 + 2.33, 43.37:t2.05, 62.42 + 4.73, 41.71 + 5.02 and 32.00 + 4.74 V/ml in control, 7th, 14th, 21st and 28 days feeding groups. But in real terms the difference in the mean value of SGPT between five groups are again insignificant.

A similar observation has been noted in liver transaminase group of enzymes, which, probably indicated the stimulation of protein bio-synthesis of liver by *Terminalia chebula*.

Phase II

Effect of liver volume and weight: - The liver volume and weight was significantly increased in CCl_4 treated group 7.07 + 0.12 m1 and 7.28 + 0.11 gm respectively though the increased volume and weight due to CCl_4 intoxication was not prevented by both the dose level (200 mg and 500 mg/kg b.w.) significantly (Table 1) However, the increase in liver volume and weight was noted comparatively less, which indicates a weak hepatoprotective activity.

Effect of Tc extract on serum total protein, serum bilirubin, SALP, SGOT and SGPT:- The serum total protein level at both the aqueous extract Tc group did not effect. The effect of CCl_4 treated rat has been showed as significant increase of serum bilirubin up to 10.28 : t 1.76 mg %. The enhance level of SRBN is slightly lower in group D. The SALP activity in CCl_4 treated did not affect the enzyme activity significantly.

The transaminase activity was also noted. No any significant change observed in both the treated group of *Terminalia chebula* (Table 2).

Table 1

Effect of T.C. extract of *Terminalia chebula* on liver volume and weight in rat subjected to CCl_4 induced toxicity.

Group	Liver volume (ml)	Liver weight (gm)
Group A	5.15 + 0.25	5.25 + 0.18
Group B	7.07 + 0.12	7.28 + 0.11
Group C	8.53 + 0.21	8.02 + 0.11
Group D	6.46 + 0.27	6.05 + 0.08

Results of ANOVA

Parameter	Source	D.F	S.S	M.S.S	F
Liver Vol.	Treated	3	35.34	11.78	40.0277*
	Error	20	5.89	0.25	
Liver Wt.	Treated	3	24.65	8.22	97.1066*
	Error	20	1.89	0.09	

*P<0.01

Table 2

Effect of T.C. extract on STP, SRBN, SALP, SGOT and SGPT activity

Parameter	Group A	Group B	Group C	Group D
STP (gm %)	6.1 + 0.28	6.3 + 0.12	I 6.4 + 0.15	6.5 + 0.16
SRBN (mg %)	1.23 + 0.26	10.28 + 1.76	10.50 + 2.65	9.89 + 2.49
SALP (KA unit)	15.5 + 1.03	17.5 + 0.06	18.2 + 0.63	18.3 + 0.83
SGOT (V/ml)	26.83 + 1.8	34.67 + 1.76	29.50 + 2.08	28.67 + 1.86
SGPT (V/rnl.)	25 .5 + 1.77	28.7 + 1.46	27.5 + 1.54	29.5 + 2.20

Results of ANOVA

Para-meter	Source	D.F	S.S	M.S.S	F
STP	Treated	3	0.53	0.18	1.1145
	Error	20	3.14	0.16	
SRBN	Treated	3	365.45	121.82	4.9582⊗
	Error	20	491.38	24.87	
SALP	Treated	3	37.84	12.61	3.3497*
	Error	20	75.32	3.77	
SGOT	Treated	3	202.83	67.61	3.1967*
	Error	20	423.00	25.15	
SGPT	Treated	3	49.13	16.30	0.8745
	Error	20	374.50	18.73	

*P<0.05; ⊗P<0.0l

Histological investigation:- The histological examination showed gross necrosis and fatty change with haemorrage in all the carbon tetrachloride treated rats. But appearance of a few normal hepatocytes was noted in those rat treated by high dose of *Terminalia chebula* (500 mg/kg b.w.).

Summary and conclusion

It is observed that in higher doses of aqueous extract of *Terminalia chebula* (500 mg/kg b.w group) it was capable of significantly reducing the liver volume and weight. The serum bilirubin level in CCl_4 treated rats indicates the hepatoprotective activity of the fruit extract.

The present work on experimental animals has shown that *Terminalia chebula* is not at all hepatotoxic. Rather it has got hepatoprotective action as observed by the structural and functional improvement of liver.

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ROLE OF *GANDHAKA* (SULPHUR) IN SKIN DISEASES - A PHARMACO-CLINICAL EXPLANATION

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Abstract: *Gandhaka* (sulphur) has been given prime importance in *rasasastra* because of its excellent therapeutic effect as well as a commonly used drug for incineration of different metals and minerals. Sulphur is used in various diseases, for both internally and externally, especially in skin diseases. In this paper, pharmacological action of sulphur in skin diseases has been described; evaluation of therapeutic effect of sulphur in skin diseases has also been emphasized.

Introduction:

With the enhancement in knowledge, there has been more awareness about the importance of sulphur compounds and their participation in therapeutics and biochemical reactions. It is apparent, but not often stressed, that the sulphur cycle in the nature is just as indispensable for the existence of life as that of the carbon and nitrogen cycles.

Certain sulphur compounds play important roles in the homeostasis of organs and organisms. The disulphide bonds of proteins contribute significantly to their conformation, and thiol groups, in many instances, that are vital for the catalytic functions of enzymes. Some other sulphur compounds serve as co-enzymes of oxidation - reduction system[1]. By these mode and mechanism of actions, sulphur is used in different therapeutic dosage-forms for both internally and externally, especially in skin diseases.

Skin, being continuously in touch with the stress and strain of the external environmental changes, is vulnerable to many diseases. In addition, many internal allergic and metabolic disorders manifest on the skin. Almost all the psychic and somatic disorders affect the function of the skin in one or another way. The problem of skin diseases has gained a momentum and has attracted works to carry out research studies on different skin diseases and thus provide the relief to the ailing humanity.

In our ancient classics, skin diseases have been described as *dosha* after *sanchaya*, *prakopa* and *prasara* stages, lodges in the *tvak* (skin), *mamsa* (muscle) and *sonita* (blood). All the diseases in this regard may be considered as

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*tvakroga*s (skin diseases) as they are manifested on skin. The skin diseases being the diseases of *bahyarogamarga*, run to a chronic course because it is difficult to bring back the *dosha*s from *sakha* to *koshtha*, as the *dosha*s are trapped in *tiryakrogamarga*.

Gandhaka is well known that possesses *kandughna*, *kushtaghna*, *krimighna*, *rakta sodhaka*, and *tvakroganasaka* properties. All the ayurvedic classics have described the application of sulphur in skin diseases. *Charakasamhita* refers to sulphur in the formulation of *Kusthadi churna* which is used for various skin diseases[2]. In *Susrutasamhita* it is used in *Mahavajrakataila* for all types of skin diseases[3]. In *Ashtanga samgraha*, it is referred to in the preparation of *Mustadi churna* that eradicates *dadru*, *pama*, *kandu*, *kitibha* and *vicharchika*[4]. Description of various preparations with sulphur for the treatment of different skin diseases can be seen in *Chakradatta* and *Rasaratnasamucchaya*[5].

Sulphur being the best remedy for skin diseases, the very same disease has been selected for the clinical trial of *Gandhakarasayana* internally and *Gandhakadruti* externally for evaluating the therapeutic efficacy of sulphur in such diseases.

Aims and objectives

The present study has been planned to: 1) interpret the preparation of *Gandhaka rasayana* and *Gandhakadruti*, 2) explain the mechanism of action of sulphur in skin diseases and 3) assess the effect of sulphur in the management of skin diseases.

Materials and methods

The study was carried out in three phases i.e. a) Pharmaceutical, b) pharmacological and c) clinical.

a. **Pharmaceutical phase**

Rasasastra, the ayurvedic pharmaceutics, deals with the preparation of drugs from metals, minerals, herbals and animal products. In this phase, the preparation of *Gandhakarasayana* and *Gandhakadruti* has been described.

Gandhaka rasayana[6]

The sulphur, purified by cow's milk, is to be triturated in a pestle-morter and lavigated by the juice or decoction of the following one by one and each for eight times:

Tvak	(*Cinnamomum verum*)
Patra	(*Cinnamomum tamala*)
Ela	(*Elettaria cardamomum*)
Nagkesara	(*Mesua ferrea*)
Guduchi	(*Tinospora cardifolia*)
Haritaki	(*Terminalia chebula*)
Amlaki	(*Emblica officinalis*)
Vibhitaki	(*Terminalia bellirica*)
Sunthi	(*Zingiber officinale* - dry)
Bhringaraj	(*Eclipta alba*)
Ardraka	(*Zingiber officinale* - fresh)

Every day, when the previous juice or the decoction is dried up, fresh juice or the decoction is to be put again into the pestle-morter and the levigation has to be continued. After the levigation of eighty eight times, when the sulphur converts into a fine powder-form, and it has to be mixed with same quantity of sugar candy powder. Thus prepared *Gandhakarasayana* is preserved in glass jars with proper lids and is used as per requirement.

Gandhakadruti[7]

One part of powdered and purified *amlasara gandhaka* and twenty parts of sesame oil are to be taken; sesame oil taken in a stainless steel vessel has to be heated slowly till the foam appeared at the top layer of the oil is

settled down. Thereafter the vessel is to be taken out from the heating device and slowly add the powder of sulphur to it and stir well. Then the vessel is to be kept on fire and heated slowly. It has to be continuously stirred so as to avoid settlement at the base. With the heat of the oil, the sulphur starts melting; then mix well in oil till it becomes yellow in colour and lastly getting to proper preparation the colour turn to brown. To test whether the *druti* is properly prepared or not, few drops of *druti* are to be poured in a saucer containing stagnant water; if it is properly prepared, the drops do not spread on the stagnant water surface due to increase viscosity and the drops appear bright red and transparent and no particle of yellow sulphur appear in the drops. Thus prepared *Gandhakadruti* is preserved in glass jars with proper lids and is used as per requirement.

b. **Pharmacological phase**

In this phase of study, the mechanism and site of action of sulphur in skin diseases are observed.

Systemic action:- Sulphur, when taken by mouth, is converted in the small intestine into alkali sulphides, which by their irritant action produce a mild laxative effects. By this mechanism sulphur helps in elimination of the *dosha*s from the *kostha*.

Local action:- Sulphur, when applied to skin, is slowly reduced to hydrogen sulphide (H_2S) and oxidized to sulphur di-oxide (SO_2) and pentathionic acid. These, especially the latter, dissolve the cuticle of itch mite and kill it. The reactions are carried out by epidermal cells and the anthropods themselves[9]. By this mechanism sulphur acts as a potent *dadrughna* (fungicide), *pamari* (scabicide), *padadarighna* (keratolytic) and *krimighna* (antihelmenthic) drug.

c. **Clinical phase**

The ultimate objective of a drug is its success in terms of clinical trial. So in this phase of study a clinical trial of *Gandhakarasayana* and *Gandhakadruti* in skin diseases like *dadru* (tinea infection), *pama* (scabies), *vicharchika* (eczyma), *padadari* (cracks in sole) has been performed.

Inclusion criteria

The patients complaining symptoms suggestive of skin diseases like *dadru*, *pama*, *vicharchika* and *padadari* were selected randomly from the O.P.D. of I.P.G.T. & R.A. Hospital, irrespective of age, sex and religion. These patients were further examined in detail by observing clinical history and physical examination. The diagnosis was based mainly on the clinical presentation of the patients.

Exclusion criteria

Age group - below 7 years and above 70 years and those suffering from diabetes mellitus were excluded from the study.

Number of patients:- Total 10 patients were registered for this study; out of them 3 patients had the symptoms of *dadru*, 3 patients *pama*, 2 patients *vicharchika* and the rest 2 patients were suffering from *padadari*.

Posology

Drug:- *Gandhakarasayana* prescribed to be taken internally and *gandhakadruti* to be applied externally.

Dose:- *Gandhakarasayana*: 500 mg twice a day orally. *Gandhakadruti* sufficient to be applied locally, twice a day.

Duration:- 30 days for both internal and external application.

Direction:- Patients were advised to apply a thin layer of *Gandhakadruti* and rubbed it properly so that it gets applied properly on the lesion, and also advised to take *Gandhaka rasayana* twice a day, once in the morning and another in the evening with milk as adjuvant.

Diet:- Advised to avoid sour foods and drinks and advised to take more milk.

Follow up:- Reviewed after each 7 days for a period of 30 days.

Assessment criteria

The patients have been assessed by mitigation in the symptoms like *kandu* (itching), *pidaka* (lesion), *rukshata* (dryness), *visarpanata* (spreading) and *vaivarnyata* (pigmentation).

Results

Those showed complete relief in the assessing symptoms as well as the skin surface and the colour of lesion appeared almost normal considered as cured. And, according to this, the patients who were suffering from *dadru*, *pama* and *padadari* had considered completely cured within due course of treatment. The patients of *vicharchika* had considered partially cured because of the symptoms like *kandu*, *pidaka*, *rukshata* and *visarpanata* had cured completely but *vaivarnyata* remained.

Discussion

From the treatment point of view, skin diseases are difficult to cure and generally run a chronic course, because *tvak* comes under *bahyaroga-marga* and it is very difficult to bring back the *dosha*s situated in *sakha* to *kostha*. Further, in almost all the skin diseases *rakta* is also involved.

In the modern medicine, there is no permanent cure for the skin diseases and the patients have to take the treatment for a long time. For the skin diseases like leprosy, there is cure in the modern medicine but due to the side effects of the drugs the drop out rate is more. For the allergic skin diseases, steroid drugs are prescribed for a long term with many hazards. So, generally a large number of patients come to ayurvedic hospitals with a hope to find out alternative remedies for their chronic skin ailments.

Ayurvedic system of medicine prescribes sulphur, in different forms, for both internal and external uses, especially for skin diseases. Pure sulphur, when applied to the skin, has no effect, but if it is mixed with any greasy substance (sebaceous secretions) some of it is converted into oxidized and reduced forms which act as a mild irritant, so cause parasitiside and causes death of the itch insects.

A survey reports on the skin diseases at the O.P.D. level of I.P.G.T. & R.A. Hospital shows that out of all the skin diseases, almost 4% patients were having *dadru*, 3.1 % were having *pama*, 3.5% were suffering from *viicharchika* and 4.2% were having padadari[10].

The result of this study shows highly effectiveness of sulphur in the treatment of skin diseases. All the patients of *dadru*, *pama* and *padadari* had cured within due course of drug. The hyper-pigmentation in *vicharchika* patients till persist and it probably will take more longer treatment to become normal.

Conclusion

Ayurvedic system of medicine should be considered as the best alternative remedies for the management of chronic skin ailments. *Gandhaka* (sulphur) is very much effective in skin diseases and should be considered the best remedy for skin diseases.

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PREREQUISITE OF METHODS OF GOOD RESEARCH PRACTICES IN AYURVEDA

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Abstract: Ancient ayurvedic literatures indicate, depict and promote the methods of research and development required for the progress of ayurveda. We need to develop these methods in the current perspectives of biomedical research for faster and wider acceptance of ayurveda globally. Plant as a platform, reverse pharmacology, systems theory and evidence based medicine are the suitable research approaches for the future development of ayurveda, while literary research, fundamental research, clinical research, pharmaceutical research and community welfare research should be the categories of research priorities for ayurveda. Collaborative and co-operative research programs is the *mantra* for accelerating the momentum of research and development in ayurveda.

Introduction and background

"Clinical wards are the best research laboratories."

Research is a meticulous and persistent enquiry of the unknown. The research methodology for such an enquiry often involves an organized and orderly plan, with inbuilt components of objectivity and experiments based on hypothesis. The globally renewed interest in ayurveda and complementary/alternative medicine (CAM) has opened up immense opportunities and scope for research and development. The opportunities and scope for the development of ISM and ayurveda can be classified as:

- Globalization and corporatization of ayurveda
- Developing ayurveda as preventive health-care modality
- Expanding ayurvedic pharmacopoeia
- Incorporating modern science & technology
- Current gaps in medical management

At the same time, there are certain threats and obstacles in its development such as:

- Spurious use of drugs over the counter
- Commercial exploitation with marketing gimmicks
- Flaws in study design and lack of reporting
- Competition from other CAMs
- Strategic development of allopathy to modern medicine

Committed centers of excellence for research and development in ayurveda and CAM would

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provide solution for a long-term strategic progress with a global impact.

Ancient ayurvedic literatures depict and promote the methods of research and documentation for the purpose of continuous progress of ayurveda (Table 1). *Chatushpramana* i.e. *pratyaksha*, *anumana*, *upamana* and *apta* are certainly the ways of deriving new knowledge and are the modes of evidence. Method of *tadvidyasambhasha* has been well mentioned in *Charakasamhita* to evolve a consensual validity[1]. *Tantrayukti* of ayurveda is a clinical method of scientific documentation of evidence. For any general purpose, a common protocol for the evaluation is described as *dasavidhapariksha*. For specific purposes of patient examination and medicine examination *aturapariksha* and *dravyapariksha* are described respectively. *Manaparibhasha* is a detailed method of measurement of weight and volume of solid and liquid medicine. Animal testing i.e. *pranija pariksha-vidhi* referred to in the ayurvedic literatures, although scattered, can be precise too; e.g. *annapanaparikshavidhi* described in *Ashtanga hridaya*[2]. In *Susrutasamhita*, a pertinent reference to *yogyavidhi* finds which means testing on dummy[3]. Whenever there is a multiplicity of factors and complexity of issues, *Charakasamhita* promotes a special additional approach to evidence called as *yuktipramana* or 'conjectural testimony'.

TABLE 1
Ancient ayurvedic methods of research and documentation

Chatushpramana	:	Parameters of evidence
Tadvidya-sambhasha	:	Consensual validity
Dasavidhapari-ksha vishay	:	Protocol for examination
Aturapariksha	:	Methods for clinical examination
Dravyapariksha	:	Examination of medication / medical equipments
Manaparibhasha	:	Methods of quantification
Pranijapariksha-vidhi	:	Testing on animals
Yogyavidhi	:	Testing on dummy
Yuktipramana	:	Conjectural testimony
Tantrayukti	:	Scientific documentation

Currently, different levels and methods of research are prevalent, and are being practiced[4]. Besides conventional clinical methods of drug trials, methods of evaluating interface of environment and health, methods of health assessment and quality of health care delivery studies, population and epidemiological studies, observational research methods, etc. are routinely being practiced in healthcare sector. Systematic reviews and meta-analysis for quantitative and qualitative analysis of pooled data from reported studies of different centers over the period of years, and bio-statistical methods for analyzing results and methods to evaluate implication of health care on economics are integral and important methods of research for current healthcare system. What we need to explore is the suitability of methods for research in ayurveda.

Current research - priorities for ISM / ayurveda

As per the current demand of healthcare, one must prioritize and focus on productive types of research activities. The types of research can be broadly categorized as literary research, fundamental research, clinical research, pharmaceutical research, community welfare

research, etc. Firstly, it is very essential to preserve and computerize our ancient medical writings and traditional knowledge e.g. Traditional Knowledge of Digital Library (TKDL)[5] by C.S.I.R., Govt. of India, etc. Further, transcriptions, translations, commentaries and new editions on existing ancient writings, etc. are to be warranted. Research on the fundamental concepts of ayurveda needs to be pursued for its expansion by its judicious interfacing with the basic life sciences. To evaluate efficacy, safety and reproducibility of results, clinical research, etc. are to be employed on various drugs, diagnostic procedures and therapeutic modalities. There is an immense potential for the diverse and pharmaceutical methods of preparation and importantly the safety studies of minerals and metals used in ayurveda as medicines. Ayurveda has always been primarily emphasized on health promotion and protection, community welfare, research such as impact of adhering to the rules and regulation of *svasthavritta*[6] or impact of using seasonal health foods and comparing it with a similar cohort group they are not following this regime, etc will help to evaluate the importance of these essential practices of ayurveda.

Selected research approaches suitable for ISM/ayurveda

Over the decades different approaches have been emerged which can be aptly suited for the research in ayurveda; *the plant as a platform for research*[7] is one of the simplest approach to be considered. A selected medicinal plant, common in use, has to be thoroughly investigated for its diverse aspects viz. cultivation and harvesting methods, tissue culture techniques, medicinal utility of various parts, pharmacological studies, different pharmaceutical preparations, combination formulation, indications, contraindications, etc. and thus establish the single or multiple medical uses of that plant. This would obviously warrant multidisciplinary, multi-centric and collaborative approach by the Research & Development network.

Another cost-effective and time-saving approach is Reverse Pharmacology approach[8], where plants or formulations are selected from the well-documented experiential database, then certain 'leads' are derived through exploratory *in-vitro* studies and on the basis of these exploratory studies a well organized programme of target oriented experiment is conducted so as to derive/evolve an effective, safe and quality drug. *Arogyavardhini* in hepatitis[9], *Mucuna pruriens* in Parkinson's disease[10], *Panchavalka* in leucorrhoea[11], *Saraca asoka* in ovulatiory DUB[12] and *Picrorrhiza kurroa* as a hepatoprotective agent[13] are a few examples of Reverse pharmacology success stories.

Systems theory[14] approach, which was proposed initially by a biologist Ludmig Von Bertalanfty in 1940, is rather too broad to comprehend but in the context of 'human system', it can be explained in brief. A human being is one system, having physical, mental and spiritual faculties. Let us select only physical faculty; there are several subsystems to this such as gastrointestinal, respiratory, cardiovascular, musculoskeletal, etc. Further to this, there are several subsystems such as organs, tissue, cells, organels, molecules and so on. All these ultimately unite to become one super system - human being. So, this systems theory approach integrates the analyzing and synthesizing methods

encompassing both holism and reductionism. What one need to remember here is that there are different levels of biological organizations and hence one should address at all these levels to bring in maximum/complete evidence of relevant science to the research efforts.

Evidence-based medicine (EBM)[15] is concerned with the medical decision-making, which refers to a triangular set of information that the physician should use to determine the best treatment for a particular patient. The three components of this triangle are (i) best available relevant, scientific and clinical evidence (ii) physician's knowledge based on practical experience and (iii) patients' own preference for treatment modalities. It appears that approaches such as EBM are most relevant for a faster global acceptance of ayurveda.

Core methods of research

Certain methods are quite essential and central to any research programme. The time spent in protocol planning and designing for the study is time invested that gets well rewarded at the end. It is essential to define the objectives of a study; the objectives might be multiple and one may categorize them into primary objectives as most essential ones and secondary objectives as relatively less important ones. Before embarking on any project, background information of the topic is very much needed and a review of the literature on the topic proposed is necessary. This basically introduces the state-of-the-art of the work. Pre-project workshop or brainstorming session with a few selected experts from the field of the project topic helps in fine tuning of the core aspects of the project as to etio-pathology, clinical and laboratory methods, efficacy and safety of the proposed modality of the therapy. Finally, an agreement amongst the sponsors, investigators and collaborators to undertake the proposed project is important for motivation and commitment. The importance of protocol writing and case-record form cannot be overemphasized for its scientific, legal and regulatory requirements. Assurance of safety and protection of the trial subjects, scientific and academic significance of the study and the value of meticulous reporting and documentation need to be attended to.

Scientific review board / Independent ethics committee

The basic purpose of a scientific review board and/or independent ethics committee is to ensure high scientific standards and high ethical values. The basic ethical principles viz. autonomy, beneficence, non-malfeasance and justice, should prevail. In small institutions, institutional ethics committee may take up the dual responsibility for scientific and ethical standards. The composition of ethics committee should be multidisciplinary and multi-sectorial which includes representation from medical, scientific, social, legal and philosophical disciplines without having a bias for gender, ethnicity, age and religion. The strength of the committee should not be less than 5 persons and although there is no upper limit the number should not cross 15. All these members are expected to be aware of the local, social and cultural norms where clinical trial is undertaken. Special member may be co-opted or invited in case of special situations. For institutional ethics committee, the chairman has to be from outside the institution. The role and responsibilities of such ethics committee can be classified in a nutshell as:

- Competent review
- Ensure scientific soundness
- Risk minimization and precaution
- Regular monitoring
- Follow regulations
- Maintain ethical values
- Education of the research community

Principles of good clinical practice

Principles of Good Clinical Practices (GCP) traces back to *Charakasamhita* - one of the oldest treatises of ayurveda[16]. Subsequent treatises also have emphasized the importance of GCP. All these emphasize the necessary quality required for a physician and the ethical and behavioral guidelines meant for doing best to the patients. However, the complexity of current methods of research necessitates more evolved guidelines. An ayurvedic physician's ethical and scientific responsibilities, besides compassion and care, involve obtaining of informed consent or disclosing risks while involved in bio-ayurvedic research.

The fundamental ethical tenet of any research on human being is that the interest of science and society should never compromise with the well being of the study subject. The aim of the ayurvedic research practices should ensure that the studies are ayurvedically and ethically sound and that the clinical safety and efficacy of the ayurvedic substances, under investigation are properly documented. Taking into consideration of WHO, ICH, USFDA and European GCP guidelines for herbals and traditional medicines as well as the Ethical Guidelines for Biomedical research on human subject issued by Indian Council of Medical Research, the scientific working group of ISBEC has prepared a draft for the guidelines of Good Ayurvedic Research Practices for clinical trials on ayurvedic products in India[17]. There is an urgent need to have a debate and discussion on such a draft to evolve a consensus among experts to finalize the guidelines for Good Ayurvedic Research Practices (GARP). These will be useful to the government agencies, academia, institutes and drug companies in their research programmes as well as to other countries for considering registration of ayurvedic drugs.

Guidelines for herbal drug standardization and quality assurance

Formerly, before the era of industrialization of drug manufacturing, ayurvedic practitioners themselves as per the need of their patients prepared ayurvedic drugs; ayurvedic treatises emphasize the good quality of medicines[18], the various methods of drug preparation[19] and test of quality assurance[20].

With the mega scale of manufacturing and marketing of herbal and ayurvedic medicines, it is very essential that globally accepted guidelines[21] for drug standardization and quality assurance methods be adopted for better acceptance of ayurvedic medicines world wide. Authentication of raw material, botanical and chemical identification and characterization, following of Good Manufacturing Practices (GMP) and maintaining good packing and storage systems are some of the essential factors for ensuring the desired activity/quality of medicines; purity testing such as exclusion of heavy metal contents (Hg, Pb, As, Cd), microbial load, pesticide and aflatoxin contamination are essential for safety assurance. Minimal pre clinical safety pharmacology is also necessary to be ensured the safety. As per the ICMR guidelines[22], Phase I clinical trial is not necessary for herbal

remedies; so also relaxation is provided in animal toxicity studies for Phase II and Phase III studies of herbal remedies. (Government is proposing to impliment these too in herbal medicine manufacturing for better assurance of quality.)

Summary and conclusion

We need to develop the methods of research and documentation as emphasized by the ancient ayurvedic literatures in current perspectives of bio-medical research for the continuous progress of ayurveda. To do such committed research, institutes having components of ayurvedic experts, basic scientists and clinical scientists, should be ready to devote for the research and development in ayurveda. Plant as a platform, reverse pharmacology, systems theory and evidence based medicine are the suitable research approaches for the future development of ayurveda, while literary research, fundamental research, clinical research, pharmaceutical research and community welfare research the categories of research priorities. Finally, consolidating strengths and negating the weakness by collaborative and co-operative research programmes should be the *mantra* for accelerating the momentum of research and development in ayurveda.

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STANDARDIZATION OF *ANUPANA*

Saraswathi Pasupathy and T. Bikshapathi*

Absact: In ayurvedic treatment, the role of *anupana* is very high. It spreads the properties of medicine to the whole body just like an oil drop spreads on water surface. Here the authors try to standardize some conventionally using *anupana*s viz. *madhu*, *ghrita*, *kshira* and *takra*.

Introduction

Ayurveda, the science of life, is an out come of continuous effort of thousands of years, experience, experiments and wisdom of ancient sages. The concepts of *anupana* are originally proposed for proper period. In *Sarnghadhara-samhita* we find detailed references to *anupana* for drugs. In the administration of drugs ayurveda holds a holistic approach. *Anupana* is that which is taken with or after medicine/ food. The term *vehicle* is derived from the word *vehiculam,* which means that which carries; it is, in other words, that which assists or a drug added to a prescription to hasten the action of the principal ingredient. It distributes the drug throughout the body like an oil drop on water, which spreads in all directions quickly. The drug will be reaching all parts of the body by two effects of *anupana*. 1) *anupana bala* (strength of the vehicle) and 2) *anupana sakthi* (potency of the vehicle) (Dr. L.L.N. Sastry, 2002).

We find various references to *anupana* such as honey, ghee, buttermilk, milk, etc. for individual compound preparations, in *Sarngadharasamhita* and other texts. Sometimes, same drug is used for different diseases with different *anupana*s. They not only act as vehicles but also have curative properties. These *anupana* should be pure or without any adulterants. Hence an attempt is being made to standardize the most commonly used *anupana* by procuring the genuine samples.

Materials and methods

Four commonly used *anupana*s viz. honey, milk, ghee and buttermilk are chosen for standardization. Honey and milk was procured from the vendor and the ghee and buttermilk were prepared in the laboratory. Chemical analysis had been carried out according to Morris B. Jacobs 3rd Edition (1999) and Indian Pharmacopoeia (IP) (1966). Some of the parameters are already published in the text Food Analysis by Morrison B. Jacob.

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Honey

Honey is the nectar and saccharine exudations of plants that are gathered, modified and stored in the comb by honeybees. Apart from its use as a vehicle, honey has got the high curative properties. Honey, mixed with water, is prescribed in the case of obesity; also, it is given for leprosy, worms, vomiting, cough and to heal the wounds (Ramadesikan 1984). Hence it has been taken for standardization.

Chemical analysis

The essential components of honey are dextrose, levulose and sucrose in small amounts. The presence of more than 8% of sucrose in honey indicates that the honey is not matured or that it is adulterated. In general, the invert sugar content is high and it is levorotatory before and after inversion. The composition of honey as per the analysis carried out is tabulated in the Table-1 and the details of the literature review in the Table-1a.

Milk

Milk is one of the important foods in the human diet. It has many components, which are very important to health. Milk is an important *anupana* for *avaleha*s and it has got many curative properties. It is recommended as a complete food for both infants and elders. Intake of milk removes tiredness, giddiness, cough, etc.

TABLE 1

Composition of honey as per the analysis

	Physico-chemical tests	Results
1	% loss on drying at 110°C	20.04
2	% Total solids	79.96
3	%Ash content	0.1
4	%Acid insoluble ash	0.01
5	Sp.gravity at room temperature	1.38
6	Refractive index	1.4789
7	%Invert Sugar	74.98
8	%Sucrose	1.90

TABLE 1a

Literature review (Morris & Jacob, 1999)

	Parameters covered	Results
1	Polarization (Direct):	
	a. immediate	-11.24
	b. constant	-14.73
	c. bio rotation	3.49
	d. at 87°C	+10.15
2	% Levulose	40.84
3	% Dextrose	32.37
4	% Acidity	0.3

Fresh cow's milk was procured for chemical analysis. The results and the details of literature review are tabulated in table - 2 and 2a respectively.

Ghee

The next important *anupana* in ayurvedic system is ghee. Ghee is good for brain and increases the memory power. It is good for skin diseases, healing of the wounds and in all types of *vata* disorders; it prevents ageing. Apart from all these features, it is light (*laghu*), spreads fast and carries the effect of the medicine uniformly throughout the body.

Genuine sample of the cow's ghee was prepared in the laboratory from cow's milk and used for the chemical standardization. The results thus produced are detailed in table - 3 (I. P.1996).

Buttermilk

A commonly consumed liquid, it is free from fat. It is an important *anupana*, which is suggested for all stomach disorders. It is particularly used in *grahani* (mal-absorption syndrome) and due to it's sour and astringent taste, it is also useful for *vata* and *kapha* disorders.

TABLE 2

Composition of milk as per the chemical analysis

	Physico-chemical tests	Results
1	% Water	86.21
2	% Total solids	12.5
3	% Ash content	0.74
4	% Acidity	0.15
5	Sp. gravity at room temperature	1.029
6	pH	6.5
7	% Sugar	4.5
8	% Fat	4.45

TABLE 2a

Literature review (Morris & Jacob -1999)

	Parameters covered	Results
1	% of solids not fat	8.77
2	% of casein	2.86
3	% of lacto albumin	0.70
4	% of protein	3.77
5	% of nitrogen	0.50

Buttermilk contains most of the nutrients of milk except the butterfat. Buttermilk was prepared from the milk at the laboratory hence it contained limited fat. Market sample was prepared from skim-milk powder and water by adding butter starter. Chemical analysis was done on genuine sample and the results are produced in table 4 (Morris B Jacob 1999 3rd edition). Buttermilk contains protein 3.00 lactose 5.0% (review).

Results and discussions

All the four *anupana*s namely honey, milk, ghee and buttermilk were chemically analyzed and the results obtained are displayed in the tables. All the four samples are found to be genuine and the parameters arrived may be considered as standard values.

Acknowledgement

The authors are thankful to the Director C.C.R.A.S., New Delhi for the financial support, to Sri K.G. Vasantha Kumar for valuable suggestions and to Sri. Rudrappa and Sri. Shekara for the technical assistance.

TABLE 3

Composition of ghee as per the chemical analysis

	Physico-chemical tests	Results
1	% Loss on drying at 110°C	0.15
2	% Ash content	0.10
3	% Acid insoluble ash	0.0009
4	% Fat content	99.83
5	Saponification-value	222.91
6	Iodine value	34.6
7	Specific-gravity	0.935
8	Acid value	2.52
9	Refractive index	1.4561
10	Unsaponifiable-matter	0.31

TABLE 4

Composition of buttermilk as per the analysis

	Physico-chemical tests	Results
1	% Water	90.5
2	% Total solids	9.5
3	% Ash content	0.7
4	% Fat	0.5

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PRELIMINARY STUDIES (*IN-VITRO*) ON ANTICOAGULANT ACTIVITY OF NATURALLY OCCURRING BIS-COUMARINS

P.C. Joshi[1], Suvra Mandal[2], P.C. Das[2] and P. Adhikari[3]

Abstract: Anticoagulants were introduced in clinical medicine almost half a century ago (both intravenous and oral) and were reported in a variety of disorders characterized by predisposition to the formation of thrombus. This paper discusses the anticoagulant activity of two bis-coumarins out of four isolated from *Boenninghausenia albiflora* and *Lasiocephon eriocephalus*.

Introduction

Most potent anticoagulant in the body that possesses various biological activities to a high degree is Heparin. Besides this, oral anticoagulants have been identified from coumarins e.g. Dicoumarol[1] etc. No other compound/drug has been discovered so far which could be used as either intravenous or oral anticoagulant. The anticoagulant effect of 4-hydroxy coumarin was first recognized by Schofield[2]. Dicoumarol is a naturally occurring 4-hydroxy bis-coumarin isolated from *Malilotus alba*. Several studies have been published on the relationship between anticoagulant activity and structures. Link's group for the first time examined one hundred and six coumarins with hydroxyl at C_4 and found only dicoumarol to have the highest activity. Later, Arora and Mathur[3] suggested that molecular shape, 8-substitution, ionizing ability and presence of a methoxyl function - all probably govern anticoagulant activity. Keeping in view these facts, the authors tried to establish the anticoagulant effect of four naturally occurring coumarins - jayantinin, bhubaneswin, matsu-kaze-lactone (isolated from *Boenninghausenia albiflora* Reichb Meissner) and lasiocephalin (isolated from *Lasiocephon eriocephalus* Dcne.). Thus an attempt has been made to find a suitable anticoagulant compound from herbal source. Preliminary study showed that out of the four coumarins only two i.e. jayantinin and lasiocephalin showed anticoagulant activity. The anticoagulant activity was measured systematically by Howell assay method[4], comparing with standard anticoagulant heparin. Method was adopted within feasible laboratory conditions and limits in fresh rat blood.

Materials and methods

Boenninghausenia albiflora[5] was collected

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from the Chaubattia area of Ranikhet district, Almora, U.P. (India) during October and identified by Sri R. N. Tewarai and S. C. Pant (Amalgamated Units, CCRAS, Tarikhet, Ranikhet). *Lasiosiphon eriocephalus*[6] purchased from the local market and was identified by Dr. S. R. Das of RRI, CCRAS, Kolkata. Voucher specimens of both the plants have been deposited in the Department of Pure Chemistry, University of Calcutta, Kolkata.

Isolation of jayantinin[7]

Air-dried whole plant (7 kg) was extracted with petroleum ether in a Soxhlet apparatus. The solvent was removed and the residue concentrated for column chromatography. The defatted plant material was percolated with alcohol and graded fractionation was carried out in order of increasing polarity of solvents.

Chromatographic resolution of petrol extract was done by following usual procedure with increasing polarity of solvents from petrol to 10% methanolic ethyl acetate using silica gel column (BDH, 60-120 mesh). In the benzene:ethyl acetate (1:1) eluent (fractions 7-13) jayantinin (Fig.1) was obtained.

Isolation of lasiocephalin[9]

Lasiosiphon eriocephalus (Thymelaeaceae) occurs in Western ghats of Bombay and Tamil Nadu states ascending to 7,000 ft. in Nilgiries. Stem bark of the plant was defatted with petrol in Soxhlet apparatus. On chromatography of the concentrated petrol extract over silica gel lasiocephalin (Fig. 2) migrated out of the column when eluted with benzene : ethy1acetate (4:1).

Reference compound

Sodium heparin (No. H. 7005: Porcine Intestinal Mucosa 169.2 units/mg: lot 38F-0135) preparation was taken for this series of work. Heparin dissolved in 0.9% sterilized saline to which 0.3% cresol added as a preservative and the solution divided into suitable aliquots, which were frozen in sealed, sterilized vials.

Anticoagulant activity

A modification of the Howell assay for heparin (L. W. Kavanagh, 1977) was employed for this investigation 0.1 ml of heparin solution of 1.7-

TABLE 1

Physical properties of jayantinin and lasiocephalin

Compound	M.P. in ^{o}C	Rf	Moleculer formula (Molecular wt., M^{+})	Yield in %
Jayantinin	255-56	0.17 hexane:ethyl acetate (1:1)	C_{20} H_{14} O_6 (350)	0.0004
Lesiocephalin	214-15	0.6 ethyl acetate	$C_{19}H_{12}O_6$ (336)	0.0016

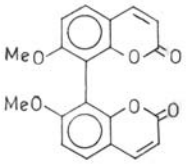

Fig. 1
Jayantinin
($C_{20}H_{14}O_6$)

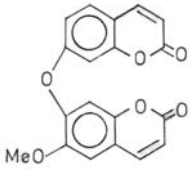

Fig. 2
Lesiocephalin
($C_{19}H_{12}O_6$)

units/ml strength was placed in 8 mm sterilized tubes. A solution of jayantinin or lasiocephalin in double distilled water (in suspension 5.5 mg/ml) in graded doses and 0.9% saline was added to make the volume 0.5 ml. Then the fresh rat blood (4 rats/ compound) of volume 0.5 ml was added to each tube to make it 1 ml. The clotting time was determined at 37^0C in a thermostatic bath.

Animal preparation

In bred Charles Foster strain rats of body weight 265.00 + 27.35 gm was acclimatized under laboratory conditions (14 hr. light and 10 hr. dark, ambient temperature $25^0 + 3^0$C) for 7 days and was supplied with standard diet (Pellets: Hindusthan Lever, India) and water *ad libitum*. The rat was killed by a blunt end and 2 ml of blood collected by a glass syringe from the exposed heart. Procedure of Howell assay for anticoagulant activity was followed according to Charles and Scott (1952) and later modified by Jaques and Kavanagh (1977)[4]. In short, a preliminary assay was done to determine the approximate range of International standard heparin solution. A stock heparin solution was prepared of about 169.2 units/ml from which final dilutions prepared for the assay was 1.7 unit/ml. Whole blood clotting time and clotting time by Howell assay were determined according to Jaques end his co-workers as mentioned above.

Results and discussion

The values reported for anticoagulant activity of the samples as measured by the Howell assay on fresh rat blood are detailed in Table 2. The effect of a sample was listed on

TABLE 2

Test for anticoagulant activity of bis-coumarin 1&2 by Howell Assay on rat blood*

	1	2	3	4	5	6	7	8
International Standard:								
Heparin (1.7 unit/ml)	x	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Jayantinin (5.5 mg/ml)	x	x	0.1	0.15	0.2	0.25	0.3	0.3 5
Laciocaphalin (5.5 mg/ml)	x	x	0.1	0.15	0.2	0.25	0.3	0.35
Saline (0.9%)	0.5	0.4	0.3	0.25	0.2	0.15	0.1	0.05
Blood	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Clotting time (jayantinin)	22’15”	62’55”	105’50”	180’57”	191’10”	193’5”	235’50”	240’06”
Clotting time (laciocaphalin)	21’38”	60’15”	111’15”	162’35”	180’	290’	360’	360’

* Indicate all solution used in ml. Whole blood clotting time 21’04” + 2.75”

the clotting time of blood to which known heparin added. Column 1 gives the clotting time of blood + saline; column 2 gives the clotting time with 1.7 units/ml of heparin added to saline + blood. 1.7 units/ml of heparin approximately triples the clotting time in this series, the effect increasing with greater normal values. Column 3 to 8 shows clotting time with the compound added to the standard heparin. With heparin present, there is a summation of anticoagulant effect to produce much longer clotting time. This is demonstrated by the values in the columns 3 to 6 compared to the value in column 2. Difference of clotting times in the columns 7 and 8 of both the compounds were negligible. This indicates that compounds with higher doses exhibit some interference in the materials, which inhibited clotting times. For systematic evaluation of suitable dose the experiment will be repeated on cat/dog blood samples with lower dose range. Both the active compounds showed no toxic effect on sub acute toxicity test at the tested doses.

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CRITICAL EVALUATION OF THE *SROTAS*

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Abstract: The role of *srotas* in the manifestation of diseases is well described in all most all the ayurvedic texts. In this paper, the authors attempt to make a critical evaluation of *srotas*; its classification, aetiological factors for the vitiation, etc. are also dealt with.

Introduction

The concept of *srotas* is defined vividly and scientifically in ayurvedic texts. It is stated that any corporeal entities do not arise or decay without *srotas*. It is defined as the transporting passages of *dhatu*s undergoing transformation. Charaka mentions that the person is the aggregate of *srotas* because of their pervasiveness and diffusiveness that aggravate and pacify *dosha*s. There are divergent opinion regarding the number of *srotas*; some says they are innumerable and to some they are numerable and describes along with classification in their respective *samhita*s.

It may be considered as the channels (micro and macro) on the basis of morphology. The term *srotas* is derived from the root *su sravano* means that which exude; ooze; filter; permeate. These channels function as the medium through which the biological materials, nutrients and excretables flow from and the *koshtha* and the exterior. It refers both to the gross major channels like respiratory tract, gastro intestinal tract, genito-urinary tract, etc. micro channels like vessels, capillaries, lymphatics, etc., and also to the molecular channels like the permeability of membraneous pores of cell membrane, etc.

It is the pre-requisite for the maintenance of good health because without healthy *srotas* body cannot grow normally. Any slight disturbance on the level of *srotas*, either structurally or functionally, leads to manifestation of disease; in other words, a defective *srotas* is the cause for the amalgamation of vitiated *dosha* and *dushya* and as a result, disease manifests inside the body. Competent *srotas* is the basis for any therapeutic procedures. *Srotas* is the root cause for a healthy body; *samsodhana* therapy is recommended for removing the existing *mala*s from the body and thereby maintains the healthy status of *srotas*.

Synonyms

Sira (vein), *dhamani* (artery), *rasayani* (lymphatics, ducts), *rasavahini* (capillary), *nadi* (tubular conduits), *panthana* (passages), *marga* (pathways, tracts), *sarirachidra* (body orifices)

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samvrutasamvrutani (open or blind passages), *sthana* (sites), *asaya* (repertories) and *niketa* (resorts) are the synonyms of *srotase*s (channels).

Structure

The orifices of the *srotas* are very small, wide, long and far, like those in the lotus stalk; through them, *rasa* 'nourishes' the body. The colour and form of the *srotas* would be similar to the *dhatu*s they transport; they may be cylindrical, 'either *sthula*' (gross, macroscopic) or *anu* (atomic or microscopic), *dirgha* (long) or *prathana* (reticulated).

Importance

1. The indulgence of anomalous diet and activities leads to the abnormality in the *srotase*s, which is the root cause for any disease; in other words, healthy *srotas* are the source of a good health.
2. The *srotase*s subserve the needs of transportation. The *dhatu*s transported through the *srotase*s are constantly subjected to (metabolic) transformations. Without *srotase*s no body-structure can grow and develop, or waste and degenerate.
3. *Vata*, *pitta* and *kapha* move through the *srotase*s; all the channels of the body cater to the needs for these movements. So long as these channels of circulation perform their normal functions, body would be free from the diseases.
4. The abnormality in the *dhatu*s brings about abnormality in the *srotas*. The vitiated *srotas* further vitiate *dhatu*s, as a vicious circle. All these are come about due to the abnormality of *agni*; thus, the lifespan, health, strength, nourishment, etc. all are dependent on *agni*.
5. There is a separate chapter on *srotas* in the *Charakasamhita*, which signifies the importance of *srotas*.
6. There is as much diversity in the *srotase*s as there is in the elements that compose the structure of the body.
7. The factors that cause *prakopa* (excitation) or *samana* (alleviation) of *dosha*s are being transported by *srotase*s.
8. The channels of circulation carry the *dhatu*s (tissue-elements or their constituents) that are subjected to transformations.
9. As per the opinion of the *salyatantra* specialists, pains of special kinds, which may manifest on account of either the piercing of or injury to *srotas* that present in certain special parts of the body, are important to gain knowledge of the prognosis of such conditions.
11. *Kayachikitsa* recognizes *srotas* that are spread throughout the body which include extremely tiny ones. Any pathological involvement of them may manifest subtle kinds of symptoms that may not be recognized or be of help in the assessment of prognosis in such involvements.
12. These are channels of microscopic dimensions, which transport the body nutrients and through which the oozing of fluids takes place.
13. Rasa spreads throughout the body through very fine pores of *srotas*, which are distributed extensively in the body very much like the minute channels present in the lotus stem.
14. *Srotas* are two fold in nature i.e. serve as conduits through which both *prasada* (nutrient) *dhatu*s as well as *maladhatu*s (waste- products or products of degradation)

are transported, and also serve as structures through the pores of which *prasadadhatu* and *mala* pass to and fro from the *sthayidhatu*s.

15. The *hridaya*, *dhamani*s, *srotase*s and *sira*s (including *rasavaha srotase*s) constitute a single circulatory unit, which regulate the proper flow of blood and supply nutrition and clear of the waste products from *sthayidhatu*s.
16. *Srotase*s include structures that secrete and excrete like kidney tubules.
17. The nutrient substances nourish the *dhatu*s under *paka* by the *ushma* of *dhatu*s. They are then made available to the *dhatus* through their own *srotases.*
18. *Srotases* do not transport *sthiradhatu*s but only the *dhatu*s, which are undergoing metabolic transformations. The *dhatu*s, which are formed consecutively, from the *poshakadhatu*s, are the *sthayidhatu*s. The nutrient material of a particular *dhatu* does not nourish it through a *srotas* other than its own, because of the location of the *poshyadhatu*s, in different parts of the body.
19. Starling concept, which assumes the ultra filtration of blood constituents is modified to include the concept of a porous capillary wall, with pore numbers, dimensions and shapes varying in capillaries of diverse tissues and operation of a rapid diffusion process across the capillaries.
20. The theory of semi permeability may be well correlated with *srotase*s because of the property of being permeable to some substances and impermeable to others.
21. If ion-concentration is greater on one side than the other, more ion on the average would migrate into the less diluted side, thus equalize concentrations.
22. There are 4 types of characteristic abnormalities that arise in the *srotas* viz. *atipravritti* (an excess flow) or *sanga* (obstruction) or *siragranthi* (haemorroidal veins) or *vimargagamana* (the flow of the fluid in the affected area, through channels other than its own).
23. All pathological lesions, either acute or chronic, have their origin in the *srotase*s.
24. *Agnidushti* or *agnimandya* of the cells that compose the *srotase*s lead to *srotovaigunya* or functional disturbance of the *srotas,* which may be followed by the structural change in them, this may in turn lead to *srotorodha* which in turn brings about an interaction between *dosha*s and *dushya*s at the site of the defect or arrest.

Aetiological factors of vitiation of *srotas*

1. Food and activities aggravate the *dosha*s and go contrary to the well being of *dhatu*s vitiating the channels.
2. Day sleep and fatty foods have feature identical to those of the fat; the former one vitiate the latter. Thus the term *dhatubhirviguna* does not mean that food and regimens should attribute opposite to those of the *dhatu*s, they only unwholesome for these *dhatu*s.

Classification

*Srotase*s are classified mainly into two groups viz. *bahya* - 9 types and *abhyantara* - 13 types.

Bahyasrotases

The *srotase*s, which have opening outside and are seen (externally) with the naked eye, are

$P < 0.001$

called *bahyasrotase*s. Various *acharya*s classify these in different ways; according to Susruta, it is 9 in male and 12 in female and to Sarngadhara it is 10 in male and 13 in female.

The *bahirmukhasrotase*s, which communicate with external air are 9 in number i.e. ear - 2, eyes - 2, mouth - 1, nostrils - 2, anus - 1 and urethra -1; in females, it is 13 i.e. openings in the breast - 2 and vaginal orifice - 1.

***Abhyantarasrotase*s**

According to *Charakasamhita, yogavahi* or *abhyantara* (internal orifices) are 13 in number with their opening inside. They are - *pranavaha, annavaha, udakavaha, rasavaha, raktavaha, mamsavaha, medovaha, asthivaha, majjavaha, sukravaha, purishavaha, mutravaha* and *svedavaha*. Susruta do not consider *asthivaha, majjavaha* and *svedavaha srotase*s but include *artavavaha srotas*.

Conclusion

The role of *srotase*s in the manifestation of diseases is well discussed in all most all ayurvedic texts; so also its importance in the maintenance of normal physiological functions i.e. the basis for good health.

A complete knowledge of *srotas* is a must for an ayurvedic physician to approach a patient in a holistic way. Manifestation of a disease occurs in the body as a result of the defective *srotase*s of the body. So any defect of *srotas* must be corrected quickly, for the restoration of normal health. Here a collective approach of the views of various *acharya*s regarding *srotase*s is specified.

Table 1
Srotas – Modern correlation

1.	*Pranavaha srotas*	Cardio- Respiratory System
2.	*Udakavaha srotas*	Portal vain and thoracic duct
3.	*Annavaha srotas*	G.I.Tract
4.	*Rasavaha srotas*	Lymphatics
5.	*Raktavaha srotas*	Circulatory system including liver and spleen
6.	*Mamsavaha srotas*	Capillaries supplying the muscles
7.	*Medovaha srotas*	Capillaries in the peripheral tissue and omentum
8.	*Asthivaha srotas*	Capillaries going to bone marrow
9.	*Majjavaha srotas*	Bone marrow pores
10.	*Sukravaha srotas*	Reproductive system including seminiferous tubules and ducts deferens
11.	*Mutravaha srotas*	Urinary system
12.	*Purishavaha srotas*	Caecum and colon
13.	*Swedavaha srotas*	Ducts of sebaceous glands
14.	*Arthavavaha srotas*	Female reproductive system including uterine vessels
15.	*Stanyavaha srotas*	Tubuli lactifer
16.	*Manovaha srotas*	Nervous system along with its nerve supply
17.	*Vatavaha srotas*	Nervous pathways

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NEEM OIL -A PREVENTIVE AGAINST LEPTOSPIRAL INFECTION IN MAN

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Abstract: Leptospirosis is one of the most widespread zoonosis in the world. It is a recurring epidemic in tropics, especially among those who work in waterlogged areas. Neem oil is traditionally known for its antibacterial and antidermatophytic effects. This was evaluated as a preventive against leptospiral infection through skin. Neem oil was found as an effective, antibacterial film on skin that prevents the portal entry of bacteria. Oil-water solution produced acidic pH (6) and it is leptospiricidal. The acidic effect was found up to a radius of 20 cm and persisted throughout while the person was in water.

Introduction

Leptospirosis is an infection caused by *Leptospira interrogans* bacteria and is thought to be the most widespread zoonosis in the world[1]. *Leptospira* live and multiply in the kidneys of an animal host, which include a variety of domestic and wild animals. Complex biological and ecological factors are governing the epidemiology, especially in tropics[2]. In India leptospirosis has become a major public health problem, following the outbreak of the disease in different parts of the country, mostly spread by rats[3,4].

Leptospirosis is considered as a major water-borne bacterial disease owing to its peculiar epidemiology[5]. Contaminated natural water bodies including ponds, rivers, canals, swamps and sewages act as source of infection. Human-water contact is inevitable in many parts of the tropics where agriculture is still the major occupation. A number of outbreaks due to single-day exposure to contaminated water sources have been reported[6].

Neem (*Azadirachta indica* A. Juss.) oil is traditionally known to possess a wide spectrum of medicinal properties[7] and its anti-fertility[8], anti-dermatophytic[9] (anti-fungal), and anti-bacterial[10] effects are well established. The present work has been undertaken in order to find out the possibility of using neem oil as a preventive that hinder the portal entry of *Leptospira*, while working in natural waters.

Materials and methods

A total number of 60 regular workers of

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waterlogged areas (canals, paddy field and sand mining on riverside) were provided with neem oil (available in local market; quality assessed using standard procedures (Table 1) and ensured that oiling was done every day, just before starting the work. The entire body surface was covered with a single layer of oil, including areas of cuts and bruises, if they had any. All other regular workers of the same area were considered as Control group and ensured that they were not taking any such preventive measures. The treatment was continued for a period of one month (May-June season).

Water samples were collected from the study area and checked for *Leptospira* through Dark Field Microscopy. Rodents were trapped from the area in random and serologically screened for *Leptospira* using Macroscopic Slide Agglutination Test (MSAT)[11]; pH of the water samples also was noted. The pH of the surrounding waters, when the person oiled with neem oil immersed in water. was analyzed in relation to time (0-5hrs.) and space (0-20 cm radius and 0-1.5 m depth) using narrow range standard pH paper. Oil-water mixtures were prepared in the laboratory in different concentrations and the pH variations were analysed using pH meter (Systronics 361).

TABLE 1

Quality of neem oil used for the treatment

Parameter	Value
Density	938.12 kg/m^3
Coefficient of viscosity	111.85 Nsm^{-2} x 10^{-3}
Surface tension (at 28°C)	33.60 Nm^{-1} x 10^{-3}
Saponification value	210.00 mg
Iodine value	63.68 g
Optical density (at 490 urn)	0.66

Results and discussion

No leptospirosis case was reported from the treated group. But two cases were reported from the same area at Kottayam Medical College Hospital during the period, which are serologically confirmed; one of them died. Dark Field Microscopy showed the samples contained Leptospires at moderate level (++) indicating the presence of the pathogen in the natural water bodies.

Three species of rats were captured from the area: *Rattus rattus* [Linn.] (House rat), *Bandicota indica* [Bechsten] (larger bandicoot rat) and *Millardia meltada* [Gray] (water rat). A total number of 34 rats were tested and 35% of them found to be serologically positive (Table 2). Rats are the predominant shedders that spread *Leptospira* into the environment[12].

Neem oil may form an impermeable layer on the skin that prevents the portal entry of the bacteria. The high viscosity, density and surface tension of the oil help to keep the film on skin intact for a much longer duration. The antibacterial property of the neem oil is well established and is effective against *Leptospira* too[13]. Antibacterial constituents like nimbidines[7] and mahmoodin[10] were isolated from the oil.

The average pH of the water in the area was found slightly acidic (Mean pH : 6.8 + 0.03), but within the optimum range (pH 6.8 to 7.2)[14] for the survival of the *Leptospira*. The neem oil while it mixes with water even in lower concentrations become acidic and it may work as leptospiricidal. *Leptospira* is very sensitive to pH changes and acidic to pH below 6.0 is leptospiricidal[15].

The pH of surrounding waters was found to be strongly acidic within a radius of 20 cm

TABLE 2

Rodents tested for leptospires by MSAT

Species	No. tested (percent)		
	Positive	Negative	Total
Rattus rattus	3 (25%)	9 (75%)	12
Bandicota indica	5 (38.46%)	8 (61.54%)	13
Millardia meltada	4 (44.44%)	5 (55.55%)	9
Total	12 (35.29%)	22 (64.71%)	34

from the oiled skin while in water; pH was found to be strongly acidic all through the depth of 1.5 m close to the skin, but with the increase of the depth, the radius of the acidic effect decreased (Table-3). This pH range remained almost static throughout the period (5 hrs.) till the person was removed from the water.

Conclusion

Leptospirosis is severe in waterlogged areas of tropics and it is difficult to prevent human-water-shedder contact. Neem oil is traditionally known for its antibacterial and antidermato-phytic action. The present findings suggest that neem oil can be used as a good preventive against leptospirosis especially among those who work in waterlogged areas. It being cheap, easily available and acceptable to local community, we recommend it for a wider use.

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TABLE 3

pH of surrounding waters of oiled skin in relation to depth and radius

Depth (cm)	Radius (cm) Mean + S.D				
	0	5	10	15	20
0	4.80 + 0.02	4.88 + 0.01	5.12 + 0.01	5.28 + 0.02	5.76 + 0.01
10	4.84 + 0.01	5.40 + 0.01	5.52 + 0.01	5.84 + 0.03	6.04 + 0.03
20	4.84 + 0.01	5.28 + 0.01	5.56 + 0.01	5.92 + 0.01	6.16 + 0.01
50	4.72 + 0.01	5.44 + 0.02	5.68 + 0.01	5.96 + 0.09	6.28 + 0.01
100	4.84 + 0.01	5.52 + 0.01	5.76 + 0.01	6.16 + 0.02	6.36 + 0.01
150	4.80 + 0.02	5.64 + 0.01	5.92 + 0.01	6.32 + 0.01	6.68 + 0.01

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EFFECT OF *ASPERAGUS RACEMOSUS* ON GROWTH AND DEVELOPMENT OF TESTES IN WISTAR RATS

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Abstract: *Satavari* (*Asperagus racemosus*) has been claimed to possess many properties related to reproductive system. However, there are very little reports on experimental or clinical evaluation of this drug, especially involving male reproductive functions, are brought out. This paper discusses the effect of *satavari* for the growth and development of testes in male Wistar rats.

Introduction

In our country, people were aware of the medicinal value of plants from the very ancient period. *Rgveda*, *Atharvaveda*, *Charakasamhita* and *Susrutasamhita* refer to various healing plants and their therapeutic applications. (Annon, 1986; Handa, 1991). Ayurveda, the oldest system of traditional medicine recommends herbal remedies to cure a variety of diseases.

Asperagus racemosus, popularly known as *satavari* has been claimed to have tonic, diuretic, aphrodisiac, antiseptic, galactogogue, anti-inflammatory and antispasmodic values (Kirtikar and Basu, 1935; Nadkami, 1954; Chopra *et al.*, 1956; Sawant, 1974; Deshpande *et al.*, 1989). Most of the studies on *satavari* in recent years are directed towards evaluation of its immuno-stimulant actions (Dahanukar *et al.*, 1986; Thatte and Dahanukar, 1988; Dhuley, 1997) or as a galactogogue (Sharma et *al.*, 1996). However, there are no reports on experimental or clinical evaluation of this drug. Further, no systematic studies on this plant are reported with reference to its effects on male reproductive functions. Hence the present investigations were planned to evaluate the effect of daily feeding of root powder on testes of Wistar rats.

Material and methods

The roots of *satavari* were collected and ground into a fine powder; the root powder then mixed in the rat-feed in the concentration of 0.5 gm per kg.

Thirty male weanling Wistar rats were randomly divided into three groups, each group containing 10 rats. Group I rats were fed with the normal diet and served as control group. The Group II and III served as treatment groups and fed with the diet containing 500 ppm of

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satavari and a proprietary ayurvedic drug respectively. The treatment continued for 21 consecutive days. After completion of the trial, all the rats were sacrificed (on 22nd day). The testes were dissected and the gross weights recorded and also subjected to histostructural studies (Singh and Sulochana, 1997; Smith and Bruton, 1977; Sinha, 1978). The data of testes weight and micrometry was analysed by using Student 't' test (Snedecor and Cochran, 1968).

Results and discussion

No change in the behaviour of control as well as treated rats was observed during the experiment. The rats in both the treatment groups did not exhibit any treatment related visible adverse reaction.

Morphological studies

Table 1 shows the mean weights of testes of the rats in the three groups. The weight of testes from control group rats was observed to be 1.54 + 0.15 g. The weight of testes among the *satavari* and the proprietary drug treated rats were observed to be 1.95 + 0.073 and 1.98 + 0.051g respectively. Significantly higher testes weights were observed in the *satavari* and the proprietary drug treated rats as compared to the weight of testes from control group rats.

Table 1
Effect of *satavari* and proprietary ayurvedic drug on weight of testes in rats

Group	Treatment	Weight of testes (G)
I	Control (Normal feed)	1.54 + 0.15
II	*Satavari* (500 ppm dose)	1.95 + 0.073*
III	Proprietary ayurvedic drug (500 ppm dose)	1.98 + 0.051*

* Significantly higher than control group (p > 0.05)

Histological and histo-chemical changes

The basic structure of the testes of the rats fed with *stavari* and the proprietary drug was

Table 2
Effect of *satavari* and proprietary ayurvedic drug on micrometry of testes in rats

Group	Treatment	Thickness of capsule (U)	Diameter of seminiferous tubules (U)	Thickness of interstitial space (U)	Height of sertoli cells (U)
I	Control (Normal feed)	30.57 + 1.48	249.57 + 3.08	30.34 + 3.08	58.0 + 2.09
II	*Satavari* (500 ppm dose)	30.57 + 1.48 [a]	267.30 + 4.27 [a]	66.36 + 2.09 [b]	65.15 + 1.48 [a]
III	Proprietary ayurvedic drug (500 ppm dose)	30.57 + 1.48 [b,c]	316.17 + 2.40 [a,b]	64.19 + 1.32 [b]	69.2 + 1.59 [b]

a Significantly higher than control group (p>0.01)
b Significantly higher than control group (p>0.001)
c Significantly higher than *satavari* treated group (p>0.001)

similar to control group rats. The seminiferous tubules were arranged loosely with wide interstitial space between the tubules. The spermatogonia, spermatocytes and spermatids were densely packed. The apical border of sertoli cells had bleb like appearance. The lumen of seminiferous tubules was filled with seminal fluid and the apical border of sertoli cells was moderate to intense positive for glycogen.

Table 2 gives the micrometry of different anatomical structures of testes. The mean thickness of capsule in the three groups was 30.57+ 1.48, 40.87 + 2.98 and 55.53 + 2.67 microns respectively. The diameter of seminiferous tubules in three groups ranged from 249.40 + 3.08 to 316.17 + 2.40 microns. The thickness of interstitial space between the seminiferous tubules ranged from 30.34 + 1.09 to 66.36 + 2.09 microns. The height of sertoli cells in the three groups were 58.00 + 2.09, 65.15 + 1.48 and 69.20 + 1.59 microns respectively.

The micrometric measurements of all the testicular tissues of rats fed on diets containing *satavari* (Group II) or the proprietary drug (Group III) were significantly higher than those of rats in control group. The thickness of capsule and the diameter of seminiferous tubules were significantly greater in Group III than in Group II.

Table 3 shows the mean diameter of different stages of germ cells; among the control group rats, the mean diameter of spermatogonia, primary spermatocyte, secondary spermatocyte and spermatid were 3.81 + 0.20, 6.45 + 0.26, 2.83 + 0.14 and 2.39 + 0.11 microns respectively. These values in Group II and Group III varied from 5.95 + 0.30 to 7.45 + 0.24, 8.5 + 0.28 to 9.45 + 0.25, 4.00 + 0.16 to 4.25 + 0.15 and 2.43 + 0.13 to 3.37 + 0.09 microns respectively.

The diameter of all the germ cells except spermatids was significantly greater among the rats fed on *satavari* as compared to values in

Table 3
Effect of *satavari* and proprietary ayurvedic drug on micrometry of germ cells in rats

Group	Treatment	DIAMETER (MICRONS)			
		Spermatogonia	Primary spermatocyte	Secondary spermatocyte	Spermatid
I	Control (Normal feed)	3.81 + 0.20	6.45 + 0.26	2.83 + 0.14	2.39 + 0.11
II	*Satavari* (500 ppm dose)	5.95 + 0.30 [a]	8.50 + 0.28 [a]	4.00 + 0.16 [a]	2.43 + 0.13
III	Proprietary ayurvedic drug (500 ppm dose)	7.45 + 0.24 [a,b]	9.45 + 0.25 [a]	4.25 + 0.15 [a]	3.37 + 0.09 [a,b]

a Significantly higher than control group (p>0.001)
a, b Significantly higher than *satavari* treated group (p>0.001)

control group. The diameter of spermatids in Group II rats was statistically similar to the diameter of spermatids in control group rats. The rats fed on diet containing proprietary drug showed higher diameter for all stages of germ cells as compared to those of rats in control group and the diameter of spermatogonia and spermatocytes as compared to *satavari* group.

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ANTI ARTHRITIC ACTIVITY OF *CHERIYA RASNADI KASHAYAM*

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Abstract: Anti-arthritic activity of *Cheriya rasnadi kashayam*, an ayurvedic formulation, was studied in male albino rats. The *kashayam* showed significant anti-arthritic activity against Freund's adjuvant induced arthritis model. The effect of the test drug compared with that of the standard drug Indomethacin and is found to be effective ($P < 0.001$).

Introduction

It is believed that arthritis is associated with an overall hyper immune condition[1]. As a result of the exposure of a foreign or auto immunity to self-antigen, classified cellular and humoral immune reactions are developed. The test drug *Cheriya rasnadi kashayam* (CRK) interferes with the immune network involving T, Band mononuclear phagocytic cells, with the help of complement cascade, resulting in a reduced or no deposition of immune complexes on the surface of articular cartilage in the joints[2].

This ayurvedic formulation contains the aqueous extract of fourteen medicinal plants (Table 1). Some of which are known to possess anti-arthritic activity and have been used in indigenous system of medcine[3-4]. The current study has been focused on the pharmacological activity of CRK.

Materials and methods

Cheriya Rasnadi kashayam was procured as a gift sample from Ashtanga Ayurveda Sala, Trichy.

Anti-arthritic activity[5]

Male albino rats (Wistar strain) of 150-200g were used for the experiment. Anti-arthritic activity of the formulation was evaluated by using Freund's adjuvant induced arthritis method.

The rats were divided into 3 groups of 6 animals each under standard laboratory conditions. All the drugs were administered orally i.e. group 1 - 0.5 ml of normal saline, group 2 - Indomethacin (5mg/kg) and group 3 - 0.5 ml of test drug (0.5ml/kg). The anti-arthritic activity was measured as the percentage inhibition of paw thickness. The results were analysed statistically by students "t" test.

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TABLE 1

Cheiya Rasnadi kashayam – Composition

Botanical Name	Parts used	Quantity
Pluchea lanceolata	Tuber	2.160 g
Ricinus communis	Root	0.720 g
Sida cordifolia	Root	0.720 g
Barleria prionitis	Stem & Root	0.720 g
Asparagus racemosus	Tuber	0.720 g
Fagonia cretica	Root	0.720 g
Adhatoda vasica	Root	0.720 g
Tinospora cordifolia	Root	0.720 g
Pinus deodara	Stem	0.720 g
Aconitum hetrophyllum	Tuber	0.720 g
Cyperus rotundus	Tuber	0.720 g
Astercantha longifolia	Stem & Root	0.720 g
Hedychium spicatum	Tuber	0.720 g
Zingiber officinale	Rhizome	0.720 g

Results

It was observed that the CRK possess prominent anti-arthritic activity. The percentage paw thickness in group 3 (CRK group) was almost equal to that of the group 2 (Indomethacin group) (Table 2).

TABLE 2

Anti-arthritic activity of CRK against Freunds' adjuvant induced arthritis

Design of Treatment	Dose	Percentage increase in paw thickness (mean + S.E. n = 6) Post insult time of assay in days									
		1	2	3	5	7	9	11	13	15	17	19
Saline	0.5 ml	102.5 + 3.9	190.3 + 11.9	210.7 + 13.3	195.8 + 10.9	180.4 + 8.9	200.3 + 15.6	205.7 + 11.9	210.5 + 16.2	260.2 + 17.8	266.3 + 20.3	268.7 + 19.8
Indomethacin	5 mg/kg	70.8 + 4.3	93.3 + 3.7	85.9 + 5.6	73.1 + 5.1	78.3 + 5.1	88.2 + 2.8	93.8 + 6.1	99.5 + 5.6	103.9 + 7.3	107.1 + 8.6	113.5 + 5.3
Test drug	0.5 ml/kg	88.9 + 2.1	120.1 + 7.2	132.5 + 7.8	110.2 + 8.8	113.4 + 7.7	123.7 + 6.3	131.5 + 5.7	133.8 + 8.7	148.4 + 11.8	150.6 + 11.7	146.3 + 10.9

p <0.001

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RATIONALITY OF USING DIFFERENT OILS AND FATS FOR HUMAN BODY

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Abstract: The significance of the use of oils is very far above the ground in ayurveda. Most of the ayurvedic preparations are based on oils, and oil itself is considered as a medicine in ayurveda. In this paper the authors attempt to standardise oils obtained from different sources with the support of contemporary knowledge.

Ayurvedic texts refer to the origin of oils as *sthavara* and *jangama*. While Charaka describes the oils under *aharopayogivarga*, Susruta deals them separately under *tailavarga.* Of all oils, *tilataila* (sesame oil) is the most commendable one. It is *madhura* (sweet) with *kashaya* (astringent) in taste, *teekshna* (that which penetrates the subtle channels of the body), *ushna* (hot) in potency and *vyavayi* (that which absorb easily). It aggravates *pitta*, binds bowel and reduces the quantity of urine but does not aggravate *kapha.* It is the best among all the alleviators of *vata.* It promotes strength, skin lustre, intelligence and digestive power. In combination with various drugs, it cures all the diseases.

People were aware of the potentiality of oils from the very ancient period; they applied it for physical fitness and graceful aging. Susruta recommends sesame oil to be used in cuts, wounds and ulcers; also, it is prescribed in burns and scalds, bites of wild beasts and birds, etc. All most all ayurvedic texts emphasize the significance of application of oils in taking bath. It is a commonly used lubricator and unguents. Its vital role in the treatments like *nasya* and *vasti* is well described.

Ayurveda elaborates *eranda taila* (castor oil) as *madhura* (sweet), *guru* (heavy), aggravator of *kapha* and alleviator of *vata*. It is recommended in the cases of *raktagulma* (a type of tumour in females), heart disease, indigestion and fever. Susruta gives a detailed description that it is hot in potency, irritating and appetizing; it leaves a pungent, astringent after taste and is subtle. It acts as a cleansing agent in respect of the internal channels of the body and is wholesome to the skin; it is spermatopoitic, rejuvenating and sweet in *vipaka* (taste after digestion). It purifies semen, vagina and removes vaginal and uterine disorders and preserves sound health. It

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improves the memory, complexion and intellect, subdues the *vata* and *kapha* and cleanses the system from all injurious principles by inducing purging.

Mustard oil is pungent in taste and hot in potency. It aggravates *rakta* as well as *pitta* and reduces *kapha*, semen and well as *vata*. It cures itching and urticaria. Susruta adds further that it is vermifuge and *lekhana* (liquefacient).

Oil obtained from *kusumbha* flowers is pungent as end product of digestion (*vipaka*) and leads to the derangement of all bodily humours. It is *vidahi* i.e. irritating and acidic in nature. It is devoid of any eye cleansing property and brings on haemoptysis. Charaka says that it produces sensation and aggravates all *dosha*s.

Coconut and *priyal* oils are sweet in taste and taste after digestion, subdues *vata* and is cold in potency, obstructs the channels of the body, facilitates the passing of urine and stool and pacify the *agni* (digestive power).

Fats are solid at 20°C, they are called 'oils' if they are liquid at that temperature. Fats and oils are concentrated sources of energy. They are classified as 1. simple lipids (e.g. triglycerides), 2. compound lipids (e.g. phospholipids) and 3. derived lipids (e.g. cholesterol).

Human body can synthesize triglycerides and cholesterol endogenously. Most of the body fat is in the form of triglycerides in adipose tissue. Fat yields fatty acid and glycerol on hydrolysis. Fatty acids are divided into two i.e. saturated fatty acid - viz. lauric, palmitic and stearic acids - and unsaturated fatty acids which are further divided into two - mono-unsaturated (e.g. oleic acid) and polyunsaturated (e.g. linoleic acid).

Polyunsaturated fatty acids are mostly found in vegetable oils and the saturated fatty acids mainly in animal fats. However, there are exceptions like coconut and palm oil, although vegetable oils have an extremely high percentage of saturated fatty acids. On the other hand, fish oils although they are not vegetable oil, contain poly and mono-unsaturated fatty acids.

Essential fatty acids are those that cannot be synthesized in human body, they can only be derived from food. The most important essential fatty acid (EFA) is linoleic acid, which serves as a basis for production of other EFA like linolenic and arachidonic acid.

Dietary sources of fats may be classified as animal fats, vegetable fats and others.

Animal fats:

Major sources of animal fats are ghee, butter, milk, cheese, egg and fat of meat and fish. Animal fats like cod liver oil, sardine oil are

TABLE 1

Fatty acid content of different fats

Fats	Fatty Acids		
	S	M	P
Coconut oil	92	6	2
Butter	60	37	3
Palm oil	46	44	10
Coconut seed oil	25	25	50
Morgarine	25	25	50
Groundnut oil	19	50	31
Soyabean oil	14	24	62
Safflower oil	10	15	75
Corn oil	8	27	65
Sunflower seed oil	8	27	65

S saturated; M monounsaturated; P polyunsaturated

TABLE 2
Dietary sources of EFA

EFA	Dietary source	% content
Linoleic acid	Safflower Oil	73
	Corn Oil	57
	Sunflower Oil	56
	Soyabean Oil	51
	Sesame Oil	40
	Groundnut Oil	39
	Mustard Oil	15
	Palm Oil	9
	Coconut Oil	2
Arachidonic acid	Meat, egg,	0.5 – 0.3
	Milk, fat	0.4 – 0.6
Linolinic acid	Soyabean oil	7
Eichosapentaenic acid	Fish oil	10

most saturated fats.

Vegetable fats:

Some plants store fat in their seeds; e,g, groundnut, mustard, sesame, coconut, etc. They are the 'sources of vegetable fats.

Other sources:

Small quantity of fat (invisible fats) are found in other food items like cereal, pulses, nuts and vegetables; for example rice carries 3%, wheat 3 %, jowar 4% and bajra 6.5 %.

Conclusion

Among the different oils and fats described in ayurvedic classics, *tilataila* (sesame oil) has been given much importance since it contains mostly unsaturated lipid. In view of eligibility to take as the edible oil, it would be better to use sunflower oil, soybean oil and ground nut oil as they possess less traction of saturated fatty acids in comparison to that of coconut and palm oil. While *tilataila* has been recommended as a medium for the oils which can be taken internally or to be used in different types of enemas; mustard oil known as *sarshapataila* has been advised as a medium for oils to be used mostly for external applications in skin diseases.

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IRRITABLE BOWEL SYNDROME - AN AYURVEDIC VIEW

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Abstract: In present time, changes in food habit and stressful life result in more and more cases of Irritable Bowel Syndrome (IBS). In this article, the author attempts to co-relate IBS with *grahani*, a disease described in ayurvedic classics having more or less similar features to IBS. A possible medicine prescription for the same is also given.

Introduction

Irritable Bowel Syndrome (IBS) is a functional bowel disorder in which defecation is associated with abdominal pain and a change in bowel habit with features of intermittent loose motion and constipation, foul smelling and at times mucoid stool and distension. IBS may be correlated with *grahani* described by ancient *rishi*s in ayurvedic classics.

Epidemiology

Approximately 20% of general population fulfills the diagnostic criteria for IBS. The disease is mostly seen among people adopting improper dietary regimen and undergoing psychological stress. Some women may develop the disease after delivery. Clinically we have observed more cases of women suffering from IBS as compared to men.

Etiology

A single cause for IBS is unlikely. It is generally believed that most patients develop symptoms in response to psychological factors, altered gastro-intestinal motility and altered visceral sensation. Ayurvedic classics emphasize on improper dietary regimen, seasonal changes and suppressed natural urges as the cause of the disease. About 50% of patients show psychological disturbances like anxiety, depression and neurosis. Acute psychological stress and overt psychiatric disease are known to aggravate IBS. Some patients develop IBS following an episode of gastroenteritis while others may be intolerant to specific dietary components like dairy products and wheat.

Pathogenesis

The etiological factors cause the vitiation of *tridosha*, which in association with weakened *pachakapitta* or *jatharagni* (diminished digestive capacity) may vitiate single-handedly or combinedly the 6th *pittadharakala* or *grahani* or *pachyamanasya* (the initial part of duodenum). This vitiation in turn, causes the change in bowel habit and other symptoms of the disease. The disease is named by ancient classics according to the organs involved.

Premonitory sign

Excessive thirst, dyspepsia, improper digestion, feeling of heaviness, cough, tinnitus, weakness

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and fatigue are premonitory signs of *grahani*. This needs keen observation by the *vaidya* or the patient.

Clinical features

The important presentation is intermittent constipation and loose motion along with colicky or cramping abdominal pain. The pain is relived by defecation. Passage of mucous along with stool is common. The patient complains of audible intestinal sounds. Some may develop additional symptoms like dyspepsia, urinary frequency, eructation, headache, backache, fatigue and foul smell from mouth.

Varieties based on *dosha* predominance

Vataja grahani:- In this, patient complains of pricking sensation over chest, abdomen, flanks, anal region and pubic area. Moreover, lost skin lustre, dryness of throat and mouth, excessive thirst and hunger, frequent defecation of mucoid stool and mental depression are the cardinal signs of *vataja grahani.*

Pittaja grahani : - Eructation, dyspepsia, excess thirst, burning sensation in chest, slightly yellowish coloration of eyes and nail beds and defecation of yellowish colored stool are the symptoms of *pittaja grahani*.

Kaphaja grahani: - Feeling of fullness in stomach, defecation of foul smelling and slightly whitish mucoid stool, sweetish taste in mouth, anorexia, nausea, cough and rhinitis, weakness, fatigue and callousness towards sex are the general clinical complications of a patient of *kaphaja grahani*.

Sannipataja grahani: -The mixed clinical features of above mentioned three varieties are found in a patient suffering from *sannipataja* or *tridoshaja grahani*.

Complication

In long run the patient may develop pain and swelling over knee and ankle joints, peripheral burning sensations and neuritis and hyper acidity. Clinically we have found most of the young patients complaining of spermaturia and erectile dysfunction simultaneously suffer from *grahani*. Some leucorrhoea patients, on leading questions, describe the history of *grahani* for a long period. If all other concerned abnormalities are excluded, a case of infertility in women may be due to chronic or *jirna grahani*.

Line of treatment

First, improper dietary habits like taking oily and spicy foods, non-vegetarian foods, heavy diet, etc., should be avoided. Another important step is reassurance to the patient. As per the line of treatment, the physician has to purify the body of the patient of *vataja grahani* by *niruhavasti*; *pittaja grahani* by *mridu virechana* and *kaphaja grahani* by *vamana*. After that, *deepana - pachana* (digestive and carminative) drugs and diet are to be administered. Use of drugs that make constipation or attempt to stop loose motion suddenly should be avoided.

Medicines

While prescribing the medications, the bodily temperament and humoral status of the patient has to be taken into account. Following medicines may be of great help.

- *Brihat lavangadi vati / Chitrakadi vati* - 500mg : 1 tab twice daily with 15 ml *Kalasakadi kvatham*
- *Nagaradi churnam / Dadimashtaka churnam / Yavanyadi churnam* : 5g twice daily with lukewarm water
- *Lavangadi modaka / Soubhagya sunthi khanda modaka* - 5g or *Mustarishtam* - 15 ml twice daily after meal.

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EXCERPTS FROM CHIKITSAMANJARI – XLVI

Unnikrishnan, P.[1]

Abstract: *Kushtha* continues from the previous issue. In this issue, various skin diseases like *vipadika*, *kuzhinakham*, *arimpara*, *sidma*, etc. and their treatment modalities are discussed in detail. Special preparations like *sreematailam* and treatment modalities for *svitra* (vitiligo-leukoderma) are also dealt with.

The ghee medicated with a *kashaya* prepared from the following and expressed juice of *nisa* (*Curcuma longa*) as liquid components and fine paste of *yashti* (*Glycyrrhiza glabra*) as solid component on external application relieves *pama* and severe itching.

Nalpamara	*Ficus racemosa*
	Ficus microcarpa
	Ficus religiosa
	Ficus benghalensis
Gunja	*Abrus precatorius*

A ghee medicated with the drugs of *Mahatiktaka* (cross ref. *sloka* 27) as *kashaya* and *kalka*, on consumption relieves *kushta*. External application of a mixture consisting four parts of sesame oil - one part of ghee and one part of *neervetti* (chaulmugra oil) - medicated with *anayadi* (*Elephantopus scaber*) or *karuka* (*Cynodon dactylon*) is advised. Alternatively, it can be medicated with *Panchavalkadi* also.

Medicate a mixture of ghee and oil - each *uri* (96 ml) with the following - each one *kazhanju** and latex of *arka* (*Calotropis gigantia*) (instead of latex, the leaf juice of *arka* may also be used) as liquid component. Add three to four *kazhanju* of *madhoochista* (bees wax) to it while hot and mix well. When cold, add six *kazhanju* of *sarjarasa* (*Shorea robusta*) and mix again. Local application of this preparation relieves *vipadika* (a disease characterized by flaking and cracking of skin of the palms and soles, also known as *padasari*).

Jeevanti	*Holostemma ada-koedien*
Manjishta	*Rubia cordifolia*
Darvi	*Coscinium fenestratum*
Kampillakam	*Mallotus philippensis*
Tutham	Copper sulphate

A paste made out of the following on external application relieves *padasari* within three days.

Induppu	Rock salt
Venna	Butter
Kadaliphala	*Musa paradisiaca*
Nalikera	Coconut
Veera	*Coccinia gradis*

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* 1 *kazhanju* = 4g

Pinarpuli	*Garcinia gummi-gutta*
Varattumanjal	*Curcuma longa*

- 1 part each

Tila *Sesamum indicum* - 7 parts

A paste prepared from fine powder of *nalpamara* mixed with *induppu, kadaliphala* and butter on external application relieves *padasari*. Fat of pig can also be added to this preparation for faster action.

The juice of the areca nut shall be pasted on the spathe of areca nut tree and then burnt it into a powder. This may be mixed with *niru* (quicklime). Application of this paste relieves *padasari* and itching.

Sreemattailam:

Kaitappookkural (inflorescence of *Pandanus odoratissimus*), *pichakattila* (leaf of *Jasminum grandiflorum*) and dried outer shell of *puga* (arecanut) powdered shall be rolled in a cotton wick, dipped in oil and lit. The oil that drops from the burning end, termed *Sreemattailam*, is to be collected and applied on *padasari*.

Fry fine powder of the following and mix it well in sesame oil and ghee to make a paste. Application of this paste relives cracking, flaking, edema and pain caused by *padasari*.

Vahnikanda	*Plumbago indica*
Pazhayamulaku	*Piper nigrum*
Manjal	*Curcuma longa*
Ellu	*Sesamum indicum*
Avanakkintandu	*Ricinus communis* (stalk)
Avanakkinkuru	*Ricinus communis* (seed)

Padakushtha is to be excised and burned with *naikkalam* (a earthen pot moistened with ghee). Then, melted pig fat is to be dripped into cow's urine for twenty one times and take back by churning. Application of this relieves *padakushtha*. A variation of *Mahatiktaka ghrita*, where expressed juice of *svaducha-tushka* (ref. *Trishnachikitsa, sloka* 11) added to the liquid component, shall be consumed. All preparations indicated for *padasari* can also be applied.

Warming the lesion with a cotton bundle containing sea salt crystals dipped in hot sesame oil relieves pain caused by *padakushtha*. Mix coconut milk with juice of *likucha* (*Artocarpus lakoocha*), *unmatta* (*Datura metal*) and *nisa*; boil the mixture and reduce to get oil. Application of this oil relieves skin lesions.

Kuzhinakham (agnail)

The barks of *peral* (*Ficus benghalensis*) and *kunatee* (realgar) burn to ash and mix in water; the sediment thus obtained is to be dried and mixed with the juice of *inchi* (*Zingiber officinale*). Application of this paste on the nail for three days alleviates pain and edema caused by agnail; pain arising from removal of nail is also relieved within five days.

A medicated oil fried with the following on application cures painful and suppurative lesions of the nail.

Induppu	Rock salt
Chukku	*Zingiber officinale*
Mulaku	*Piper nigrum*
Ulli	*Allium sativum*
Varattumanjal	*Curcuma longa*
Kayam	*Ferula asafoetida*
Pinarpuli	*Garcinia gummi-gutta*
Tippali	*Piper longum*

A cloth bundle containing the following, mixed in oil, used for dressing the infected wounds is very effective.

Pazhayamulaku	*Piper nigrum*
Pinakattol	*Terminalia chebula*
Pazhantintrineekam	*Tamarindus indica*

Cherukadaliver	*Musa paradisiaca*
Uppu	Salt
Karpooram	Camphor

Application of *Doorvadi taila* clears itching and formation of wounds on the scalp, termed *Kapalarus*. Local application of the following medicated oil clears wounds and itching of the scalp. Expressed juice of the following as liquid component and fine paste of *Eladi* group of drugs or *nalpaamaram*, *sevya* (*Vetiveria zizanioides*) and *nisa*

Paruva	*Streblus asper*
Parutti	*Gossypium herbaceum*
Neeli	*Indigofera tinctorea*
Tulasi	*Ocimum sanctum*
Karuka	*Cynodon dactylon*
Vrisha	*Justicia beddomei*

Prepare a medicated oil with the expressed juice of *amari* (*Indigofera tinctorea*), *karunochi* (*Vitex negundo*), *bhringi* (*Eclipta prostrata*), *matula* (*Datura metal*) *doorva* (*Cynodon dactylon*), *nisahva* (*Curcuma longa*) and *bakula* (*Mimusops elangi*) as liquid component and *ksheeritaru* (*Ficus racemosa, Ficus microcarpa, Ficus religiosa* and *Ficus benghalensis*) and *yashti* as solid component for local application in diseases affecting the skin of the scalp. Expressed juice of *parpataka* (*Hedyotis corymbosa*), *karintumpa* (*Anisomeles malabarica*) and outer covering of tender coconut shell can also be added to the liquid components in the above preparation for enhanced effect.

The following medicated oil clears itching, burning and headache when applied on the scalp. Oil is to be medicated with the expressed juice of *karuka, parpadam, amari, kanjunni* (*Eclipta prostrata*), *eranjiyila* (leaf of *Mimusops elangi*), *ponnanganiyila* (*Alternanthera sessilis*), *ummattila* (leaf of *Datura metal*), *kodinjali* (*Piper betel*) and *tulasi* as liquid component and fine paste of the following as solid component.

Chandanam	*Santalum album*
Irattimadhuram	*Glycyrrhiza glabra*
Kottam	*Saussurea lappa*
Ramacham	*Vetiveria zizanioides*
Nannari	*Hemidesmus indicus*
Nalpamaram	*Ficus racemosa* *Ficus microcarpa* *Ficus religiosa* *Ficus benghalensis*

This oil is equally effective in itching of the body also.

When *kushtha* becomes severe and spreads all over the body, *Manibhadra* pills are to be consumed for purging, depending upon the strength of the patient to sustain the drug and process. *Guggulutiktaka* medicated oil shall be consumed. A variation of *Mahatiktaka ghrita* where *techippoo* (*Ixora coccinia*) is also added as *kashaya* is more effective.

Ghee medicated with the *kashaya* of *aragvadha* (*Cassia fistula*) root one hundred times (the process of medication of ghee should be repeated one hundred times), when consumed along with water medicated with *khadira* (*Acacia catechu*) clears *kushtha*. Fine paste of the following drugs, termed *Panchakam kandam* can also be added to the above medication as solid component for quicker action.

Panchakam kandam:

Manjal	*Curcuma longa*
Vara	*Terminalia chebula* *Emblica officinalis* *Terminalia bellirica*
Varahi	*Curculigo orchioides*
Mukil	*Cyperus rotundus*
Kotuveli	*Plumbago indica*

The following preparations are seen effective in *kushtha*.

- *Panchavalkadi* oil
- *Kachooradi* oil
- *Eladi* oil
- *Dinesavalyadi* oil
- *Nalpamardi* oil
- *Triphaladi* oil
- *Guggulvadi kuzhampu*
- Medicated *Neervetti* oil
- *Patoladi kashaya*
- *Khadiraristadi kashaya*
- *Mukkuti* with *techippoo*
- *Triphaladi* pills, sesame seeds and *Karkokilari* (*Psoralea corylifolia*)

Chunangu:

It is a lighter or darker discoloration of the skin, at times associated with itching aggravated by sweating. The following preparation, on application, cures *chunangu*.

Take *ponkaram* (borax) on the blade of a knife and heat. Make a paste with limejuice and an excess quantity of *chandana* and apply on the lesion. When dry, rub away the application with *chandana* and wash off with sour buttermilk. Mix ash from the stalk of *kumbalam* (*Benincasa hispida*) in cow's urine to a paste and rub on the *chunangu*. The above ash shall be kept in buffalo's dung at night for fifteen days consecutively, ground to a paste in mercury, and applied locally for the cure of *chunangu*.

Sidhma:

Sidhma is a skin lesion characterized by exfoliation. A paste prepared from the following on rubbing clears *sidhma*.

Nagapushpa	*Mesua nagassarium*
Elakabeeja	*Cassia tora*
Kushtha	*Saussurea lappa*
Njaval	*Syzygium cumini*
Cheruvellila	*Mussaenda frondosa* (leaves)
Kasamardam	*Cassia occidentalis*

Dadru:

Make a paste from fine powder of the following in the milky latex of *snuheepatra* (*Euphorbia ligularia*) and apply on the lesion for the cure of *dadru*.

Prapunna-tabeejam	*Cassia tora*
Nisa	*Curcuma longa*
Konnapatram	*Cassia fistula*
Kappalam (*Marotu*)	Pieces of clay tiles
Abhaya	*Terminalia chebula*

Arimpaara (wart):

Fine powder of *chitraka* (*Plumbago indica*), *pathya* (*Terminalia chebula*) and *seesa* (onsulphate) should be made to a paste in the milky latex of *kalli* (*Euphorbia ligularia*) and applied on the wart.

When the abscess or wound in *kushtha* becomes cracked contaminated and suppurated, do all treatments indicated for *dushtavrana* (chronic abscess). *Triphaladi* pill shall be taken. *Guggulupanchapalam* powder shall be consumed. Apply the paste of *attittoli* (bark of *Ficus racemosa*) and *chandanam*. Apply old dry powder of cow dung mixed with butter. Milky latex of *peral* (*Ficus benghalensis*) shall be applied on abscess with pus. Latex of *parakam* (*Streblus asper*) can also be applied. Apply mercury ground to a paste from the expressed leaves of *ummam* (*Datura metal*). Apply sesame oil.

Grind the following in cow's urine to make a paste, mix it with buttermilk and rub well on the body for the relief of extensive skin lesions.

Vyaghata-patram	*Cassia fistula*
Katukam	*Picrorhiza scrophulariiflora*

Nisa	*Curcuma longa*
Agni	*Plumbago indica*
Patu	Rock salt
Tamara	*Nelumbo nucifera*
Malayinchi	*Zingiber zerumbet*
Prapunnatabeejam	*Cassia tora*
Tilam	*Sesamum indicum*

Kilasa or *svitra*:

Kilasa or *svitra* is a disease characterized by hypo pigmentation of the skin. There is no oozing from the lesion. Based on the causative *dosha*, it is divided into three, *vatika, paittika* and *kaphaja*. Prognosis is unsatisfactory in the ascending order. They affect *rakta* (blood), *mamsa* (muscular tissue) and *medas* (fat tissue) respectively. Reddish or scarlet colored dry lesions are seen in *vatika*, pink, copper colored lesions with loss of hairs are found in *paittika* and white, hard and massive lesions with itching demarcate *kaphaja*. The treatment of *svitra* is similar to that of *kushtha*.

Svitra that present the following features will not respond to treatment.

- White hairs on the lesion.
- Extensive lesion
- Lesion admixed with white skin patches of different tones
- Old lesions (duration more than an year)
- New lesions on palms, lips and genitals
- Onset of *svitra* on regions of earlier burns

Purification is the initial measure in the treatment of *svitra*. Purge the patient by giving *Manibhadra* pills, once in every four days. Keep *vakuchi* (*Psoralea corylifolia*) overnight in the *kashaya* prepared from *kali* (*Terminalia bellirica*) grind it in the water and drink for the relief of *svitra*.

Fine powder of *guggulu* (*Commiphora mukul*) mixed in *Tikttaka ghrita* shall be consumed. Consume *Mahatiktaka ghrita*. Ashes of tiger skin mixed with butter can be applied. Ashes of elephant skin or elephant teeth can also be applied locally. Application of plain sesame oil alone, in the long run, relieves *svitra*.

Fine powder of the following mixed with butter is to be applied on *svitra*. *Dhatreerasa* (*Emblica officinalis*) mixed with *chandrarekharaja* (powder of *Psoralea corylifolia*) is also to be consumed.

Gandhaka	Sulphur
Grihadhooma	Soot
Nisa	*Curcuma longa*
Avalguja	*Psoralea corylifolia*
Kosatakibeeja	*Luffa acutangula*

Take an earthen vessel copiously applied with ghee and add cow's urine to it; mix the liquid with fine powder of *chitraka, chukku, kurumulaku* (*Piper nigrum*) and *tippali* (*Piper longum*); keep the admixture for fifteen days and consume the liquid in suitable doses for the cure of curable *svitra*. All treatments indicated for *kushtha* can also be followed.

The following cereals, pulses and vegetables are recommended in *svitra*.

Sali	*Oryza sativa*
Yava	*Hordeum vulgare*
Godhuma	*Triticum aestivum*
Koradoosha	*Paspalum scrobiculatum*
Priyangu	*Callicarpa macrophylla*
Mudga	*Vigna radiata*
Masura	*Lens culinaris*
Tuvari	*Cajanus cajan*
Jangala tikta - saka	bitter green leafy vegetables of jungle habitat
Vara	*Terminalia chebula* *Emblica officinalis* *Terminalia bellirica*
Patola	*Trichosanthes lobata*

Khadira	*Acacia catechu*
Nimba	*Azadirachta indica*
Arushkara	*Semecarpus anacardium*
rechanam	*Operculina turpethum*

Madya prepared with medicines
Mathita like *induraji* (*Sasankakirana*)

The patient shall not consume food that is excessively hot and acrid, salty or sour, curd, milk, jaggery, *anoopa* fish, *anoopa* meat. (*Anoopa* is the term given to a geographic area that is rich in water, mountains and trees. The individuals who live in such places are more prone to diseases and so are animals.) The patient should be subjected to purification therapy as per the schedule given below.

- *Vamana* - every fifteen days
- *Virechana* - every month
- *Nasya* - every third day
- *Raktamoksh* - every six months

Rituals such as fasting, control of senses, sacrifices, worship of *brahmins*, elders, teachers and gods, friendship with individuals having high will power, worship of Jina, Jinasuta (son of Jina) and Bhaskara (sun god) relieves *kushtha* that is the apparent manifestation of evil (*papa*).

Sage Atreya prescribes the following oil termed *Kushthantaka*.

Thirty-two *palam*[1] of *vakuchi* (*Psoralea corylifolia*) should be boiled with one *drona* (12.228 l.) of water and reduced to one fourth and filtered. Five *nishkas*[2] each of *trikanta* (Magnet) and twenty-five *nishka*s of sulphur should be ground to a paste for three hours continuously in the juice of *nagavalli* (betel leaf). The paste should be mixed well in the filtrate and one *drona* of sesame oil added to it. This mixture should be boiled in low flames frequently agitating with ladle. When the solid component of the mixture reaches *chikkana* stage (a stage where the rolled sediment retains its solid form), the oil should be removed from fire, subjected to cool to room temperature and kept in a vessel hidden in a heap of cereals for a period of thirty days. The consumption of this oil with sediment (*kalka*) should start on an auspicious day, star and time. A person who starts this medication will reach the stage of perennial life similar to that of gods. The patient should take rest, avoid all exercises and control his mind. He should consume only cereals with milk. Application of this oil relieves all *kushtha*s including congenital.

1. one *palam* = 48g; 2. one *nishka* = 48g

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दैत्यग्रहोन्माद – एक चिकित्सात्मक अध्ययन

गोपालाणी अजय,* सी.वी. जयदेवन* और ए. रघुनाथ**

Daityagrahonmada, a peculiar psychiatric disorder, described in ayurvedic texts presents almost similar clinical picture of Bipolar affective disorder-1, a disease described in modern medicine. Here the authors present their successful treatment experience on one of the patients affected by this diseases

दैत्यग्रह – भूतोन्माद का एक प्रकार वर्णन किया गया है । जिसके लक्षण कुछ इस प्रकार से बताए गए हैं –

जिह्मदृष्टिं दुरात्मानं गुरुदेवद्विजद्विषम् ।
निर्भयं मानिनं शूरं क्रोधनं व्यवसायिनम् ।।
रुद्रः स्कन्दो विशाखोऽहमिन्द्रोऽहमिति वादिनम् ।
सुरामांसरुचिं विद्यात् दैत्यग्रहगृहीतकम् ।।

अ. हृ. उ. ४/१६,१७

आज भी मानसिकरोग चिकित्सालयों में उपरोक्त लक्षणोंवाले रोगी देखने को मिल जाते हैं । जिन्हें आधुनिक शास्त्र "manic episode" का निदान करता है । ऐसे हि एक रुग्ण की सफल आयुर्वेदिक चिकित्सा हमारे यहाँ की गयी । जो कुछ इस प्रकार थी –

'क' नाकम एक रुग्णा, उम्र ३५ साल हमारे यहाँ – सरकार आयुर्वेद मानसिकरोग अस्पताल में भरती की गयी । उस समय उसके लक्षण निम्नलिखित प्रकार के थे –

- चिडचिडापन (Irritability)
- अत्यधिक भाषण (Increased talkativeness)
- क्रोध (Increased anger)
- अपशब्द उच्चारण (Abusive tongue towards family members)
- अत्यधिक स्नानरत, शौचरत (Excessive bathing/ washing)
- निद्रानाश (Sleeplessness)
- स्व–प्रलाप (Self-muttering)
- अस्थाने हास्य (Inappropriate laughing)
- अस्थाने नृत्य, गीत (Inappropriate singing and dancing)
- स्वादिष्ट भोजनाभिलाषा (Demanding delicious food)

उपरोक्त सभी लक्षण रुग्णा में एक महिने से अत्याधिक अवस्था में थे । एक महिने पहले उसके रिश्तेदारों से उसके संबंध ठीक न होने से लक्षणों में वृद्धी पाई गयी ।

पूर्व वृत्तांत:

रुग्णा का कुल व्याधी काल १२ साल हैं । जिसमें अब तक manic episode के ३ वेग पाए गए हैं । तीनों बार

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रुग्णा को आधुनिक अस्पताल में भरती करवाया गया । चिकित्सा के बाद पूर्ण उपशम भी देखा गया । लेकिन लगभग हर ३ साल बाद व्याधी का वेग देखा गया । इसलिए इसबार ४ था वेग आने पर रिश्तेदार उसे आयुर्वेद चिकित्सा के लिए लाए।

कुलवृतांत:– निम्न वर्ग की रुग्णा के माता पिता दोनों शराब के आदी हैं। कुटुंब में किसी और व्यक्ति को कोई भी मानसिक व्याधी नहीं ।

स्ववृतांत:– रुग्णा का जन्म पूर्णता: प्राकृतिक तरीके से, कोई भी परेशानी रहित हुआ । विकासक्रम प्राकृत था । रुग्णा बचपन से चिडचिडी, झगडालु स्वभाव की थी ।

शिक्षण:– रुग्णा B.A. (मलयालम) कि छात्रा थी। बीमारी की वजह से पढाई बीच में छोडनी पडी ।

व्यवसाय:– एक माह तक निजी अस्पताल में परिचारक का काम ।

रुग्णा परीक्षण

सामान्य परीक्षण:– रुग्णा का सामान्य शारीरिक परीक्षण प्राकृत पाया गया ।

मानसिक परीक्षण:– आधुनिक दृष्टि से mental status examination करने पर निम्नलिखित तथ्य पाये गये।

Mental Status examination (on admission)

1. Appearance and behaviour
   - unkempt, co-operative
   - Rapport - superficial
   - Eye to eye contact possible
2. Psychomotor activities
   - Increased
   - Restless
   - No mannerism / tics
3. Speech
   - Answers questions,
   - Irrelevant talk
   - tone volume increased at times
   - No neologisms
   - Repeating certain sentences : “I am wife of Dushyanta Maharaja”
4. Thought
   - Stream - flight of ideas
   - Contact - delusion of grandiosity : “she herself is Priyanka gandhi”
5. Perception
   - Denies any hallucination
6. Mood
   - Subjective - unable to tell
   - Objective - Anxious, irritable
7. Attention and concentration
   - Impaired
8. Memory
   - Immediate - impaired
   - Recent past - present
9. Insight - Impaired
10. Judgment and intelligence - impaired
11. Abstractibility - impaired

Provisional diagnosis

Bipolar affective disorder (BPAD-I) with most recent episode manic with psychotic features

आयुर्वेदिक निदान

आयुर्वेदिक दृष्टि से रुग्णा का निदान “वातपित्तोन्माद एवं दैत्यग्रहोन्माद” किया गया । रुग्णा में वातोन्माद, पित्तोन्माद एवं दैत्यग्रह के निम्नलिखित लक्षण पाए गए थे :–

वातोन्माद

- सततम् अनियताम् गिरामुत्सर्ग
- स्मितहासित रोदनम् अस्थाने
- नृत्यगीत वादित्रम् अस्थाने
- अलब्धेषु अभ्याहारेषु लोभ लब्धेषु अवमान
- तीव्र मात्सर्य
- शीतातुर
- भ्रमती
- बहुभाषित:

पित्तोन्माद

- क्रोध
- संरंभश्च अस्थाने
- शास्त्रादिभिराभिहननम् स्वेषां परेषां वा ।
- प्रच्छाय शीतोदकान्नाभिलाषा
- विनिद्रम्

दैत्यग्रह

- दुरात्मानं
- निर्भयं
- मानिनं
- शूरं
- क्रोधनं
- व्यवसायिनं
- रुद्रः स्कंदो विशाखोऽहमिन्द्रोऽहमिती वादिनम्
- अन्नपानजातौ असंतुष्टि
- अतृप्तं
- असकृत हसन्तम्

चिकित्सा

रुग्णा को अन्तः रुग्ण विभाग में भरती करके एक माह तक निम्नलिखित चिकित्सा दी गयी ।

१. स्पेशल पावडर (गोक्षुर, अश्वगन्धा, सर्पगन्धि) दो ग्राम सुबह छः बजे व शाम आठ बजे ।

२. मानसमित्र वटकं – एक गोलि शाम पाँच बजे ।

३. महाचंदनादि तैल – तलं के लिए ।

४. अविपत्ति चूर्ण बीस ग्राम – कोष्ठ शोधन के लिए – तीन दिन ।

५. तलपोदिच्चिल – पुराणधात्रीफल से – सात दिन ।

६. स्नेहपान – कल्याणकघृत साठ मि.लि. से चार सो बीस मि.लि. तक – सात दिन ।

७. विरेचन – अविपत्तिचूर्ण से – बीस ग्राम ।

८. वस्ति (योगवस्ति) – धान्वन्तरं मेषुपाकं , एरण्डमूलादि कषायं

चिकित्सोपरांत परीक्षण

चिकित्सोपरांत रुग्णा के सभी लक्षणों में पूर्णतः उपशम देखा गया । निद्रा प्राकृत । स्वप्रलाप अल्प मात्रा में था । चिकित्सोपरांत mental status examination इस प्रकार था ।

1. Appearance and behaviour
   - Patient well dressed
   - Rapport - possible
   - Eye to eye contact - possible
2. Psychomotor activities - Absent
3. Speech
   - Some time - irrelevant
   - Normal tone volume
   - No repitation of words
4. Thought
   - Flight of ideas - present (some times)
   - Delusion of grandiosity - reduced
5. Perception - Denies any hallucination
6. Mood - Pleasant, at time irritable
7. Orientation - Oriented to time/place/person
8. Memory - Preserved - Immediate/Recent/Past
9. Attention - Concentration present
10. Insight - Grade II
11. Judgment and intelligence - improved
12. Abstractibility - present

निशकर्ष

१. आयुर्वेदिक संहिताओं में वर्णित ग्रहोन्माद के लक्षण आज भी प्रत्यक्ष देखे जा सकते हैं ।

२. दैत्यग्रहोन्माद के लक्षण आधुनिक दृष्टि से manic episode से पूर्ण रूप से मिलाए जा सकते हैं ।

३. ग्रहोन्माद के लिए दैवव्यपाश्रय चिकित्सा का व्यवधान होते हुए भी लक्षणों के अनुसार दोषोन्मादोक्त युक्तिव्यपाश्रय चिकित्सा करने पर भी सफलता मिलती देखी जा सकती है ।