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# Āryavaidyan

लाभानां श्रेय आरोग्यम्

*Of all the gifts,*
*the most precious is health*

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# āryavaidyan

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# FROM THE PAGES OF VĀGBHAṬA - LXXXII

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Abstract: After the description of general facts regarding the nidānapañcakam (the five methodologies to diagnose an abnormality), specific causative factors of particular doṣas and their combinations are discussed in the end portion of this chapter (Sarvaroganidānam).

इति प्रोक्तो निदानार्थ: तं व्यासेनोपदेक्ष्यति ।

(Iti prokto nidānārtha:
tam vyāsenopadekṣyati ।)

The matter of nidāna is to be detailed now which has already been introduced.

सर्वेषामेव रोगाणां निदानं कुपिता मला: ।। १२ ।।
तत्प्रकोपस्य तु प्रोक्तं विविधाहितसेवनम् ।
अहितं त्रिविधो योगस्त्रयाणां प्रागुदाहृत: ।। १३ ।।

(sarveṣāmeva rogāṇām
nidānam kupitā malā: ।। 12 ।।
Tatprakopasya tu proktam
vividhāhitasevanam ।
ahitam trividho yoga-
strayāṇām prāgudāhṛta: ।। 13 ।।)

On generally speaking, aetiology of all diseases is nothing but vitiated doṣas. The cause of vitiation of these three doṣas is the use of different unwholesome things which has already been mentioned. The unwholesome things to our body i.e. the 3 types of conjugation of the three factors were also emphasised previously.

The general aetiology of all the diseases is highlighted here. According to āyurvedic principles the vitiated doṣas produce all abnormalities in the body. So, as a one word, we can account that the general aetiology of all diseases is vitiation of vāta, pitta and kapha.

To clarify this hypothesis one previous statement is quoted again; the conjugation of factors like kāla (season), artha (objects) and karma (activities) in meager, excess and improper level, is the unique cause of ill-health. This has already been stated in the first chapter of Sūtrasthānam (1/19) and elaborated later (12/34-44).

Now the unwholesome food habits as well as activities particular to each doṣa and their combinations are explained.

तिक्तोषणकषायाल्परूक्षप्रमितभोजनै: ।
धारणोदीरणनिशाजागरात्युच्चभाषणै: ।। १४ ।।
क्रियातियोगभीशोकचिन्ताव्यायममैथुनै: ।
ग्रीष्माहोरात्रिभुक्तान्ते प्रकुप्यति समीरण: ।। १५ ।।

(Tiktoṣaṇakaṣāyālpa-
rūkṣapramitabhojanai: ।
dhāraṇodīraṇaniśā-

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jāgarātyuccabhāṣaṇai: ॥ 14 ॥
Kriyātiyogabhīśoka-
cintāvyāyamamaithunai: ।
grīṣmāhorātribhuktānte
prakupyati samīraṇa: ॥ 15 ॥)

Vāta gets vitiated by food articles that are bitter, pungent and astringent in tastes, less in quantity, rarified in nature and taken untimely; and activities such as suppression and over-compulsion of natural urges, night vigil, loudly speech, over implementation of treatment procedures, vulnerability of fear, sorrow, continuous thoughts and overexertion by exercises and sexual indulgence. The time factors like the end of summer, end of the day and night and the end phase of food digestion are also precipitate vitiation of vāta.

Here the precipitatory factors of vitiation of vāta are analised in respective of food articles, activity patterns and time factors. One doubt may arise here that how does the vasti treatment, famous procedure against vātadoṣa, vitiate that doṣa? Though vasti is the appropriate management procedure for vitiation of vāta, overuse or improper use of kaṣāyavasti (such as without implementing snehavasti in between kaṣāyavasti) certainly cause the hike of vātadoṣa.

Vātaprakopa is natural at the end of summer, means the rainy season. Likewise, the ends of day (afternoon) and night (time before dawn) are the precipitative time of vātakopa. The food taken, first [when abides at āmāśaya (stomach)] provokes kapha, then pitta [when it moves through pacyamānāśaya (small intestine)] and then vāta (at large intestine and return becoming a waste product).

More explanation of aetiological factors is seen in Aṣṭāṅgasamgraham. With regard to food-articles, the aetiological factors of vātadoṣa such as addition of laghu, śuṣka, rūkṣa, śīta items and the use of viṣṭambhi, virūḍhaka, tṛṇadhānya, kāḷaya, caṇaka, kārīra, tumba, kaliṅga, cirbhiṭa, biśa, śāluka, jāmbava, tiṇṭuka are noted. Intake of food by a thirsty person as well as water by a hungry one is also come in this list. Loss of blood, exposure to eastern wind, over fight, fight with more healthy persons and the act of assassination, pulling of rough bow, climbing over more higher and difficult areas, over-walking, teaching, running, swimming, trauma, throwing heavy clods, trying to control the untamed cows, horses, elephants, throwing rock pieces, metallic things, logs, act of elevation by body parts, throwing, encircling, tough movements, tightly tying, beating others (mostly risky activities) affliction of fear and anxiety are also seen in the aetiological factors of vāta precipitation.

पित्तं कट्वम्ळतीक्ष्णोष्णपटुक्रोधविदाहिभि: ।
शरन्मध्याह्नरात्र्यर्धविदाहसमयेषु च ॥ १६ ॥

(Pittam kaṭvmḷatīkṣṇoṣṇa-
paṭukrodhavidāhibhi: ।
śaranmadhyāhnarātryardha-
vidāhasamayeṣu ca ॥ 16 ॥)

Pitta is vitiated by food items that are pungent, sour, intensive, hot, salty, hatred and vidāhi (that which induce the acid-peptic imbalance); also, it is vitiated at the time of śarad (autumn), midday, night and during digestion.

Additional list in the respective context of Aṣṭāṅgasamgraham cites thus: food items viz. śukta, saṇḍākīmadya, mūtra, mastu, dadhi, dhānyāmḷa, oils, kulatha, māṣa, niṣpāva, tilānna, kaṭvara, kuṭherādivarga, āmrātaka, āmḷika, pīlu, ballātaka, lāṅgalika and maricam; exposure to sunlight, fire, dust, fumes, affliction of jealous, indigestion and improper sexual act provoke the pitta.

स्वाद्वम्ळलवणस्निग्धगुर्वभिष्यन्दिशीतळै: ।
आस्यास्वप्नसुखाजीर्णदिवास्वप्नातिबृंहणै: । १७ ।।
प्रच्छर्दनाद्ययोगेन भुक्तमात्रवसन्तयो: ।
पूर्वाह्णे पूर्वरात्रे च श्ळेष्मा, द्वन्द्वं तु सङ्करात् ।। १८ ।।

(Svādvamḷalavaṇasnigdha-
gurvabhiṣyandiśītaḷai: ।
āsyāsvapnasukhājīrṇa-
divāsvapnātibṛmhaṇai: ।। 17 ।।
Pracchardanādyayogena
bhuktamātravasantayo: ।
pūrvāhne pūrvarātre ca
śḷeṣmā, dvandvam tu saṅkarāt ।। 18 ।।)

Kapha is vitiated by consumption of food items that are sweety, sour, salty, unctuous, heavy, abhiṣyandi (that which provoke the mucus secretion) and cold; by activities like sleep due to idleness, sitting idle for long time, indigestion, day sleep and over-nutrition; by mithyayoga of vomiting procedure. And during the first part of digestion, day and night and in the spring season (vasanta) kapha used to provoke. The samsargadoṣas (pairs) do vitiate due to conjugation of both types of respective aetiological factors.

Picchila, abhiṣyandi food, navānna, piṣṭānna, prathuka, sthūlabhakṣya, śaṣkuli, raw milk, kīlāṭa, kūcika, takrapiṇḍaka, piyūṣa, sugarcane juice, phāṇita, guḍa, ānūpa flesh, moca, kharjūra, bhavya and nārikela are the food stuff that provoke kapha. Water intake at night, over intake of water every time, inertia to do work by body - mind and speech, avoidance of pillow, exposure to fog, passion of exaltation, control of vomiting, ayoga of samśodhana will also provoke kapha.

मिश्रीभावात्समस्तानां सन्निपातस्तथा पुन: ।
सङ्कीर्णाजीर्णविषमविरुद्धाध्यशनादिभि: ।। १९ ।।
व्यापन्नमद्यपानीयशुष्कशाकाममूलकै: ।
पिण्याकमृद्यवसुरापूतिशुष्ककृशामिषै: ।। २० ।।
दोषत्रयकरैस्तैस्तैस्तथाऽन्नपरिवर्तनात् ।
ऋतोर्दुष्टात्पुरोवाताद्ग्रहावेशाद्विषाद्भरात् ।। २१ ।।
दुष्टान्नात् पर्वताश्ळेषाद्ग्रहैर्जन्मर्क्षपीडनात् ।
मिथ्यायोगाच्च विविधात्पापानां च निषेवणात् ।२२।
स्त्रीणां प्रसववैषम्यात्तथा मिथ्योपचारत: ।

(Miśrībhāvātsamastānām
sannipātastathā puna: ।
saṅkīrṇājīrṇaviṣama-
viruddhādhyaśanādibhi: ।। 19 ।।
Vyāpannamadyapānīya-
śuṣkaśākāmamūlakai: ।
piṇyākamṛdyavasurā-
pūtiśuṣkakṛśāmiṣai: ।। 20 ।।
Doṣatrayakaraistaistai-
stathāऽnnaparivartanāt ।
ṛtorduṣṭātpurovātād-
grhāveśādviṣādgarāt ।। 21 ।।
Duṣṭānnāt parvatāśḷeṣād-
grhairjanmarkṣapīḍanāt ।
mithyāyogācca vividhāt-
pāpānām ca niṣevaṇāt ।। 22 ।।
Strīṇām prasavavaiṣamyāt-
tathā mithyopacārata: ।)

The combination of respective aetiological factors of these three doṣas result to produce sannipāta or tridoṣakopa. Besides these, certain other factors are also to be accounted in the mechanism of sannipāta. These are intake of saṅkīrṇānna (mixing of pathya and apathya foods) ajīrṇānna (food that causes indigestion), viṣamānna (intake of food in improper time and amount i.e. either less or over quantity), viruddhāśana, addhyaśana (taking food just after a meal), etc and the use of deteriorated liquor or beverage, śuṣkaśāka (particular leafy vegetable in much dried state) unripened

raddish, piṇṇyāka, mud, surāmadya just after its preparation, meat that is putrefied, dried or of much lean animal. The food articles denoted tridoṣakara in respective contexts like sraṣapaśāka (sū. 6/114) among leafy vegetable, lakuca among fruits, sea-water in jalavarga (sū. 5/12) are the supremes to provoke three doṣas. Deterioration of food or sudden change of food habit (on account of shifting the living place), vitiation of bodily tissues, exposure to eastern wind, affliction of bhūtagrahas and toxic agents, use of garaviṣa, putrid food, inhabitation at mountains, infliction of birth-star due to annoyance of constellation, different types of mithyāyoga, improper conjugation of a person with season, sensory objects and personal activities, habituation of sins (10 sins are described in sūtrasthāna, chapter II in dianacarya context) are the precipitatory factors of sannipāta and in the case of women, delivery complications and their mismanagement especially provoke sannipāta.

In Aṣṭāṅgasamgraham, use of maṇḍakadadhi, yavaka, yavaśuka, vallūra, lakuca, āmaphala are also seen with respect to vitation of sannipāta. Sudden changes in seasonal nature, inhalation of unwholesome drugs, affliction of toxins, endogenous toxins produced in the later stages of carbuncles and the full cloudy weather are specified in this context as specific aetiological factors.

प्रतिरोगमिति क्रुद्धा रोगाधिष्ठानगामिनी: ।। २३ ।।
रसायनी: प्रपद्याशु दोषा देहे विकुर्वते ।। २३ ½ ।।

(pratirogamiti kruddhā
rogādhiṣṭhānagāminī: ।। 23 ।।
Rasāyanī: prapadyāśu
doṣā dehe vikurvate ।। 23½ ।।)

Thus, the vitiated humours by particular kind of aetiology or by their conjugation or by sannipāta condition, will reach the bodily channels very quickly making them the gateway of diseases and show their manifestation as the disease.

इति श्रीवैद्यपतिसिंहगुप्तसूनुश्रीमद्वाग्भटविरचितायामष्टाङ्गहृदयसंहितायां तृतीये निदानस्थाने सर्वरोगनिदानं नाम प्रथमोऽध्याय: ।। १ ।।

(iti śrīvaidyapatisimhaguptasūnuśrīmadvāgbhaṭaviracitāyāmaṣṭāṅgahṛdayasamhitāyām tṛtīye nidānasthāne sarvaroganidānam nāma prathamoऽdhyāya: ।। 1 ।।)

Thus end the 1st Chapter named Sarvaroganidānam in the Nidānasthāna of Aṣṭāṅgahṛdayam of Vāgbhaṭa.

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# ANTIBACTERIAL ACTIVITY OF A FERN ON TIRUMALA HILLS OF TIRUPATI

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Abstract: This paper deals with phytochemical screening and antimicrobial activity of *Actiniopteris radiata* (Sw.) Link., growing on rocky crevices of Tirumala hills of Tirupati, Adhra Pradesh. Qualitative screening of phytochemicals such as alkaloids, carbohydrates, steroids, flavonoids, proteins and starch was carried out by standard methods. Antibacterial activity was assessed by well method using different solvent extracts on different human pathogenic microorganisms. During this investigation it has been found that carbohydrates, steroids, flavonoids and proteins were present in this plant and ethyl acetate extract showed good inhibitory activity against most of the pathogenic microorganisms.

## Introduction

The World Health Organization has compiled a list of more than 21,000 plant species supposedly used globally in medicine. Now-a-days more and more angiospermic plants are being used for medicine/antimicrobial activity. However, the lower group of plants like pteridophytes is largely neglected and has not been well documented although they are known for their beauty, elegance and infinite variety. According to world fern statistics by Michael Hassler, out of 10,000-12,000 fern species of the world, India has 1042 pteridophytes species. The medicinal qualities of ferns, real or imaginary, are mentioned as early as 300 B.C. by the Greek, philosopher Theophrastus and his Indian contemporaries, Susruta and Caraka. Pteridophytes make an important contribution to the earth's plant diversity. They form a significant, sometimes, dominant, component of many plant communities, being the second largest group of vascular plants. Pteridophytes are used in Homeopathic, Ayurvedic, Tribal and Unani medicines and provided as insecticides, antibiotics, food and ornamentation; but habitat destruction by man has today endangered more than 10% of the fern species. Among the medicinal plants mentioned in old Indian texts, mayūraśikha or mayūrapaṅkha, meaning peacock's feather, has been identified as *Actiniopteris radiata* (Sw.) Link.[1] (Fig.I). This is a fern of Actinopteridaceae family. It is of limited distribution and in areas where it occurs, is restricted to depleted walls and rocky crevices

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of steep slopes of exposed hilly areas like Tirumala hills[2]. It is a herbaceous miniature palm-like fern up to 25cm height; lamina fan-shaped with numerous dichotomous segments; segments of fertile frond longer than those of the barren one; sori arranged in two rows on the lower side of the pinnae lobes. The fronds are chewed for sore throat and this plant has anthelmintic and styptic activities[3]. The present study is intended to determine the antimicrobial activity of the plant against some pathogenic microorganisms.

**Materials and methods**

The whole plants were collected from the Tirumala hills of Tirupati in the month of December, 2006. The plant was identified using a dictionary of the pteridophytes of India[3] and was authenticated by comparing with herbarium specimen of Botany department, S.V.University, Tirupati and voucher specimen was deposited in the herbarium of department of Applied Microbiology, S.P.M.V.V., Tirupati. The plant material was washed 2-3 times with tap water and distilled water to remove the soil and dirt particles and then surface sterilised with 90% alcohol. The shade dried material was milled into coarse powder by mechanical grinder and was extracted using different solvents such as acetone, benzene, chloroform, diethylether, distilled water, ethyl acetate, methanol and petroleum ether in soxhlet extractor at a temperature not exceeding the boiling point of each solvent. The extracts were concentrated to dryness under vacuum and were preserved at 4°C until use. Screening of phytochemicals such as alkaloids, flavonoids, steroids, carbohydrates, proteins and starch was carried out using the above extracts by following the standard methods[4]. Agar well plate method was used to assess the effect of plant extracts on different pathogenic bacteria. Sterilised petridishes with nutrient agar were inoculated by spreading using sterile L-shape rod with 50µl of each bacterial culture, which were standardised according to 0.5 Mc Farland solution[5] from 24hr. old cultures. Wells of about 6mm diameter were aseptically punched on each agar plate using a sterile cork borer and fixed volume (100µl ) of the plant extracts were then added to the agar wells. The plates were incubated at 37°C for 16-18 hr. and were examined for the presence the zones of inhibition.

Fig. I
*Actiniopteris radiata*

**Results and discussion**

In the present study it was found that extracts of all solvents showed positive result for carbohydrates, steroids and flavonoids. Tests for proteins showed negative result with soxhlet extracts but showed positive result when tested with fresh extracts. This indicates that proteins may be denatured during the soxhlet extraction process. The results of the phytochemical screening and antibacterial activity are given in the tables 1 & 2 respectively. Fig. II a&b represents the results of the antibacterial activity of

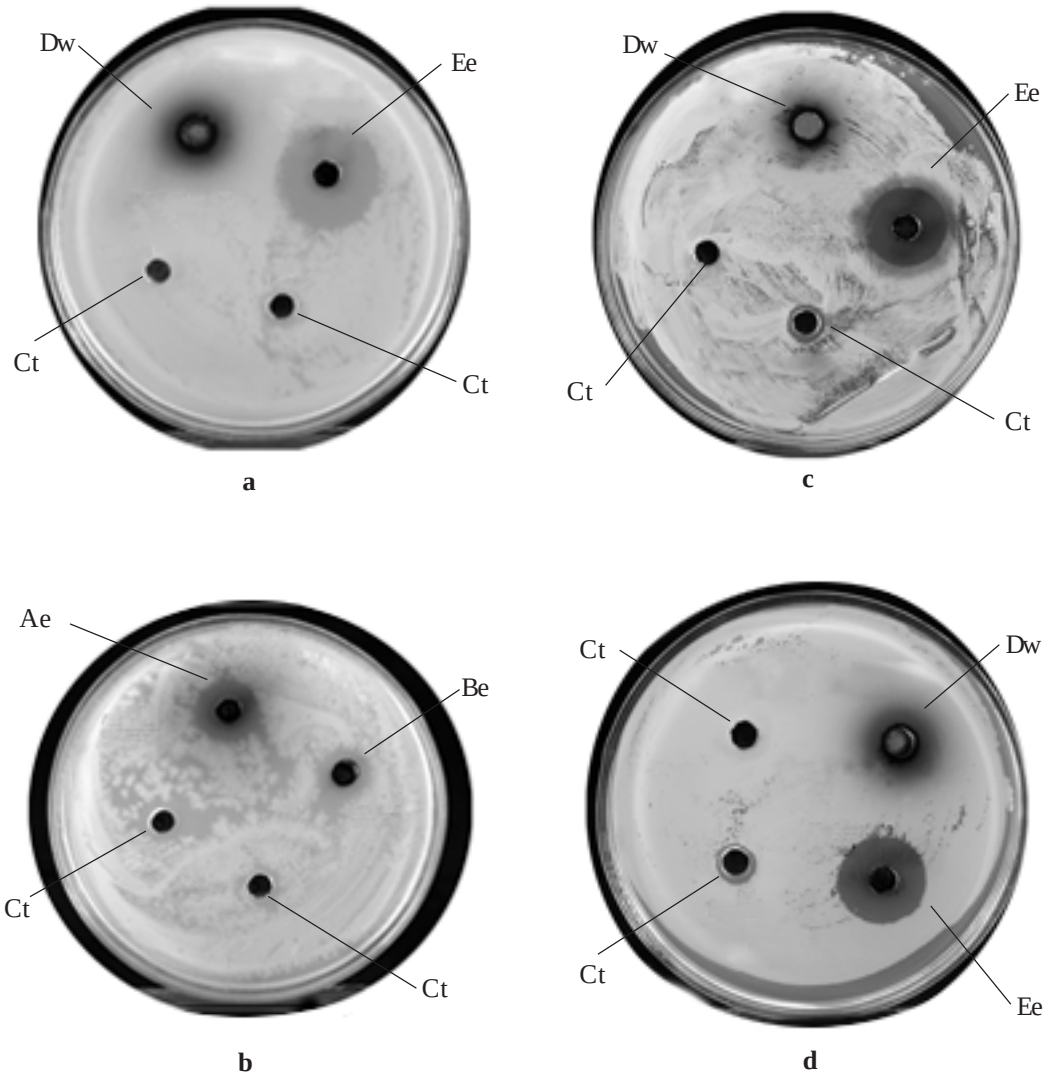
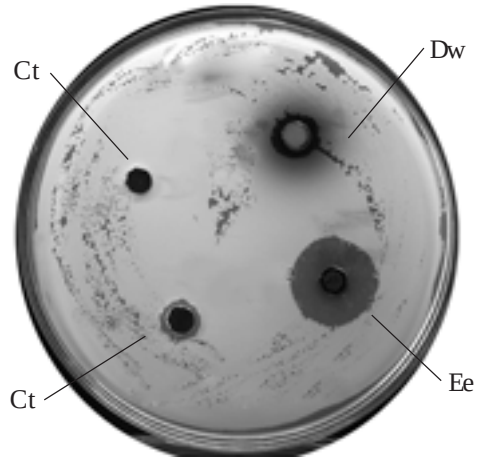



Fig. IIa

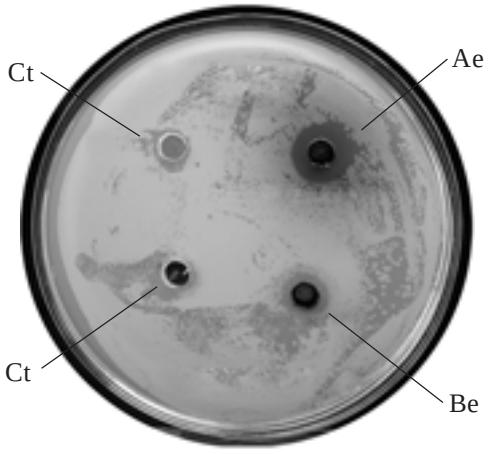
Antimicrobial activity of *Actiniopteris radiata* (Sw) Link. on different pathogenic microorganisms

a - Ethyl acetate extract on *Bacillus subtilis*; b - Acetone extract on *Proteus vulgaris;* c - Ethyl acetate extract on *Staphylococcus aureus*; d - Ethyl acetate and distilled water extracts on *Klebsiella pneumoniae*

**Dw** Distilled water; **Ee** Ethylacetate extract; **Ct** Control; **Ae** Acetone extract; **Be** Benzene extract




**e**




**f**

Fig. IIb

Antimicrobial activity of *Actiniopteris radiata* (Sw) Link. on different pathogenic microorganisms
e - Ethyl acetate and distilled water extracts on *E.coli*; f - Acetone extract on *Bacillus cereus*

**Ct** Control; **Dw** Distilled water;
**Ee** Ethylacetate extract; **Ae** Acetone extract;
**Be** Benzene extract

this plant in agar well method. Ethyl acetate extract provided more consistent antibacterial activity compared to those extracted by other solvents. The methanol extract has shown inhibitory activity against *E.coli*. *Proteus vulgaris* was inhibited by acetone extract. *B.subtilis, B.cereus, Klebsiella pneumoniae* and *Pseudomonas aeuruginosa* were inhibited by ethyl acetate extract only. Antibacterial activity of this plant on pathogenic micro-organisms was studied by Parihar and Bohra[6] by disc diffusion method. Further studies aimed at isolation and purification of active phyto-constituents may yield a few more compounds with greater antibacterial activity are in the progress in our laboratory.

**Conclusions**

It is concluded that antibacterial activity of *Actiniopteris radiata* and its active constituents would be helpful in treating various kinds of diseases. Crude extracts and their interactions with different active fractions of the plants are needed to explore the exact mechanism of the interaction among the active phytoconstituents.

TABLE 1
Phytochemical screening of
*Actiniopteris radiata* (Sw.) Link.

| Solvent extracts | Alk | Car | Fla | Ste | Pro | Sta |
|---|---|---|---|---|---|---|
| Acetone | - | + | + | + | - | - |
| Benzene | - | + | + | + | - | - |
| Butanol | - | + | + | + | - | - |
| Choloroform | - | + | + | + | - | - |
| Diethyl ether | - | + | + | + | - | - |
| Distilled water | - | + | + | + | - | - |
| Ethyl acetate | - | + | + | + | - | - |
| Petroleum ether | - | + | + | + | - | - |
| Methanol | - | + | + | + | - | - |

Alk - Alkaloids (Mayer's test); Car - Carbohydrates (Molish's test); Fla - Flavonoids ($FeCl_3$ test); Ste - Steroids (Salko-wski test); Pro - Proteins (Biuret test); Sta - Starch (Iodine test); '-' Absent; '+' Present

TABLE 2

Antibacterial activity of Actiniopteris radiata (Sw.) Link. in agar well method

| Name of the organism | Inhibition zones in mm with different | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ace | C | B | C | Chl | C | DE | C | DW | C | EA | C | M | C | P | C |
| *Bacillus cereus* | 8 | 2 | - | - | - | - | - | - | - | - | 14 | 3 | - | - | - | - |
| *Bacillus subtilis* | - | - | - | - | - | - | - | - | 5 | - | 18 | 3 | 5 | - | - | - |
| *E.coli* | 7 | 4 | 5 | - | - | - | - | - | 4 | - | 12 | 3 | 14 | 3 | - | - |
| *Klebsiella pneumoniae* | 10 | 5 | - | - | - | - | - | - | 3 | - | 13 | 3 | - | - | - | - |
| *Proteus vulgaris* | 11 | 6 | 6 | 4 | - | - | - | - | - | - | - | - | 5 | - | - | - |
| *Staphylococcus aureus* | - | - | - | - | - | - | - | - | 3 | - | 15 | 3 | - | - | - | - |

Ace - Acetone; B - Benzene; Chl - Chloroform; DE - Diethyl ether; DW - Distilled water;
EA - Ethyl acetate; M - Methanol; P - Petroleum ether; C - Control; '-' No inhibition.

Similarly, the efficacy of crude extracts or polyherbal preparations needs to be studied in-vivo to assess their therapeutic utility.

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# ROLE OF ĀYURVEDIC TREATMENT IN THE MANAGEMENT OF DIABETES

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Abstract: This study explores the effect of Madusār granules, an āyurvedic formulation, in the management of Diabetes mellitus.

## Introduction

Diabetes is a metabolic disorder characterised by a high blood sugar levels and caused by failure to produce enough insulin (Type I) or in some cases body cells do not respond appropriately to insulin that is produced (Type II). The modern management of diabetes, in spite of newer developments, remains unsatisfactory. The use of insulin is not always indicated and in many cases is ineffective due to insulin antibodies and several other unknown mechanisms. The Oral hypoglycemic agents too have been found to have limitations in therapeutic use primarily because of their side-effects.

Aims and objectives: - i) To find out the role of ayurvedic treatment in diabetes mellitus and ii) to develop an alternate line of treatment in treating diabetes mellitus.

## Material and methods

This study was under taken in the Āyurvedic Department of Sassoon General Hospital, Pune from October 2006 to May 2007 (Intake period - 2 months; period of therapy - 6 months).

Selection criteria: - A written consent was taken from the patient for the voluntary participation in the study. Patients included controlled and uncontrolled diabetes irrespective of age/sex without any acute complication.

Out of 116 patients, only 63 patients completed the 6 months treatment. Follow up was made after 7, 15, 30 days and then after every 30 days.

Investigation: - Clinical investigations were done on the following parameters before and after the treatment:

- Blood sugar (done after 7, 15, 30, 60, 90 and 180 days after treatment)
- F
- PP
- Urine routine
- Cholesterol
- LFT
- KFT
- GHb

Treatment: - 5 gm of Madhusār granules, twice daily, was given for adults, and 2.5 gm in case of children.

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Contents of Madhusār:- Each 100gm granules contain the following ingredients:-

| Sanskrit/Scientific name of the drugs | Part used | Qty. (in gm) |
|---|---|---|
| 1. Madhunāśini (*Gymnema sylvestre*) | leaves | 21.5 |
| 2. Methi (*Trigonella foenum-graecum*) | seeds | 4 |
| 3. Gaudhamādinī (*Casearia esculenta*) | roots | 6.5 |
| 4. Jambu (*Eugenia jambolana*) | seeds | 4 |
| 5. Kāravellaka ( *Momordica charantia*) | fruits | 4 |
| 6. Asana (*Pterocarpus marsupium*) | barks | 45 |
| 7. Haridra (*Curcuma longa*) | roots | 5 |
| 8. Āmalaki (*Emblica officinalis*) | fruits | 10 |

Many studies have shown hypoglycemic effect of āyurvedic herbs[4-9]; these medicinal herbs have property of inducing pancreas to secrete insulin and have capacity of regeneration of Beta cells of pancreas.

**Observation and discussions**

In the present study, there were 14 patients having Type-I diabetes (i.e. those require insulin) and 49 having Type-II (i.e. those which do not require insulin). One peculiar point observed in the Type-I cases were age distribution; majority of Type-I patients were above the age group of 51 years. It shows shift of age group to higher side in type-I cases. Majority of the patients were males. The subjects were having diabetes well established for more than 2 years (Table 1).

All the patients in Type-I diabetes category were already having insulin therapy along with antidiabetic agents like Sulphonylureas and Biguinides. 49 Type-II patients were already on antidiabetic drugs. Majority of patients were (97%) having more than 4 complaints like frequency of urination, tiredness, nocturia, thirst, joint pains and body-ache, tingling and numbness. Only 10 patients were having blurred vision.

25 patients (39.68%) had blood sugar level <200 mg% (P.P.) while 23 (36.5%) were having moderate range i.e. 200-350 mg% (Table 2).

**Effect of treatment**

Patients were given Madhusār granules 5gm twice daily. Half dose was given to children and all the other drugs taken by patients earlier were continued and gradually stopped. Out of 49

TABLE 1
Distribution of patients according to sex, age and duration of the ailment

| Parameter | Type-I* | Type-II | Total |
|---|---|---|---|
| 1. Sex | | | |
| - Male | 10 | 33 | 43 |
| - Famale | 4 | 16 | 20 |
| Total | 14 | 49 | 63 |
| 2. Age group | | | |
| - 01-10 | 2 | | |
| - 11-20 | - | - | 1 |
| - 21-30 | 1 | - | 1 |
| - 31-40 | 2 | 9 | 11 |
| - 41-50 | - | 18 | 18 |
| - 51-60 | 5 | 16 | 21 |
| - >60 | 4 | 6 | 10 |
| Total | 14 | 49 | 63 |
| 3. Duration (in years) | | | |
| - 0-1 | 2 | 7 | 9 |
| - 2-5 | 4 | 20 | 24 |
| - 6-10 | 3 | 12 | 15 |
| - 11-15 | 3 | 9 | 12 |
| - 16-20 | 2 | - | 02 |
| - >21 | - | 1 | 01 |
| Total | 14 | 49 | 63 |

* Type-I insulin required; Type-II not required

TABLE 2

Status of blood sugar level (BSL) before and after the treatment

| DM Type | Before Treatment | | | | | | After Treatment | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 120-140 | 140-199 | 200-300 | 300-350 | Total | | 120-140 | 140-199 | 200-300 | 300-350 | Total |
| • Fasting | | | | | | | | | | | |
| - Type- I | 6 | 5 | 3 | - | 14 | | 8 | 6 | - | - | 14 |
| - Type-II | 18 | 23 | 8 | - | 49 | | 38 | 11 | - | - | 49 |
| Total | 24 | 28 | 11 | - | 63 | | 46 | 17 | - | - | 63 |
| • PP | | | | | | | | | | | |
| - Type-I | 2 | 5 | 4 | 3 | 14 | | 3 | 4 | 7 | - | 14 |
| - Type-II | 2 | 16 | 19 | 12 | 49 | | 17 | 22 | 9 | 1 | 49 |
| Total | 14 | 21 | 23 | 15 | 63 | | 20 | 26 | 16 | 1 | 63 |

* Type-I insulin required; Type-II insulin not required

PP Normal <140, Mild <200; Moderate <200-350, Severe >350

Type-II diabetes patients, allopathic drugs were stopped in 19, reduced in 14 and were continued in 16. Out of 14 patients of Type-I diabetes, insulin was stopped in 1 patient and was reduced in 9 patients. Nearly 70% of Type-I patients could be maintained on reduced/no dosage of insulin.

Relief of symptoms: - There were more than 4 complaints associated with diabetes in majority patients (97%) before the start of treatment. Most of the patients started showing relief of symptoms within 2 months and onwards and after treatment they were symptom free. (Table 3)

**Conclusion**

- 73% patients positively responded to ayurvedic treatment and were maintained on either normal or mild diabetic range (<200mg% P.P.) This difference in the level of BSL after treatment is statistically significant ($z = 3.98$ $p < 0.01$)
- Before treatment there were 38 patients (60.31%) having BSL >200mg% but after treatment only 17 patients (27%) were showing BSL >200 mg%. This difference in level of BSL after treatment is statistically significant as $z = 3.79$, $p < 0.01$
- Effect of āyurvedic treatment was found pronounced in Type-II patients; allopathic treatment was completely stopped in 19 (39%) cases, and in 14 allopathic dosages was reduced. Thus 68% patients were maintained on either no allopathic drugs or in reduced doses of allopathic drugs.
- Out of 14 cases in Type-I patients, one case stopped insulin completely and successfully maintained on ayurvedic treatment; whereas in 9 (64%), the units of insulin dosage reduced substantially from 35 to 21.6.
- Relief of symptoms was noticed from 7 days of treatment; but in 78% patients relief seen after two months therapy; and after 6 months treatment, 98.36% patients were symptom free. This difference in relief of symptoms is statistically highly significant ($z = 35$ $p < 0.0001$)

In short, āyurvedic treatment could be a

TABLE 3

Status symptoms during the course of treatment

| Symptoms | Days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1st | 7th | 15th | 30th | 60th | 90th | 120th | 150th | 180th |
| Frequency of urination | 58 | 55 | 48 | 45 | 30 | 11 | 8 | 6 | 1 |
| Nocturia | 42 | 38 | 30 | 30 | 25 | 20 | 16 | 08 | 0 |
| Appetite | 30 | 28 | 25 | 20 | 10 | 08 | 05 | 05 | 0 |
| Thirst | 43 | 40 | 36 | 32 | 30 | 20 | 18 | 08 | 0 |
| Tiredness | 55 | 50 | 48 | 45 | 42 | 40 | 38 | 15 | 0 |
| Oedema | 20 | 20 | 15 | 10 | 10 | 08 | 06 | 04 | 0 |
| Blurred vision | 10 | 10 | 08 | 08 | 078 | 06 | 05 | 04 | 0 |
| Joint pain & Body ache | 56 | 54 | 50 | 28 | 13 | 10 | 04 | 02 | 0 |
| Tingling and numbness of both extremities | 30 | 30 | 28 | 28 | 22 | 15 | 10 | 10 | 0 |
| Wt. lost | 06 | 05 | 05 | 05 | 04 | 04 | 04 | 04 | 0 |

successful alternative in the management of diabetes. It may be taken in conjunction with allopathic treatment or by reducing the dosage of allopathic drugs, so that the side effects of allopathic drugs can be reduced and an early well being is possible.

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# MANAGEMENT OF MṚDBHAKṢYAJANYA VIKĀRA (PICA) IN CHILDREN

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Abstract: Mṛdbhakṣyajanya disorders develop in children due to habit of ingestion of non-food things like mud, clay, etc. which cause various disorders[1,2]. This condition can be compared with pica described in modern sciences. Pica is an eating disorder involves repeated or chronic ingestion of non nutrient substances. This paper briefly describes the clinical concept and principles of management of pica in children.

## Introduction

The term 'pica' is derived from a Latin word 'magpie', a bird known for its peculiar eating behaviour. This bird eats and carries away odd objects. Pica is a pre-school age problem and is defined as a deprived appetite or altered appetite and craving for unnatural articles as food. Pica is defined as "the persistent eating of non-nutritive substances for a period of at least one month, without an association with an aversion to food" and classifies it as a feeding and eating disorder of childhood[3].

## Incidence

The age of onset is usually 1 to 2 years, but it may be even earlier. Pica usually remits in childhood but can continue into adolescence and adulthood. It appears to be more prevalent in the lower socioeconomic classes[4]. Children with the age group of one to five years are commonly affected, especially those who are underfed and anaemic[5]. The condition also occurs in pregnant women.

## Etiology

Tasting or mouthing of objects is considered normal in infants and toddler up to the age of 2 years. Persistence of this habit beyond the age of 2 years may be a manifestation of family disorganisation, parental neglect, poor supervision or lack of affection[6]. Children with pica usually have history of neonatal insults[7].

The specific causes of pica are unknown, but certain conditions and situations can increase the cause of pica[8].

- Nutritional deficiencies, such as iron or zinc that may trigger specific cravings.
- Malnutrition, especially in underdeveloped countries, where people with pica most commonly eat soil or clay.
- Cultural factors - in families, religions, or groups in which eating nonfood substances is a learned practice.
- Parental neglect, lack of supervision, or food deprivation - often seen in children living in poverty.

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- Developmental problems such as mental retardation, autism, other developmental disabilities or brain abnormalities.
- Mental health conditions, such as obsessive-compulsive disorder (OCD) and schizophrenia.

Evidence supports that some pica cases are response to dietary deficiency. Often nutritional deficiencies are associated with pica and their correction often improves symptoms. However, everyone does not respond when a nutritional deficiency is corrected, which may be a consequence of pica rather than the cause, and some people with pica do not have a documented nutritional deficiency[9].

People with pica may develop habit of eating variety of nonfood substances like ashes, chalk, soil, wool, wood, soap and stones[10]. There are certain specific terms associated with the habit of eating non-edible substances. Amylophagia is an abnormal craving for starch - one voraciously consume purified starch typically cornstarch or laundry starch. Geophagia is the compulsive eating of earthy substances, including sand, soil and clay. Pagophagia is the ingestion of extraordinary amounts of ice, often related to iron lack. Trichophagia is the practice or habit of eating hair.

Although consumption of some items may be harmless, pica is considered to be a serious eating disorder that can sometimes result in serious health problems such as lead poisoning, iron-deficiency and anemia.

**Signs & symptoms**

The following are the warning signs of pica[10]:-

- Repetitive consumption of nonfood items for a period of at least one month or longer despite of efforts to restrict it.
- The behavior is considered inappropriate for a child older than 24 months.
- The behavior is not part of a cultural or religious practice.

**Complications and hazards**

According to the āyurvedic texts, many diseases may develop like pāṇḍu (anaemia), śotha (oedema), kāsa (cough), atisāra (diarrhea), kṛmi (worm infestation), chardi (vomiting), agnimāndya (poor digestion), aruchi (anorexia), gātravedana (body-ache), bhrama (mental confusion), tandra (stupor), ālasya (lethargy) and śūla (abdominal pain) due to chronic ingestion of nonfood substances[10].

In children, pāṇḍuroga (anaemia) may be an important clinical manifestation due to eating clay or dirt. The anaemia produced due to the habit of eating mud is called as mṛdbhakṣya-janya pāṇḍu. It is usually found in children and may also be found in pregnant woman, in old person and person with worm infestation. In a child habitually eating clay, one or two or all the three doṣas get vitiated according to the type of clay. Vāta, pitta and kapha doṣas get aggravated by ingestion of kaṣāya (astringent), uṣara (alkaline) and madhura (sweet) clay respectively. Clay vitiates rasa and other dhātus (tissues). Clay, moreover, produces roughness in rasa, dhātus (tissues), etc. It fills up and blocks the śrotasas (channels) without undergoing digestion or change. Thus by destroying the strength of sense, luster and energy it produces pāṇḍu-roga which further destroys strength, complexion and power of digestion. The child develops swelling on orbit, cheek, eyebrows, feet, navel and private parts, suffers from intestinal parasites and passes loose stools with blood and mucus[10].

Children with pica are slow in motor and mental development and show more neurological defects deviant behaviour. In children with propensity for pica, ingestion of contaminated soil may lead to worm infestation and parasitic infection and often complain of chronic abdominal pain. Children may often be anaemic and have mineral and vitamin deficiencies. They are prone to develop iron deficiency and anaemia. Pica may be a prerequisite for lead poisoning. Lead containing dust and paint are taken up by small children through their normal hand to mouth activity. However, lead poisoning results mostly from ingestion of dust, the large flakes of paint themselves pass essentially unchanged through the stool.

Children with pica are at an increased risk for the following serious health problems[11]:-

- Heavy metal poisoning like lead poisoning due to eating lead-based paint chips.
- Bowel problems from consuming indigestible substances. Gastrointestinal tract symptoms may include constipation, acute or chronic abdominal pain, nausea, vomiting, abdominal distension, loss of appetite, etc.
- Intestinal obstruction or perforation due to eating substances that could get lodged in the intestines.
- Dental injury from eating hard substances.
- Parasitic infestations.
- Nutritional deprivation (iron and zinc deficiency, vitamin deficiency, failure to thrive, achlorhydria, etc).

Pica involving lead-containing substances during pregnancy may be associated with an increase in both maternal and fetal lead levels.

**Investigation**

Pica after the 2nd year of life needs investigation and proper treatment. Differential diagnoses include autism, schizophrenia and such physical disorders such as Kleine-Levin Syndrome[12]. Detailed history should be taken about age at onset of pica, items consumed and family set up for emotional disorder and mental retardation should be excluded[13]. Necessary investigations should be done for anaemia, worm infestation and for evidences of lead toxicity. Child with blood lead level of 10 ì g/dl or more is designated as having lead poisoning[14]. Large radio-opaque flakes of paint, when present on abdominal radiological examination, are a clear indicator of exposure to lead containing paint[15]. X-Rays or other imaging may be helpful to identify what was eaten or to look for bowel problems, such as obstruction.

The medical evaluation of a patient suspected of having pica should include a complete blood count, peripheral smear for eosinophilia, determination of iron, ferritin and lead levels, electrolytes and liver function. An obstruction series or plain abdominal radiographs may be necessary to distinguish obstruction from parasites.

**Prevention**

There are no known methods of preventing pica. However, once pica is known or suspected, measures can be taken to reduce further ingestion of nonfood substances. Removing the particular substance from readily accessible areas can be helpful. Close observation of the individual with pica may limit inappropriate eating behaviors[16].

**Treatment**

In case of pica or mṛdbhakṣyajanya disorders like pāṇḍu (anaemia), first of all the habit of the child to eat mud or unwanted articles should be changed. Cyavanaprāśa may be given for licking.

Child should be observed under close supervision. In mṛdbhakṣyajanya disorders, the clay which may be composed of various indigestible and inassimilable substances obstructs the various channels. So it is necessary to clear it by use of proper purgative after considering the strength of the patient and then energiser diet should be given[17].

Iron supplementation is often prescribed. Worm infestation should be managed with anti-helminthics. Medicated ghee can be given to normalise digestive function. Other associated problems should be managed accordingly

Treating the patient diagnosed with pica is challenging. Management should include education about general nutrition and may require iron therapy if a deficiency of this mineral is uncovered. Diagnosing and treating any underlying medical condition or complication such as lead poisoning is also important. The most important aspect of therapy is to remove the child from the source of exposure to lead. In most cases, this is the only necessary action. Only in more severe cases treatment is indicated. Fortunately, in many cases pica will remit with time. Psychotherapy is of value in cases where pica is associated with psychosomatic problems. Patience is the key in treating pica because it may take time for some children to stop wanting to eat nonfood items.

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# EFFECT OF CANDRAMĀRĀDI YOGA IN ESSENTIAL HYPERTENSION

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Abstract: High blood pressure, termed hypertension, is a condition that afflicts almost one billion people worldwide and is a leading cause of morbidity and mortality. Hypertension is an under diagnosed condition because it causes damage to the body with no symptoms or only mild symptoms. The main objective in the management of hypertension is prevention of target organ damage and reduction of cardio-vascular risk. The management requires a multi-pronged approach. No single drug is completely designed for the complete control of BP. In the present study we have tried to evaluate the efficacy of Candramārādi yoga in essential hypertension and the response was found statistically very significant.

## Introduction

Hypertension has come to human knowledge during the last decade of 19th century after the discovery of stethoscope and sphygmomanometer. Hypertension had been included as the disease entity by Richard Bright in the early 19th century. Hypertension has been referred to as the "silent killer" because patients may have no symptoms until they present with a vascular complication. A full and careful clinical history is essential to assess the etiology, causes and complications of hypertension. Most patients with uncomplicated hypertension are asymptomatic or present with non-specific (occasionally vague) symptoms. Most cases of hypertension are diagnosed as an incidental finding at a routine medical examination or after visiting the doctor for another condition.

In āyurvedic classics no disease has found which exactly simulates essential hypertension. Previous researchers made their effort to simulate hypertension with the disease like siragata vāta, raktagata vāta and āvṛta vāta-roga, but hypertension cannot be correlated completely with them.

## Materials and methods

In the present study, 30 patients of uncomplicated mild to moderate essential hypertension were taken. They were randomly selected from OPD of Kāyacikitsa, Sir Sunder Lal Hospital, Institute of Medical Sciences, BHU, Varanasi. Most of the patients were allowed to have treatment as outdoor patients, but few of them were admitted in Kāyacikitsa ward. The effect of drug was assessed and recorded weekly for four weeks. All Patients were advised to avoid

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smoking, strenuous exercise and to take low salt and fatty diet.

Inclusion criteria:- Patients were graded as hypertensive on the basis of '7th joint National Committee criteria on detection, evaluation and treatment of high blood pressure' (2003) report as shown in Table 1

Exclusion criteria:- The patients having raised arterial blood pressure associated with: i.) severe/malignant hypertension, ii) secondary hypertension and iii) mild/moderate hypertension with complications or target organ damage were excluded from the study.

**Trial drug**

The trial drug Candramārādi yoga was prepared by mixing fine powder of the following ingredients:-

Sarpagandha (*Rauwolfia serpentina*) - 2 parts
Aśvagandha (*Withania somnifera*)
Arjuna (*Terminalia arjuna*)
Punarnava (*Boerhavia diffusa*)
Gokṣura (*Tribulus terrestris*)
Śaṅkhapuṣpi (*Convolvulus pluricaulis*)
Brāhmi (*Bacopa monnieri*) - each 1 part

Total dose of trial drug had been taken 8 gm/ day which was given to the patient in two divided dose i.e. 4 gm with water.

Observations:- Out of 30 patients registered, only 26 patients completed the trial. Demographic profile of 26 patients is given in Table 2.

TABLE 1
7th Joint National Committee (JNC) criteria for Hypertension

| Category | Blood Pressure (mm Hg) | |
|---|---|---|
| | Systolic | Diastolic |
| 1. Normal | <120 | <80 |
| 2. Pre hypertensive | 120 - 139 | 80 - 89 |
| 3. Hypertension stage - I (mild) | 140 - 159 | 90 - 99 |
| 4. Hypertension stage - II (moderate) | > 160 | > 100 |

**Results**

Of 26 patients, 16 were mild hypertensive while 10 were moderate hypertensive. All the patients were assessed weekly and after 4 week; and the final assessment is given in Table 3.

**Discussion**

The trial drug was selected for the research work due to the peculiar quality of its 7 ingredients in the treatment of hypertension. Sarpagandha has antiadrenergic property as well as anxiolytic property and has been approved. Aśvagandha has anxiolytic, rejuvenating and cardio-tonic property. Gokṣura and punarnava has proved diuretic property and they are popularly used as diuretic in various disorders like śotha, jalodara and mūtrarogas. Śaṅkhpuṣpi and brāhmi have intellect-promoting and anxiolytic properties.

TABLE 2
Demographic profile of patients (n=26)

| Description | | No. | % |
|---|---|---|---|
| Age | 41-60 year | 13 | 50.00 |
| Sex | Male | 22 | 84.61 |
| Religion | Hindu | 22 | 84.61 |
| Education | Graduate | 9 | 34.61 |
| Occupation | Servicemen | 10 | 38.46 |
| Habitat | Urban | 14 | 53.84 |
| Dietary habit | Mixed diet | 23 | 88.46 |
| Socio-ec. status | Middle | 16 | 61.53 |
| Addiction | Smoking | 19 | 73.07 |
| Lifestyle | Active | 19 | 73.07 |
| Marital status | Married | 25 | 96.15 |
| Prakṛti | Vāta-kapha | 17 | 65.38 |

Maximum patients were male patients, aged between 41-60 years and belonged to middle class family. Majority of patients were of vata-kapha prakṛti. The mean systolic BP was 156.38 ± 10.05 mm Hg and diastolic BP was 102.23 ± 4.35 mm Hg. After 4 week treatment, mean systolic BP was 129.38 ± 4.75 mm Hg and diastolic BP was 84.08 ± 3.12 mm Hg respectively.

**Conclusion**

The following conclusions have been drawn keeping behind the knowledge of modern parameters and experience of the present work:

1. Compound drug 'Candramārādi yoga' is found an excellent remedy for mild and moderate hypertension, so it may also be tried in all grades of the disease singly or as an adjuvant.

TABLE 3
Effect of Candramārādi yoga on various parameters

| Description | BT (Mean±SD) | AT (Mean±SD) | AT - BT | 't' value | p value |
|---|---|---|---|---|---|
| 1. Effect on symptoms | | | | | |
| - Headache | 1.65 ± .93 | 0.30 ± 0.47 | 1.34 ± 0.74 | 9.21 | p < 0.001(H.S.) |
| - Vertigo | 1.88 ± 0.76 | 0.42 ± 0.50 | 1.46 ± 0.76 | 9.79 | p < 0.001(H.S.) |
| - Insomnia | 1.65 ± 0.79 | 0.27 ± 0.45 | 1.38 ± 0.69 | 10.12 | p < 0.001(H.S.) |
| - Easy fatigability | 1.73 ± 0.77 | 0.31 ± 0.47 | 1.42 ± 0.64 | 11.28 | p < 0.001(H.S.) |
| - Palpitation | 1.69 ± 0.68 | 0.34 ± 0.56 | 1.34 ± 0.62 | 10.91 | p < 0.001(H.S.) |
| - Chest pain | 1.57 ± 0.85 | 0.23 ± 0.43 | 1.34 ± 0.68 | 9.95 | p < 0.001(H.S.) |
| 2. Effect on BP | | | | | |
| - Systolic | 156.38 ± 10.05 | 129.38 ± 4.75 | 27.00 ± 6.48 | 21.24 | p < 0.001(H.S.) |
| - Diastolic | 102.23 + 4.35 | 84.08 + 3.12 | 18.15 + 3.14 | 29.42 | p < 0.001(H.S.) |
| 3. Effect on LFT | | | | | |
| - Sr. Bilirubin | 0.71 ± 0.12 | 0.55 ± 0.16 | 0.16 ± 0.21 | 4.04 | p < 0.001(H.S.) |
| - SGOT | 31.84 ± 5.25 | 28.03 ± 5.42 | 3.80 ± 4.04 | 4.80 | p < 0.001(H.S.) |
| - SGPT | 31.42 ± 4.70 | 27.00 ± 6.19 | 4.42 ± 3.98 | 5.66 | p < 0.001(H.S.) |
| - Alk. Phosphatase | 209.19 ± 50.81 | 199.15 ± 50.50 | 10.03 ± 32.68 | 1.56 | p > 0.05 (N.S.) |
| 4. Effect on Lipid profile | | | | | |
| - Sr. Cholesterol | 157.11 ± 16.04 | 149.88 ± 16.25 | 7.22 ± 8.42 | 2.57 | p < 0.05 (Sig) |
| - Triglycerides | 102.44 ± 25.30 | 91.88 ± 26.04 | 10.55 ± 7.05 | 4.48 | p < 0.01 (H.S.) |
| - HDL | 63.44 ± 12.63 | 68.33 ± 13.81 | - 4.88 ± 4.53 | 3.23 | p < 0.02 (Sig) |
| - LDL | 107.11 ± 14.51 | 97.33 ± 10.16 | 9.77 ± 17.41 | 1.68 | p > 0.05 (N.S.) |
| 5. Effect on Hb, Urea, etc. | | | | | |
| - Hemoglobin | 13.00 ± 0.87 | 13.34 ± 0.54 | - 0.34 ± 1.01 | 1.72 | p > 0.05 (N.S.) |
| - Blood Urea | 29.30 ± 5.37 | 25.42 ± 5.57 | 3.88 ± 3.74 | 5.28 | p < 0.001(H.S.) |
| - Sr.Creatinine | 0.80 ± 0.20 | 0.52 ± 0.17 | 0.27 ± 0.21 | 6.54 | p < 0.001(H.S.) |
| - Blood Sugar (R) | 116.11 ± 19.39 | 104.80 ± 14.03 | 11.30 ± 12.24 | 4.70 | p < 0.001(H.S.) |

*LFT - Liver Function Test

2. Excellent symptomatic relief has been seen in headache, dizziness, insomnia and palpitation and also improvement in chest pain and fatigability have been noted.
3. Moderate improvement was also seen in lipid profile of patients. So in future, we can also try this formulation in case of dyslipidemia.

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# EFFECT OF BIO PESTICIDE IN CONTROLLING MOSQUITO DENSITY

P.M. Madhu[1], K.V. Girish[2,] E.V. Santhosh[2] and A.K.Venugopal[3]

Abstract: This paper reveals the details of the study conducted at Karivellur-Peralam Panchayath, Kerala, to assess the effect of bio pesticide in controlling mosquito density. As we have faced the issue of mosquitos in the previous years and there was possibility of mosquito born disease in northern Kerala during the rainy season this year, an effective campaign was conducted. Realizsing the health issues due to chemical mosquito repellents, uses of bio pesticides were promoted. The effort was very effective.

**Background and objectives**

The face of Kerala has changed much in a few decades.Industrialisation, population explosion, changes in the lifestyle, etc. led to the accumulation of waste material, which in turn encouraged the mosquito density. Mosquitoes became the most dreadful organisms which can have a direct impact on public health and influence the state's economy, including coastal and mountain tourism, agriculture, and urban development. The most celebrated Kerala health model is now facing the problem of communicable diseases like dengue fever and chickungunya. Conventional methods adopted to control mosquitoes and indiscriminate use of synthetic pesticides has not only led to the development of resistant strains and the presence of toxic residues on food grains used for human consumption has led to health and environmental problems. To overcome such problems, bio-intensive integrated pest management (BIPM) has been suggested and practiced by the farming community, where biological pesticides play an important role in agriculture. Use of organic pesticide to control mosquitoes may be a boon in preventing vector born diseases.

**Material and methods**

Basic tools are Standard, white 400 ml-capacity dipper; an eyedropper; modified bilge pump, white enamel or plastic pan, boots, 6 oz. plastic bags or some other form of container for collecting larvae; labels for the collections; and a pencil.

The village has 13 wards. Initially, we have selected 5 typical mosquito breeding natural habitats in each ward. We used Belkin method for this assessment. Belkin (1954) developed this simple index for determining larval density.

The formula is: $BI = \frac{TLP}{ND} \times BP$ ; where BI = the

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breeding index, TLP = the total number of larvae and pupae taken, ND = the number of dips and BP = the number of breeding places.

(When searching for mosquito larvae, it is necessary to proceed slowly and carefully. Approach the area to be inspected with caution, as heavy footfalls will create vibrations that disturb larvae and cause them to dive to the bottom. Likewise, avoid disturbance of the water, as this will have the same result. Approach the area to be sampled with the sun in one's face; this prevents shadows that also disturb larvae and cause them to dive. If wind is of significant magnitude dipping should be done on the windward side of the habitat where larvae and pupae will be most heavily concentrated. Mosquito larvae are usually confined to the margins of a body of water and will not be found in open, deep water. Dipping should be done around floating debris, aquatic and emergent vegetation, logs and tree stumps in the water, and grasses around the margins. Look for the presence of larvae and pupae before beginning to dip.One must also recognise that each area to be checked may contain a number of different microhabitats, and each may contain the larvae

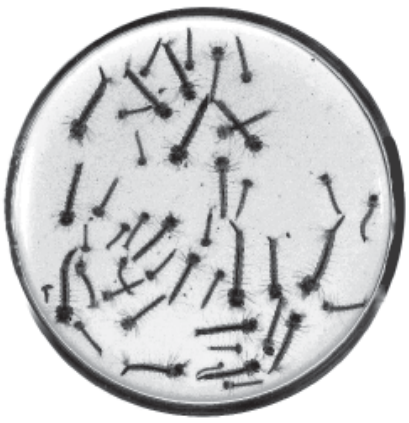

Fig. a
Different stages of larvae collected for observation

of different species. Learn to recognize different microhabitats within an area; each one of these should be sampled in order to obtain a comprehensive picture of the area's species composition-Ref. Larval Surveillance Procedures - Modified from O'Malley, 1989)

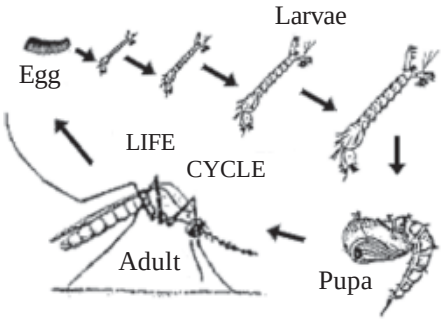


Fig. b

During growth, the larva molts (sheds its skin) four times. The stages between molts are called instars. At the 4th instar, the usual larva reaches a length of almost ½ inch and towards the end of this instar ceases feeding. When the 4th instar larva molts, it becomes a pupa (Fig. a&b)

**Description of study areas**

The study was carried out between the months of May and June of 2008. Karivellur-Peralam village situate at the northern part of Kannur district in Kerala. Nearly 400 hectors of land consists paddy field with marshy lands and watershed areas. Drainage pits of domestic animal excreta form another major mosquito breeding habitat. (Fig. c)

**Use of bio pesticide**

The bio pesticide was prepared with the combination of leaves of quick stick - śīma-kkonna (*Gliricidia sepium*), a commonly available plant in our region, tobacco, neem oil and limestone powder. Leaves of quick stick and tobacco were grinded well and boiled in a


Fig. c
Karivellur - Peralam Area map showing the mosquito dense regions

vessel with 10 litres of water and made to 5 litres. 2 litres of neem oil poured in to it. Limestone powder was added to get all the ingradients mixed thoroughly. This decoction was used after dilution in breeding places. Assessment of the breeding index was again performed 1 week after the use of bio pesticide. (Table 1)

**Observations and result**

In addition to the typical field study, we have done in vitro study on mosquito larval samples. The four morphological stages such as egg, larva, pupa and adult stages were observed in plane water sample and in pesticide mixed water sample. Presence of bio pesticide prevented the transformation of the larva to pupa stage, and destroyed it later (Table 1). The response to the bio pesticide was very significant according to statistical analysis (Table 2)

TABLE 1

Survey result of ward-vise mosquito breeding indices before and after the use of bio-pesticide

| Ward | Mosquito Breeding Indices | |
|---|---|---|
| | Before use | After use |
| 01. Vadakkumbad | 24.6 | 2.4 |
| 02. Manakkad | 16 | 0.8 |
| 03. Kookkanam | 20.4 | 3.4 |
| 04. Puthur | 10.8 | 1 |
| 05. Verikkara | 26.4 | 3.2 |
| 06. Kozhummal | 19.4 | 1.6 |
| 07. Kuvacheri | 18.2 | 2.2 |
| 08. Peralam | 14.8 | 4.4 |
| 09. Manakad thek | 24.6 | 3.4 |
| 10. Onakkunnu | 28.6 | 2.6 |
| 11. Kunyan (E) | 11.8 | 1.2 |
| 12. Kunyan (W) | 18.6 | 1.4 |
| 13. Pallikkovval | 22.8 | 3.4 |

TABLE 2

Statistical analysis of response to the bio-pesticide

| Assessment Criteria | Mean Score (SD) | | | 't' test | |
|---|---|---|---|---|---|
| | Before | After | Diff. | SE | 't' |
| Breeding index | 19.77 (5.54) | 2.39 (1.13) | 17.38 (4.41) | 1.22 | 5.314 |

p = <0.001

**Conclusion**

The ovicidal and larvicidal effects of each ingredient in bio pesticide were scientifically proved by eminent researchers in different parts of the world. Based on these observations, we framed this study in this scenario to make use in rural health. The result show significant effect of biopesticide in eradicating the mosquitoes. Hence we got encouragement to popularise it among the rural people and to make them to prepare it themselves and to use around their surrounding. It could protect the people from many of the mosquito-borne communicable diseases.

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# EFFICACY OF 'BALA COMPOUND' ON SERUM PROTEIN ENHANCEMENT IN INFANTS - A CLINICAL STUDY

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Abstract: Studies conducted in various countries indicate that Infant Mortality Rate (I.M.R.) is very high in developing countries, and infection has been observed as the major cause. Immune system in neonates is not yet fully established. This study evaluates the efficacy of an āyurvedic recipe 'bala compound', having ingredients of medhya as well as rasāyana drugs. It was tried in infants in the form of oral drops for a period of six months. The result was very encouraging; there was significant increase of serum protein levels after six months.

**Introduction**

Bala refers to synonym of infant, neonate and child; coined so because of lack of strength (bala) and prone to adverse environmental changes and infections. Ojas has been mentioned as a synonym of bala in various āyurvedic texts (Su. sū. 2/31). Decrease of ojas will lead to imbalance of doṣas, which is the basic factor of diseases (vyādhi).

Caraka has put forth vyādhikṣamatva in the aspect of resistance against diseases. Infant mortality claims 60-250 of every 1000 live births. Infections are the major cause of morbidity as well as mortality during infancy. The neonates particularly premature are at higher risk of developing immune defenses and responses (Rem and Puri, 1983).

Anthropometric and Apgar score assessment will give a picture of well being of neonate. The proteins are nothing but the precursors of the immuno-globulins. Serum proteins are assessed for the improvement in immunity of the infant. The immune system is spread diffusely throughout the body and consists of 10-12 cells in the spleen, liver, bone marrow, thymus, lymph nodes and in the circulating blood. The cells have a mass of 2 kg and produce about 60g of protein for the immune system in the malnourished individuals, particularly in protein malnutrition; the immunity is low and the susceptibility to infection is high. Normal value of serum protein in newborn is 4.6-7.4 gm/dl and in first year to seven years is 6.1-7.9 gm/dl.

Aim of the study:- To evaluate the efficacy of an āyurvedic recipe - 'bala compound' in protecting against various common ailments during early infancy period especially by way of enhancing serum proteins in infants which

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was assessed through estimation of changes in serum protein level with administrations of 'bala compound' in comparison of conventional multivitamin drops.

**Materials and methods**

24 neonates delivered at Prasūtitantra labour room of S.S. Hospital, B.H.U. Varanasi were selected on random basis and divided into two groups 'A' and 'B' with 12 cases in each group. Group A was administered 5 oral drops of 'bala compound' twice daily and group B 5 drops of conventional multi vitamin drops twice daily irrespective of neonatal age and weight.

**Inclusion criteria**

1. Age of the mother not exceed 30 years.
2. No bad obstetrical history.
3. No history of maternal illness or drug intake during antenatal care except those required for ANC essentially.
4. Mothers fully immunized.
5. Neonates born by spontaneous vaginal delivery.
6. Full term neonates with gestational age between 37-41 weeks.
7. Neonates birth weight between 2500-3000gms.

**Exclusion criteria**

1. Neonates not turned up for immunization schedule.
2. Neonates having history of birth anoxia, birth trauma, etc.
3. Congenital anomalies in the neonate.
4. Maternal ante partum or post postpartum hemorrhage.

**Drug administration**

Equal parts of the ingredients of the compound, viz. atibala (*Abutilon indicum*), āmalaki (*Emblica officinalis*), viḍaṅga (*Embelia ribes*), gudūci (*Tinospora cordifolia*), pippali (*Piper longum*), yaṣṭimadhu (*Glycyrrhiza glabra*), śaṅkhapuṣpi (*Convolvulus pluricaulis*), vaca (*Acorus calamus*) nagarmotha (*Cyperus rotundus*) and ativiṣa (*Aconitum heterophyllum*) were taken in the form of drops and administered orally in the dose of 5 drops twice daily irrespective of neonatal age and weight on 11th day of the life onward as colonization in

TABLE 1
Distribution of patients according to sex, gestational age and feeding pattern

| Parameter | Group A (n=12) | | Group B (n=12) | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| • Sex: | | | | | | |
| - Male | 7 | 58.3 | 8 | 66.7 | 15 | 62.50 |
| - Famale | 5 | 41.70 | 4 | 33.30 | 9 | 37.50 |
| • Gestational age: | | | | | | |
| - 37-38 | 2 | 16.70 | 2 | 16.70 | 4 | 16.60 |
| - 38-39 | 7 | 58.30 | 6 | 50.00 | 13 | 54.17 |
| - 39-40 | 2 | 16.70 | 3 | 25.00 | 5 | 20.84 |
| - 40-41 | 1 | 8.30 | 1 | 8.30 | 2 | 8.33 |
| • Feeding status: | | | | | | |
| - Breast fed | 6 | 50.00 | 7 | 58.30 | 13 | 54.16 |
| - Partially breast fed | 6 | 50.00 | 5 | 41.70 | 11 | 45.84 |
| - Bottle feed | - | - | - | - | - | - |

TABLE 2
Umbilical Cord blood serum protein level in groups A & B

| Range (mg/dl) | Group A (n=12) | Group B (n=12) |
|---|---|---|
| 4-5 | - | 2 |
| 5-6 | 4 | 5 |
| 6-7 | 8 | 5 |

Group A:- Mean 6.02; S.E. 0.19
Group B:- Mean 5.71; S.E. 0.261

TABLE 3
Response of the bala compound on serum protein in Group A & B

| Range of S. protein in gm/100 ml | Group A (n=12) | | | | Group B (n=12) | | | |
|---|---|---|---|---|---|---|---|---|
| | Follow up - I | | Follow up - II | | Follow up - I | | Follow up - II | |
| | No. | % | No. | % | No. | % | No. | % |
| 4-5 | - | - | - | - | 1 | 8.30 | 1 | 8.30 |
| 5-6 | 3 | 25.00 | - | - | 5 | 41.70 | 2 | 16.70 |
| 6-7 | 7 | 58.30 | 10 | 83.30 | 5 | 41.70 | 7 | 58.30 |
| 7-8 | 2 | 16.70 | 2 | 16.70 | 1 | 8.30 | 2 | 16.70 |
| Mean | | 6.37 | | 6.67 | | 6.03 | | 6.35 |
| S.E. | | 0.19 | | 0.15 | | 0.23 | | 0.22 |

intestine is said to be impaired (Meharban Singh).

**Assessment parameters**

- Purely depend up on the laboratory investigations.
- Cord blood serum protein level is assessed after birth and venous blood serum protein levels on follow ups.

**Result and discussion**

Of 24 cases, 15 were male and 9 were females; 13 cases were under gestational age of 38-39 weeks; 13 cases were breast fed and 11 cases partially breast fed (Table 1).

The results of the clinical study (Tables 2&3) confirm the serum protein enhance effect of the 'bala compound' in Group A. After three months of administration of the trial drug and conventional multi vitamin drops (i.e., I follow up), there was significant increase of mean serum levels of protein in both the groups, but better increase observed in Group A. And also there was a highly significant increase of mean serum protein after six months of trial in both groups.

Immunological factor plays an import role in neonates who are easily prone to infections. To combat the infections, bala compound can improve and increase the immunity of neonates instead of multivitamin drops. Since it is a time bound study the clinical trial can conduct in a large number of subjects to establish the safety and efficacy of the trial drug.

Acknowledgement

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# IMPORTANCE OF MEDICINAL PLANTS IN RASAŚĀSTRA

Shraddha U Nayak* Poorneshwar Sawant* Joshi V.K.**

Abstract: Medicinal plants are an integral part of Rasaśāstra. Minerals and metals cannot be used directly. They need to be processed or purified before use. Both processing and purification is done with medicinal plants. The present paper analyses the various groups of drugs used in Rasaśāstra and their significance.

## Introduction

Rasaśāstra is a science which deals with metals and minerals where rasa primarily denotes mercury. Mercury is the chief material of Rasaśāstra possessing high therapeutic value. Many metals and minerals were identified to potentiate mercury primarily for the purpose of alchemy. Based on the utility of other metals and minerals in purifying, processing and potentiating mercury, they are classified as mahārasa, uparasa and sādhāraṇa rasa. These metals and minerals cannot be used as such therapeutically. They have to be subjected to various procedures like śodhana, māraṇa, satvapatana and drutinirmāṇa. In all these processes, medicinal plants play a pivotal role. There are diverse applications of medicinal plants in Rasaśāstra. Classics such as Rasaratnasamuchaya, Rasataraṅgiṇi have grouped medicinal plants into various categories based on the usefulness. This paper is an attempt to analyse the utility of medicinal plants in Rasaśāstra.

## Utility in processing

The most significant aspect of plants is their use in procedures like satvapatana, śodhana and māraṇa. Plants utilised for these purposes are grouped into different categories as follows:

### Drāvaka gaṇa

The drugs mentioned in this group like guñja (*Abrus precatorius*), guggulu (*Commiphora mukul*), guda (jaggery) and taṅkaṇa (borax) facilitate melting of materials, and hence they are used in the processes of satvapatana[1]; e.g. bhūnāga satvapatana.

### Kṣāra varga

Kṣāras are said to ward off the impurities, hence the drugs of this group like palāśa (*Butea monosperma*), muṣkaka (*Schrebera swietenioides*), yavakṣāra (*Hordeum vulgare*) and tila (*Sesamum indicum*) are used in śodhana and māraṇa[2]; e.g. i) pṛavāḷa śodhana in kṣāravarga and ii) use of tilakṣāra in haritāla śodhana.

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**Amḷa varga**

The drugs in this group like - amḷavetaśa (*Garcinia pedunculata*), jambīra (*Citrus limon*), nimbuka (*Citrus aurantifolia*), bījapūraka (*Citrus medica*), cāṅgeri (*Oxalis corniculata*), caṇakāmḷa (*Cicer arietinum* ), amḷīka (*Tamarindus indica*), kola (*Ziziphus jujuba*), dāḍima (*Punica granatum*), ambaṣṭa (*Hibiscus cannabinus*), tindiḍīka (*Rhus parviflora*), nāraṅṅa (*Citrus reticulata* ), rasapatrika (juice or leaves of amḷa dravyas) and karamarda (*Carissa carandas*) - potentiate the substances and hence used in śodhana, māraṇa and svedana[3]; e.g. i) use of ciñca (*Tamarindus indica*) in niyamansamskāra, ii) vaikrānta māraṇa in amḷavarga dravyas and iii) amḷavarga dravyas are suggested in śodhana of varāṭika.

**Viṣa varga**

All the poisonous drugs of this group like śṛṅgika (*Aconitum chasmanthum*), kāḷakūṭa (an *Aconitum* species) and vatsnābha (*Aconitum napellus*), due to their uṣṇa (hot), tīkṣṇa (sharp) qualities, are used in śodhana, māraṇa and satvapatana[4]; e.g. i) use in satvapatana of chapel and ii) for parāda bandhana.

**Dugdha varga**

This varga includes all the latex producing drugs like udumbara (*Ficus racemosa*), aśvattha (*Ficus religiosa*), nyagrodha (*Ficus benghalensis*), tilvaka (*Excoecaria agallocha*), dugdhika (*Chamaesyce thymifolia*), snuhi (*Euphorbia ligularia*), varāhikanda (*Dioscorea bulbifera*) and meṣaśṛṅgi (*Gymnema sylvestre*), which can be used in mārana procedure of various metals[5]; e.g. i) snuhīkṣīra (*Euphorbia ligularia*) in raupya (silver) māraṇa and ii) arkadugdha (*Calotropis gigantia*) in vaṅgamāraṇa.

**Taila varga**

Tailas or snehas like kaṅguni (*Celartrus paniculatus*), tumbini (*Luffa cylindrica*), karira (*Capparis decidua*), siddhārtha (*Brassica juncea*), somarāji (*Psoralea corylifolia*), vibhītaka (*Terminalia bellirica*), atasi (*Linum usitatissimum*), tila (*Sesamum orientale*), devadāli (*Luffa echinata*), danti (*Baliospermum montanum*), tumbaru (*Zanthoxylum armatum*), aṅkola (*Alangium salvifolium*), unmatta (*Datura metal*), ballātaka (*Semecarpus anacardium*), palāśa (*Butea monosperma*) and taila are used in procedures like śodhana and māraṇa[6]; e.g. i) jyotiṣmati taila (oil of *Celastrus paniculatus*) in raupya (silver) śodhana and ii) ballātaka taila (oil of *Semecarpus anacardium*) in vaṅga māraṇa.

**Examination of bhasmas**

After the preparation of bhasmas by the process of māraṇa, they are examined for adequacy and utility in the body. Their action is first assessed on certain herbs; e.g. svarṇamākṣika. It contains copper hence its bhasma should be free from astringent taste and should not give rise to appearance of greenish-blue colour if tested in curd or āmalaki (*Emblica officinalis*).

**Plants as anupānas**

Anupāna acts as an adjuvant, which helps in early absorption of drug and improves the action of drug. Since medicinal drugs are easily accessible by body because of its organic nature, if given along with the metallic drugs, they will cause easy absorption of drugs and will also reduce the toxicity of any drug. Also, a particular drug if given along with a particular anupāna will show different action on the body (Table 1)

TABLE 1

| Drug | Anupāna | Karma |
|---|---|---|
| Svarṇabhasma | Ghṛta | Rasāyana |
| | Vaca | Smṛtiprada |
| | Bhṛṅgarāja-svarasa | Vṛṣya |

**Effective antidotes**

The utility that cannot be overlooked is the use of plants as an antidote in the adverse effects of the minerals. Various metals if consumed unpurified or in excess amount can cause dreadful diseases. In such cases certain medicinal herbs act as antidotes for the metals like mercury, lead etc.; e.g. i) kulatha kvātha (decoction of *Macrotyloma uniflorum*) and dāḍimatvak kvātha (decoction of fruit-rind of *Punica granatum*) act as an antidote of svarṇamākṣika bhasma and ii) gudūci (*Tinospora cordifolia*) is used in toxic effects of haritāla.

**In making of the apparatus**

Raktavarga, śvetavarga, pītavarga are category of drugs which go into the constitution of various apparatus commonly used in Rasaśāstra.

**Raktavarga dravyas**

The drugs namely kusumbha (*Carthamus tinctorius*), khadira (*Acacia catechu*), lākṣa (*Laccifer lacca*), mañjiṣṭha (*Rubia cordifolia*), raktacandana (*Pterocarpus santalinus*), ākṣī (*Terminalia bellirica*), bandhujīva (*Pentapetes phoenicea*), karpūra-gandhini (*Curcuma aromatica*) and mākṣika (honey) mentioned in this varga are used for imparting colour to the ingredients used in the making of the apparatus varṇa mūśa and also attribute their own pharmaceutical properties[7]. This mūśa (apparatus) is used for the purpose of: i) śodhana of sasyaka and ii) lohitīkaraṇa of abhraka bhasma.

**Śveta varga dravyas**

This varga includes tagara (*Valeriana jatamansi*), kuṭaja (*Holarrhena pubescens*), kunda (*Jasminum multiflorum*), guñja (*Abrus precatorius*), jīvantika (*Holostemma adakoedien*), sitāmbhoruhakanda ( tuber of white variety of *Nelumbo nucifera*) and these are used in trituration of raupya mūśa. They enhance the colour of white metals[8].

**Pītavarga dravya**

Similarly, the pītavarga dravyas like kimśuka (*Butea monosperma*), karṇikāra (*Cassia fistula*), haridra (*Curcuma longa*) and dāruharidra (*Berberis aristata*) are used in jāraṇa process[9].

If the bhāvna of juice or decoction of the above said drugs is given and jāraṇa process is performed, such substance which has undergone the jāraṇa process will attain colour of the respective groups[10]

Another use of plants is its efficacy in sealing. At the time of doing various samskaraṇa on parāda or during kupīpakva rasāyana, the joints of yantra must be sealed. This sealing is called mudra. The drugs like udumbara (*Ficus racemosa*), vaṭa (*Ficus benghalensis*), lākṣa (*Laccifer lacca*), atasi taila (*Linum usitatissimum*), etc, are used in making madanamudra.

**Discussion**

Plants are essential part of Rasaśāstra. The various groups of drugs with their utility have been tabulated in Table 2.

Very few scientific studies have been conducted to know the utility of medicinal plants in various processing of Rasaśāstra. Many herbs are used in detoxification of toxic qualities of metals and minerals. These herbs not only remove the impurities and detoxify the metals but also add

TABLE 2
Various groups of drugs and their utility

| Sl.No. | Varga | Utility | Reference |
|---|---|---|---|
| 1. | Rakta varga | Preparaton of varṇa mūśa | Rasaratnasamucchayam, 10/88 |
| 2. | Śveta varga | Preparation of raupya mūśa | Ibid, 10/90 |
| 3. | Pīta varga | Jāraṇa process | Ibid, 10/89 |
| 4. | Drāvaka varga | Sattvapatana process | Rasataraṅgiṇi, 2/35 |
| 5. | Kṣāra varga | Śodhana, māraṇa | Rasaratnasamucchayam, 10/69 |
| 6. | Amḷa varga | Śodhana, māraṇa, svedana | Ibid, 10/79 |
| 7. | Viṣa varga | Śodhana, māraṇa, sattvapatana, parādabandhana | Ibid, 10/82 |
| 8. | Dugdha varga | Māraṇa | Ibid, 10/85-86 |

their own properties and make the drug accessible to the body.

E.g.: i) garlic (*Allium sativum*) is used for purification of mercury. Mercury atom or molecule will tend to bind with any molecule present that has sulphur or sulphur-hydrogen combination in its structure. Garlic contains sulphur compounds like allicin, diallyl disulphide, etc. and hence is used for purification of mercury. Also it contains selenium which acts as anti-oxidant and protects the body from mercury toxicity,

ii) lemon juice is used for purification of śaṅkha (conch-shell) and kapardika (cowrie-shell). Lemon juice contains vitamin C which helps in absorption of calcium in the body. Since śaṅkha contains calcium carbonate, its absorption is facilitated by lemon juice and hence is used for purification,

iii) The drugs mentioned in taila or sneha vargas are also used for śodhana since they bring about softness in the hard metals; e.g. Jyotiṣmati taila is used for śodhana of raupya (silver). Due to the tīkṣṇaguṇa of jyotiṣmati (*Celastrus paniculatus*), it helps to remove the impurities in raupya. Also the medhyaguṇa (intellect promoting) of this drug enhances the action of raupya on majjāvahasrotas.

In māraṇa or incineration, metals are triturated with svarasa (juice) or kvātha (decoction) of herbs and then subjected to high heat for easy dissociation, absorption and assimilation. It has been stated that for māraṇa of dhātus instead of gandhakādi dravyas or arilohas [nāga (lead), vaṅga (tin), yasada (zinc)] the medicinal herbs should be used; e.g. i) use of triphala kvātha in loha māraṇa and ii) use of nimbu svarasa (juice of *Citrus lemon*) in vaikrānta māraṇa.

Mercury-induced toxicity leads to elevation of lipid per oxidation level but decline in the glutathione content in liver and elevation of SGOT and SGPT. In such cases, tulasi (*Ocimum sanctum*) used as anupāna is found to decrease LPO (lipid per oxidation) SGPT and SGOT.

**Conclusion**

Though mineral drugs are more potent and fast acting as compared to the herbal drugs, due to their inorganic nature and toxicity, they are not easily acceptable to the body. Hence, for better therapeutic efficacy devoid of any hazardous effects, plants are to be used. The rationale behind the use of medicinal plants is an interesting area which needs scientific evaluation.

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Rasaratnasamucchayam:-

१. गुडगुग्गुलुगुञ्जाऽऽज्यसारघैष्टङ्गणान्वितैः ।
दुर्द्रावाखिललोहादेर्द्रावणाय गणो मतः ॥(१०/९६)

२. पलाशमुष्ककक्षारौ यवक्षारः सुवर्चिका ।
तिलनाळोद्भवः क्षारः संयुक्तं क्षारपञ्चकम् ॥
(१०/६९)

३. अम्ळवेतसजम्बीरनिम्बुकं बीजपूरकम् ।
चाङ्गेरीचणकाम्ळं च अम्ळीकं कोलदाडिमम् ॥
अम्बष्ठा तिन्तिडीकश्च नारंगं रसपत्रिका ।
करवन्दं तथा चान्यदम्ळवर्गः प्रकीर्त्तितः ॥
चणकाम्ळश्च सर्वेषामेक एव प्रशस्यते ।
अम्ळवेतसमेकं वा सर्वेषामुत्तमोत्तमम् ।
रसादीनां विशुद्ध्यर्थं द्रावणे जारणे हितम् ॥
(१०/७७-७९)

४. शृङ्गीकं क्ष्वळकूटं च वत्सनाभं सकृत्रिमम् ।
पित्तं च विषवर्गोऽयं स वरः परिकीर्त्तितः ॥
(१०/८२)

५. उष्ट्रिकोदुम्बराश्वत्थभानुन्यग्रोधतिल्वकम् ॥
दुग्धिका स्नुग्गणश्चैव तथैवोत्तमकण्टिका ।
एषां दुग्धैर्विनिर्दिष्टो दुग्धवर्गो रसादिषु ॥
(१०/८५-८६)

६. कङ्गुणी तुम्बिनी घोषा करीरश्रीफलोद्भवम् ।
कटुवार्त्ताकसिद्धार्थसोमराजी विभीतजम् ॥
अतसीजं महाकाळी निम्बजं तिलजं तथा ।
अपमार्गद्विवदाळीदन्तीतुम्बुरुविग्रहात् ॥
अंकोलोन्मत्तभल्लातपलाशेभ्यस्तथैव च ।
एतेभ्यस्तैलमादाय रसकर्मणि योजयेत् ॥
(१०/७१-७३)

७. कुसुम्भं खदिरो लाक्षा मंजिष्ठा रक्तचन्दनम् ।
आक्षी च बन्धुजीवश्च तथा कर्पूरगन्धिनी ॥
माक्षिकं चेति विज्ञेयो रक्तवर्गोऽतिरञ्जनः ।
(१०/८८)

८. तगरः कुटजः कुन्दो गुञ्जा जीवन्तिका तथा ।
सिताम्भोरुहकन्दश्च श्वेतवर्ग उदाहृतः ॥ (१०/९०)

९. किंशुकः कर्णिकारश्च हरिद्राद्वितयं तथा ।
पीतवर्गोऽयमादिष्टो रसराजस्य कर्मणि ॥
(१०/८९)

१०. रक्तवर्गादिवर्गैश्च द्रव्यं यज्जारणात्मकम् ।
भावनीयं प्रयत्नेन तादृग्रागाप्तये खलु ॥ (१०/९२)

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# EFFICACY OF TṚVṚT AND RASONA OIL IN UDĀVARTINI YONIVYĀPAD

Shabnam Jahan and Neelam*

Abstract: Most of the diseases of female genital tract are described under the heading of yonivyāpad in āyurvedic literature. Udāvartini yonivyāpad, according to āyurveda, is a disorder of vāyu, its normal course is reversed to give the clinical features of painful menstruation, low backache, etc. Various formulations have been indicated in āyurvedic classics in the management of udāvartini yonivyāpad. Tṛvṛt and rasoṇa oil is one of such preparations. This paper evaluates the efficacy tṛvṛt and rasoṇa oil in udāvartini yonivyāpad.

**Introduction**

Udāvartini yonivyāpad is one among many gynaecological disorders described in āyurveda. According to Caraka, natural urges in reverse direction fills the yoni in udāvartini yonivyāpad due to movement of flatus, etc[3]. This aggravates vāta doṣa and produces severe spasm all around the female genital tract; during this, menstrual flow goes up and then excreted with great difficulty because of upward movement of raja (menstrual blood). This disease is known as udāvartini yonivyāpad, and comparing to different signs and symptoms described in the text, it can be mostly correlated with dysmenorrhea.

Aim of the study: - To evaluate the efficacy of tṛvṛt and rasoṇa oil in udāvartini yonivyāpad

**Material and methods**

31 married patients of different age groups and parity with chief complaint of painful menstruation were randomly selected from the Prasutitantra O.P.D. of S.S. Hospital.

Patient was placed in lithotomic position and under full aseptic measure, 3 ml autoclaved tṛvṛt and rasoṇa oil loaded with 5ml disposable syringe, was introduced into the uterus within 25-30 min.

Criteria for inclusion: - Only married women of different age group and parity with painful menstruation without pelvic pathology.

Criteria for exclusion: - Women suffering from systemic diseases, with organic lesion benign or malignant growth of reproductive tract and any degree of prolapsed and hypoplastic uterus, PCOD, any congenital abnormality of genital tract.

**Result**

Scoring of pain was done on the basis of patient's statement (VRS) and Visual Analogue Scale (VAS). Follow ups were done regularly at monthly intervals and symptomatic relief in pain, decrease in intensity of pain and duration of pain with improvement in associated symptoms

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were observed and recorded (Table 1). Results were assessed on the following basis:

1. Symptomatic relief in pain (lower abdomen, thigh, back)
2. Decrease in intensity of pain.
3. Decrease in duration of pain.
4. Relief in associated symptoms

- Cured - All the above four parameters were fulfilled
- Improved - Of the above, three parameters were fulfilled
- Partially improved - Only one parameter was fulfilled
- Unchanged - No change was observed

**Discussion**

The prime aetiological factor of udāvartini yonivyāpad is vitiated vāyu, which encircles the yoni at the time of menstruation causing yoniśūla, a cardinal symptom of udāvartini yonivyāpad. Other symptoms which are found are also due to vāta.

During observation mean age was 28.61 years and nulligravidity and nulliparity were found in maximum cases (48.39%) (Table 2). These findings show that dysmenorrhea is more common in early reproductive age of nulliparous women as this age-group faces the maximum change and responsibilities. All these will produce fear; fear leads to anxiety and depression which may be manifested as pain; nulliparous women were less likely to suffer from dysmenorrhea because pregnancy and child birth improve the vascularity and growth of uterine muscles and causes destruction of nerve endings in uterine muscle and cervix after vaginal delivery.

TABLE 2

Incidence of age, gravidity and parity

| Sl. No. | Variables | Mean | ± SD |
|---|---|---|---|
| 1. | Age | 28.61 | 5.00 |
| 2. | Gravidity | 1.58 | 2.13 |
| 3. | Parity | 1.19 | 1.47 |

Maximum frequency of sexual intercourse was observed to be daily (35.48%) (Table 3). This observation show that increased frequency of coitus produces active or passive congestion and inflammation of the reproductive organs resulting in painful menstruation. Most of the women suffering from painful menstruation were housewives (90.32%) and hailed from middle class families (54.83%) (Table 3). Housewives are always busy in household works having anxiety and tension of overwork; this anxiety and tension results in hormonal imbalance in women, which is one of the causative factor of

TABLE 1

Scoring of intensity of pain and duration of pain during menstrual period

| Description | Mild (+) | Moderate (++) | Severe (+++) |
|---|---|---|---|
| Intensity of pain | No need to take any drug. | When pain interfere in the physical activity, need rest or analgesics for some times. | Always need of rest and analgesics. |
| Duration | Pain begins few hours (2-4 hrs) before menses. | Pain persists for 12 hours with menses. | Pain persist for 24 hours with menses. |

painful menstruation as progesterone stimulate myometrail contractions of the smooth muscles of the cervix and causes narrowing of the cervical canal; progesterone further stimulates the production of prostaglandin F2 alpha which in turn accentuates pain. Middle and lower class people usually take the advantages of the government teaching institute and hospitals and usually follow the research protocol.

On statistically comparison between initial and at different follow-ups, highly significant results were seen from 1st follow-up in intensity and duration of pain; highly significant results were also seen from 2nd follow-up in all the symptoms except diarrhea, backache and pain in vagina.

Tṛvṛt[4] is having properties of rūkṣa, laghu, tīkṣṇa guṇas; madhura, kaṭu, tikta, kaṣāya rasas; uṣṇa vīrya and kaṭu vipāka. It pacifies vāta due to its emmenagogue property and snigdha, guru and picchilla guṇas, Rasoṇa[5] suppresses vāta; tila taila[6] also has vātahara property due to its guru, vṛṣya, vikasi, viṣād and lekhana guṇas, Hence senhapāka with tṛvṛt and rasoṇa pacified vāta. Vasti[7] is the treatment which normalises the vāyu in pakvāśaya and other pelvic visera.

TABLE 3
Incidence of occupation, socio-economic status and frequency of sexual intercourse

| Description | No. | % |
|---|---|---|
| 1. Occupation: | | |
| - House wife | 28 | 90.32 |
| - Service | 3 | 9.67 |
| 2. Socio-economic status: | | |
| - Upper | 1 | 3.22 |
| - Middle | 17 | 54.83 |
| - Lower | 13 | 41.93 |
| 3. Frequency of Sexual Intercourse: | | |
| - Daily | 11 | 35.48 |
| - Thrice in a week | 7 | 22.58 |
| - Twice in a week | 5 | 16.12 |
| - Once in a week | 5 | 16.12 |
| - Twice in a month | 3 | 9.67 |

Associated symptoms such as low back pain and constipation were relived due to the virecana (purgative) action of tṛvṛt[7], which eliminated the vitiated vāta seated in the pakvāśaya. Other associated features like head-ache, giddiness, nervousness were partially relieved due to decreased pain threshold and psychological upset during menstruation. The relief was due to tridoṣaghna and anulomalana properties of tṛvṛt and rasoṇa oil.

The vātanulomaka and śrotośodhaka effect of vasti is well known; it also acts as stimulant by contents used in formation of vasti dravya. The medicated oil administered through intrauterine route penetrates the microchannel due to the sūkṣma guṇa of the taila and normalises the vitiated vāta seated there.

**Conclusion**

1. Uttaravasti with tṛvṛt and rasoṇa oill give good result in udāvartini yonivyāpad. Tṛvṛt acts by its kaṭu and tikta rasa, kaṭu-vipāka and uṣṇa-vīrya, and rasoṇa by its guru, pichilla guṇa and snigdha properties.
2. Good result seen due to anti inflammatory action of tṛvṛt and rasoṇa.
3. Maximum beneficial effects of uttaravasti are achieved due to vātanulomak and sortośo-dhak effect of vasti.
4. Uttaravasti suppress apānavāyu and norma-lise its function. Uttarvasti with tṛvṛt and rasoṇa oill is a good recipe for the treatment of udāvartini yonivyāpad.

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# PATHOPHYSIOLOGY OF STRESS AND PSYCHOSOMATIC DISORDERS IN ĀYURVEDA

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Abstract: Āyurveda fundamentally adapts a psychosomatic approach including the basic concepts, evaluation and diagnosis of patient and therapeutics. Many of the psychosomatic disorders have been clearly described in āyurvedic classics including different kinds of stressors that play a vital role in the causation of disease. This article attempts to critically analyse the concept of stress and the consequent psychosomatic disorders.

**Introduction**

A study of the āyurvedic literature shows significant evidences elucidating the psycho-somatic approach of this system of medicine towards health and disease. There are lot of descriptions in āyurvedic classics regarding concept of stress, its pathophysiology and psychosomatic disorders. Āyurvedic classics consider ayoga, atiyoga and mithyāyoga of kāla (time rhythm), buddhi (intellect) and indriyārtha (sensorial objects) as the three fundamental causes of ill health. These are nothing but three categories of stress and informational pathology were considered intimately linked with psycho-somatic approach as understood today[1].

Ayurveda has enumerated a number of somatic diseases, where psychic factors are actively involved either at the level of causation or aggravation of a disease. The scope of psychic factor is so widened that a new group of illness known as psycho-somatic disorders emerged and one out of every three person is said to be victim of these disorders. There are certain types of personalities who are generally unaffected by these disorders, because of their increased level of satvaguṇa, which allows the person to cope with the stressors bravely. 'Satvavān sahate sarvam' is the āyurvedic dictum and such personalities are known as sātvika-mahāprakṛti. The rājasika and tāmasika personalities are highly prone to stress related problems because of their low level of satvaguṇa.

**Stress in āyurveda**

Viewing the whole framework of human being, āyurveda has approached the problem of stress and its disorders. Regarding the etiology of diseases, āyurveda classifies various sources of stress (stressors) in terms of: i. asātmendriyā-rthasamyoga, ii. prañjaprādha and iii. pariṇāma[7]. Other causes are: suppression of natural urges, various psychic and emotional factors.

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Asātmyendriyārthasamyoga:- All the external stressors operating through the sense organs cause physical or emotional changes, which are not conducive for health and are likely to disturb the homeostasis and cause disease.

Prañjāparādha: - If one looses the power of correct perception (dhī vibhramśa), develops mental instability and looses the restraining and memory abilities (dhṛti and smṛti vibhramśa), whatever mental or physical actions he performs, under such circumstances, is usually absurd. This state of affair i.e. unsound action by unsound mind, leads to vitiation of all the doṣas (śārīrika and mānasika) and produce psychosomatic disorders known as prañjāparādhajanyavyādhi.

Pariṇāma:- Similarly, abnormal chrono-biological (seasonal) changes are also known to produce stress or stress-disorders, which are included among physical stressors by modern science[2].

Among physiological stressors of different kinds, suppression of natural urges of food, sleep, thirst, nausea, vomiting, urination, defecation, gaseous discharge, seminal discharges, sneezing, yawning, weeping, etc. vitiate all the three doṣas and cause several psychosomatic disorders.

- The role of emotional factors like, harṣa (happiness), viṣāda (unhappiness) and śoka (grief) has been greatly emphasised by ācārya Caraka; he considers viṣāda to be the most important among the factors aggravating a disease; harṣa as the most important factor which nourishes the body, and śoka as the cause of emaciation[8]. The mental and physical stressors have been further emphasised while explaining adharma or misconduct as the important cause of a disease[9].
- The atipravṛtyādi śrotodusṭi is also influenced by mental stress factors like krodha, śoka, bhaya, which have been counted among the vitiating factors of svedavaha śrotas.

**Mind - body relation in āyurveda**

Āyurveda has never kept mind and body on two different sub-stratums rather they have been recognised as fundamental component of life, which dynamically interact with each other to sustain life at every level. The concept of psychosomatic interaction and mechanism of psychosomatic disorders can be thoroughly understood by considering the following references.

- Satva is also called the mind which regulates, stimulates (preraka) and sustains (dhāraka) the body in combination with the ātma[10]. The body follows the mind and mind follows the body[11].
- Vāta in its normal state of functioning sustains the constituents of the body (doṣa, dhātu, mala) and their course through the body. It restrains the mind (from all undesirable objects) and concentrates (on the desirable objects). It restrains and impels the mental activities[12].
- Śārīrika-manodoṣas are interdependent; the somatic factors cause vitiation of psychic doṣas and similarly, psychic factors cause the vitiation of somatic doṣas - for example: excessive kāma (lust), śoka (worry), bhaya (fear) causes aggravation of vāta doṣa; krodha (anger) causes pitta vṛddhi[13]; harṣa (happiness) causes kapha vṛddhi[14]. Excessive intake of madya (alcohol) causes rajodoṣavṛddhi, and abhiṣyandikara āhara promotes tamodoṣavṛddhi. Śārīrikadoṣas perform certain mental functions in addition to their

somatic functions; similarly, the psychic doṣas also perform certain bodily functions - for example: rajodoṣa - cala (movement), tamodoṣa - regulatory function. (Table 1)[3]

Āyurveda views mind and body as two aspects of one unity. The psychological and physiological processes interacts one another and parallel to each other; for example, the thought of danger and the fear (bhaya) is accompanied by changes in the heart rate and blood chemistry, while conversely alcohol or toxins of disease affect thought and feelings. There are various references in āyurvedic texts, which clearly describe that different kinds of negative psychological states act as etiopathogenic factor in causation of various somatic and psychosomatic illnesses (Table 2)[4].

**Interaction of psychic and somatic disorders**

Diseases have been classified into two categories based on their predominant seat i.e. śārīrika and mānasika. When the diseases (psychic and somatic) persist for a longer period may get combined with each other[15].

Physical diseases are influenced by mental diseases and vice-versa; because, there are common exciting factors for both the psychic and somatic doṣas viz. i) asātmyendriyārtha samyoga, ii) prañjāparādha and iii) pariṇāma. In this reference, Cakrapāṇi, commenting upon the word 'parasparam', suggests the four possibilities: i. somatic disease affecting other somatic diseases, ii. psychic disease affecting other psychic diseases, iii. psychic disease affecting other somatic diseases and iv. somatic disease affecting other psychic diseases[16].

TABLE 1

Mānasika functions of tridoṣas

| Doṣas | Prakṛta functions | Vaikṛta functions |
|---|---|---|
| Vāta | Utsāha, manovyāpāra, manoniyamana, harṣa, prayatna | Manobhṛamśa, nidrānāśa, viṣāda, bhaya, dainya |
| Pitta | Manorathasādhana, prasāda, medhā, ñjānam, śaurya, harṣa, abhilāṣā | Pralāpa, mūrchā, madabhramśa, krodha, alpanidratā |
| Kapha | Dhṛti, alobha, kṣama, ñjānam, buddhi | Tandrā, nidrādhikata, ālasyam, mandabuddhi acaitanyam, mūrchā |

Among these, the psychic disorders influencing somatic diseases (śarīrāṇām mānasena) is of special significance and corresponds to the modern concept of psychosomatics. Cakrapāṇi's statement regarding the role of chronicity (kāla) in the interaction between psychic and somatic diseases, where he conceives pronounced psychosomatic interaction in case of prolonged duration (cirakāla) with minimum such interaction in case of short duration, is very much logical and valid even today[5].

- Kind and pure manas (i.e. without rāga and dveṣa) destroys all the jvaras i.e. diseases[17]. Suśṛuta has described the importance of psychic factor in faster healing of wound that the patient should keep mentally happy (prītamanas) and optimistic (āśāvāna). Śāṅgadhara explains that in case of lust and anger, pulse, which is somatic factor, is rapid and in case of anxiety and fear, it is weak[18].
- Those who wants to protect the heart, the great vessels and ojas, should avoid particularly the causes of afflictions of mind (mental worries). One should regularly resort to measures which are conducive to heart and ojas, cleaning of explaines śrotas, and also make efforts for serenity of mind and knowledge[19].

TABLE 2

Some important negative psychological states that act as etiopathogenic factor in the causation of various somatic and psychosomatic illnesses

| Psychological states | Psychosomatic illnesses | Reference |
|---|---|---|
| 1. Krodha | Pittaja jvara | Carakasamhita, Nidānasthānam, 1/12, |
| | Pittaja prameha | Ibid, 4/124 |
| | Kṣayaja rājayakṣma | Ibid, 6/8 |
| | Pittaja gulma | Ibid, 5/12 |
| | Pittaja atisāra | Ibid, 19/6 |
| | Tṛṣṇā | Carakasamhita, Cikitsāsthānam, 22/6 |
| | Delayed healing of wound | Ibid, 25/33 |
| | Pratiśyāya | Ibid, 26/104 |
| | Vātavyādhi | Ibid, 28/16 |
| 2. Śoka | Vātaja jvara | Carakasamhita, Nidānasthānam, 1/19 |
| | Vātaja prameha | Ibid, 4/36 |
| | Kṣayaja rājayakṣma | Ibid, 6/8) |
| | Vātaja gulma | Ibid, 5/9 |
| | Pāṇḍu | Carakasamhita, Cikitsāsthānam, 16/9 |
| | Sannipātika atisāra | Ibid, 19/8 |
| | Śokātisāra | Ibid, 19/9 |
| | Vātaja chardi | Ibid, 20/7 |
| | Tṛṣṇā | Ibid, 22/6 |
| | Delayed healing of wound | Ibid, 25/23 |
| | Arocaka | Ibid, 26/124 |
| 3. Cinta | Kṣayarājayakṣma | Carakasamhita, Nidānasthānam, 6/8 |
| | Pāṇḍu | Carakasamhita, Cikitsāsthānam, 16/9 |
| | Sannipātika atisāra | Ibid, 19/8 |
| | Hṛdroga | Ibid, 16/77 |
| | Vātavyādhi | Ibid, 28/16 |
| 4. Bhaya | Kuṣṭha | Carakasamhita, Nidānasthānam, 5/6 |
| | Sādhāraṇajanyakṣaya | Ibid, 6/6 |
| | Kṣayaja rājayakṣma | Ibid, 4/6 |
| | Pāṇḍu | Carakasamhita, Cikitsāsthānam, 16/9 |
| | Sannipātika atisāra | Ibid, 19/6 |
| | Āgantuja atisāra | Ibid, 19/9 |
| | Vātaja chardi | Ibid, 20/7 |
| | Hṛdroga | Ibid, 26/77 |
| 5. Harṣa | Kaphaja jvara | Carakasamhita, Nidānasthānam, 1/25 |

There are important descriptions regarding the preventive measures of psychosomatic disorders like the vikāras of heart and blood vessels, e.g. coronary artery disease, hypertension, the ojas vikāras (immunological disorders) like rheumatoid arthritis, bronchial asthma, thyrotoxicosis, allergic skin disorders. All these are known to be produced and aggravated by various mental conflicts like kāma, krodha, śoka bhaya, chittodvega (anxiety), avasâda (mental depression), etc. Today an entirely different branch of science i.e. psychoneuroimmunology has emerged which studies the impact of psychological factors on the biochemical neurotransmitters and immune factors leading to different kinds of diseases.

**Pathogenesis of psychosomatic disorders**

Specific features of etiological factors (nidāna), doṣas and dhātus determine the bodily immunity or susceptibility of manifestation of a disease[20]. When the equilibrium of these three factors is disturbed or when they do not support each other or when they are weak, then either the disease does not manifest or there is delay in manifestation or the disease is very mild or all its symptoms are not properly manifested. If the situations are contrary to what is mentioned above, the corresponding result will also be otherwise.

**Manobala influencing manifestation of a disease**

According to āyurveda, development of a disease also depends upon the psychic personality and mental strength described in terms of manobala, which differs from individual to individual. Depending upon the predominance of satva-raja-tamo guṇas, mental strength is of three types viz. pravara, madhyama and avara[21]. The individual having avarasatva, low mental strength, even if possess plump or big physique, cannot tolerate even mild pain; they are susceptible to fear, grief, greed, delusion and ego; thus because of low tolerance and maladjustment the individual of avarasatva are highly vulnerable to psychosomatic disorders[22].

This description of pathogenesis in āyurveda is similar to the stages of development of stress-response described by Hans Selye: '.....alarm reaction, stage of resistance and stage of exhaustion called General Adaptation Syndrome'[6], which emphasises that it is the level of stress (etiological factors) and the duration of stress characterised by its long term persistence, results into development of a specific psychosomatic disease. In other words, a severe or moderately severe type of stress is able to produce disease only when it persists for long time (kālaprakarṣa); the duration of which differs from individual to individual based on the status of body tissues (immunity) and psychic personality.

Thus, the etiological factors, which are stressors in case of psychosomatic disorders, vary in scope, intensity and duration. The way the person perceives situation, whether consciously or unconsciously, is also significant, which depends on the type of satva (mental strength) of the individual, which modifies the perception depending upon his genetic constitution (prakṛti), earlier conditioning influences, past experiences and cultural pressures.

Thus the degree of adaptability of an individual is genetically determined, which according to āyurveda, depends upon the prakṛti (psychosomatic constitution). If adaptation to physical or psychological stressor is successful, the dynamic steady state of homeostasis is maintained or restored. Homeostasis will be

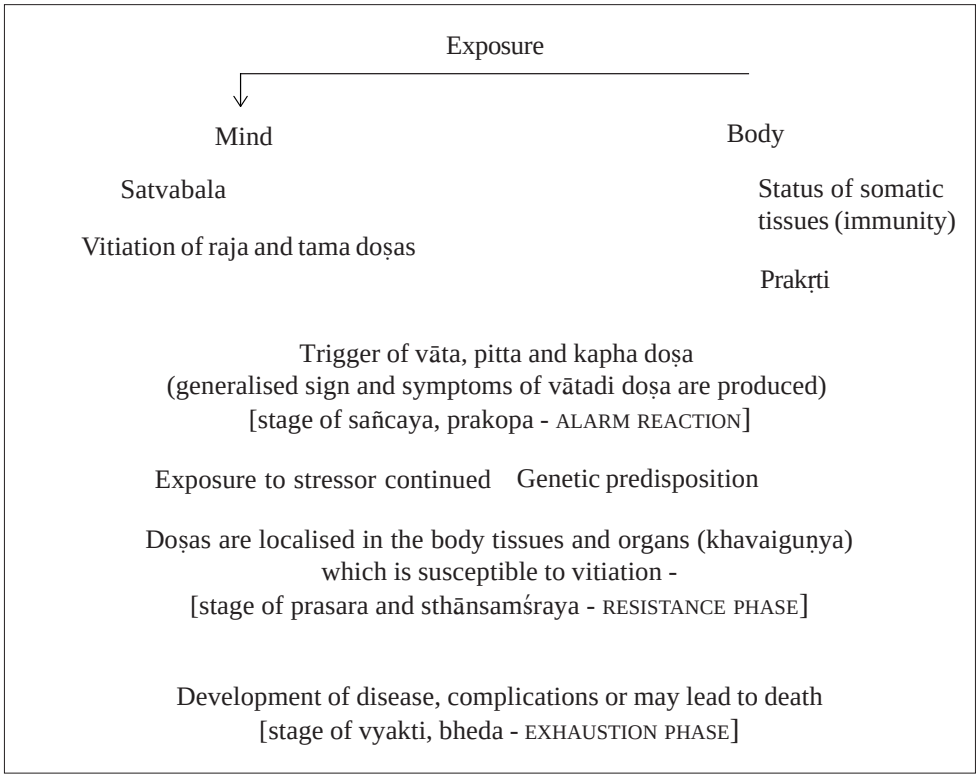
disrupted, if the adaptive response is inefficient, inappropriate or excessive; the consistent faulty adaptation results into a psychosomatic disorder in individual of weak-psychosomatic constitution.

The pathogenesis of psychosomatic disease described in āyurveda can also be understood in the light of stress response in terms of HPA (Hypothalamic-pituitary adrenocortical) axis involvement. The psychic stress perceived by mind stimulates hypothalamus, which leads to a series of changes by stimulating endocrinal glands and by producing various stress hormones (similar to trigger of doṣas i.e. vāta, pitta, kapha, raja and tama), which, after the function of somatic tissues (dhātus), ultimately produce different kind of pathologies or disorders.

Schematic presentation of pathogenesis of psychosomatic disorders based on āyurveda:- Stressors (nidāna) - psychic stress i.e. kāma, śoka, bhya, krodh, etc.; unwholesome diet, life style and code of conduct (asātmendriyārtha, prañjāparādha); environmental stress - climatic changes (kāla/pariṇāma) (Chart 1)

Thus, there are lot of descriptions available in āyurvedic classics regarding stress related disorders and psychosomatic disorders. It is the

Chart 1
Schematic presentation of pathogenesis of psychosomatic disorders based on āyurveda



need of the present era to understand the application of āyurvedic principles regarding the pathophysiology of stress and psychosomatic disorders and its sound preventive measures.

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8. Ibid, 25/40
9. Carakasamhita, Vimanasthanam, 3/20
10. सत्वतश्चेति सत्वमुच्यते मनः ।
    तच्छरीरस्य तन्त्रकमात्मसंयोगात् ।
    (च. वि. ८/११९)
11. शरीरं ह्यापि सत्वमनुविधीयते, सत्वं च शरीरम् ।
    (च. शा. ४/३६)
12. .....वायुस्तन्त्रयन्त्रधरः, .....नियन्ता प्रणेता च मनस,.....। (च. सू. १२/८) (?)
13. कामशोकभयाद्वायुः, क्रोधात् पित्तं,.....।
    (च. चि. ३/११५)
14. हर्षश्लेष्मा.....। (च. नि. १/२५) (?)
15. ते च विकाराः परस्परमनुवर्तमानाः
    कदाचिदनुबध्नन्ति कामादयो ज्वरादयश्च ।।
    (च. वि. ६/८)
16. अत्र परस्परस्केन, शरीराणां शरीरेन, मनसानां मनसेन, शरीराणां मनसेन, मनसानां शरीरेण, चानुबन्धो ज्ञेयः । (चक्रपाणि – च.वि. ६/८)(?)
17. करुणार्द्रमनः शुद्धं सर्वज्वर विनाशनम् ।
    (अ.हृ.चि.)
18 *Śārṅgadharasamhita*, I. 39)
19. तन्महत् ता महामूलास्तच्चौजः परिरक्षता ।
    परिहार्य विशेषेण मनसो दुःखहेतवः ।।
    (च. सू. ३०/१३)
20. इह खलु निदानदोषदूष्यविशेषेभ्यो
    विकारविघातभावाभावप्रतिविशेषा भवन्ति ।
    (च. वि. ४/४)
21. सत्वं मनोबलं गुणविशेषो रजस्तमसोविपक्षः सत्वे, सति पिडादिसहिष्णुत्वं मनोबलं भवति ।(डलहण)
22. सत्त्वतश्चेति – सत्त्वमुच्यते...।। (च.वि. ८/११९)


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Clinical observation

# ACUTE MYELOID LEUKEMIA - M1

Madhu K.M.*

A 16 year old girl came to Arya Vaidya Sala, Charitable Hospital, special OPD with complaints of abdominal pain, mild regular fever and dry cough on 16.06.2004. On examination she revealed that reddish discolouration on skin and gum bleeding were seen occasionally and continuous body ache.

Her records showed that she was diagnosed as acute myeloid leukemia-M1 through bone marrow aspiration on 08.04.2004 from Nizam's Institute of Medical Sciences, Hyderabad. Her USG abdomen showed mild splenomegaly and X-rays showed mild degree of pleural effusion with sign of consolidation of basal segment of left lower lobe. Her Hb was 5.4gm%, total count was 3000/cumm, platelets was 4000/cumm, red cell count was 2.3 mill/cumm, polymorphs 21%, lymphocytes 54%, blasts 72% and ESR was 70mm/one hr. Doctors of Nizam's Institute of Medical Sciences advised for chemotherapy but the patient and relative were against for doing the same.

She had a history of headache and fever on alternate days for one-year duration. Six months before cough started. Two months before cough increased and rise of temperature were seen daily. Blood were transfused whenever the Hb% level comes down. Blood picture on 2-4-2004 was Hb 9.1gm%. Total count was 3000/cumm and platelets were 18,000/cumm. Her diet was iddly and tea at 8am, fruit juice at 9am, fruits at 10.30 am, Vegetarian lunch at 12.30 pm, fruits at 4 pm and vegetarian dinner at 8 pm.

The following medicines were prescribed.

1. Nimbamruthadi Panchathiktham Kashayam 10 ml + warm water 40 ml + Chandraprabha vatika one. To be taken at 6 am and 6 pm on empty stomach.
2. Nityakalyani ext. 1gm + Pippali churnam 1gm + Cap. RRT (Rasasindooram 200mg, Rajathabhasmam 100 mg and Thalakabhasmam 50 mg) one. (To be taken at noon and night before food).
3. Balaswagandhadi tailam, warm and apply all over body, massage gently for one hour and take bath with warm water.
4. Ayolipta tippali 4gm to 8gm. To be taken at early morning (5 no. of tippali made paste with warm water and apply on cast iron pan for whole night. Next morning scrape the paste - 4gm to 8gm and mix with milk)

Her diet habit was revised in the following manner with the advice not to use non-vegetarian diet, spicy food, heavy food, red chilies, tamarind and curd.

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**Physician, Clinical Research Unit, Charitable Hospital, Kottakkal Arya Vaidya Sala, Kottakkal*

7.00 am Light refreshment
11.00 am Vegetarian lunch
3.00 pm Light refreshment/black tea/juice
7.00 pm Vegetarian dinner

Monthly review checkups were advised. After 4 months, the blood picture was:

| | |
|---|---|
| Hb | 12.5gm% |
| Total Count | 7200/cumm |
| Platelet | 3.9 lakh/cumm |

Polymorphs 29%, lymphocytes 29% and ESR were 5mm/one hr.

Ayolipta tippali was stopped. Advised to use Chyavanaprasam 10gm at bedtime and continue the medications.

On 25-08-2008, patient came for review. She told she had an incident of chest infection. During that period body ache and joint pain were seen severely. A modification was done on medicines as follows:

1. Sahadevyadi leham – 3gm (To be taken at 6 am and 6 pm)
2. Gugguluthiktam kashayam
3. Nityakalyani ext. 1gm + Pippali curnam 1gm + Cap.RRT one (To be taken at noon and night before food)
4. Sanjivani tailam. Apply all over body/painful area. Wipe off with warm water.
5. Kooshmandarasayanam 10 gm (to be taken at bedtime)

On 20.10.2008, patient came for review. The blood picture was Hb 11.4gm%, total count 12.200/cumm, platelets 3.4 lakh/cumm, polymorphs 82%, lymphocytes 15%, ESR was 65 mm/one hr. Presently she is free from abdominal pain, cough and fever. The reddish discolouration on skin and gum bleeding were not seen. Her physiological condition was much better. She is able to do all works and is running a normal life. She was advised to continue the medications.

The case can be viewed in an āyurvedic way in the following manner. We may correlate the case as a type of pāṇdu. Kapha vitiation is more in the condition. As a result srotorodha can happen. The formation and maturation of blood cells are blocked. The blocking effect of kapha is rectified with the srothaśodhana treatment and normal function of pitta also restored. The process of transformation of rasadhātu into raktadhātu is affected here. The dhātvāgni has to be stimulated so as to improve the transformation process.

Pleehamaye pippali (for the diseases of spleen, pippali is the topmost). This treatment principle is used here. The effect of Pippali churnam will certainly stimulate the action of spleen which will help to maintain the blood levels in this disease.

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# MANAGEMENT OF WILSON'S DISEASE THROUGH ĀYURVEDIC PRINCIPLES AND PRACTICE - A CASE REPORT

Achintya Mitra and Jayram Hazra*

Abstract: A 13 year old girl, presented with Wilson's disease with its cardinal features of growth retardation, hoarseness of voice and joints pain since childhood, was treated with āyurvedic drugs, where subjective and objective parameters improved including level of serum ceruloplasmin and 24 hours copper in urine. The serum cereuloplasmin level was improved 34.04% as well as it became within normal limit and estimation of copper in 24 hours urine was decreased 95.34% in 37 days treatment schedule. As it is a rare case, āyurvedic treatment modalities were used with good results.

## Introduction

Wilson's disease or hepatolenticular degeneration is an autosomal recessive genetic disorder in which copper accumulates in tissues; this manifests as neurological or psychiatric symptoms and liver diseases. The condition is due to mutations in the Wilson disease protein (ATP7B) gene[1]. In āyurveda, this condition may be considered under janmabalapravṛtta vyādhi[2] and vāta along with pitta are of responsible intrinsic factors for disease progression. A 13 year old girl was admitted in the IPD for āyurvedic treatment with symptoms of growth retardation, hoarseness of voice, difficulty in deglutition, pain and stiffness of all joints, lethargy, snoring and loss of appetite. She was diagnosed from a leading paediatric hospital at Kolkata as Wilson's disease.

## Materials and methods

Diagnosis and assessment: - Levels of ceruloplasmin are abnormally low (<0.2 gram/liter) in 80-95% of cases of Wilson's disease. Low ceruloplasmin is also found in Menkes disease and aceruloplasminemia, which are related to, but much rarer than, Wilson's disease[3]. The combination of neurological symptoms, Kayser-Fleisher rings and a low ceruloplasmin level is considered sufficient for the diagnosis of Wilson's disease[4].

Serum copper and more importantly urine copper are elevated in Wilson's disease. Urine is collected for 24 hours in a bottle with a copper-free liner. Levels above 100 ì g/24h (1.6 ì mol/24h) confirm Wilson's disease, and levels above 40 ì g/24h (0.6 ì mol/24h) are strongly indicative[5].

In this case both subjective and objective

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parameters were evaluated. Serum ceruloplasmin, 24 hours urine copper estimation, routine blood, liver function tests were carried out before and after treatment for assessment.

Treatment regimen: - Dīpana - pācana treatment was given for 14 days at Out Patient Department and no dietary restriction was advised. After this treatment, patients was admitted at In-patient Department for samśodhana treatment[6] and she was undergone snehapāna for 7 days with Kalyāṇakaghṛta[7] and Dhānvantaraghṛta[8] (1:1, v/v), svedana for 3 days and virecana with Ereṇḍataila[9] (10ml single dose). After virecana, 5 days samsarjankrama was followed and mātravasti with Kṣīrabalataila[10] (35 ml / day, p/r) for 7 days with patrapiṇḍa paṭoli sveda[11]. During mātravasti and patrapiṇḍa paṭoli sveda, śamana treatment as per signs and symptoms was carried out.

**Result and discussion**

In people with Wilson's disease, copper begins accumulating in the liver immediately after birth, but signs and symptoms generally occur before the age of 5-6 years. The disease almost always becomes apparent before age 30, but Wilson's disease symptoms sometimes appear much later in life. The stored copper can damage many organs and tissues, but the liver and central nervous system are most often affected[12]. In the present case, symptoms had been noticed at the age of 5 years. The case was presented with marked growth retardation, mild to moderate degree of pain of all joints, difficulty in speaking with hoarseness, drooling, loss of appetite and lethargy. The case was first diagnosed by the reputed paediatric hospital in Kolkata and patients had refused to take medicines after few months as she was gradually became poor and even she was unable to attend the school.

This is the rare condition in which the total body copper is increased; with excess copper deposited in causing damage to several organs in late stage. A low serum ceruloplasmin is the best single laboratory clue to the diagnosis and assessment. A high copper content in urine is also best supportive tests for Wilson's disease. The copper binding agent penicillamine is the drug of choice in Wilson's disease and liver transplantation may be needed for acute hepatic failure or for advanced cirrhosis with liver failure[12].

In the present case, the subjective and objective parameters were assessed. In objective findings, haemoglobin perecentage was improved (10 g / dl, 11.2g /dl.), erythrocyte sedimentation rate was reduced (30 mm of 1st hour, 20 mm of 1st hour) whereas there was significant changes in liver function tests except value of alkaline phosphatage. The level of alkaline phosphatage was remarkably reduced to 86.81 % (690 IU/L, 91 IU/L). The serum ceruloplasmin level and estimation of copper in 24 hours urine were carried out before and after treatment. The serum cereuloplasmin level was improved 34.04% as well as it became within normal limit (14.1 µg / dl, 18.9 µg / dl) and estimation of copper in 24 hours urine was decreased 95.34% (2144 µg / L, 98 µg / L) in 37 days samsadhana treatment schedule which resembled an encouraging scientific value (Table 1).

**Conclusion**

In the present study, samsadhana cikitsa had been performed in a case of Wilson's disease after exploration of doṣa-dūṣyas and rogibala as per āyurevdic principles and practice. Dipanīya-pācaniya cikitsa followed by snehapāna, bhaṣpasveda, virecana, samsarjanakarma, mātravasti along with patrapiṇḍa paṭoli svedana

TABLE 1
The objective values of the case study

| Parameters with units | Before Treatment | After Treatment | Normal value |
|---|---|---|---|
| Hb% (g/dl) | 10.0 g/dl | 11.2 g/dl | |
| TC of WBC Count (cmm) | 6,800/Cumm | 7,000 /Cumm | |
| DC of WBC | $N^{64}L^{33}E^{02}$ $M^{01}$ | $N^{66}L^{30}E^{04}$ | |
| ESR (mm/1st Hr.) | 30 mm/1st Hr. | 20 mm/1st Hr. | |
| Blood Sugar | 83.0 mg /dl | | |
| Liver Function tests: | | | |
| Total Bilirubin | 0.43 | 1.07 mg/dl | < 1.1 mg/dl |
| SGOT | 36.0 | 37 IU/L | 8-40 IU/L |
| SGPT | 34.0 | 34 IU/L | 5-40 IU/L |
| Total Serum Protein | 8.1 | 7.2 mg/dl | 6.6-8.3 mg/dl |
| Serum Albumin | 4.2 | 4.1 mg/dl | 3.5-5.0 mg/dl |
| Serum Globulin | 3.9 | 3.1 mg/dl | 3.1-3.3 mg/dl |
| Alk. Phosphatase | 690 | 91 IU/L | A- 60-170 IU/L |
| Serum Creatinine | 0.6 | 0.6 mg/dl | F-0.5-0.9 mg/dl |
| Serum Ceruloplasmin ( µg /L) | 14.1 mg/dl | 18.9 mg/dl | 15-60 mg/dl |
| 24 hours copper estimation in urine | 2144.0 µg/L | 98.0 µg/L | 2.00-30.00 µg/L |

had been carried out in 37 days treatment schedule. The total clinical condition was improved when evaluated on the basis of subjective and objective parameters. Serum cereloplasmin and estimation of copper in 24 hours urine are of cardinal parameter for diagnosis and assessment of this case. In the present study, serum cereloplasmin level was increased and maintained within normal range, and moreover, the copper level in 24 hours urine was remarkably reduced.

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# FUNDAMENTALS OF BHAIṢAJYAKALPANA - A HOLISTIC APPROACH

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Abstract: Basic and holistic understanding of Fundamentals of Bhaiṣajyakalpana is mandatory for every āyurvedic scholar. At present this title is being addressed in under graduate and post graduate curricula of āyurvedic studies very casually which is not adequate. In this context, some set of parameters referring to our ancient classics are proposed. Incorporation of these are to be considered in the academic syllabi of studies of ayurveda at different strata.

**Introduction**

At present, the world is a global village and transferring information each other is a welcoming phenomena. This transfer of information has incorporated āyurvedic system of medicine in the main stream and this is the reason why Indian system of medicine is getting popularity and its legal acceptance across the globe in the current scenario.

Success of any system of medicine primarily depends on its fundamental doctrines of diagnosis, therapeutics and, of course, medicines prescribed during the course of treatment. The manufacturing qualities of formulations of any system of medicine are primarily responsible for its pharmacological and therapeutic effects. To achieve the objects of quality, standard, safe and efficacious medicines, one always needs to follow the fundamentals during the manufacturing processes. These fundamentals of manufacturing processes are prominently mentioned in āyurvedic classics, but not at one place or in one section (sthāna) or in one chapter; this information is scattered here and there all over the classics.

More so, ever since the title 'Fundamentals of Bhaiṣajyakalpana' is mentioned in the curricula of undergraduate syllabus of CCIM, some points have been discussing in the text books of Bhaiṣajyakalpana (āyurvedic pharmaceutics), which are not adequate to cover the required information desired for quality production of āyurvedic formulations. Therefore, it was planned to collect all the information in this context from Bṛhattrayi to GMP notification (schedule T of Drug and Cosmetic Rule 1945) of Deptt. of AYUSH, Government of India.

**Material and method**

Carakasamhita, Suśrutasamhita, Aṣṭāṅgahṛdaya, Śāraṅgadharasamhita and GMP Notification of Government of India were referred to get facts and figures related to quality control, quality assurance and validation for manufacturing of āyurvedic formulations. Some useful points with regard to selections of raw material, collection and storage techniques and precautions during

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manufacturing processes have covered; properties of good medicines, choice of route of administration, factors for the dose determination as well as duration of the administration of medicine have also explained.

All the above information have been arranged chronologically, discussed and inter-related under various subtitles, and finally have drawn conclusions that what titles may be added in the curriculum of undergraduate and postgraduate under the heading of Fundamentals of Bhaiṣajyakalpana.

**Observations**

**Carakasamhita**

a. Basic primary dosage forms: - Carakasamhita describes five basic dosage forms viz. svarasa (expressed juice), kalka (pasty mass), śṛta (decoction), śīta (cold percolation/ maceration) and phāṇṭa (hot infusion); and emphasises the therapeutic categorisation by quoting its chronological order i.e. predecessor one is more effective in comparison of successor[1].

b. Standardisation and quality control: - In Vimānasthāna, it discusses some important factors that are must for manufacturing of quality āyurvedic medicines. As a first step, Caraka describes samskāra i.e. pharmaceutical process with the objectives of change/ synergism/potentiation/reduction in different physiological/pharmacological and therapeutical properties of substances[2].

   Counting the factors to be considered for quality control of āyurvedic formulation during their manufacturing process, ācārya describes the following points: i. toya sannikarṣa (treatment with water), ii. agni sannikarṣa (treatment with heat energy), iii. śauca (purification/hygiene), iv. mathana (churning/homogenous mixing), v. deśa (effect of local geography), vi. kāla (effect of local environment), vii. vāsana (aromatic effect on medicament), viii. bhāvana (levigation/ impregnation) ix. kālaprakarṣa (effect of duration on storage of finished product) and x. bhājana (effect of quality/material of utensil used in the manufacturing process).

c. Quality control: - Kalpasthāna emphasises the effect of deśa, kāla and bhājana on properties and potency of a substance. Any pharmacological and therapeutic action may takes place due to inheritance of properties from these resources[3]. By virtue of appropriate samyoga (addition of ingredients), kāla (appropriate time) and samskāra (proper manufacturing process which infuse some properties), even a small quantity of a drug may produce more powerful effects and vice-versa (even a recipe in large quantity may produce very mild effects)[3a].

d. Quality assurance: - Even drugs of antagonistic potency are added to a recipe in order to impart desirable colours, taste, touch and smell. Such addition also helps to cure the diseases effectively[4]. In this context, ācārya points out that the following should be avoided[4a]: i) unseasoned and untimely collected drugs, ii) therapeutic administration in less or excess dose, iii) drugs that are stored for a longer period after collection, iv) prepared without proper impregnation and v) improperly processed.

e. Potential up-gradation: - For enhancement of the potency of a recipe, it is necessary to impregnate (bhāvana) the ingredients either with the juice or decoction of the same drug.

By this, even a small quantity of the drug becomes exceedingly effective[5].

f. Properties: - Finally, it is concluded that a medicine may be called as best if it possesses the following features[6]: i) small in quantity but quick in action, ii) capable of eliminating morbid doṣas easily in large quantity, iii) light in digestion, palatable, pleasing and curative of the concerned disease, iv) not causing any serious complications, v) quite good on physiological parameters, means it should not produce depression and vi) agreeable smell, colour and taste.

**Suśrutasamhita**

a. Basic primary dosage form: - There are six basic dosage forms in āyurveda[7]. These are kṣīra (latex), rasa (expressed juice), kalka (pasty mass) śṛta (decoction), śīta (cold percolation) and phāṇṭa (hot infusion). These are counted in decreasing order of potency on therapeutic parameters.

b. Properties: - The raw material should be procured from good soil, on a pious day, in prescribed correct dose, should possess acceptable organoleptic characters and it should not show any adverse reactions even if it is administered with the substances which are not suitable for the patient and disease[8]. And of course, it must show all good therapeutic effect when administered after proper examination of patient and disease.

c. Therapeutic dose: - The amount of therapeutic dose of any medicine is in increasing order except in general debility and geriatric[9]. Ācārya also states that the dose of medicine in childhood and old is comparative.

d. Quality assurance:- A plant grown in good area may be collected for preparation of medicine provided that is not contaminated, infected, injured, poisonous, not affected by environmental factors during transportation and the plant must be matured and full of its desired qualities[10]. Suśrutasamhita quantifies the difference in properties of new and old substances, and directs that substances like honey, ghee, jaggery, black pepper, viḍaṅga of older quality should be used; but the rest may be taken of fresh quality[11]. Regarding procurement of raw material, it indicates that those substances which are grown in another season, infested, not from good soil, and cereals which are new, should not be considered for medicinal purposes. They may produce many kind of adverse effect[12].

e. Soil test for quality assurance: - Proper examination of soil and place in the vicinity must be done before procurement of plants. The plants grown in muddy rocky soil, uneven surface, soil full of termites, religious places, alkaline soil and soil with heavy storage or shortage of water should not be taken. The plant material may be accepted from such a ground that is always rich with different vegetation[13].

f. Dose determination: - Dose may be fixed in accordance of the status of disease and patients; for example, in moderate condition of disease and patient, decoction, cūrṇa and kalka may be prescribed 4 pala, 1 pala and ¼ pala respectively[14].

**Śārṅgadharasamhita**

a. Quality assurance: - Regarding the difference in weight of fresh and dried raw material, one fundamental concept has been established by Ācārya Śārṅgadhara that fresh drugs may be taken in double amount in

comparison of dried drugs[15]. He also points out about the priority of season to get more better specific pharmacological actions for e.g. śarat ṛtu is the best time for collection of herbs for all types of preparations; for herbs which are indicated for vamana and virecana, the best time is the end of vasanta ṛtu[16].

b. Stability period of different dosage forms:- Generally, medicinal recipes lose their potency after one year of their preparation; cūrṇas (powder) after two months, guṭikas (pills) and lehyas (confection) after one year, ghṛtas and taila (ghee, oils) after four months (in another sect it is 16 months), recipes which are digested (ADME) easily and quickly become poor in action after one year, while āsavas (self generated alcohol preparations) and dhātu (metal and mineral recipes) become more potent as they become old[17].

c. Rules for drug administration: - Regarding the time for administration of medicine, it is indicated that all medicines are generally administered in the morning specially with some difference for decoction. Other times for better effect of medicines are, at the time of sun rise, midday meal, night meal at frequent intervals (SOS) and at bed time. These are the five suitable times for the administration of medicine[18].

**Contemporary views**

Some contemporary works consider five points under the heading of fundamentals of Bhaiṣajyakalpana: i) paribhāṣa, ii) māna, iii) pañcavidha kaṣāya kalpana, iv) rasa-guṇa-vīrya-vipāka-prabhāva and v) anukta viśeṣokta[19]. Some other counts it as ten viz i) anukta viśeṣokta, ii) paribhāṣa, iii) auṣadha kalpana, iv) auṣadha nāmakaraṇa, v) rasa-guṇa-vīrya-vipāka-prabhāva, vi) bhaiṣajya mārga, vii) mātra, viii) anupāna, ix) auṣadhasevanakāla and x) savīryata avadhi[20].

**Discussion**

What are fundamentals of Bhaiṣajyakalpana? What are its relevancy and why knowledge of fundamentals is so important? Whether the knowledge of these fundamentals is applicable in the present day pharmaceutics?

Fundamentals are basic theme of any discipline of knowledge. With the knowledge of these categorised parameters one can go ahead in course of completion of the object. Hence, here the object is to understand the parameters that are responsible for quality production of āyurvedic medicine.

Carakasamhita is considered as the reference book, almost in all respect, of all discipline of knowledge in āyurveda. This is true in the case of Bhaiṣajyakalpana too. One can observe that most of the theme points i.e. quality assurance, quality control of raw material, intermediary preparations and finished products are covered in Carakasamhita[21]. It describes five basic fundamentals and their chronological order of potency which is very significant in deciding the dosage form. The best part of fundamentals of Bhaiṣajyakalpana is in Vimānathānam in which the classical effect of different kinds of pharmaceutical procedures on the property of treated materia medica is emphasised. In this section, the effect of different kinds of media, purification, heat and other pharmaceutical procedures are covered. The points like the effect of aroma (that makes the formulation more palatable) and the effect of the material of the container (used in the manufacturing process), etc. are very significant. In Vimānasthānam, it describes the

qualities that must be present in a substance to be called as a medicine[22]. Here, the beauty of the concept of ācārya is that he has covered not only the properties, the dose, the pharmacological actions (pharmacokinetics and pharmacodynamics) but the effect of modification on the mental status of the patients also; he emphasised that the drug must be free from all kinds of side effect, adverse drug reactions (ADR) which are subject material of Pharmacovigilance at present.

Suśruta and Vāgbhaṭa also have contributed very high to the fundamentals of Āyurvedic Pharmaceutics. All the parameters that are notified at present under the heading of Good Agricultural Practices (GAP) and Good Collection Practices (GCP) have been systematically covered in Suśrutasamhita[23].

The contribution of Śārṅgadharasamhita in the field of Āyurvedic Pharmaceutics is unparallel in the specific reference of systematic presentation. The chapters named on the basis of different dosage forms consist of definition, synonyms, manufacturing process, completion tests, dose, duration, description of anupāna and sahapāna. The most important contribution of Ācārya Śārṅgadhara is the description on 'saviryata avadhi' of different kinds of āyurvedic dosage forms[24]. On the basis of which Government of India has notified the stability period of different dosage form in November, 2005 which are mandatory for the export of different dosage forms.

**Conclusion**

All these references corroborate the need of inclusion of these points in the curriculum of undergraduate and postgraduate studies of Bhaiṣajyakalpana, and it is proposed that the following headings may be termed as Fundamentals of Bhaiṣajyakalpana: i) paribhāṣa and māna, ii) identification, authentification, collection and storage of raw material, iii) rasa-guṇa-vīrya-vipāka-prabhāva (pharmacological property of raw material), iv) manufacturing process under Standard Operative Procedure (SOP) and Good Manufacturing Practices (GMP), v) completion test, vi) stability period and vii) route of administration, dose and duration. And the notifications of Department of AYUSH, Government of India regarding GMP (Schedule T, D&C Rule 1945) may also be covered under the heading of Fundamentals of Bhaiṣajyakalpana. Also, apart from the five points mentioned by contemporary authors, the factors numerated in Carakasamhita (Vim. 1/22) and concept of Ācārya Śārṅgadhara regarding 'saviryata avadhi' may be included in the undergraduate studies under the heading of Fundamental of Bhaiṣajyakalpana.

Incorporation of all these pharmaceutical points in the curriculum will help to make it more comprehensive.

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2. संस्कारो हि गुणान्तराधानमुच्यते । ते गुणास्तोया–ग्निसन्निकर्षशौचमन्थनदेशकालवासनभावनादिभि: कालप्रकर्षभाजनादिभिश्चाधीयन्ते ।। (च. वि. 1/21(2))
3. तानि तु द्रव्याणि देश–काल–गुण–भाजन–संपद्वीर्यबलाधानात् क्रियासमर्थतमानि मवन्ति ।। (च. क. 1/7)

4. इष्टवर्णरसस्पर्शगन्धार्थं प्रति चामयम् । अतो विरुद्धवीर्याणां प्रयोग इति निश्चितम् ।।
(च. क. 12/48)

5. भूयश्चैषां बलाधानं कार्यं स्वरसभावनैः । सुभावितं ह्यल्पमपि द्रव्यं स्याद्बहुकर्मकृत् ।। स्वरसैस्तुल्य-वीर्यैर्वा तस्माद् द्रव्याणि भावयेत् । (च. क. 12/46)

3a. अल्पस्यापि महार्थत्वं प्रभूतस्याल्पकर्मताम् ।।
कुर्यात् संयोगविश्लेषकालसंस्कारयुक्तिभिः ।
(च. क. 12/48)

6. अल्पमात्रं महावेगं बहुदोषहरं सुखम् ।
लघुपाकं सुखस्वादं प्रीणनं व्याधिनाशनम् ।।
अविकारि च व्यापत्तौ नातिग्लानिकरं च यत् ।
गन्धवर्णरसोपेतं विद्यान्मात्रावदौषधम् ।।
(च. सि . 6/15-16)

4a. अकालेऽल्पातिमात्रं च पुराणं न च भावितम् ।
असम्यक्संस्कृतं चैव व्यापद्येतौषधं द्रुतम् ।।
(च. सि. 6/28)

7. क्षीरं रसः कल्कमथो कषायः श्रृतश्च शीतश्च तथैव फाण्टम् । कल्पाः षडेते खलु भेषजानां यथोत्तरं ते लघवः प्रदिष्टा ।। (सु. सू. 44/91)

8. प्रशस्तदेशसम्भूतं प्रशस्तेऽहनि चोद्घृतम् ।
युक्तमात्रं मनस्कान्तं गन्धवर्णरसान्वितम् ।।
दोषघ्नमग्लानिकरमविकारि विपर्य्यये ।
समीक्ष्य दत्तं काले च भेषजं पाद उच्यते ।।
(सु. सू. 34/22-23)

9. तत्रोत्तरोत्तरासु वयोऽवस्थेसूत्तरोत्तरा भेषजमात्राविशेषा भवन्ति, ऋते च परिहाणेः । तत्राद्यापेक्षया प्रतिकुर्वीत ।। (सु. सू. 35/30)

10. तस्यां जातमपि कृमिविषशस्त्रातपपवनदहनतोय-ससम्बाधमार्गैरनुपहतमेकरसं पुष्टं पृथ्ववगाढमूल-मुदीच्याश्चौषधमाददीतेत्येष भूमिपरीक्षाविशेषः सामान्यः । (सु. सू. 36/3)

11. सर्वाण्येव चाभिनवान्यन्यत्र मधुघृतगुडपिप्पली-विडङ्गेभ्यः । (सु. सू. 36/7)

12. अनार्तवं व्याधिहतमपर्यागतमेव च ।
अभूमिजं नवञ्चापि न धान्यं गुणवत् स्मृतम् ।।
नवं धान्यमभिष्यन्दि लघु संवत्सरोषितम् ।
विदाहि गुरु विष्टम्भि विरूढं दृष्टिदूषणम् ।।
(सु. सू. 46/50-51)

13. श्वभ्रशर्कराऽश्मविषवल्मीकश्मशानाधातनदेवता-यतनसिकताभिरनुपहतामनूषरामभङ्गुरामदूरोदकां स्निग्धां प्ररोहवतीं मृद्वीं स्थिरां समां कृष्णां गौरीं लोहितां वा भूमिमौषधार्थं परीक्षेत । (सु. सू. 36/3)

14. व्याध्यादिषु तु मध्येषु क्काथस्याञ्जलिरिष्यते ।
बिडालपदकं चूर्णं देयः कल्कोऽक्षसम्मितः ।।
(सु. सू. 39/14)

15. शुष्कं नवीनं यद्द्रव्यं योज्यं सकलकर्मसु ।
आर्द्रं च द्विगुणं युञ्ज्यादेष सर्वत्र निश्चयः ।।
(शा. सं. 1/1/48)

16. शरद्यखिलकार्यार्थं ग्राह्यं सरसमौषधम् ।
विरेकवमनार्थं च वसन्तान्ते समाहरेत् ।।
(शा. सं. 1/1/59)

17. गुणहीनं भवेद्वर्षादूर्ध्वं तद्रूपमौषधम् ।
मासद्वयात्तथा चूर्णं हीनवीर्यत्वमाप्नुयात् ।।
हीनत्वं गुटिकालेहौ लभेते वत्सरात् परम् ।
हीनाः स्युर्घृततैलाद्याश्चतुर्मासाधिकात्ततः ।
ओषध्यो लघुपाकाः स्युर्निर्वीर्या वत्सरात् परम् ।।
पुराणाः स्युर्गुणैर्युक्ता आसवा धातवो रसाः ।
(शा. सं. 1/1/54-56)

18. ज्ञेयः पञ्चविधः कालो भैषज्यग्रहणे नृणाम् ।
किञ्चित् सूर्योदये जाते तथा दिवसभोजने ।।
सायन्तने भोजने च मुहुश्चापि तथा निशि ।
(शा. सं. 1/2/2-3)

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# EXCERPTS FROM CIKITSĀMAÑJARI - LXI

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Abstract: The causative factors of different types of karṇaroga (ear diseases) and their various treatments are discussed in this issue.

**DISEASES OF THE EAR**

Karṇaśūla has been classified into five viz. vātaja, pittaja, kaphaja, kṣataja and sannipātika. Karṇanāda, bādhirya, pratināha, karṇakaṇḍu, karṇaśopha, pūtikarṇa, kṛmikarṇa, karṇavidradhi, karṇārśa, karṇārbuda, kūcikarṇa, karṇapippali, vidārika, pāḷīśoṣa, tantrika, paripota, utpāta, unmantha, du:khavarṇa and lihyākhyā are the other diseases affecting the ear. Thus, total 25 numbers of diseases are grouped as ear-diseases.

Common cold, sporting in water, irritated by foreign bodies, assaulted by noise and other causes, perturbed vāta enters the channels of ear and give rise to sudden pain.

Among these karṇapippali, sannipāta karṇaśūla, vidārika and kūcikarṇaka are incurable. Tantrika is curable with difficulty and the remaining are curable.

For all ear diseases oleation, sudation, inunction, application of paste, errhine and bloodletting may be conducted as per the conditions.

Consumption of soup at night is prescribed for pain of the ear caused by deranged vāta. Sudation (of the painful ear) is recommended after external application of suitable oil capable of normalising vāta; and afterwards, fill the ear with the medicated juice prepared in the following manner. Apply oil and rock salt on the leaves of guñja (*Abrus precatorius*), vilva (*Aegle marmelos*), viśokadaḷa (*Saraca asoca*) and veḷḷerukku (*Calotropis procera*) and subject to puṭapāka; filling the ear with expressed juice from these leaves, in lukewarm, relieves earache.

Roots of kumizhu (*Gmelina arborea*), kūvaḷam (*Aegle marmelos*), pātiri (*Stereospermum colais*), palakappayāni (*Oroxylum indicum*) and muñña (*Premna corymbosa*) together is to be rolled in a cloth to make a wick. Dip the wick in oil and burn; collect the drops of oil that fall down as it burns and instill into the ear for quick relief from earache. The same process can be done with the wood of bhadrakāṣṭha (*Cedrus deodara*) kuṣṭha (*Saussurea lappa*) or sāraḷā (*Pinus roxburghii*).

External application with fine paste prepared with milk from devatāram (*Cedrus deodara*) and eḷḷu (*Sesamum indicum*) is recommended. Eḷḷu and śatakuppa can also be used in the same manner. Fumigation with medicated milk (pālpuka) around the painful ear is prescribed for sudation. For this, medicate the milk with

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kuṛunttōṭṭiver (root of *Sida rhombifolia* ssp. *retusa*) and the crushed leaves of āvaṇakku (*Ricinus communis*). Repeated sudation, application of heat with medicated bolus (piṇḍasveda), treatments indicated for vātavyādhi such as administration of enema with medicated kaṣāya and medicated oil (nirūha and anuvāsana) and the treatments indicated for facial paralysis (ardita) and chronic rhinitis (pratiśyāya) - all these are to be followed.

Crush iñci (*Zingiber officinale*) mixed with rock salt and tie in a cloth bundle; press it between fingers to instill the drops in the ear for sudden relief from pain. Mix finely chopped daśamūla with dhānyāmḷa and boil; use the vapour arising from it through a tube (naḷī sveda) for sudation for the relief of pain, discharge and heaviness of the ear. Apply oil on the leaves of āvaṇakku (*Ricinus communis*) and wither in fire; instillation of expressed juice from it into the auditory meatus alleviates ear pain. Leaves of kaḷḷippāla (*Euphorbia ligularia*) or erikku (*Calotropis gigantia*) can also be instilled as above. Instillation with a cloth bundle of rock salt dipped in the expressed juice of betel leaf (*Piper betel*) is also effective. Warm expressed juice from withered leaves of erikku and ummattu (*Datura metal*) shall also be instilled in the ear.

Instillation of expressed juices from the following in the ear, and sudation around the ear relieves severe ear ache.

| | |
|---|---|
| Iñci | *Zingiber officinale* |
| Kadaḷi | *Musa paradisiaca* |
| Muriṅṅa | *Moringa oleifera* |
| Veḷḷuḷḷi | *Allium sativum* |

Severe pain of the ear accompanied by tinnitus (śabda) is relieved by instillation of goat's urine mixed with rock salt. Instillation of mustard oil relieves ear ache. Sesame oil medicated with suratāru (*Cedrus deodara*) mustard and the juice of sinduvāra (*Vitex trifolia*) relieves ear ache.

Sesame oil medicated with the following as solid components and goat's urine as liquid component also relieves ear ache.

| | |
|---|---|
| Kuṣṭha | *Saussurea lappa* |
| Śuṇṭhī | *Zingiber officinale* |
| Vacā | *Acorus calamus* |
| Dāru | *Cedrus deodara* |
| Śatāhva | *Anethum graveolens* |
| Hiṅgu | *Ferula asafoetida* |
| Saindhava | Rock salt |

Application of Triphalādi oil on the head is prescribed.

Avoid head bathing and drinking of cold water even during day time. Snehapāna is indicated in ear-ache caused by pitta; ghee mixed with sugar is used for this purpose. The patient is to be purged after snehapāna. Breast milk boiled with drākṣa (*Vitis vinifera*) and yaṣṭi (*Glycyrrhiza glabra*) is used for filling the ear (karṇapūraṇa). Application of butter on the vertex is recommended.

Prepare one kuḍaba (192 ml) of medicated oil from fine powders of the following as solid components, and one prastha (768 g) of yaṣṭīmadhurasa (decoction of *Glycyrrhiza glabra*) and two prastha of milk as liquid components. Usage of this oil in the form of nasal drops (nasya), for filling the ear (karṇapūrana), and external application on the head or ear, relieves ear ache. Filling the ear with honey also relieves ear ache.

| | |
|---|---|
| Yaṣṭi | *Glycyrrhiza glabra* |
| Ananta | *Tragia involucrata* |
| Hima | *Santalum album* |
| Uśīra | *Vetiveria zizanioides* |
| Kākolī | *Fritillaria roylei* |

| | |
|---|---|
| Lodhra | *Symplocos laurina* |
| Jīvaka | *Malaxis acuminata* |
| Mṛṇāḷa | *Nelumbo nucifera* (leaf stalk) |
| Biśa | *Nelumbo nucifera* (stem) |
| Mañjiṣṭha | *Rubia cordifolia* |
| Sāribā | *Hemidesmus indicus* |

Medicated ghee prepared with fine powder of yaṣṭīmadhu, mixed with water and milk as liquid component, used as nasal medication (nasya) relieves ear ache.

Medicated sesame oil prepared with fine powders of iraṭṭimadhuram (*Glycyrrhiza glabra*) and devatāhāram (*Cedrus deodara*) as solid component and milk as liquid component, on instillation and nasya, relieve ear ache. Fine powders of yaṣṭi, ananta (*Tragia involucrata*), etc, (earlier mentioned), mixed with ghee can be applied on the ear. Nasya with breast milk is also good. Oil prepared from the expressed juices of āṛukālādi as liquid component and with the solid component of Triphaladi tailam, may be applied on the head.

Snehapāna and vamana are prescribed for treating ear ache caused by perturbed kapha; ghee prepared with pippali (*Piper longum*) is used for snehapāna.

Inhalation of medicated smoke (dhūma), nasal medication (nasya), filling of the mouth with medicated liquid (gaṇḍūṣa) and sudation (sveda) relieve ear ache caused by perturbed kapha. Instillation of expressed juices of the following, in lukewarm, relieves ear ache:

| | |
|---|---|
| Laśuna | *Allium sativum* |
| Ārdraka | *Zingiber officinale* |
| Śigru | *Moringa oleifera* |
| Muriṅgya | *Moringa oleifera* |
| Mūlaka | *Raphanus sativus* |
| Kadaḷī | *Musa paradisiaca* |

Sesame oil, medicated with the urine of goat (aja), sheep (āvi) and vamśatvak (bark of *Bambusa arundinacea*), on filling the ear, relieves ear-ache.

Mustard oil medicated with hiṅgu (*Ferula asafoetida*), tumburu (*Zanthoxylum armatum*) and nāgara (*Zingiber officinale*) can also be used for filling the ear in ache caused by perturbed kapha.

The treatment for ear ache caused by increased pitta is in the same lines as that of vitiated pitta. Bloodletting by cutting of veins is also suggested. Purulent secretions from the ear are treated with inhalation of medicated smoke (dhūma), nasal medication (nasya) and gargling (gaṇḍūṣa). Clean auditory canal with cotton wicks twice a day and fumigate the canal with purā (guggulu-resin); then fill the ear with pure honey. Heat a copper vessel; pour honey into it and add fine powders of pathyā (*Terminalia chebula*) and niśa (*Curcuma longa*); stir well and squeeze out the honey drop-by-drop into the ear to fill the canal for the arrest of pus formation.

Puncture a lemon and fill the hole with rock salt. Cover the lemon with mud or clay and drop it in ember; take out it when the mud coating cracks, and remove the clay. Squeeze the lemon to extract the juice, add a small quantity of sesame oil to it and apply as ear drops; this alleviates pain and edema.

Apply the paste of uḷḷi (*Allium sativum*) and hiṅgu on the leaves of arka (*Calotropis gigantia*); wither in ember and use the expressed juice as ear drops for relieving the pain. Cover green seeds of parutti (*Gossypium herbaceum*) with the ripened yellow leaves of jack tree and cook in ember of paddy husk. Expressed juice from these seeds, on instillation

in the ear, relieves ache. The buds of pariccakam (*Hibiscus aculeatus*) can also be used in the same way. Wrap a piece of devatāram (*Cedrus deodara*) with a silk cloth and lit. The oil that drops from the cloth during the process, on instillation, relieves ear ache.

Dip a cotton wick, filled with powders of trikaṭu (*Zingiber officinale, Piper longum, Piper nigurm*) and ceñcālyam (*Shorea robusta*), in oil and lit. The oil that drops from it shall be used for filling the ear. Oil prepared from the fine powders of any or all of the following prepared the same way can also be used.

| | |
|---|---|
| Kumizhu | *Gmelina arborea* |
| Kūvaḷam | *Aegle marmelos* |
| Pātiri | *Stereospermum colais* |
| Palakappayyāni | *Oroxylum indicum* |
| Muñja | *Premna corymbosa* |

Fine powders of dried muḷayila (leaf of *Bambusa arundinacea*) and kūvaḷattila (leaf of *Aegle marmelos*) can also be used to prepare oil in the same manner.

Fumigation of the ear with fine powders of nāgadanti (*Baliospermum montanum*) and tṛtvākkatir (inflorescence of *Ocimum sanctum*) mixed with ghee opens up muffled audition. Fumigation with kūvaḷattila, dry taviṭu (bran), mañña!ppoṭi (powder of *Curcuma longa*) and veḷḷuḷḷi (*Allium sativum*) mixed with ghee relieves pain and relieves muffling.

Medicated sesame oil prepared from the expressed juice of pāviṭṭayila (leaves of *Morinda pubescens*) may be applied on the head. Medicated sesame oil prepared from the expressed juices of the following as liquid component and milk and fine powders of koṭṭam (*Saussurea lappa*), iraṭṭimadhuram and candanam (*Santalum album*) as solid component, on application on the head, opens up blocked audition and relieves secretions from the ear. Triphalādi tailam or Asanavilavādi tailam may also be applied.

| | |
|---|---|
| Vēṅṅayila | *Pterocarpus marsupium* (leaf) |
| Kūvaḷattila | *Aegle marmelos* (leaf) |
| Koṭiññāli | *Piper betel* (stem) |
| Kayyōnni | *Eclipta prostrata* |
| Ciṯtamṛtu | *Tinospora cordifolia* |

Vacālaśuṇḍi or Nirguṇḍīlaśunādi, on instillation of the ear, opens up audition. Oil medicated with the tender shoots of panasa (*Artocarpus heterophyllus*) used as ear drops relieve ear ache. Similarly, oil medicated with an excess quantity of expressed juice of kāravellidaḷa (leaves of *Momordica charantia*) relieves abscesses within the external auditory canal.

Slightly fry crushed nakta (*Curcuma longa*) and harītaki (*Terminalia chebula*) in a copper container and place in a cloth bundle; press the bundle and instill the liquid in the ear for the arrest of pus drain from the ear.

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