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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 - LXXXI

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Abstract: Introduction of āyurveda, its scientific base, scientific view on various useful materials, treatment procedures and functions of the body - especially in connection with bodily humours, are explained in the previous two sections viz. Sūtra and Śārīra sthānas. Now, the diseases with respect to their skandhas i.e. hetu, liṅga and auṣadha, are explained. Of these, the first 2 aspects are explained in this section of Nidānasthāna.

The science of āyurveda is categorised into 3 sections viz. hetu (causative factor), liṅga (clinical feature) and auṣadha (management profile); these are called the three skandha of the science.

अथातः सर्वरोगनिदानं व्याख्यास्यामः ।
इति ह स्माहुरात्रेयादयो महर्षयः ।

(Athāta: sarvaroganidānam vyākhyāsyāma: iti ha smāhurātreyādayo maharṣaya: ।)

Now the aetiology (nidāna) of all diseases in general is to be explained. Thus spoke the sages like Ātreya.

The common aetiology (description of causative factors) of diseases is already detailed in Sūtra-sthāna in relation with doṣas as their vitiation is the prime object of analysis regarding the aetiological perspective. The specific aetiology and separate explanations of manifestation of diseases are to be stressed now. As explained by Ācārya Caraka, the disease is to be evaluated first and then its management (Ca. su. 20/24). That is why the section of nidāna is introduced. Nidāna is nothing but the explanation of aetiology and symptomatology. Perhaps, more explanations of the word 'nidāna' are to be assessed. Some explain that nidāna is that by which a disease is explained. Some others suggest that it is the aspect by which a disease is ascertained and then explained.

रोगः पाप्मा ज्वरो व्याधिर्विकारो दुःखमामयः ।
यक्ष्मातङ्कगदाबाधाः शब्दः पर्यायवाचिनः ।। १ ।।

(Roga: pāpmā jvaro
vyādhirvikāro du:khamāmaya: ।
yakṣmātaṅkagadābādhā:
śabda: paryāyavācina: ।। 1 ।।)

Roga, pāpmā or pāpa, jvara, vyādhi, vikāra, du:kha, āmaya, yakṣma, ātaṅka, gada and ābādha are synonyms of the word 'disease'. Each word among these eleven has a particular meaning that is being discussed now:

The word 'roga' is derived from the root 'ruk', means to produce pain. Generally, all the diseases are producing pain either to the body

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or to the mind. Pāpmā or pāpa means sin. This is supporting the common faith that all the diseases are the result of sins - here in this context, misdeeds, which lead a person to be diseased. Fever (jvara) is a common condition seen in most of the diseases. It is also a major disease denominated in the name of rogapati. That is why disease is also remarked by the word jvara. Vyādhi means the condition by which a patient is subjected to pricking pain. The severity and endurance of the diseased condition enable it to be reckoned so. Vikāra or vikṛti is the abnormal condition of the body; abnormality is a must to evolve a diseased condition. Negative feeling is the real meaning of du:kha. Usually du:kha is to mean either distress or pain. As disease leads a person to an unpleasant condition, the word is applicable to disease by all means. Āmaya means a condition in relation to āma. Since most of the diseases are evolved in connection with āma, the word āmaya is generally applicable to disease.

Ekādaśarūpa (eleven diseases) are seen in tuberculosis (rājayakṣma), as it is named rogarāḍ, major among the diseases or the king of diseases. That is why yakṣma is adopted as the synonym of disease. Ātaṅka means calamities that may lead to death. It corroborates the meaning as diseases often do cause the death of a patient. The word gada means various causative factors; a disease evolves out due to several causes from within and outside the body. Ābādha is to denote epidemic diseases due to external causes; as disease is affected by these factors for a person, the word is applied to explain disease.

निदानं पूर्वरूपाणि रूपाण्युपशयस्तथा ।
सम्प्राप्तिश्चेति विज्ञानं रोगाणां पञ्चधा स्मृतम् ।। २ ।।

(Nidānam pūrvarūpāṇi
rūpāṇyupaśayastathā ।
samprāptiśceti vijñānam
rogāṇām pañcadhā smṛtam ।। 2 ।।)

Aetiology, prodromal symptoms, clinical features, positive as well as negative regimen towards a disease and pathogenesis are the five phenomena to understand a disease.

These five are the separate five aspects of a disease and using these five tools, a sceptic-minded physician can arrive to a final diagnosis. This pentad is termed as nidānapañcakam (pentad of aetiology, etc.), the five separate entities or diagnostic methods.

निमित्तहेत्वायतनप्रत्ययोत्थानकारणै: ।
निदानमाहु: पर्यायै:.....

(Nimittahetvāyatana-
pratyayotthānakāraṇai: ।
nidānamāhu: paryāyai:.....)

Nimitta, hetu, āyatana, pratyaya, utthāna and kāraṇa are the six synonyms of nidāna (causative factor).

The word nidāna is used in āyurveda to explain two things i.e. 1) diagnostic tool and 2) causative factor. Nidānapañcakam goes with first meaning whereas here, in the verse, the second meaning is reckoned. The first or general meaning of nidāna is diagnostic tool. There are definitions to suggest this meaning, which explain that nidāna is that by which a disease is analysed; nidāna is the study by which a disease is diagnosed first and then is explained. But, here in this verse, the second meaning is taken into account as each one among the nidānapañcakam is explained in detail.

As in the case of synonyms of roga, there are

six synonyms of nidāna which also possess particular meanings: i) nimittam - a factor which does cause the starting process of disease phenomenon, ii) hetu - the causative factor, iii) āyatanam - the way to disease, iv) pratyayam - that which shows the relation with effect (here effect is disease), v) utthānam - the factor which removes the inertia of doṣas in the process of vitiation and vi) kāraṇam - cause process.

Various types of aetiological factors are explained in aetiology- related āyurvedic works. Five important classifications are given in Table 1.

.....प्राग्रूपं येन लक्ष्यते ।। ३ ।।
उत्पित्सुरामयो दोषविशेषेणानधिष्ठित: ।
लिङ्गमव्यक्तमल्पत्वाद्व्याधीनां तद्यथायथम् ।। ४ ।।

(.....prāgrūpaṁ yena lakṣyate ।। 3 ।।
Utpitsurāmayo
doṣaviśeṣeṇānadhiṣṭhita: ।
liṅgamavyaktamalpatvād-
vyādhīnāṁ tadyathāyatham ।। 4 ।।)

Prodromal symptom is a nidānam by which a forthcoming disease can be inferred not with details such as involvement of particular doṣa as the prodromal symptom is non lucid and meager. But this varies from disease to disease.

Though these prodromal symptoms are meager and non lucid to clarify a disease in detail, these have some distinguishing features. The other nidāna factors such as nimitta, samprāpti, etc. explain how a disease evolved but prodromal symptoms do explain about a forthcoming disease.

Mādhava's clear cut explanation regarding prodromal symptoms gives more clarity in this regard. The features produced by the vitiated doṣas at the phenomenon of sthānasamśraya (lodging of vitiated doṣas to particular site to manifest a disease) are called prodromal symptoms by which a forthcoming disease can be inferred.

These are mainly categorised into two i.e. sāmānyam (general) and viśiṣṭam (specific).

तदेव व्यक्ततां यातं रूपमित्यभिधीयते ।
संस्थानं व्यञ्जनं लिङ्गं लक्षणं चिह्नमाकृति: ।। ५ ।।
(Tadeva vyaktatāṁ yātam
rūpamityabhidhīyate ।
samsthānam vyañjanam liṅgam
lakṣaṇam cihnamākṛti: ।। 5 ।।)

Rūpam is the clinical manifestation of the same (prodromal symptom) in a lucid manner. It also has synonyms like samsthānam, vyañjanam, liṅgam, lakṣaṇam, cihnam and ākṛti.

Rūpam or lakṣaṇam is the actual manifested form of a disease. This can again be explained as the characteristic feature (or features) of an original disease. It happens at the time of manifestation (vyakti) of vitiated doṣas, the fifth kriyākāla, whereas prodromal symptom (pūrvarūpa) occurs on the fourth kriyākāla i.e. sthānasamśraya.

हेतुव्याधिविपर्यस्तविपर्यस्तार्थकारिणाम् ।
औषधान्नविहाराणामुपयोगं सुखावहम् ।। ६ ।।

TABLE 1
Aetiological factors - five important classifications

| Sl. No | No. of divisions | Description |
|---|---|---|
| I | 3 | Pariṇāma, prañjāparādha and asātmendriyasamyoga |
| II | 4 | Sannikṛṣṭa, viprakṛṣṭa, vyabhicāri and pradhānika |
| III | 3 | Doṣahetu, vyādhihetu and ubhayahetu |
| IV | 2 | Vyañjakahetu and utpādakahetu |
| V | 2 | Bāhyahetu and ābhyantarahetu |

विद्यादुपशायं व्याधेः स हि सात्म्यमिति स्मृतः ।
विपरीतोऽनुपशयो व्याध्यसात्म्याभिसंज्ञितः ।। ७ ।।

(Hetuvyādhiviparyasta-
viparyastārthakāriṇām ।
auṣadhānnavihārāṇā-
mupayogam sukhāvaham ।। 6 ।।
Vidyādupaśāyam vyādheḥ
sa hi sātmyamiti smṛtaḥ ।
viparītoऽnupaśayo
vyādhyasātmyābhisamjñitaḥ ।। 7 ।।)

Upaśaya (positive regimen) to a disease can be ascertained by the use of: i) medicine, ii) food and iii) physical activities either separately or collectively opposite to cause of disease, disease or both, if the disease got cured. On the contrary, if the disease aggravates the use of these 3 things in such manner, is to be connoted anupaśaya (opposite to upaśaya). Upaśya is also called by the term sātmyam (accustomed to disease) and the negative regimen by asātmyam (non accustomed to disease).

This can be considered as some trial and error methods of the use of correct regimen of a particular disease regarding the application of medicament, food supplement and physical activity. Examples for uapśaya and anupaśaya given in the Madhukośa commentary of Mādhavanidāna are given in the Table 2.

यथादुष्टेन दोषेन यथा चानुविसर्पता ।
निर्वृत्तिरामयस्यासौ सम्प्राप्तिर्जातिरागतिः ।। ८ ।।

(Yathāduṣṭena doṣena
yathā cānuvisarpatā ।
nirvṛttirāmayasyāsau
samprāptirjātirāgatiḥ ।। 8 ।।)

Samprāpti (synonyms: jāti and āgati) is the mode of evolution of a disease by doṣa vitiated in a

TABLE 2

Upasaya and anupaśaya - examples

| Sl. No | Particulars | Medicine | Food | Physical activity |
|---|---|---|---|---|
| 1. | Hetu viparītam | Śuṇṭhī in śītajavara | Rasa in vātajvara | Vigil in abhiṣyanda due to day-time sleep |
| 2. | Vyādhi viparītam | Khadira in kuṣṭha | Masūra in atisāra | Pravahanam in udāvarttam |
| 3. | Ubhaya viparītam | Daśamūla kvātha in vāta śopha | Buttermilk in vāta-kapha grahaṇi | Vigil in abhiṣyanda due to day-time sleep after intake of oily food |
| 4. | Hetu viparīta arthakāri | Uṣṇa upanāha in paittika śopha | Vidāhi in paittika vṛaṇa | Frightening in vātonmāda |
| 5. | Vyādhi viparīta arthakāri | Madana phala in vomitting | Milk for atisāra | Induce vomiting by fingers |
| 6. | Ubhaya viparīta arthakāri | Viṣa in viṣa disease | Paiṣṭika madya in madātyaya due to gauḍa madya | Swimming in ūrusthambha due to over exercise |

particular way and spread to the afflicted site in a particular manner.

Samprāpti may be described as the pathogenesis of a disease. As per the number and strength of causative factors, the toxicity of interaction between doṣa and dūṣya will increase and make the samprāpti more complicated.

सङ्ख्याविकल्पप्राधान्यबलकालविशेषत: ।
सा भिद्यते, यथाऽत्रैव वक्ष्यन्तेऽष्ठौ ज्वरा इति ।। ९ ।।
दोषाणां समवेतानां विकल्पोंऽशांशकल्पना ।
स्वातन्त्र्यपारतन्त्र्याभ्यां व्याधे: प्राधान्यमादिशेत् ।। १०
हेत्वादिकात्स्न्र्यावयवैर्बलाबलविशेषणम् ।
नक्तंदिनर्तुभुक्तांशैर्व्याधिकालो यथामलम् ।। ११ ।।
इति प्रोक्तो निदानार्थ:.....

(Saṅkhyāvikalpaprādhānya-
balakālaviśeṣata: ।
sā bhidyate, yathāऽtraiva
vakṣyanteऽṣṭhau jvarā iti ।। 9 ।।
Doṣāṇām samavetānām
vikalpomऽśāṁśakalpanā ।
svātantryapāratantryābhyām
vyādhe: prādhānyamādiśet ।। 10 ।।
Hetvādikārtsnyāvayavair-
balābalaviśeṣaṇam ।
naktandinartubhuktāmśair-
vyādhikālo yathāmalam ।। 11 ।।
iti prokto nidānārtha:.....)

Samprāpti can be divided into five viz. saṅkhyāsamprāpti, vikalpasamprāpti, prādhānyasamprāpti, balasamprāpti and kālasamprāpti. The 8 types of jvara (which are going to be explained in the next chapter) is the example of saṅkhyāsamprāpti. Permutation and combination of vitiated doṣas are vikalpasamprāpti. Prādhānyasamprāpti is divided into two viz. svatantra and paratantra according to the nature of disease. Balasamprāpti shows the gravity of strength of samprāpti, which is accounted by the percentage of involvement of nidāna, pūrvarūpa and ruja of a particular disease. Kālasmprāpti indicates the relation between the vitiated doṣa and the fraction of time factors like day, night, seasons, different stages of diseases and food digestion.

Thus the basic part of nidāna is explained.

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# PHARMACOGNOSTIC STUDIES ON AERIAL PARTS OF *PLUMBAGO ZEYLANICA* LINN.

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Abstract: *Plumbago zeylanica* (citraka) belonging to Plumbaginaceae family, is a subscandent perennial shrub found throughout India. Its different parts are used to cure number of diseases in the traditional system in various parts of the world. The stem and leaf morphoanatomy has been studied, aiming to supply knowledge for the pharmacognostic and taxonomic species identification.

## Introduction

Plumbaginaceae are a small group of caryophyllid flowering plants, which are closely related to Polygonaceae. It has 800 species in 24 genera found all over the world. The plant, commonly known as citraka, is often employed in the traditional medicine and investigated mainly for phytochemical and pharmacological purposes. The main part used in this species is roots[3-4].The roots of are reported as antioxidant[5], CNS stimulant[6], antimicrobial[7], antiplasmodial[8], wound healing[9], hypolipidaemic and antiatherosclerotic[10]. The stems and the leaves are also used traditionally in various parts of the world[11]. Traditional healers in South India use *P. rosea* in place of *P. zeylanica*[12]. Both these plants are added as an ingredient in lot of herbal preparations. Nevertheless, as morphological aspects have not been emphasised for aerial vegetative organs and also for roots, our present investigation was planned to study the root, stem and leaf morphoanatomy and few other pharmacognostic parameter of this plant, aiming to supply knowledge for the medicinal plant identification and for the taxonomy of related species

## Materials and methods

The plant was collected from Kanyakumari district, Tamil Nadu, and authentically identified. Voucher specimen (BRNCP/P/006/2006) was deposited in the herbarium of Department of Pharmacognosy, BRNCP, Mandsaur.

## Pharmacognostic studies

Morphological studies: - Morphological studies were done using simple microscope. The shape, size, colour, taste and odour of stems and leaves were determined.

Microscopic studies: - Microscopic studies were done by preparing thin hand sections of leaf and stem. The sections of leaves and stems were cleared with chloral hydrate solution and then stained with phloroglucinol and hydrochloric acid, and mounted in glycerin.

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Separate sections were prepared and stained with iodine solution for identification of starch grains. Powders (# 60) of the stems and leaves were used for observation of powder microscopical characters. The powdered drug was separately treated with phloroglucinol-HCl solution, glycerin and iodine solution to determine the presence of lignified cells, calcium oxalate crystals and starch grains.

Physicochemical constants: - Total ash, water-soluble ash, acid insoluble ash and sulphated ash were determined. Petroleum ether (60-80°), acetone, chloroform, alcohol and water-soluble extractive values were determined to find out the amount of components soluble in various solvents[13,14].

Micrometry: - Eyepiece micrometer was calibrated using stage micrometer and the factor was calculated. With the help of eyepiece micrometer measurements were done in transverse section of stem and in powder. The powder was stained with phloroglucinol and HCl for phloem fibre, with lactophenol and iodine for starch grains[15].

Fluorescence studies: - Fluorescence study is an essential parameter for first line standardisation of crude drug. The powder material was treated separately with different reagents and exposed to visible and ultraviolet light (short and long) to study their fluorescence behavior[15].

## Results

### Macroscopic characters

Morphological studies revealed that *P. zeylanica* has simple and entire leaves, with elliptical shape, entire margin, symmetrical base, acumi-nate apex and petiolate. The leaves are light green in colour with size measuring about 5-10 cm long and 2-7 cm wide and bitter in taste. (Fig. I)

### Microscopic characters

Microscopical studies of the leaves showed presence of anomocytic type of stomata, uniseriate, multicellular, non-lignified covering trichomes (40-180µ L, 27µ W) on both the surfaces. Polygonal epidermis cells (24µ-28µ) were the outermost layer covered with cuticle. Mesophyll showed dorsiventral organization, with a width of 250 -280µ W. It had two layers of palisade parenchyma cells (60µ -68 µ L) below the upper epidermis which extended to the midrib region and various layers of spongy parenchyma, the latter occupying 60% of the mesophyll. Midrib region (1235-1369µ W) showed five to seven layers of thick walled collenchyma cells (12µ -14µ D) below the upper epidermis and above the lower epidermis. The size of spongy parenchyma cells in the midrib is 41µ -110µ D while that of the lamina region

Fig. I
*Plumbago zeylanica* Linn.

27µ -55µ D. Highly lignified 6-8 sets of vascular bundles (95µ -136µ D) observed in the midrib region with xylem vessel of 136µ - 164µ L, 27µ - 41µ W (Fig. IIa).

Stems are 0.5-1.5 m L, 1.2-2 cm in D; cylindrical shape, odourless, blunt taste and light green in colour. Stems showed epidermis as the outer most layer covered with cuticle. Below the primary ridge, eight to twelve layers of collenchyma cells (41µ - 69 µ); and continuous layer of sclerenchymatic sheath of 5-9 cells (136 µ W) are present; next to it, is the phloem region (Fig. IIb). The lignified vascular bundles are 190-200µ W with xylem vessels of 50-130 µ D, followed by pith (410 µ) region (Fig. IIc).

**Powder microscopy**

The powder microscopy of leaves revealed presence of stomata with epidermis, covering trichomes, parenchyma with brownish matter and xylem vessels. Stem powder showed stomata with epidermis, multicellular covering trichomes, sclerides, xylem vessels, and parenchyma cells. When treated with iodine, starch grains were also observed in all the parts (Fig.III&IV).

The leaves showed presence of ranunculaceous type of stomata; stomatal index on the lower epidermis is 93 to 95 (Fig.Va), and upper epidermis 86 to 88 (Fig.Vb). Stomatal number on the lower epidermis is 24 to 26, and on the upper epidermis 74 to 76, vein islet number is 2 to 5 (Fig.Vc), and vein termination number 16 to 18. Presence of simple oval and circular starch grains are noteworthy features.

**Ash values**

Total ash, water soluble, acid insoluble and sulphated ash values are given in Table 1. Water soluble extractives were found to be more in this species (Table 2). Results of fluorescence studies are given in Table 3.

**Discussion**

In folk medicine and in ayurveda *Plumbago zeylanica* is used in various ailments and other

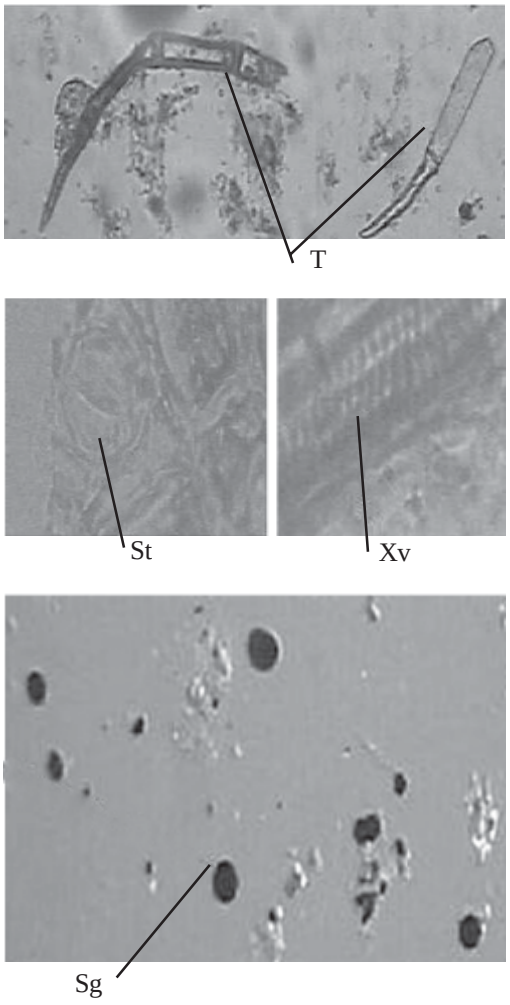



Fig. III - Powder characteristics of leaf

**T** Trichomes; **St** Stomata;
**Xv** Xylem vessels; **Sg** Starch grains

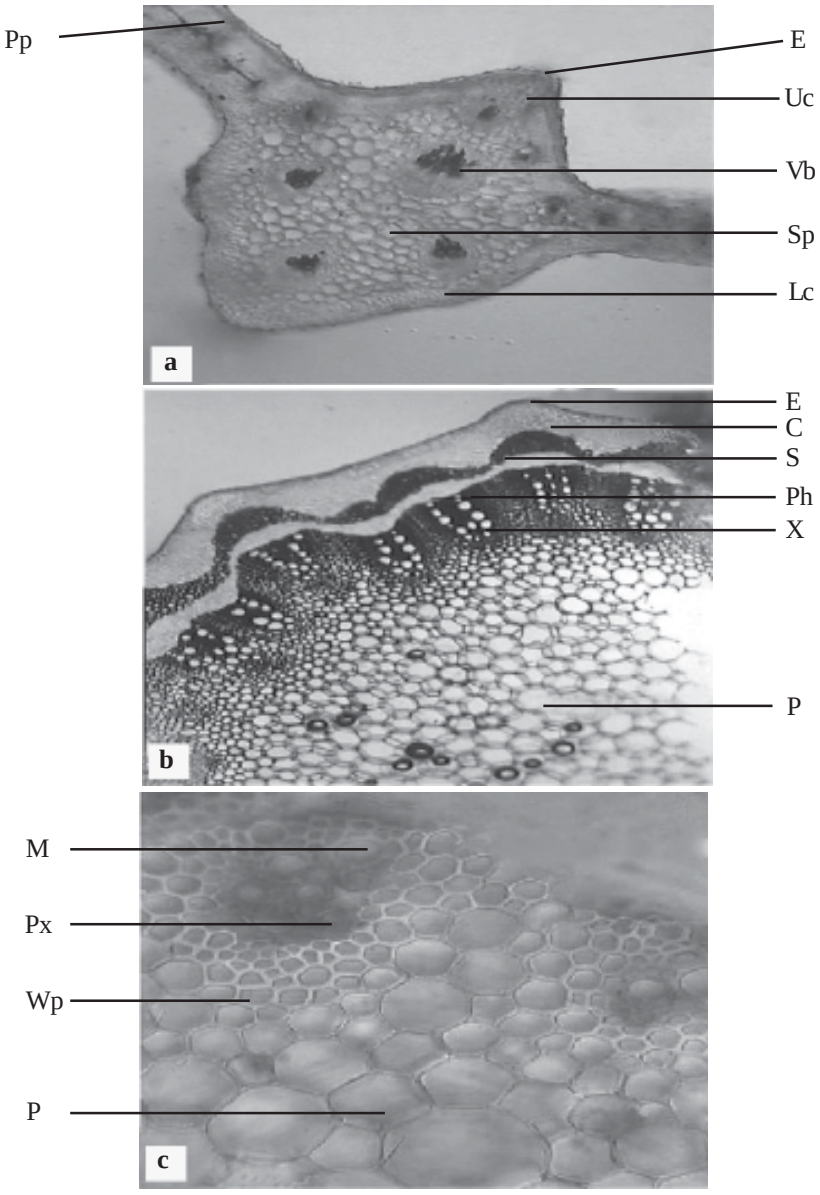



Fig. II**a-c** - *Plumbago zeylanica* Linn.- TS of leaf & stem

a) TS of leaf (x 100); b) TS of stem (x 50); c) Secondary region of stem (x 450)
**Pp** Palisade parenchyma; **E** Epidermis; **Uc** Upper collenchyma; **Vb** Vascular bundle; **Sp** Spongy parenchyma; **Lc** Lower collenchyma; **C** Collenchyma; **S** Sclerenchyma; **Ph** Phloem; **X** Xylem; **P** pith; **M** Metaxylem; **Px** Protoxylem; **Wp** Wood parenchyma

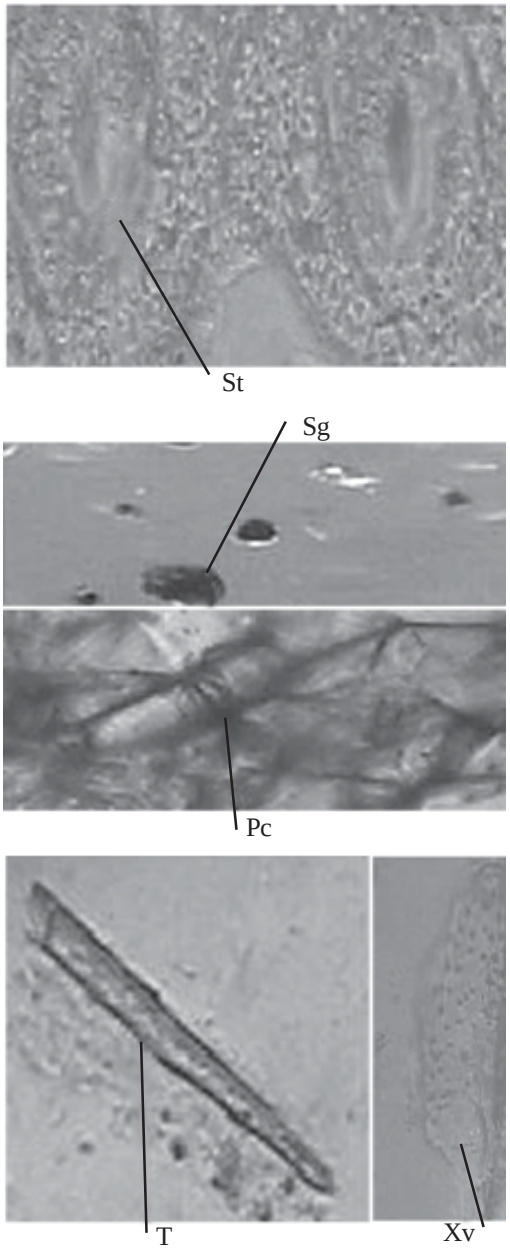



Fig. IV - *Plumbago zeylanica* Linn. Powder characteristics of stem

**St** Stomata; **Sg** Starch grains; **P** Parenchyma; **T** Trichomes; **Xv** Xylem vessels

species like *Plumbago rosea* is also mixed up and sold in the market in different parts of the country in the same vernacular. Although both the species could be easily distinguished on the basis of the flowers, it becomes very difficult when the crude drug is in the form of dried and cut pieces[16]. Therefore, some diagnostic characters have been evolved which is of great value and could be used in deciding the genuineness of the drug source.

The stomata present in the leaves increases photosynthetic potential, protect xylem from cavitation favouring water flow and promote heat dissipation by water loss; herbaceous species maintain low stomatal densities and hydraulic conductances, maximizing the control on loss of water to a dry atmosphere. This control is optimized by a well-developed cuticle, a barrier which contributes to the maintenance of plant water status[17].

Trichomes are epidermal outgrowths of considerable value for taxonomic purposes. These outgrowths play a role in plant defense

TABLE 1

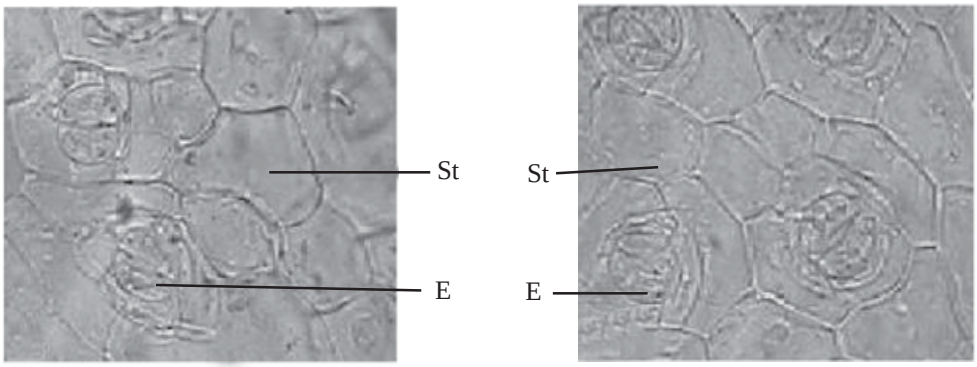
Determination of ash values (% w/w)

| Ash values | Leaf | Stem |
|---|---|---|
| Total ash | 10.20 | 6.5 |
| Acid insoluble ash | 1.87 | 1.99 |
| Water soluble ash | 4.30 | 3.52 |
| Sulphated ash | 8.77 | 6.3 |

TABLE 2

Determination of extractive values (% w/w)

| Extractive solvents | Leaf | Stem |
|---|---|---|
| Pet. Ether (60-80°C) | 12 | 3.2 |
| Chloroform | 6.6 | 2.8 |
| Acetone | 2.5 | 2.7 |
| Ethanol | 10.7 | 5.3 |
| Water | 15.3 | 13.8 |



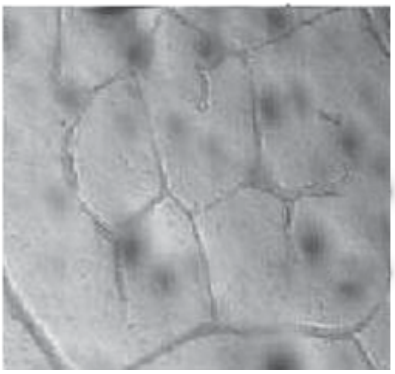




Fig. V**a-c** - *Plumbago zeylanica* Linn.- Stomata & Venation

a) Stomata in lower epidermis of leaf (x 450); b) Stomata in upper epidermis of leaf (x 450); c) Venation in leaf (x 100) - **St** Stomata; **E** Epidermis;

TABLE 3

Fluorescence analysis of powders of aerial parts

| Treatment | Leaf | | | Stem | | |
|---|---|---|---|---|---|---|
| | Visible (400- 800 nm) | U.V. short (254 nm) | U.V. long (365 nm) | Visible (400- 800 nm) | U.V. short (254 nm) | U.V. long (365 nm) |
| As such | Greyish green | Greyish green | Greyish green | Yellow | GY* | Light yellow |
| Methanol | Brown | Green | Golden brown | Brown | GY | Brown |
| 1 N NaoH | Brown | Dark green | Dark brown | Dark brown | Nil | Nil |
| M+NaoH* | Brown | Dark green | Dark brown | Brown | Dark green | Nil |
| Ethanol | Greyish green | Greyish green | Greyish green | Brown | GY | Slightly yellow |
| $H_2SO_4$(60%) | Golden brown | Mud color | Green | Light brown | GY | Dark brown |
| Conc. $H_2SO_4$ | Mud color | Green | Dark green | Light brown | GY | Nil |

*Methanol + NaoH (1:1); GY = Greenish yellow

especially with regard to phytophagous insects, avoiding insect feeding and oviposition responses, and the nutrition of larvae. They may be involved in the regulation of temperature and water repellency as well[18].

The stem organization in incipient secondary growth observed in this study corresponds to a typical herbaceous pattern, and the epidermis usually representing the outermost cell layer of the young stem. The sclerenchymatic ring in the cortex are composed of fibers and stone cells. The sclerenchymatic cell concentration is effective in withstanding environmental pressures, such as damage by wind and to fend off herbivores[19].

The establishment of the vascular cambium follows the common pattern of secondary growth, where phloem and xylem usually constitute closed cylinders traversed by narrow rays, which are often homogeneous[20]. Pith usually consists of parenchyma, which may become partly or wholly lignified, and serve to store starch or secrete crystals and other ergastic substances[21]. Ash values, extractive values and fluorescence analysis are few parameters which normally are adopted to get the qualitative information about the purity and standard of the crude drug.

The macro and the micro morphological standards discussed can be considered as a distinguishing parameter to identify and decide the authenticity of this drug in herbal industry and thus can be included as microscopic standards in the Indian Herbal pharmacopoeia

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# CLINICAL AND EXPERIMENTAL EVALUATION OF KAṬUKI CŪRṆA IN HEPATITIS B

N. Sujata, Sujeet Kumar, Gopal Das Gupta and N.P. Rai*

Abstract: Liver is one of the extensively explored areas in modern medicine. Among the various diseases affecting it, Hepatitis-B virus infection is the most common. The clinical symptoms of Hepatitis-B are similar with those described under kāmala in āyurveda. Western medicine, despite its enormous success does not offer any promising cure in this ailment. In this context, a trial was conducted as part of research program to evaluate the role and efficacy of kaṭuki (*Picrorhiza kurrooa*) in powder form in the management of Hepatitis-B. The result was found satisfactory in terms of clinical and biochemical parameters.

## Introduction

Hepatitis-B, because of its potential to cause life-threatening complications like cirrhosis, ascites, and hepatocellular carcinoma, is on the top of the national agenda in Public health. Hepatitis-B virus infects more than 2 billion people worldwide annually, out of which 360 millions are chronic carriers[1]. It is the 10th leading cause of mortality, and hepatocellular carcinoma is the 5th most common cancer in the world which accounts for 1.2 millions deaths globally every year[2]. Hepatitis B virus (HBV) is a frequent culprit of acute viral hepatitis. It is a DNA virus with a unique enzyme i.e. the DNA Polymerase that has the capacity to synthesize DNA by reverse transcription. The clinical illness produced by HBV may range from asymptomatic and unapparent infection to fulminant and fatal acute infection on one hand and sub clinical persistent infection to rapidly progressive chronic liver disease with cirrhosis and hepatocellular carcinoma as complications on the other[3].

Āyurveda claims to afford a long lasting cure for hepato biliary disorders since ages. Kaṭuki is one of the renowned herbal drugs extensively described in all āyurvedic classics and Kaṭuki-cūrṇa has been tried in all cases of jaundice. The drug has been successfully tried on experimental models to evaluate its efficacy and safety for which considerable research data is available substantiating the drug as a hepato-protective with significant antiviral, antioxidant, and membrane stabilising properties.

Though āyurvedic classics do not describe the infective etiology of kāmala (jaundice), its clinical presentation is similar to that described in modern medicine. The cardinal features of Koṣṭaśākhāsṛtakāmala are yellowish discolouration of sclera, skin, urine and stool-like

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appearance in severe cases, burning sensation, generalized fever, weakness, fatigue, anorexia and weight loss[4-6.]

A clinical trial conducted on 44 cases of viral Hepatitis B with Kaṭukicūrṇa has shown significant results in normalizing the liver function tests along with the disappearance of surface antigen from the circulating blood.

**Aims and objectives**

The present study was undertaken to assess: i) the efficacy of kaṭuki on biochemical of liver parameters and ii) the antioxidant properties of the trial drug on experimental models.

**Materials and method**

A total of 44 cases diagnosed with acute viral hepatitis (due to HBV injection) were enrolled after obtaining informed consent from the O.P.D. and I.P.D. of Kāyacikitsa, B.H.U, Varanasi. Of 44, 38 cases completed the trial period.

**Inclusion criteria**

- Patients aged between 20-50 years of either sex
- Having symptoms and signs of acute viral hepatitis
- Having Liver Function Tests which were abnormal with presence of HbsAg and other viral markers for HBV in blood.

**Exclusion criteria**

- Chronic hepatitis (>6months duration)
- Viral markers of Hepatitis B negative
- Other causes of viral hepatitis like HAV, HCV, HDV and HEV.
- Complications like obstructive jaundice, cirrhosis, fulminant hepatitis, liver failure, hepatocellular carcinoma, etc.

Study design: - This was a double blind, placebo controlled study where the observer and subjects were unaware of the study medication. The institution Ethical Review Committee of B.H.U approved the study. All patients underwent complete general examination to rule out any gross abnormalities and were evaluated clinically and biochemically to confirm the diagnosis.

Grouping:- Subjects were divided into groups as follows: (i) Treated group: (n=30) that received 10gm of Katuki churna per oral in two divided doses along with lukewarm water and (ii) Control group (n=8) that received oral glucose and normal diet.

**Assessment**

All the subjects were evaluated weekly in the initial month and thereafter once in a month up to 6 months. Efficacy of trial drug was assessed by i) relief in symptoms on a point rating score i.e. 0-No presence, 1-Mild, 2-Moderate and constant, 3-Severe, impairing; and ii) normalization of abnormal liver function tests and disappearance of Australia antigen from the blood.

The laboratory evaluation was carried out at enrolment and thereafter weekly for 1 month and once in a month up to 6 months. Hepatitis B surface antigen was done at enrolment and at the end of 3rd and 6th month of trial period.

Statistical analysis: - Both the groups were compared by Students unpaired‘t’ test. Changes in the various biochemical parameters were evaluated at the end of 1st, 2nd, 3rd and 4th weeks and later assessed by Students paired‘t’ test for statistical significance (Table 1).

**Results**

The patients whose symptoms were mild to moderate and LFTs with moderate elevations were kept under control group as per ethical

committee recommendation. In the treated group, the scores of the symptoms like yellow sclera, yellow urine, anorexia, nausea and fatigue were significantly reduced at the end of 1 month (80%). On the other hand the control group showed only moderate relief 50% in anorexia and nausea but only mild relief in symptoms like yellow sclera and yellow urine. Moreover, some of the patients had pain in the abdomen and constipation.

The changes in improvement of symptoms were supported by biochemical parameters like Serum Bilirubin (Total), Alanine transaminase (ALT), Aspartate transaminase (AST) and Alkaline phosphatase (ALP). The mean difference of Bilirubin, ALT, AST and ALP were found to be statistically significant in the fourth follow-up of treated group as compared to control group. An inter-group comparison between treated and control groups was statistically highly significant in the unpaired't' values P<0.001 for all the above parameters.

Among 30 patients of the treated group, almost 26 became negative for Australia antigen at the end of 4th month, while in the control group (n=8) 6 of them became negative when administered trial drug after the completion of trial period.

**Experimental study**

Grouping of animals: - Total 24 rats included in the study were divided into 4 groups of 6 animals each: Group I - Normal (Control); Group II - Animals received 1.3g of Katukicurna/100g wt of albino rat, per oral, for 7 days (Katuki perse); Group III - Animals were given 1% carboxy methylcellulose (CMC) in distilled water for 7 days with paracetamol at 2g/kg body wt. P.O. suspended in 1% CMC administered on the 5th day (Asha and Pushpangadan, 1997) (Paracetamol treated), and Group IV - Animals received 1.3g of Katukicurna/100g wt of albino, per oral for 7 days with paracetamol at 2g/kg body wt. P.O. given on the 5th day (Kaṭuki treated).

TABLE 1
Statistical analysis of both the groups

| Variable | Treated Group (n=30) | | Control Group (n= 8) | | Unpaired 't' |
|---|---|---|---|---|---|
| | Mean ± SD BT | Mean ± SD AT | Mean ± SD BT | Mean ± SD AT | |
| Bilirubin | 17.03 ± 3.82 | 1.64 ± 0.82 P <0.001 HS | 11.49 ± 1.23 | 7.5 ± 0.76 P< 0.01 S | 15.52 P <.001 |
| ALT | 832.53 ± 141.27 | 52.6 ± 16.92 P <0.001 HS | 838.7 ± 37.39 | 650.0 ± 30.6 P<0.01S | 22.4 P<0.001 |
| AST | 723.94 ± 57.53 | 40.4 ± 24.5 P <0.001 HS | 562.0 ± 34.8 | 380.12 ± 30.86 P <0.01 S | 25.69 P <0.001 |
| ALP | 648.8 ± 60.13 | 120.5 ± 26.52 P <0.001 HS | 593.0 ± 40.38 | 380.0 ± 25.65 P <0.1 S | 16.94 P <0.001 |

ALT - AlanineTransaminase (SGPT); AST - Aspartate Transaminase (SGOT); ALP - Alkaline Phosphatase

At the end of the experiment (48hrs after paracetamol administration), under ether anesthesia, blood samples were collected in centrifuge tubes via cardiac puncture, and the serum was separated. The abdomen was then cut open and liver samples were removed. In order to prevent RBC contamination, samples were cut into small slices, rinsed thoroughly in ice-cold normal saline and blotted by with blotting paper. Serum samples were frozen immediately in a deep freezer at - 20°C and enzyme assays were performed on the next day.

The enzyme assays were done by collecting the serum samples and were subjected to assay for liver marker enzymes such has Aspartate transaminase (AST) Alanine transaminase (ALT) and Alkaline phosphatase (ALP). Activities of AST and ALT were assayed according to the 2-4 DNPH methods. Values are expressed as IU/dl, ALP activity was measured using the method of Kind and King (1954) and results are expressed as K.A. units/L.

The histopathological examination was done by preserving liver pieces that were preserved in 10% formaldehyde solution for histopathological study embedding them in paraffin wax. Sections of about 4-6ì m thicknesses were taken. They were stained with hematoxylin and eosin, and photographed.

**Observations**

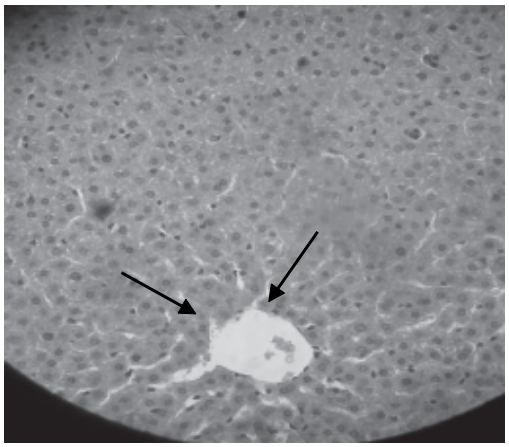
Bio-chemical observation:- As compared to the control group, the animals in the paracetamol-treated group showed a significant increase in lipid peroxidation (LPO) as revealed by raised M.D.A and SOD activity with an equal increase in serum levels of hepatic marker enzymes. Prevention was significant in animals receiving kaṭuki and paracetamol. Animals given only kaṭuki showed no alteration in LPO and SOD without any significant effect on other parameters (Table 2).

Histopathological observations: - Liver section from control rats showed normal lobular architecture and normal hepatic cells with a well-preserved cytoplasm and well-defined nucleus and nucleoli (Fig.I - a1&a2). Histopathological examination of the livers of animals given only Kaṭukicūrṇa showed no significant morphological changes, as compared to animals in the control group (Fig.I - b1&b2). Liver sections

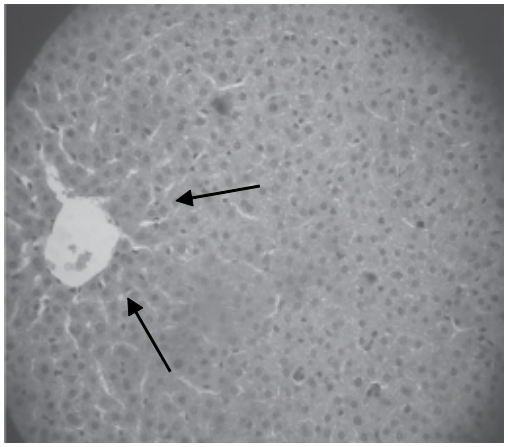
TABLE 1
Effect of Katukichurna on different parameters (Mean ± S.E)

| Group | AST (IU/L) | ALT (IU/L) | ALP (IU/L) | M.D.A. (nmol/ml serum) | S.O.D (nmol/ml serum) |
|---|---|---|---|---|---|
| Control | 51.33±1.75 | 17.67±0.76 | 39.33±1.05 | 0.347±0.06 | 0.181±0.002 |
| Katuki-perse | 51.50±0.96$^{(ax)}$ | 19.50±0.67$^{(a,x)}$ | 38.50±1.34$^{(a,x)}$ | 0.374±0.006$^{(a,x)}$ | 0.171±0.005$^{(a,x)}$ |
| Paracetamol | 90.17±0.98$^{(ax)}$ | 70.00±0.86$^{(c,y)}$ | 70.00±0.68$^{(c,y)}$ | 0.671±0.005$^{(c,y)}$ | 0.392±0.036$^{(c,y)}$ |
| Katuki | 72.83±1.33$^{(cz)}$ | 50.50±0.89$^{(c,z)}$ | 40.67±0.88$^{(c,z)}$ | 0.539±0.042$^{(b,z)}$ | 0.145±0.004$^{(c,z)}$ |

AST - Aspartate Transaminase; ALT - Alanine transaminase; ALP - Alkaline phosphatase.
Group-II is compared with Group I (x); Group-III is compared with Group-I (y) and Group-IV is compared with Group-III (z). Superscripts 'a' is P> 0.05 'b' P < 0.01 and 'c' P < 0.01. All statistical analysis were done by student unpaired 't' test 'P' values <0.01 were considered to be statistically significant.



a1



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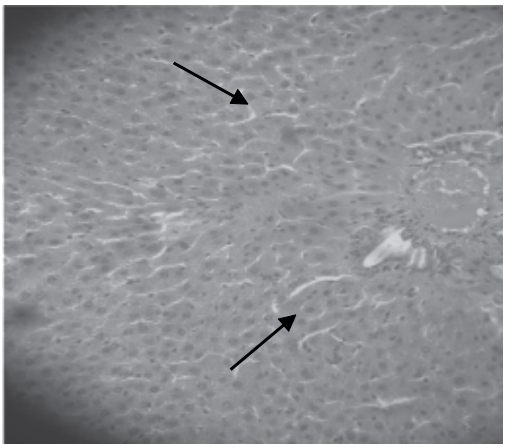
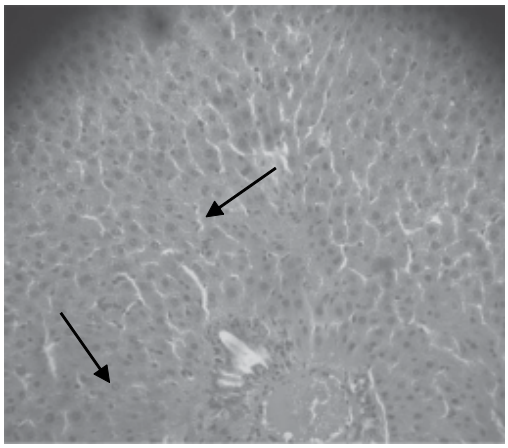


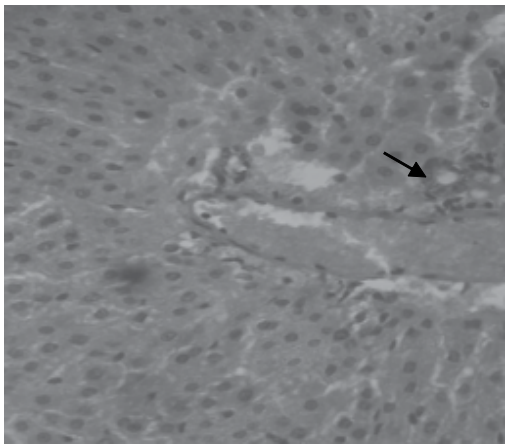
b1



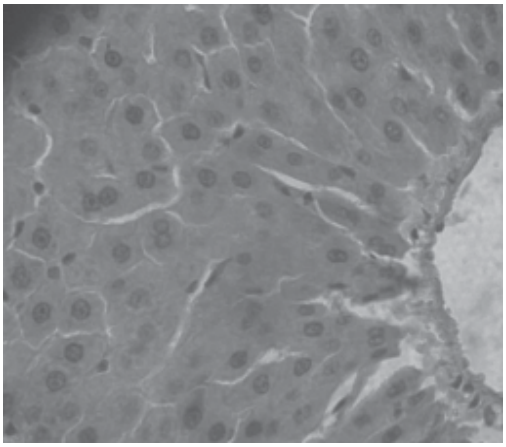
b2

Fig. I. a1-b2 : Histopathological examination - Liver section

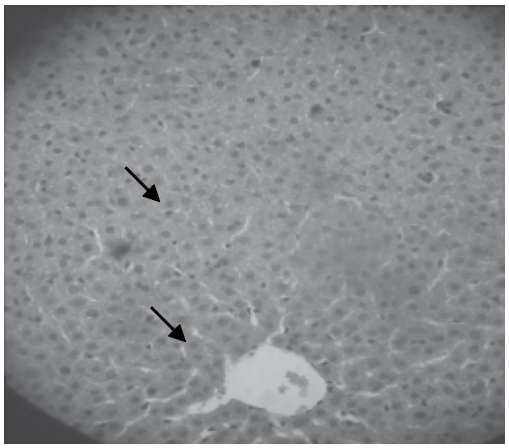
**a1**&**a2** Control rats - showing normal lobular architecture and normal hepatic cells with a well-preserved cytoplasm and well-defined nucleus and nucleoli;
**b1**&**b2** Katukicurna only - showing no significant morphological changes



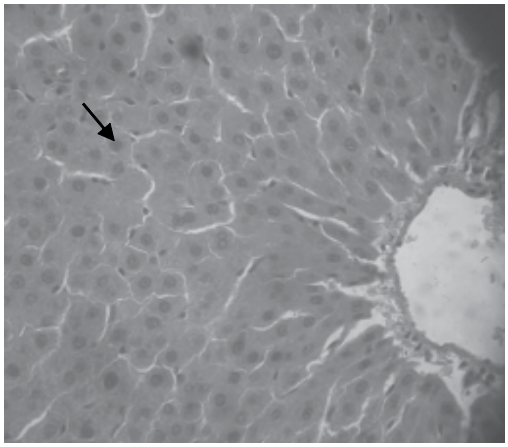
a1



a2



b1



b2

Fig. II. a1-b2: Histopathological examination - Liver section

**a1**&**a2** Paracetomal treated - showing cloudy swelling and ballooning degeneration, loss of lobular architecture, etc; **b1**&**b2** Pretreatment with Katukicurna - showing normal lobular structure with less cloudy swelling

from animals given paracetomal showed cloudy swelling and ballooning degeneration, and loss of lobular architecture and marked regenerative activity in the form of binucleation, nuclear enlargement and prominent nucleoli. Some cells showed loss of nucleus and nucleoli kupffer cells were hyperplastic (Fig.II - a1&a2). Pretreatment with Kaṭukicūrṇa showed normal lobular structure with less cloudy swelling and hardly ascertainable ballooning degeneration and less regenerative activity in paracetamol challenged animals (Fig.II - b1&b2).

**Discussion**

Kaṭuki (*Picrorhiza kurrooa*) is a renowned āyurvedic drug containing bitter active ingredient picrorrhizin and kutkin. This drug possesses tikta rasa (bitter taste) and śīta vīrya (cold potency), which pacify pitta, the main culprit doṣa in the pathogenesis of jaundice. Kaṭuki is a potent chologogue which enhances the secretion of bile and excretes it into the gastro-intestinal tract through the common bile duct. Mṛduvirecana (mild purgation) is the frontline principle of management of kāmala of any origin. Kaṭuki has cathartic effect also and causes excretion of stools. This is to be viewed in correlation with the drug lactulose prescribed by western medicine. Excess surge of bilirubin hamper the enterohepatic circulation of bilirulin and causes excretion of bilirubin in the stool. The mechanism of action of *Picrorhiza kurrooa* is not established. The therapeutic activity of the drug may be based on two mechanisms: i) kutkins alter the structure of the outer membrane of the hepatocytes in such a way as to prevent penetration of the liver toxin into the interior of the cell[8], ii) kutkins stimulate the action of nucleolar polymerase-A, resulting in ribosomal protein synthesis and, thus stimulates the regenerative ability of the liver and formation of new hepatocytes[9,10]. Apocynin, is one of its constituents, has been found to exhibit powerful anti-inflammatory effects on a variety of inflammatory models[11].

Silymarin is a well-known hepatoprotective agent. Silymarin is a flavonol- lignan mixture obtained from seeds of *Silybum marianum*. Silymarin is a mixture of silybin, isosilybin, silychristin and silydianin. Silybin A and B are collectively known as silibinin. Randomized, controlled trials have proved efficacy of silymarin in liver diseases.

The above results of clinical and experimental studies reveal that the hepatoprotective activity of kaṭuki (*Picrorhiza kurrooa*) is at par to silymarin, or in many cases, superior to the effect of *Silybum marianum*.

**Conclusion**

Hepatitis B is the leading cause of acute viral hepatitis. The symptoms range from a silent infection to devastating conditions like cirrhosis, hepatoma, ascites, etc. The role of ayurveda in treating hepatobiliary conditions is unparalleled. Single or compound herbal drugs therapies available are very effective and a lot of research data is available, substantiating it. A clinical trial with katuki in the powder form in acute Hepatitis B infection (done as a part of research study) showed that the drug exhibited significant hepatoprotective and antiviral properties due to presence of bitter active principles picrorrhizin and kutkin.

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# CLINICAL EVALUATION OF HERBO MINERAL FORMULATIONS IN THE MANAGEMENT OF ARŚAS (HAEMORRHOIDS)

G.Venkateshwarlu, H. Pushpalatha and B.N.Sridhar*

Abstract: Though haemorrhoids (arśas) are not a life threatening disease, it causes considerable discomfort, both mentally and physically. Several surgical/conventional therapies like sclerotherapy, rubber band ligation, anal dilatation, photo coagulation, cryosurgery and haemorrhoidectomy are now in practice in its management. However, there is no a universally acceptable technique without side effects. In this context, a single blind clinical trial was carried out to evaluate the clinical efficacy of selected āyurvedic herbo-mineral formulations containing Kravyādi rasa, Triphala cūrṇa and Kāśiśādi taila; and the results were encouraging.

**Introduction**

Acārya Suśruta defines arśas (haemorrhoids) as: "arivat prāṇān śṛṇoti iti arśa:" which means it is an ano-rectal disorder with congested growths in the anal canal capable of disturbing the normal physiological functions of the body like an enemy. In āyurveda, this disease is considered as a local manifestation of systemic derangement or vitiation of doṣas due to various aetiological factors, which includes wrong or unwholesome diet and deeds that adversely effects the jaṭharāgni (digestive fire) resulting in mandāgni (low digestive fire) and leads to vibandha (constipation), which causes injury to the anal canal during forcible defecation. This provokes the doṣavikṛti and causes arśas.

Arśas may be compared with haemorrhoids, which are the varicose condition of the haemorrhoidal plexus of veins situated in the lower portion of the rectum and in the anal canal. The etiology is still a matter of conjecture. The age-old factors enumerated as hereditary, laxity of external sphincter, anal infection, as principal cause and chronic constipation is a co-existing factor in majority of the patients.

Gogligher states that, at least 50% of the people over the age of 50 years have some degree of haemorrhoidal symptoms and estimated men are to be affected roughly twice as frequently as women (Bennet *et al* 1963). The prevalence rate of this disease is 4.4% in ten million people. The faulty food habits and sedentary life style of modern man increases the incidence rate.

Suśruta, the father of ancient surgery, has enumerated four-fold measures in the treatment of arśa which are more practical even today: i) bheṣajacikitsa (medical management), ii) kṣāra-karma (chemical cauterisation), iii) agnikarma

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(thermal cauterisation) and iv) śastrakarma (surgical management). He has also emphasized that the selection of treatment method should be according to the nature of disease. Medical management is an effective mode of recent origin, involving the minimal vitiation of doṣas without any grave symptoms.

**Material and methods**

The study was carried out at the O.P.D of Regional Research Institute (Ay.), Bangalore. A total number of 88 patients were taken for clinical trial for a period of 21 days and the follow up was made at an interval of 7 days during the study period and at interval of 15 days up to 3 months thereafter. The study has been carried out on the basis of selection criteria.

**Selection criteria**

- 16 - 60 years of age of either sex
- Painful/pain less
- Bleeds/does not bleed
- Anorectal arsas (hemorrhoids)
- Fresh/previously operated
- Pile mass palpated/seen by P/R exam or proctoscopy

**Exclusion criteria**

- Patients with malignancy
- Incontinence of stool
- Cirrhosis of liver- portal hypertension
- Tuberculosis/diabetes/systemic disease
- Bleeding diathesis
- Multiple hemorrhoids
- Cardiac and neurological diseases

**Trial drugs**

- Kravyādi rasa - 500mg three times a day with warm water
- Triphala cūrṇam - 5gm at bedtime with warm water
- Kāśīśādi tailam - 2ml for local application before and after defecation.

**Diet**

- Pathyāhāra (wholesome diet):- Milk, buttermilk, ghee, rice, leafy vegetables, śūraṇa kanda (yam), citrus fruits and plenty of oral fluids**.**
- Apathyāhāra (unwholesome diet):- Non vegetarian diet, spicy foods, alcohol, tobacco and canned foods and beverages**.**

**Assessment criteria**

Good response:- i) above 75% to complete disappearance of known symptoms and absence of complications and ii) considerable regression in the size of pile mass.

Fair response: - i) 50% and above relief in presenting symptoms and ii) some regression in the size of pile mass

Poor Response: - i) 25% and above relief in presenting symptoms and ii) with negligible change in the size of pile mass

No response: - No relief in presenting symptoms and no change in the size of pile mass.

Withdrawal: - i) discontinuation of treatment during the trial, ii) development of any complications, iii) aggravation of the disease symptoms and iv) any side effect of the drugs.

**Observations and results**

It was observed that males were more affected than females. The incidence ranging from 21-40 years of age were more followed by 41-60. It was observed that patients between 1-3 years of duration were more compared to other categories and all were non-operated. As far as body constitution (śarīraprakṛti) is concerned, pittaja was more susceptible to the disease followed by vātaja prakṛti. The disease was found to be more susceptible in patients having non vegetarian and spicy food along with

irregular bowels and emotional stress. In regards to occupation, maximum patients were of sedentary habits. Pittaja predominance of arśas was more compared to other categories. As regards to position of hemorrhoids, more patients had it in 11'O clock position followed by 7'O clock position. Bleeding, itching and anemia were seen more followed by pain and induration. Mild bleeding was observed in many patients invariably related with defecation. The observations are detailed in Table 1&2.

The overall treatment response among the cases studied were as follows: 13 (14.77%) cases showed good response, 16 (29.55%) cases fair response and 15 (17.04%) cases showed mild response, 14 (15.91%) patients did not show any response and rest 20 (22.73%) were dropouts (Table 3).

**Discussion and conclusion**

The etiology of haemorrhoids is still a matter of conjecture. However, Nesselrod opined that infection could be the principal cause of the disease. Other proctologists attribute haemorrhoids to man's erect posture, heredity, absence of valves in the portal system, straining at stool due to constipation, strenuous work, prolonged standing, chronic illness. etc.

Burkitt (1972) has reported that the incidence increases in the community due to the use of

TABLE 3
Result of treatment

| Response | Patients | |
|---|---|---|
| | No. | % |
| 1. Good Response | 13 | 14.77 |
| 2. Fair Response | 26 | 29.55 |
| 3. Poor Response | 15 | 17.04 |
| 4. No Response | 14 | 15.91 |
| 5. LAMA | 20 | 22.73 |

TABLE 1
Distribution of patients according to age, sex, chronicity of disease, prakṛti, occupation, etc.

| Parameter | Patients | |
|---|---|---|
| | No. | % |
| 1. Sex wise distribution | | |
| - Male | 50 | 56.82 |
| - Female | 38 | 43.18 |
| 2. Age group (in year) | | |
| - up to 20 | 06 | 6.81 |
| - 21-40 | 55 | 62.50 |
| - 41-60 | 24 | 27.27 |
| - 60 & above | 03 | 3.40 |
| 3. Chronicity (in year) | | |
| - <1 year | 21 | 23.86 |
| - 1-3 | 27 | 30.68 |
| - 3-6 | 18 | 20.45 |
| - >6 years | 22 | 25.00 |
| 4. Śarīraprakṛti | | |
| - Vātaja | 21 | 23.86 |
| - Pittaja | 31 | 35.23 |
| - Kaphaja | 00 | 00 |
| - Vāta-pittaja | 15 | 17.04 |
| - Vāta-kaphaja | 07 | 7.95 |
| - Pitta-kaphaja | 14 | 15.90 |
| 5. Personal history | | |
| - Smoking | 27 | 30.68 |
| - Tobacco chewing | 11 | 12.5 |
| - Non-veg | 80 | 90.90 |
| - Spices intake | 74 | 84.09 |
| - Alcoholic | 13 | 14.77 |
| - Emotional stress | 55 | 62.5 |
| - Irregular bowel habits | 69 | 78.41 |
| 6. Nature of work (occupation) | | |
| - Sedentary | 69 | 78.41 |
| - Moderate | 11 | 12.50 |
| - Strenuous | 08 | 9.09 |
| 7. Doṣa predominance | | |
| - Vātaja | 17 | 19.34 |
| - Pittaja | 63 | 71.59 |
| - Kaphaja | 00 | 0.0 |
| - Sannipātaja | 00 | 0.0 |
| - Sahaja | 08 | 9.09 |

TABLE 2
Distribution of patients according to Clock position, clinical findings,bleeding pattern, etc.

| Parameter | Patients | |
|---|---|---|
| | No. | % |
| 1. Position of hemorrhoids | | |
| - 3'O Clock | 16 | 18.18 |
| - 7'O Clock | 27 | 30.68 |
| - 11'O Clock | 32 | 36.36 |
| - 3'& 7'O Clock | 12 | 13.64 |
| - 3'& 11'O Clock | 01 | 1.14 |
| - 3,7& 11'O Clock | 00 | 0.0 |
| 2. Clinical findings | | |
| - Bleeding | 88 | 100 |
| - Pain | 43 | 48.86 |
| - Swelling | 22 | 25.0 |
| - Tenderness | 17 | 19.32 |
| - Itching | 70 | 79.54 |
| - Induration | 38 | 43.20 |
| - Anemia | 62 | 70.45 |
| 3. Bleeding pattern | | |
| - No bleeding | 00 | 0.0 |
| - Mild | 65 | 73.86 |
| - Moderate | 20 | 22.73 |
| - Profuse | 03 | 3.41 |
| - Before defecation | 11 | 12.5 |
| - With defecation | 54 | 61.36 |
| - After defecation | 23 | 26.14 |
| 4. Nature/type of pain* | | |
| - Pricking | 06 | 13.95 |
| - Cutting | 10 | 23.25 |
| - Burning | 06 | 13.95 |
| - Itching | 20 | 46.51 |
| - Throbbing | 01 | 2.32 |
| - Mixed | 00 | 0.0 |
| 5. Level of Hemoglobin | | |
| - < 7gm% | 09 | 7.95 |
| - 7-10gm% | 53 | 60.22 |
| - >10gm% | 26 | 29.55 |

* Total number of patients - 43

more refined foods. In the present study it was also observed that out of 88 patients, 80 (90.90%) patients were non-vegetarians and 74 (84.09%) patients were having of spicy food habits which would vitiate digestive enzymes (jaṭharāgni) and cause irregular bowel habits (constipation); this was the principal cause of arśas and its various pathological manifestations in 69 (78.41%) patients in this study.

Though the diagnosis of arśas is simple, the choice of treatment method may be difficult because one treatment measure may not be applicable to all type of arśas. Arśas has diverse manifestations and accordingly the treatment has got to be on individual merits.

Haemorrhoids is generally regarded as a surgical disease. The fact that so many operative and para-surgical procedures in vogue prove that there is no standard treatment procedure available for its management. Besides the surgical procedures involve risk factors and also have certain limitations.

Keeping in view of above facts, a non-invasive, conservative āyurvedic drug regimen Kravyādi rasa, Kāśīśādi taila and Triphala cūrṇa have been selected and studied.

The ingredients of Kravyādi rasa possess the properties of appetizer, carminative, digestive, and haematinic and are useful in dyspepsia, indigestion, haemorrhoides etc. It also has the properties of elimination of undigested toxic substance (āmadoṣa). Since the main causative factor for arśas is low digestive power and undigested toxic substances, Kravyādi rasa is effective as it improves the digestive function and eliminates toxic substances from the body. The other ingredient borax (ṭaṅkaṇa) have the action of laxative (recana), to bring back the

normalcy of apānavāyu by vātānulomana which relieves intra abdominal pressure. Kravyādi rasa also contains lohabhasma that checks the anaemia in arśas patients.

Triphala cūrṇa, which contains harītaki (*Terminalia chebula*), vibhītaki (*Terminalia bellirica*) and āmalaki (*Emblica officinalis*), an important component exhibits laxative action by stimulating the intestinal mucus membranes by the secretion of mucus which enhances bowel movement and helps in smooth evacuation and relieves the pain during defecation. Its astringent properties, tannins and abundant Vitamin 'C', act on blood capillaries that help in arresting the bleeding.

The most important role of Kāśīśādi taila used for local application is that it has cytogenic and extra tissue debridement action and the main ingredient kāśiśa ($FeSO_4$) having the properties of anti inflammatory (vṛaṇaropana) and wound healing (vṛaṇaśodhana), which helps in relieving pain, swelling and local congestion.

The trial patients were also advised to follow dietary regimen on buttermilk, milk, ghee, leafy vegetables, yam (śūraṇa kanda), citrus fruits and plenty of oral fluids that help in the prevention of recurrence of haemorrhoids.

The combination of trial drugs would acts systemically and locally on ano rectal piles and will help in the control of gross reduction of associated symptoms on minimum possible time to give relief to the patients.

Acknowledgement
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# MANAGEMENT OF ANKLE SPRAIN WITH MAÑJIṢṬHĀDI LEPA - A CLINICAL STUDY

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Abstract - This is a clinical study carried out based on āyurvedic principles referred to in Bhagna cikitsa of Suśrutasamhita. In the study, Mañjiṣṭhādi lepa was applied to the patients of ankle sprain for 7 days and results observed were excellent.

**Introduction**

The competitive and hectic lifestyle is increasing the incidence of trauma. In day-to-day life, ankle is one among the most common site for acute musculo-skeletal injuries and sprains, which account for 75% of ankle injuries. Acute ankle trauma is responsible for 10-30% of sports related injuries in young athletes. Each year an estimated one million people consult the physicians with acute ankle injuries. More than 40% of ankle sprain have the potential to cause chronic problems.

Ankle Sprain is a common walking and sports injury. It can be very painful experience and can significantly affect a patient's lifestyle. Ankle sprain may result in a partial or complete tear of a ligament, which destabilises the ankle joint. It is characterised by pain, swelling, tenderness and stiffness of the affected ankle joint.

The history of trauma can be anticipated from the date, survival of the fittest. Even though there is no direct reference to ankle sprain in āyurveda, Acārya Suśruta has mentioned (in the context of Asthi-bhagnacikitsa) 'patanābhighātatva', which means patana and abhighāta are main causes of sprain. In the same context he has advised for application of cold paste (śīta pradeha). While explaining different modalities of treatment for bhagna, where lepa or paste is one form of treatment, Suśruta has emphasised to use Mañjiṣṭhādi lepa. Lepana upakrama is explained as ādhya-upakrama by Suśruta, which is analgesic (vedanāsthāpaka) and anti inflammatory (śothahara). In view of the above, an attempt was made to study the āyurvedic principles of management of ankle sprain with Mañjiṣṭhādi lepa.

Structures involved in ankle sprain are: i) complete rupture of anterior tibio-fibular ligament (ATFL) - 65% ; ii) both anterior tibio-fibular ligament and calcaneo-fibular ligament - 20% ; iii) anterior inferior tibio-fibular ligament (high ankle sprain) - 10% and iv) deltoid ligament - 3% .

Aim and objective: - The aim of the clinical study was to assess the efficacy of Suśruta's principles

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in the management of ankle sprain using Mañjiṣṭhādi lepa.

## Materials and method

### Source of data

Cases presenting with classical signs and symptoms of ankle sprain from the OPD and I.P.D of S.D.M college of Ayurveda and Hospital were selected and studied on 15 patients.

### Diagnostic criteria

Diagnosis was done based on the history of inversion or eversion of foot and clinical features like pain, tenderness, swelling, loss of function, discoloration, and joint stiffness.

### Inclusion criteria

Patients of grade I and II ankle sprain: [Grade I - Mild pain, swelling, joint stiffness and little or no loss of function. Grade II - Moderate to severe pain, swelling, joint stiffness and loss of function.]

### Exclusion criteria

- Patients with radiological evidence of fracture and dislocation of ankle joint.
- Patients with third grade ankle sprain [Grade III - Severe pain, profuse swelling, complete joint stiffness and complete loss of function]

Ingredients of Mañjiṣṭhādi lepa (all in equal quantity):- i) mañjiṣṭhamūla (root of *Rubia cordifolia*), ii) yaṣṭimadhumūla (root of *Glycyrrhiza glabra*), iii) raktacandana - heartwood (*Pterocarpus santalinus*), iv) śāli-piṣṭi - grain (*Oryza sativa*) and v) Śatadhauta ghṛta (100 times potentially-upgraded ghee).

### Method of preparation

All the above mentioned ingredients were finely powdered and taken in equal quantity in a bowl, and lepa (paste) was prepared by mixing in hot water and applied to the affected limb in śīta (cold) form.

### Method of application

Lepa was applied twice daily in pratilomagati (opposite direction) with a thickness of ardra mahiṣa carma (0.4-0.8 cm) and removed before dried completely.

Duration: - This procedure was carried twice daily.

### Assessment criteria

Effect of Mañjiṣṭhādi lepa was assessed on clinical signs and symptoms daily over a period of one week by giving scores. Assessment was done based on clinical parameters as follows-

- Subjective parameters: - Pain
- Objective parameters: - Swelling, tenderness, discoloration, movement of joint.

### Follow up

Patients were examined on initial day zero and further followed daily for one week. Then weekly once follow up for four weeks to note the changes in signs and symptoms based on the research proforma and also to note whether the relief provided by the therapy was sustained or not or whether there was any relapse.

## Results

One week duration of treatment provided significant relief in all the symptoms; 100% result was obtained in the movements of joint as dorsiflexion, plantarflexion, adduction,

TABLE 1
Result of the treatment

| | Symptoms | Result (%) |
|---|---|---|
| 1. | Pain in ankle joint | 88.23 |
| 2. | Tenderness in ankle joint along affected ligament | 85.71 |
| 3. | Swelling in ankle joint | 75 |
| 4. | Loss of function in ankle joint | 100 |
| 5. | Discoloration in ankle joint | 100 |

abduction, inversion and eversion after the application of Mañjiṣṭhādi lepa (Table 1)

**Discussion**

Mañjiṣṭhādi lepa is a combination of 5 drugs having cold in potency (śītavīrya) and sweet-astringent predominant in taste (madhura kaṣāya rasa pradhāna). These properties are helping to pacify pitta, rakta and vāta, which are mainly vitiated in acute traumatic conditions. This helps for the management of ankle sprain.

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# CLINICAL EVALUATION OF ARJUNĀDI YOGA IN THE MANAGEMENT OF VYĀNABALAVAIṢAMYA (ESSENTIAL HYPERTENSION)

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Abstract: Essential hypertension (vyānabalavaiṣamya) is nothing but arterial hypertension without a definable cause and can be considered as a heterogeneous disorder. In āyurvedic literature, it is not described as a special disease entity, however, based on nidāna, samprāpti and lakṣaṇa it is considered as the vitiation of vyānavāyu, hence it is termed as vyānabalavaiṣamya. No single drug recipe will be safe and effective in essential hypertension. In this direction, Central Council for Research in Ayurveda and Siddha (CCRAS) has been conducted clinical trials at various levels with different formulae. The present study has been taken up to see the efficacy of a combination of drugs i.e. arjuna, vaca, brahmi, jaṭamānsi in one Group (I) and the same combination of drugs along with yoga and meditation in another Group (II). Group-I was effective in 59.99% and in Group-II, 68.00%. On statistical analysis both the groups were found highly significant.

**Introduction**

Cardiovascular (CVS) disease is a great health problem in developed and developing countries. Mortality from CVS diseases among working age people in India, South Africa and Brazil was found to be one and half to two times higher than that of the United States, for which hypertension is the commonest cause.

Hypertension is of two types, Primary and Secondary. Primary or essential hypertension is the arterial hypertension with no definable cause. It is a heterogeneous disorder and is a dynamic process and depending on the stage of the disease, the underlying pathophysiology changes. Individuals, in whom a specific structural or organic gene defect is responsible for hypertension, are defined as having secondary form of hypertension.

In patients with early hypertension, both sympathetic and parasympathetic control mechanisms are abnormal. The tachycardia, increased cardiac output, increased dp/dt, and venoconstriction characteristic of these patients are due to a combination of diminished resting parasympathetic inhibition and enhanced sympathetic stimulation. These patients have elevated plasma rennin and nor epinephrine levels and enhanced vascular responses to stress as a consequence of their increased sympathetic activity.

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In āyurvedic classics, hypertension is not described as a special disease entity. Based on the samprāpti and lakṣaṇa, it can be considered as the vitiation of vyānavāyu, hence CCRAS coined the term vyānabalavaiṣamya. Vyānavāyu is situated in hṛdaya and circulates in the entire body. In the normal state, the function of vyānavāyu is rasa samavahana - ejection of rasadhātu and effective circulation of rasa and rakta dhātus[1]. Based on these functions, it can infer that vyānavāyu is the controlling factor of cardiac output, vascular resistance, thereby maintaining the normal tension in the vasculature and if vitiation takes place, lead to hypertension.

Hypertension if left untreated, invariably leads to the cerebral heamorrhage, shock, stroke, severe cardiac problems, etc. It needs long treatment and on long term it causes side effects. No single drug recipe will be safe and effective in all patients with essential hypertension. The anti-hypertensive approach, at present, is not only to control hypertension, but also to prevent/reduce target organ damage and improve organ function. At the same time, therapy should diminish concomitant risk factors for cardiovascular disease and should improve the quality of life. Keeping in view the above facts, CCRAS is conducting clinical trials at various levels with different formulae. Number of drugs have been screened pharmacologically for their anti-hypertensive effect and based on the pre-clinical studies data, the present study was taken up to see the efficacy of arjuna, vacha, brahmi and jaṭamānsi in Group-I.

Yoga has been utilised as a therapeutic tool to achieve positive health and control and cure of diseases. Hypertensive patients with mild or moderately raised blood pressure who are advised relaxation exercises have often benefited. There are several uncontrolled and few controlled studies, which have confirmed that blood pressure can be lowered particularly in regular practitioners of yoga; hence yoga and meditation along with the above drugs were adopted in Group II.

**Material and methods**

After thorough clinical examination and according to the inclusion criteria, 41 patients in Group-I and 31 in Group-II admitted into the study; 6 patients in each group dropped out. Clinical, pathological and biochemical investigations carried out as per the proforma and results assessed according to the assessment criteria. For the purpose of statistical analysis, adopted parameters graded on 0-10 scale. The study was carried out between 2001-2002 at Regional research Institute, Vijayawada, Andhra Pradesh.

**Inclusion criteria**

1. Hypertensive patients of either sex between the ages of 35-70 years,
2. having no known complaints of the disease,
3. having BP 150 / 95 mm of Hg or higher,
4. duration of the disease < 15 years.

**Exclusion criteria**

1. Patients below the age of 35and above 70,
2. Patients having systemic/serious complications of cardio vascular system, cerebro vascular system and renal system
3. Hypertensive retinopathy
4. Malignancy
5. History of liver disease in the recent past
6. Patients labeled as malignant hypertensive
7. Patients who responded with salt-restricted diet, avoiding mental, physical strain
8. Duration of the disease more than 15 years

**Parameters adopted**

Subjective:- i) Śiraśūla (headache), ii) bhrama (dizziness), iii) kṣubdata (irritability), iv) śrama (fatigue), v) anidra (insomnia) and vi) dourbalya (weakness).

Objective:- Blood pressure - sitting, standing and laying.

**Assessment criteria**

Good Response:- i) Normalcy in the systolic and diastolic blood pressure, ii) free from presenting symptoms and iii) improvement in general well being of the patients.

Fair response: - i) Considerable reduction of blood pressure (Systolic + Diastolic), ii) improvement in clinical symptoms and iii) no significant improvement in general well-being of the patient.

Poor response: - Mild improvement in clinical symptoms and well being of the patient, but blood pressure remains unchanged.

No response: - No response in the symptoms and blood pressure remains unchanged or increased.

Withdrawal criteria: i) Discontinuation of treatment during trial, ii) development of any serious complications due to disease or drug and iii) blood pressure increases and the patient does not show any significant improvement in clinical symptoms.

The level of the study was OPD; type - single blind trial and the period - 12 weeks (6 weeks drug administration + 6 weeks observation with out drug).

TABLE 2
Statistical analysis of changes in sign & symptoms in Group I&II

| Sign & symptoms | Mean Score | | SD + | | Diff. (BT-AT) | | SE | 't' | p |
|---|---|---|---|---|---|---|---|---|---|
| | B.T. | A.T. | B.T. | A.T. | Mean | SD + | | | |
| 1. Śirasśūla (Headache) | | | | | | | | | |
| Group I | 377.13 | 94.94 | 3.33 | 1.67 | 377.74 | 3.33 | 0.56 | 5.96 | <0.001 |
| Group II | 286.07 | 16.00 | 3.45 | 0.81 | 257.22 | 3.27 | 0.65 | 4.86 | <0.001 |
| 2. Dourbalya (weakness) | | | | | | | | | |
| Group I | 4395.96 | 79.87 | 11.37 | 1.53 | 268.96 | 2.81 | 0.475 | 6.35 | <0.001 |
| Group II | 138.83 | 54.92 | 2.40 | 1.51 | 72.26 | 1.73 | 0.34 | 3.88 | <0.001 |
| 3. Bhrama (dizziness) | | | | | | | | | |
| Group I | 388.96 | 173.6 | 3.38 | 2.25 | 160.89 | 2.17 | 0.36 | 7.83 | <0.001 |
| Group II | 226.00 | 34.23 | 3.06 | 1.19 | 139.70 | 2.41 | 0.48 | 4.33 | <0.001 |
| 4. Kṣubdata (irritation) | | | | | | | | | |
| Group I | 388.96 | 79.88 | 3.38 | 1.53 | 234.61 | 2.62 | 0.44 | 7 | <0.001 |
| Group II | 220.23 | 52.83 | 3.02 | 1.48 | 148.37 | 2.48 | 0.49 | 3.59 | <0.005 |
| 5. Śrama (fatigue) | | | | | | | | | |
| Group I | 446.72 | 144.96 | 3.62 | 2.06 | 189.84 | 2.36 | 0.39 | 4.97 | <0.001 |
| Group II | 54.92 | 16.00 | 1.51 | 0.81 | 39.51 | 1.28 | 0.25 | 2.56 | <0.025 |
| 6. Anidra (insomnia) | | | | | | | | | |
| Group I | 354.95 | 129.93 | 3.23 | 1.95 | 142.7 | 2.04 | 0.34 | 6.20 | <0.001 |
| Group II | 281.38 | 16.00 | 3.42 | 0.81 | 247.69 | 3.21 | 0.64 | 3 | <0.01 |

**Treatment schedule**

Group I: - Finely powdered arjuna (*Terminalia arjuna*), vaca (*Acorus calamus*), brāhmi (*Bacopa monnieri*) and jaṭamānsi (*Nardostachys grandiflora*) - all in equal parts - 3g thrice daily with water along with specific dietary regimen.

Group II: - The above drugs (3g thrice daily) along with yoga (except śīrṣāsana) and meditation daily with specific dietary regimen.

**Observations and result**

Incidence of age was observed in both the groups (Table 1). Different signs and symptoms before starting the treatment were from severe to mild degree. After 6 weeks of treatment, statistically significant/highly-significant result was observed in both the group in signs and symptoms such as headache, weakness, dizziness, irritation, fatigue and insomnia (Table 2). Normal systolic and diastolic blood pressure was observed in both the groups; statistically both the groups found highly significant - P<0.001 (Table 3-5).

**Discussion**

Of 35 patients, 21 (59.99%) in Group I and of 25 patients, 17 (68.00%) in Group II got benefited; hence, Group-II appears more effective in relieving hypertension and its associated symptoms (Table 6).

Pharmacodynamics of the drugs:- Arjuna, vaca, brahmi and jaṭamānsi are powerful combination of hypotensive and cardiotonic drugs. Among these, arjuna is cardiotonic hence gives relief in symptomatic complaints of hypertension. Brahmi is sedative, cardiotonic and it was also found, as in the case of reserpine, to deplete nor-adrenalin and 5-HT content of rat brain. Jaṭamānsi is hypotensive, depressant on CNS and having anti arrhythmic activity within auricular flutter; it is anxiolytic and anti convulsant also. The other important drug is vaca, which is sedative, analgesic and causes moderate depression of blood pressure and having anti cholinergic action. Almost all these drugs are having properties of rasāyana, medhya and tridoṣaśamaka; along with these, their prabhāva, uṣna and vīrya potencies might have helped in controlling hypertension and relieving its symptoms.

TABLE 1
Incidence of age

| Age-group (years) | Group-I | | Group-II | |
|---|---|---|---|---|
| | No. | % | No. | % |
| 35-40 | 12 | 29.26 | 03 | 09.67 |
| 41-50 | 13 | 31.70 | 14 | 45.16 |
| 51-60 | 12 | 29.26 | 11 | 35.48 |
| 61-70 | 04 | 09.78 | 03 | 09.69 |
| Total | 41 | 100.00 | 31 | 100.00 |

TABLE 3
Statistical analysis of change in Systolic pressure

| | Group-I | | | Group-II | | |
|---|---|---|---|---|---|---|
| | BT | AT | Diff. | BT | AT | Diff. |
| Mean | 163.08 | 140.17 | 22.91 | 161.68 | 138 | 23.68 |
| SD ± | 18.01 | 20.79 | 19.62 | 14.74 | 17.79 | 18.81 |
| SE | | | 3.31 | | | 3.76 |
| 't' | | | 6.92 | | | 6.29 |
| P | | | <0.001 | | | <0.001 |

TABLE 4
Statistical analysis of change in Diastolic pressure

| | Group-I | | | Group-II | | |
|---|---|---|---|---|---|---|
| | BT | AT | Diff. | BT | AT | Diff. |
| Mean | 110.22 | 91.82 | 18.40 | 104.24 | 86.72 | 17.52 |
| SD ± | 13.39 | 12.56 | 14.60 | 7.73 | 9.48 | 10.16 |
| SE | | | 2.47 | | | 2.03 |
| 't' | | | 7.44 | | | 8.62 |
| P | | | <0.001 | | | <0.001 |

In Group-II, the above drugs administered along with yoga and meditation. In this group, the percentage of relief was more in comparison with Group-I, may be due to the added effect of yoga and meditation.

Probable mode of action of yoga and meditation**: -** The exact mechanism as to how yoga and meditation help in various disease-states is not known. It has been suggested that there could be neuro-humoral pathways with a selective effect on each pathological situation. It is observed in large proportion of the patients that blood pressure elevation is neurogenic, and the autonomic nervous system is involved in both the initiation and maintenance of elevated arterial pressure in essential hypertension. Exercise and meditation activates the autonomic nervous system, thereby causes either a decrease in the activities of the sympathetic nervous system or an increase in the activities of the parasympathetic nervous system, and thus a new balance between the two nervous wings is achieved. Meditation may activate the thalamic, hypothalamic, fore brain and

TABLE 5
Systolic & Diastolic pressure before & after treatment

| Severity Grade Scores | Group-I | | | | Group-II | | | |
|---|---|---|---|---|---|---|---|---|
| | Before Treatment | | After Treatment | | Before Treatment | | After Treatment | |
| | No | % | No | % | No | % | No | % |
| 1. Systolic Pressure: | | | | | | | | |
| 100 – 110 | 00 | 00.00 | 02 | 05.71 | 00 | 00.00 | 01 | 04.00 |
| 112 – 120 | 00 | 00.00 | 05 | 14.28 | 00 | 00.00 | 06 | 24.00 |
| 122 – 130 | 00 | 00.00 | 09 | 25.71 | 00 | 00.00 | 07 | 28.00 |
| 132 – 140 | 05 | 14.28 | 08 | 22.85 | 01 | 04.00 | 02 | 08.00 |
| 142 – 150 | 07 | 20.00 | 06 | 17.18 | 09 | 36.00 | 03 | 12.00 |
| 152 – 160 | 10 | 28.57 | 01 | 02.85 | 06 | 24.00 | 04 | 16.00 |
| 162 – 170 | 05 | 14.28 | 02 | 05.71 | 05 | 20.00 | 02 | 08.00 |
| 172 – 180 | 04 | 11.45 | 00 | 00.00 | 02 | 08.00 | 00 | 00.00 |
| 182 – 190 | 02 | 05.72 | 00 | 00.00 | 01 | 04.00 | 00 | 00.00 |
| 192 – 200 | 01 | 02.85 | 02 | 05.71 | 01 | 04.00 | 00 | 00.00 |
| 202 & Above | 01 | 02.85 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 |
| Total | 35 | 100.00 | 35 | 100.00 | 25 | 100.00 | 25 | 100.00 |
| 2. Diastolic Pressure: | | | | | | | | |
| 070 – 080 | 00 | 00.00 | 14 | 40.00 | 00 | 00.00 | 14 | 56.00 |
| 082 – 090 | 00 | 00.00 | 07 | 20.00 | 00 | 00.00 | 05 | 20.00 |
| 092 – 100 | 16 | 51.61 | 09 | 25.71 | 16 | 64.00 | 05 | 20.00 |
| 102 – 110 | 10 | 32.25 | 02 | 05.71 | 06 | 24.00 | 01 | 04.00 |
| 112 – 120 | 02 | 06.45 | 03 | 08.58 | 02 | 08.00 | 00 | 00.00 |
| 122 – 130 | 04 | 12.90 | 00 | 00.00 | 01 | 04.00 | 00 | 00.00 |
| 132 – 140 | 03 | 09.67 | 00 | 00.00 | 00 | 00.00 | 00 | 00.00 |
| **T**otal | 35 | 100.00 | 35 | 100.00 | 25 | 100.00 | 25 | 100.00 |

TABLE 5
Result of the treatment

| Response | Group-I | | Group-II | |
|---|---|---|---|---|
| | No | % | No | % |
| Good | 08 | 22.85 | 12 | 48.00 |
| Fair | 13 | 37.14 | 05 | 20.00 |
| Poor | 09 | 25.73 | 06 | 24.00 |
| No | 05 | 14.28 | 02 | 08.00 |
| Total | 35 | 100.00 | 25 | 100.00 |

endocrine connections in a subtle manner that is not available in other forms of exercises. Hence yoga and meditation, by stabilizing the neuro-electrical signals sending by the hypothalamus to the autonomic nervous system, cause decrease of blood pressure.

**Conclusion**

- The drug combination viz. arjuna, brahmi, jaṭamānsi, vaca administered in Group I found effective in 59.99% of patients.
- The above drug combination prescribed with yoga and meditation in Group II was effective in 68.00 % of patients.
- Both the groups found effective in relieving symptoms of hypertension such as śiraśūla, bhrama, daurbalya, kṣubdata, śrama and anidra.
- On statistical analysis, both the groups found highly significant (P<0.001) in normalizing systolic and diastolic blood pressure
- On over all assessment of results, Group-II appeared more effective than Group-I, because of the added effect of yoga and meditation.

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# EVALUATION OF ANTIMICROBIAL ACTIVITY OF *PASSIFLORA INCARNATA*

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Abstract: The aqueous and organic solvent extracts of the leaves of *Passiflora incarnata* was tested for antimicrobial activity. The plant exhibited a broad spectrum of antimicrobial activity against some selected pathogenic bacteria and fungi. The antifungal activity was tested against *Aspergillus niger, Aspergillus fumigatus, Aspergillus ruantii* and *Candida albicans*. Anti bacterial activity was tested against *Proteus vulgaris, Bacillus subtilis, Staphylococcus aureus, Escherichia coli* and *Pseudomones aeruginosa*. The methanolic extract exhibited significant activity against all the selected strains.

## Introduction

*Passiflora incarnata* is commonly known as Passion vine belongs to the family Passifloraceae. It is a perennial creeping vine, native to the Central America, cultivated in tropical and sub tropical countries like Florida, Guatemala, India and Srilanka[1].

The literature survey reveals that *Passiflora incarnata* has much pharmacological importance. The plant is used for sleeping disorders, restlessness, nervousness, stress and anxiety. It is also used in neuralgia, tachycardia and gastrointestinal disorders[2]. It has been screened for neuropharmacological activities[3,4]. A phytochemical investigation of the leaf, flowers and fruit extracts of *Passiflora incarnata* is also reported. The major chemical constituents of this plant are Apigenin and Luteolin glycosides, Vitexin, Kaempferol, Quercetin, indole alkaloids, fatty acids and traces of volatile oil [5].

A survey of literature showed that no systemic approach has been made to study antimicrobial activity of this plant. The present paper is an attempt to study the antimicrobial activity of *Passiflora incarnata*.

## Materials and methods

The leaf of *Passiflora incarnata* was procured from a private herbal garden in Coonoor, Nilagiris district during the month of March 2007; and were botanically identified and authenticated, and a voucher specimen of the plant is maintained in the department of Pharmacognosy, JSS College of Pharmacy, Ooty.

The leaves were dried under shade and powdered. 500g of the powdered leaf was exhaustively extracted with petroleum ether, chloroform, acetone, methanol and water using soxlet extractor. The extracts were evaporated to dryness under controlled temperature and then subjected to preliminary phytochemical analysis.

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The extracts were then separately dissolved in sulphoxide (DMSO) to get 5, 7.5 & 10 mg/ml solution and tested for antifungal activity. The solvent (DMSO) used for solubilisation was previously tested for its antifungal activity against all the test organisms and found to be negative.

The antimicrobial activity was assayed by disc diffusion method and the disc diameter was 6mm[6, 7]. The *in vitro* screening was carried out by employing 24 hours cultures of *Aspergillus niger, Aspergillus fumigatus, Aspergillus ruantii, Candida albicans, Proteus vulgaris, Bacillus subtilis, Staphylococcus aureus, Escherichia coli and Pseudomonas aeruginosa* using Sabouraud dextrose agar medium.

Clotrimazole (1mg/ml) and Ampicillin (1mg/ml) were used as standard antifungal and antibacterial agent respectively. The Petri dishes used for antibacterial screening were incubated at 37°C for 24 hours and those used for fungal activity were incubated at 28°C for 48 hours, and the zone of inhibition was measured[8, 9].

TABLE 1
Antimicrobial activity of *Passiflora incarnata*

| Micro-organism | Extracts | | | | | | C* (con: 1mg/ml) |
|---|---|---|---|---|---|---|---|
| | Methanolic (con: mg/ml) | | | Acetone (con: mg/ml) | | | |
| | 5.0 | 7.5 | 10.0 | 5.0 | 7.5 | 10.0 | |
| *A. niger* | 7.5 | 15.0 | 23.0 | 7.0 | 13.5 | 20.0 | 29[a] |
| *A. fumigatus* | 7.0 | 14.5 | 22.5 | 5.0 | 13.0 | 18.0 | 27[a] |
| *A. ruantii* | 6.0 | 13.0 | 19.5 | - | 8.0 | 15.5 | 22[a] |
| *C. albicans* | 7.0 | 13.0 | 22.5 | 6.0 | 10.0 | 15.0 | 27[a] |
| *P. vulgaris* | 6.5 | 11.5 | 20.0 | - | 6.5 | 12.0 | 22[b] |
| *B. subtilis* | 7.5 | 15.0 | 20.5 | 5.5 | 13.0 | 18.0 | 22[b] |
| *S. aureus* | 7.0 | 12.5 | 19.0 | 6.0 | 10.0 | 15.5 | 23[b] |
| *E. coli* | 6.5 | 11.0 | 17.5 | 5.5 | 8.0 | 15.0 | 18[b] |
| *P. aeruginosa* | 6.0 | 11.0 | 16.0 | 5.0 | 10.5 | 15.0 | 17[b] |

*C - Control
a - Clotrimazole (1mg/ml); b - Ampicillin (1 mg/ml)
Diameter of zone inhibition in mm (n=9)

**Result and discussion**

The results of screening of antimicrobial activity of the leaf extract of *Passiflora incarnata* are summarized in Table 1.

The results suggest that methanolic extract of *Passiflora incarnata* possess potential inhibitory activity at all the three concentration tested against all the bacterial and fungal strains used for the experiment. Acetone extract showed a moderate antifungal and anti bacterial activity against all the selected strain at the concentration of 10mg/ml and the chloroform, petroleum ether and aqueous extract did not produce any measurable antimicrobial activity of bacterial and fungal culture at any of the concentration tested.

Phytochemical investigation of the leaf extract revealed the presence of alkaloids, flavanoids and phenols in methanolic extract. The acetone extract showed the presence of only alkaloid.

Flavanoids are found to be effective antimicrobial substance and they have ability to complex with extracelular and soluble proteins to complex with bacterial cell wall[10]. Plant phenolics and polyphenols are known to be toxic to microorganism[11]. Therefore the flavanoids and phenolic compound may be responsible for the higher anti microbial activity of the methanolic extract of *Passiflora incarnata.*

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# EFFICACY OF KŪŚMĀṆḌABĪJA CŪRṆA IN DEPRESSIVE ILLNESS - A CLINICAL STUDY

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Abstract: Depressive illness is a major mental health problem among the various psychiatric disorders. Since antiquity the measures to control the depression are being tried. Medhya-rasāyana drugs have been described in various āyurvedic texts for specially improving the medha, intelligence and cure the mental diseases like depressive illness. Kūśmāṇḍa is one of the medhya-rasāyana drugs described in āyurvedic text. Keeping this view, kūśmāṇḍabīja cūrṇa has been selected as a trial drug for the treatment of depressive Illness.

**Introduction**

Depressive illness is a global mental health problem in the present era. It is very common, and between 5 to 10 percent of the population is suffering from this illness. It is characterised by sad mood, loss of interest in activity, lack of confidence, impaired concentration, suicidal tendency, etc.

Main pathology of depressive illness is disturbance of activity of neurotransmitters like decreased activity of noradrenergic, dopaminergic and serotonergic fiber activity; also, the person clinically presents symptoms like depressed mood and unhappiness.

**Material and methods**

35 patients were selected from the Kāyacikitsa OPD and IPD of Sir Sunder Lal Hospital, I.M.S., B.H.U, Varanasi for the present study; all the subjects were turned up for full follow ups. They were interviewed along with relatives and attendants and were observed for the state of mind and mental activity.

The patients were screened and diagnosed by using DSM-IV diagnostic criteria for depressive illness. The following exclusion criteria were considered while registering the cases.

Patients with following symptoms of having the history of following clinical condition were excluded:

- Mood incongruent delusions or hallucinations incoherence or marked loosening of associations.
- Patients superimposed with schizophrenia, schizophreniform disorders, mania or bipolar disorders as psychotic disorder not otherwise specified.
- Generally anxiety, obsessive compulsive disorders.
- Chronic drug abuse, e.g. barbiturates, etc.
- Toxic causes like alcohol ingestion and withdrawal.

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- Organic diseases like some diseases of gastrointestinal system (irritable bowel syndrome, colitis), myocardial infarction, CNS diseases (e.g. Alzheimer's diseases), metabolic and endocrine disorders, etc.

Kūśmāṇḍa (*Benincasa hispida*), family - cucurbitaceae, is having sweet taste (madhura rasa), light and oleaginous property (laghu-snigdha guṇa), cold potency (śīta vīrya), sweet after post-digestion (madhura vipāka) and pacifies vāta and pitta (vāta pitta śamaka). Pakva phala (ripened fruit) pacifies all doṣas. It mitigates diseases of pitta, rakta and vāta and cures disorders of the mind and mitigates all the doṣas[5]. These medhya properties of kūśmāṇḍa can be considered as medhya rasāyana drug and due to its medhya effect, kūśmāṇḍabīja cūrṇa is selected for trial purpose for its possible antidepressant effect.

**Drug administration**

The trial drug, dried and powdered kūśmāṇḍabīja (seeds of *Benincasa hispida*) was prepared at BHU Pharmacy. 10gm kūśmāṇḍabīja cūrṇa were prescribed in two divided doses, morning and evening, with honey as anupāna (additive) for 1 month. The patients were advised to come at 30 days interval for the assessment of therapeutic response and for follow ups.

**Observations and results**

The effect of trial treatment on psychometric tools and clinical symptoms are detailed in Tables 1 and 2.

**Discussion and conclusion**

The cases selected in this study were based on DSM-IV diagnostic criteria for major and minor depressive disorder; and as referred to in Bhāva-prakāśa (Madhyamakaṇḍa), medhya drug kūśmāṇḍa was selected for trial treatment.

The kūśmāṇḍabīja cūrṇa prepared from B.H.U., Ayurvedic Pharmacy was used in the patients and studied its effect with the help of certain clinical symptoms sad mood, suicidal tendency, anxiety, lack of confidence, loss of interest and Hamilton Depression Rating scale, Hamilton Anxiety Rating scale and Immediate Memory Span Test direct and indirect.

The effect of trial drug was observed on symptoms such as sad mood, suicidal tendency, anxiety, lack of confidence and loss of interest. It suggests that most of the patients were found to be statistically highly significant reduction in the degree of symptoms. Also, the effect of trial procedure observed on Hamilton Rating Scales on depression and anxiety was statistically highly significant. The effect of trial procedure observed on Immediate Memory

TABLE 1
Effect of trial treatment on clinical symptoms (n=30)

| Symptoms | Mean ± SD | | | 't' value | p |
|---|---|---|---|---|---|
| | BT | AT | D | | |
| Sad mood | 1.71 ± 0.57 | 0.54 ± 0.56 | 1.17 ± 0.69 | t = 11.22 | p < .001 HS |
| Suicidal tendency | 1.37 ± 0.65 | 0.60 ± 0.65 | 0.77 ± 0.55 | t = 8.34 | p < .001 HS |
| Anxiety | 1.29 ± 0.67 | 0.43 ± 0.56 | 0.86 ± 0.43 | t = 11.79 | p < .001 HS |
| Lack of confidence | 1.51 ± 0.66 | 0.51 ± 0.61 | 1.00 ± 0.42 | t = 14.08 | p < .001 HS |
| Loss of interest | 1.46 ± 0.61 | 0.51 ± 0.61 | 0.94 ± 0.54 | t = 10.34 | p < .001 HS |

TABLE 2
Effect of trial treatment on psychometric tools (n=30)

| Sym-ptoms | Mean ± SD | | | 't' | p |
|---|---|---|---|---|---|
| | BT | AT | D | | |
| HDRS | 12.83 ± 1.99 | 4.83 ± 1.79 | 8.00 ± 1.53 | 30.85 | < .001 |
| HARS | 7.91 ± 2.06 | 2.91 ± 1.46 | 5.00 ± 1.64 | 17.98 | < .001 |
| IMSD | 4.64 ± 1.25 | 5.08 ± 1.13 | 0.44 ± 0.82 | 3.12 | < .01 |
| IMSID | 3.44 ± 0.82 | 3.82 ± 0.96 | 0.38 ± 0.78 | 2.86 | < .01 |

Span test Direct and Indirect found statistically significant. It showed most of the patients improved the memory after treatment. It shows the kūśmāṇḍabīja cūrṇa is effective for the treatment of depressive illness.

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# PHYTOCHEMICAL AND PHYSICO-CHEMICAL SCREENING OF *PHYLLANTHUS RETICULATUS* POIR.

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Abstract: This paper deals with the phytochemical and physico-chemical studies of *Phyllanthus reticulatus* Poir. Phytochemical study was carried out by preparing various extracts using different solvents of increasing polarity order successive solvent extraction method. It revealed the presence of alkaloid, carbohydrates, phytosterol, flavonoid glycosides, phenolic compounds and tannin. The physicochemical study includes different standardization parameters like loss on drying, foreign organic matter, ash values, extractable matter, foaming index, swelling index, total phenolic and flavonoid content and study of TLC of different extracts.

## Introduction

*Phyllanthus reticulatus* Poir (Euphrobiaceae) popularly known as 'potato-bush' is distributed through out India, in hedges or waste places near villages and along streams and canals. Literature survey reveals that the whole plant is astringent, sweet, cooling, diuretic, alternant, stomachic, constipating and attenuant. It is reported to be useful in vitiated condition of *pitta*, burning sensation, strangury, gastropathy, ulemorrhagia, ophthalmodynia, sores, burns, suppuration, diarrhea, skin eruption and obesity (ICMR, 1987; Orient Longman, 2003; Nadkarni, 1976).

A systematic study of a crude drug embraces through consideration of both primary and secondary metabolites derived as a result of plant metabolism. The plant material is subjected to preliminary phytochemical screening by subjecting shade dried plant powder for successive solvent extraction and qualitative phytochemical screening for the detection of various plant constituents present in different extracts.

The quality of medicinal plant is detected by various parameters such as ash value, extractable matter, swelling index, foaming index, foreign organic matter and loss on drying. The standardization of these parameters is of great importance in establishing the identity, quality and purity.

## Materials and methods

The whole plant was collected from the riverside in Manipal, Dist.Udupi, Kerala. The fine powder of dried plant was subjected for successive solvent extraction using petroleum ether (60-80°C), benzene, chloroform, acetone, 70% alcohol and water in increasing polarity order.

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The extraction with all solvent except water was carried out by Soxhlet's method, while for water, cold maceration was adopted. Fluorescence analysis of the plant was observed under UV light according to Chase and Pratt (1949). Physico-chemical studies were carried out as per Indian Pharmacopoeia (1966) and WHO (1998). TLC studies were carried out according to Igon Stahl (1969) and preliminary phytochemical studies were carried out according to Kokate, C. K. (1986) and Khandelwal, K.R. (2003).

**Phytochemical screening**

Each extract was subjected to qualitative phytochemical tests (Table 1). Details of the tests are explained hereunder:

1. Carbohydrates and glycosides[1]

Small quantities of alcoholic and aqueous extract was dissolved separately in 5 ml of distilled water and filtered. The filtrate was subjected to various tests to detect the presence of carbohydrates.

TABLE 1
Qualitative chemical examination of extracts

| Plant Constituents | Extracts | | | | | |
|---|---|---|---|---|---|---|
| | Pe | Be | Ce | Ae | Ee | We |
| Carbohydrate | | | | | + | + |
| Glycosides | | | | | - | - |
| Gums and mucilage | | | | | | + |
| Fixed oil and fats | - | - | | | | |
| Phytosterols | + | + | + | - | - | |
| Proteins & amino acids | | | | | - | - |
| Flavonoids | | | | | + | - |
| Saponin | | | | | - | - |
| Alkaloids | | | - | | + | - |
| Phenolic compounds and tannins | | | | | + | + |

Pe - Petroleum ether (60-80° C); Be - Benzene; Ce - Chloroform; Ae - Acetone; Ee - Ethanol; We - Water
+ Positive (present); - Negative (absent)

Molisch's test: - 2-3 ml of aqueous extract was added with few drops of á-naphthol solution in alcohol, shaken and then added concentrated $H_2SO_4$ from the sides of the test tube. Violet ring is formed at the junction of two liquids. Hydrolysed another small portion of the extract with dilute HCl for a few hours in water bath and subjected the hydrolysate by following test to detect the presence of different glycosides:

Legal's test for cardiac glycosides: - The aqueous or alcoholic extract was added with 1 ml solution of Sodium nitroprusside. Pink to red colour appeared.

Borntrager's test for anthraquinone glycosides: - 3 ml of the extract was added with diluted $H_2SO_4$. Boiled the solution and filtered. The cold filtrate was added with an equal volume of benzene or chloroform; shaken well and separated the organic solvent. Organic layer was introduced with ammonia. Ammoniacal layer turned pink or red.

Foam test for saponin glycosides: - Shaken the drug or dried powder vigorously with water; persistent foam was observed. Dissolved a small portion of the extract in water and treated the following tests to detect the presence of reducing sugars.

Fehling's test: - Mixed 1 ml of each Fehling's A and Fehling's B solutions then boiled for one minute followed by addition of an equal volume of test solution. Heated the contents in a water bath for 5-10 min first yellow, then brick red precipitate was observed.

Benedict's test: - Mixed equal volume of Benedict's reagent and test solution was taken in a test tube. Heated in a boiling water bath for 5 min, solution appeared green, yellow or red depending on amount of reducing sugar present in the test solution.

Gums and mucilage: - 10 ml of aqueous extract was slowly transferred to 25 ml of absolute alcohol with constant stirring in a beaker. The precipitate was filtered and dried in the air. Examine the precipitate for its swelling properties and for the presence of carbohydrates.

2. Fixed oils and fats

A small quantity of petroleum ether and benzene extracts separately was pressed between two filter papers. Oil stained on the paper indicates the presence of fixed oil.

3. Protein and amino acids

Small amount of aqueous and alcoholic extracts were dissolved in separate test tubes and the following tests were performed.

Biuret test: - Few amount of the extract was added to 4% sodium hydroxide solution followed by a drop of 1% copper sulfate solution; the development of violet to pink colour indicated the presence of protein.

Xanthoproteic test: - A small amount of extract warmed with concentrated $HNO_3$ formed yellow colour. The colour turned orange when solution was made alkaline. The colour is due to nitration of aromatic ring present in phenyl alanin, tyrosine and tryptophan.

4. Phytosterols[2]

Refluxed petroleum ether, acetone and alcoholic extracts separately with solution of alcoholic potassium hydroxide till complete saponification has taken place. Saponified mixture was diluted with distilled water and extracted with ether. The ethereal extract was evaporated and subjected the residue (unsaponifiable matter) to following tests:

Salkowski reaction: - 2 ml of extract was added with 2 ml chloroform and 2 ml of conc. $H_2SO_4$ then shaken well. Chloroform layer showed red and acid layer has shown greenish yellow fluorescence.

Libermann - Burchard reaction: - 2 ml of the extract was mixed with chloroform. 1-2 ml acetic anhydride and 2 drops conc. $H_2SO_4$ was added from the sides of the test tube. Initially red, then blue and finally green colour was observed.

Libermann's reaction: - 3 ml of the extract was mixed and heated with 3 ml of acetic anhydride. After cooling, few drops of conc. $H_2SO_4$ were added, and produced blue colour.

5. Flavonoids

Aqueous and alcoholic extracts were taken and performed the following tests:

Shinoda test: - The dry powder or extract was added with 5 ml of 95% ethanol and few drops of conc. HCl and 0.5 g magnesium turnings. Pink colour was observed.

6. Tannin and phenolic compound

2-3 ml of aqueous or alcoholic extracts was taken and added with few drops of following reagents in separate test tubes:

- 5% $FeCl_3$ solution: deep blue- black colour.
- Lead acetate solution: white precipitate
- Gelatin solution: white precipitate
- Bromine water: decolouration of bromine water
- Acetic acid solution: red colour solution

7. Alkaloids

A small amount of the solvent free chloroform, alcohol and water extracts were taken separately in a test tube and added with 5ml of 1.5% HCL (v/v) and then filtered. The filtrate was used for presence of alkaloids by the following tests (Levinson and Mac Fetch, 1956).

Dragendorff's reagent test: - The filtrate was sprayed on a filter paper using chromatographic sprayer and dried. The reagent was applied on the filter paper using capillary tube; the development of orange to red colour confirmed for the presence of alkaloid.

Wagner's reagent test: - The little amount of the above extract filtrate was added to this reagent; appearance of brown flocculent precipitation revealed the presence of alkaloid.

Mayer's reagent test: - The little amount of the above extract filtrate was added to this reagent; it gave a white or pale yellow precipitate, which revealed the presence of alkaloid.

Hager's reagent test: - Upon addition of little amount of above extract filtrate, it has shown characteristic crystalline precipitate which indicated the presence of alkaloid.

**Physico-chemical parameters**[3]

Ash values: - Ash values are helpful in determining the quality and purity of crude drugs in powdered form. The total ash method is designed to measure the total amount of material remaining after ignition. This includes both "physiological ash", which is derived from the plant tissue itself, and "non-physiological" ash, which is the residue of the extraneous matter (e.g. sand and soil) adhering to the plant surface. The different ash values like total ash, acid insoluble ash, water-soluble ash, sulphated ash, nitrated ash and carbonated ash were determined according to Indian Pharmacopoeia. (Table 2)

Extractive values: - Extractive values are useful for evaluation of crude drugs and give an idea about the nature of chemical constituents present in them. The amount of extractive drug yield to a given solvent is often an approximate measure of a certain constituent or group of related constituents the drug contains. In some cases, the amount of drug soluble in a given solvent is an index of its purity. The solvent used for extraction should be in a position to dissolve appreciable quantities of substances desired. Petroleum ether 60-80°C, 95% ethanol-soluble extractive values and water-soluble extractive values were determined according to Indian pharmacopoeia.

Tannin content: - Tannins are substances capable of turning animal hides into leather by binding proteins to form water-insoluble substances that are resistant to proteolytic enzymes. This process, when applied to living tissue, is known as an "astringent" action and is the reason for the therapeutic application of tannins. Chemically, tannins are complex substances; they usually occur as mixtures of polyphenols that are difficult to separate and crystallize. It was determined according to WHO methods.

Swelling index: - Many medicinal plant materials are of specific therapeutic or pharmaceutical utility because of their swelling properties,

TABLE 2
Successive solvent extraction of *Phyllanthus reticulatus* Poir

| Solvent | Colour and Consistency | Yield (% w/w) |
|---|---|---|
| Petroleum ether (60- 80°) | GB* (sticky solid) | 1.52 |
| Benzene | GB (sticky solid) | 0.92 |
| Chloroform | GB (sticky solid) | 0.834 |
| Acetone | RB (sticky solid) | 1.318 |
| Ethanol (95%) | RB (sticky semi-solid) | 4.545 |
| Chloroform water | RB (sticky solid) | 3.318 |

*GB - Greenish black; RB - Reddish black

especially gums and those containing an appreciable amount of mucilage, pectin or hemicellulose. The-swelling index is the volume in ml taken up by the swelling of 1 g of plant material under specified conditions. It was determined according to Indian pharmacopoeia.

Foaming index: - Many medicinal plant materials contain saponins that can cause persistent foam when an aqueous decoction is shaken. The foaming ability of an aqueous decoction of plant materials and their extracts is measured in terms of a foaming index. It was determined according to Indian pharmacopoeia.

Total phenolic and flavonoid content: - The antioxidative effect is mainly due to phenolic components, such as flavonoids4, phenolic acids, and phenolic diterpenes5. The antioxidant activity of phenolic compounds is mainly due to their redox properties, which can play an important role in absorbing and neutralizing free radicals, quenching singlet and triplet oxygen, or decomposing peroxides6. Many of these phytochemicals possess significant antioxidant capacities that may be associated with lower incidence and lower mortality rates of cancer in several human populations7. It is determined according to Singleton and Rossi (1965).

Fluorescence analysis: - The Fluorescence behavior of the powdered drug in different solutions and different extract obtained by successive solvent extraction towards day light and short ultra violet light were observed[8] (Table 1).

TLC studies:- The Thin Layer Chromatographic studies of the petroleum ether 60-80°C, chloroform and ethanol extracts were carried out in various solvent systems using silica gel G as adsorbent[9] (Table 3).

**Results and discussion**

The average value of extractive and its colour/ consistency obtained by successive solvent extraction is reported in Table 2. The result of qualitative phytochemical examination of various extracts obtained by successive solvent extraction revealed the presence of alkaloid, carbohydrates, sterol, flavonoids, phenolic compounds, tannin, gum and mucilage are summarized in Table 1. The quality parameters of the crude drugs as raw materials were established with the help of several official

TABLE 3
Physico-chemical studies of
*Phyllanthus reticulatus*

| Parameters | Result |
|---|---|
| • Foreign organic matter | 0.012% |
| • Loss on drying at 110°C | 9.3% |
| • LOD by IR method | 8.2% |
| • Ash content | |
| - Total ash | 3% |
| - Water soluble ash | 3% |
| - Acid insoluble ash | 1% |
| - Sulphated ash | 3% |
| - Nitrated ash | 7% |
| - Carbonated ash | 4% |
| • Extractive values (hot) | |
| - Petroleum ether 60-80°C | 7% |
| - Ethanol | 6.1% |
| - Water | 11.8% |
| • Extractive values (cold) | |
| - Petroleum ether 60-80°C | 2% |
| - Ethanol | 4.6% |
| - Water | 8% |
| • Volatile oil | Nil |
| • Swelling index | 4.5 ml |
| • Foaming index | < 100 |
| • Tannin content | 1.6% |
| • Total phenolic content | |
| - Alcoholic extract | 0.158 mg/ml |
| - Aqueous extract | 0.150 mg/ml |
| • Total flavonoid content | |
| - Alcoholic extract | 0.165 mg/ml |

determinations based on physical and physico-chemical studies is reported in Table 3. Fluorescence characteristics of the powdered drug are mentioned in Table 4. TLC study of different extract obtained by successive solvent extraction is reported in Table 5. These studies were aimed at ensuring standardisation of herbal drug under investigation and ensure its quality, purity and identity.

**Conclusion**

Qualitative phytochemical study of various extracts obtained by successive solvent extraction of *Phyllanthus reticulatus* Poir revealed the presence of different plant constituents like alkaloid, carbohydrates, sterol, phenolic compounds, tannins, flavonoids, gum and mucilage in different extracts based on polarity. Physicochemical standardization parameters like ash value, extractable matter, foaming index, swelling index, total phenolic and flavonoid content, loss on drying and foreign organic matter were determined to establish the pharmacopoeial standards that, in turn, helps in identifying the drug. The standardization of these parameters is of great importance to guarantee the identity, quality and purity.

TABLE 4
Fluorescence analysis

| Sample + Reagent | Observation under | |
|---|---|---|
| | Day light | UV shortwave |
| Powder as such | Straw colour | Light green |
| Powder + : | | |
| 1N HCL | Slight turbidity | Light green |
| 1N $H_2SO_4$ | Blackish-brown | No color |
| 1N NaOH (Aq.) | Brown | Dark brown |
| 1N NaOH (Alc.) | YB* | Light yellow |
| Ammonia | YB | GY |
| Iodine | Dark brown | Brown |
| 5% $FeCl_3$ | DYB | Dark brown |
| Acetic acid | Light brown | Orange |
| 1N $HNO_3$ | Light brown | No color |
| Picric acid | Yellow | GY |
| Petr. ether extract | Blackish green | YB |
| Chlor. extract | Black | YB |
| Acetone extract | Black | CB |
| Ethanol extract | CB | Dark brown |
| Water extract | Dark brown | Dirty green |

*YB - Yellowish-brown; GY - Greenish-yellow; DYB - Dark Yellowish-brown; CB - Chocolate-brown

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# VIRUDHĀHĀRA - AN IMPORTANT CAUSE OF DISEASES

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Abstract: It has been mentioned in āyurvedic classics that virudhāhāra (dietetic incompatibility) plays an aetilogical role in the development of many diseases. The present study was undertaken to evaluate the effect of virudhāhāra in causation of diseases. The analysis of data indicates a significant effect of virudhāhāra in the causation of diseases.

**Introduction**

Now-a-days people are extremely interested in dietetics as they are aware of relationship between diet and health. Āyurveda, the ancient science, over thousands of years ago, has clearly mentioned that the biological body is born out of the wholesome diet and all the diseases are produced due to unwholesome diet. In this context āyurvedic classics have paid special attention on virudhāhāra (dietetic incompatibility). While describing the etiology of diseases, virudhāhāra has always been mentioned as one of the important factors.

Viruddha substances are those which cause increase of doṣas in the body and remain antagonistic to the dhātus (tissues). Several examples of viruddhāhāra has been mentioned in the āyurvedic classics. The use of viruddhāhāra for long duration produces various disorders like sterility, blindness, erysipelas ascitis, eruption, insanity, fistula, fainting, intoxication, tympanitis, anaemia, poisoning, edema, amḷapitta, jvara, genetic disorders and even death.

**Material and method**

The study was conducted in the O.P.D. of Kāyacikitsa at Sir Sunderlal Hospital, Institute of Medical Sciences, B.H.U., Varanasi. The selected patients were interrogated for their dietetic habits by using a questionnaire. Total of 536 patients were screened and 'Z' test was applied to test the significance of difference between proportions.

**Observations and results**

In the present study a total of 534 patients were selected. The majority of patients were in age group 40-49 years, 355 were male and 229 were female; only 50 patients were aware about virudhāhāra (Table 1).

Virudhāhāra like milk-chapati and sabji (stew), non-veg. with salad, intake of food without learning the bowel and intake of food opposite to digestive power are very common; whereas milk with sprouted grains, cold water bath after

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TABLE 2

Distribution of patients according to type of viruddha-ahara

| Type of viruddhāhāra | Number of patients | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Skin disease | Jvara | Pāṅdu | Pratiśyaya | Śvāsa | Rājyakṣma | Amḷapitta | Udaraśūla | Grahaṇi | Sthūlata | Madhumeha | Hṛdroga | Adhaman/ atopa | Āmavāta | Sandhivāta | Kaṭiśūla | Manyaśūla | Śirasūla | Cittodvega | Avasāda | Apasmāra |
| Milk + Banana | 3 | - | - | - | - | - | - | - | - | 2 | 3 | - | - | 3 | - | - | - | - | - | - | - |
| Milk chapati + Sabji (stew) | 6 | - | 4 | - | 3 | 9 | - | - | - | 2 | - | 3 | 12 | - | 9 | - | 3 | 3 | 3 | - | - |
| Milk + Paratha sabji (stew) | 9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Milk + Sprouted grain | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Intake of milk after salad | 3 | - | - | 3 | 1 | 3 | 2 | - | - | - | 3 | - | - | - | 3 | - | - | - | - | - | - |
| Regular intake of paneer | - | - | - | - | - | 3 | - | - | 3 | - | - | - | - | - | 3 | - | 3 | - | 3 | - | - |
| Curd + Jaggery | 3 | - | - | - | - | - | 3 | - | - | - | - | - | - | - | 9 | - | - | - | - | - | - |
| Curd + Salad | - | - | 6 | - | - | - | - | - | - | - | - | 3 | - | - | - | - | 3 | 3 | - | - | - |
| Intake of curd at night | - | - | 6 | - | - | - | - | - | - | - | 3 | - | - | 3 | - | - | - | - | 3 | - | - |
| Non-veg. + Salad | 3 | 3 | - | 3 | - | - | - | - | 6 | - | 6 | - | - | - | 12 | - | 6 | - | - | - | 1 |
| Intake of food without clearing bowel | 6 | - | - | - | - | - | 3 | 6 | - | - | | - | 9 | - | - | 3 | - | - | - | 3 | - |
| Intake of food opposite to digestive power | 6 | - | - | - | - | - | - | 3 | - | - | - | - | 3 | 6 | - | - | - | - | - | 3 | - |
| Intake of food immediately after physical fatigue | 3 | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Intake of food without appetite | 3 | - | - | 3 | - | - | - | - | - | - | - | 3 | 9 | - | - | - | - | 3 | - | - | - |
| Intake of food when over hungry | - | 6 | 3 | - | - | - | - | - | - | - | - | - | 9 | - | 6 | - | 3 | - | - | - | - |
| Intake of food after exposure to sun light | - | 6 | - | - | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - | - |
| Taking of bath after exposure to sun light | - | 6 | - | 9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Cold water bath after fatigue | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Regular intake of chaumine | - | - | - | - | - | - | - | - | - | - | - | - | - | 6 | - | - | - | - | - | - | - |
| Administration of purgative in wrong way | - | - | - | - | - | - | - | - | - | - | - | - | 9 | - | - | - | - | - | - | - | - |
| Intake of food opposite to constitution. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - |

fatigue, intake of food opposite to constitution were uncommon especially in patients of eastern U.P. and Bihar (Table 2).

More than 50% patients showed history of virudhāhāra in the cases of pratiśyaya, rājayakṣama, amḷapitta, udarśūla, grahani, madhumeha, adhamana/atopa, sandhivāta, āmavāta, cittodvega; whereas history of virudhāhāra was below 50% in patients of śvāsa, kaṭśūla, avasāda and apasmāra.

The proportion of presence/absence of virudhāhāra was found statistically significant in cases of skin disease, jvara, pāṇdu, adhamana/atopa, āmavāta and not significant in rājayakṣma, sandhivāta, mānyaśūla. This 'Z' as well as Chi. Square test being large sample test, could not be applicable in cases of pratiśyaya, śvāsa, amḷapitta, udaraśūla, grahaṇi, sthūlata, madhumeha, hṛdroga, kaṭiśūla, śiraśūla, cittodvega, avasāda and apasmāra due to less number of cases observed (Table 3).

When 'Z' test applied, to test the significance

TABLE 3

Distribution of patients of different diseases according to history of virudhahara

| Disease | Hstory of virudhahara | | | | 'Z' test | 'P' value |
|---|---|---|---|---|---|---|
| | Yes | | No | | | |
| | No | % | No | % | | |
| Skin disease (n=81) | 51 | 62.96 | 30 | 27.04 | 2.33 | <0.01* |
| Jvara (n=30) | 21 | 70 | 9 | 30 | 2.19 | <0.02* |
| Pāṇdu (n=36) | 24 | 66.67 | 12 | 33.33 | 2 | <0.05* |
| Pratiśyaya (n=18) | 15 | 83.33 | 3 | 16.67 | - | - |
| Śvāsa (n=9) | 3 | 33.33 | 6 | 66.67 | - | - |
| Rājayakṣma (n=36) | 21 | 58.33 | 15 | 41.67 | 0.48 | >0.05 |
| Amḷapitta (n=21) | 12 | 57.14 | 9 | 42.86 | - | - |
| Udaraśūla (n=15) | 9 | 60 | 6 | 40 | - | - |
| Grahaṇi (n=15) | 19 | 60 | 6 | 40 | - | - |
| Sthūlata (n=6) | 3 | 50 | 3 | 50 | - | - |
| Madhumeha (n=15) | 12 | 80 | 3 | 20 | - | - |
| Hṛdroga (n=21) | 6 | 50 | 6 | 50 | - | - |
| Adhamana-Atopa (n=54) | 42 | 77.78 | 12 | 22.22 | 4.11 | <0.001* |
| Sandhivāta (n=63) | 36 | 57.14 | 27 | 42.86 | 1.13 | >0.05 |
| Āmavāta (n=30) | 24 | 80 | 6 | 20 | 3.29 | <0.001* |
| Kaṭiśūla (n=15) | 3 | 20 | 12 | 80 | - | - |
| Manyaśūla (n=36) | 15 | 41.67 | 21 | 58.33 | 1 | >0.05 |
| Śiraśūla (n=12) | 6 | 50 | 6 | 50 | - | - |
| Cittodvega (n=15) | 9 | 60 | 6 | 40 | - | - |
| Avasāda (n=9) | 3 | 33.33 | 6 | 40 | - | - |
| Apasmāra (n=6) | 1 | 16.67 | 5 | 83.33 | - | - |
| Total - 534 | 324 | 60.67 | 210 | 39.33 | 4.93 | P<0.001* |

* Significant

TABLE 1

Distribution of patients according to age, sex, awareness about virudhāhāra

| Parameters | Number | Percentage |
|---|---|---|
| 1. Age: | | |
| 10-19 | 52 | 9.74 |
| 20-29 | 88 | 16.48 |
| 30-39 | 120 | 22.47 |
| 40-49 | 124 | 23.22 |
| 50-59 | 100 | 18.72 |
| 60-69 | 50 | 9.36 |
| 2. Sex: | | |
| Male | 355 | 66.47 |
| Female | 229 | 42.88 |
| 3. Awareness | | |
| Yes | 50 | 9.33 |
| No | 484 | 90.67 |

of difference between proportion of presence and absence of virudhāhāra all together it was observed significant (Z=4.93, P<0.001), which suggest that viruddāhāra has some role in causation of disease.

**Discussion and conclusion**

The analysis of data showed that awareness about virudhāhāra in patients was lacking. Milk-chapati + sabji (stew) was the commonest virudhāhāra observed in Eastern U.P. and Bihar. Virudhāhāra has some role in the causation of disease but the exact mode of action of virudhāhāra was not clear from this study. To evaluate the exact role of viruddhāhāra there is a need for proper experimental and clinical study with large sample on scientific parameters. Thus from the above study we can conclude that to maintain health and to reduce the risk of disease one should always avoid consumption of virudhāhāra.

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# EFFICACY OF SOME ĀYURVEDIC DRUGS IN THE MANAGEMENT OF ECZEMA (VICARCIKA) AND ITS IMPACT ON LIVER FUNCTION

Meenakshi Shukla* and Bipin Mishra**

Abstract: Vicarcika or eczema is a disease of relapsing and remitting course. Its treatment is still a challenge to dermatologists. At present, corticosteroids are the drug of choice, which, on many occasions, do not respond. There are many side effects and in many cases recurrence also. So, āyurvedic compounds Laghumañjiṣṭhādi kvātha and Siktādi lepa was taken as trial drugs, as they are indicated in āyurvedic classics for successful treatment of vicarcika.

**Introduction**

Eczema or vicarcika is a recurrent non contagious inflammation of the skin characterised by erythema, scaling, odema, vesiculation and oozing. It is a specific type of allergic cutaneous manifestation of antigen antibody reaction. In āyurveda, it is classified under kṣudrakuṣṭha. It is dominated by tridoṣa along with psycho-stress factor (mānasika vikāras) resulting in deterioration of rasa (plasma) rakta (blood), tvak (skin), lasikadhātus (lymphatics) and manifested in the clinical symptoms of vicarcika (eczema).

Due to vitiation of doṣas and dhātus clinical symptoms appears which is characterised by superficial inflammatory oedema of epidermis associated with vesicle formation. Itching eruption and discharge is present. Among which itching embarrasses the patient. Itching leads to scratching and intense scratching express fleshy part under the skin and causes oozing out of the serous fluid or seropurulent exudates.

Morpho-clinically the disease may be divided into three stages: i) acute, ii) chronic and iii) sub-acute.

Acute stage: - It is characterised by itching erythema followed by oedema, papules, vesicles, oozing and crusting.

Chronic stage: - If the cause of eczema persists and the eczema last over months or years it becomes chronic. It is characterised by lichenification, hyper-pigmentation or hypo-pigmentation.

Sub-acute stage: - It lies between acute and chronic stages and is characterised by papules and scaling with moderate degree of oedema and erythema.

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The known remedies of eczema are not satisfactory and ideal. Therefore, dermatological potentialties of two āyurvedic formulations Laghumañjiṣṭhādi kvātha and Siktādi lepa mentioned in āyurvedic classics for the treatment of vicarcika (eczema), has been chosen for clinical trial.

**Material and methods**

50 clinically diagnosed patients were taken from O.P.D. of Kāyacikitsa of S.S Hospital, BHU, Varanasi within a period of 1 ½ year.

Inclusion criteria: - Patients showing sign and symptoms of eczema between the age groups of 10-70 years were selected for the study.

**Drug and dosage**

The composition of Laghumañjiṣṭhādi kvātha was same as described in Bhaiṣajyaratnāvali, but the composition of Siktādi lepa described by Vāgbhaṭa was modified slightly. Here, 'sindūra' was substituted in place of rasāñjana as described in Cikitsā Ādarsh by Rajeswardutta Shastri.

Ingredients: - The ingredients of Laghumañjiṣṭhādi kvātha are: - i). nimba (*Azadirachta indica*), ii) haridra (*Curcuma longa*), iii) triphala (three myrobalans), iv) vaca (*Acorus calamus*), v) devadāru (*Cedrus deodara*), vi) kaṭuka (*Picrorhiza kurrooa*) and mañjiṣṭha (*Rubia cordifolia*). The ingredients of Siktādi lepa are: i) mustard oil - 250 ml, ii) wax - 25gm, iii) guggulu (*Commiphora mukul*) - 10gm, iv) tutha (copper sulphate) - 10g, v) manaśśila (realgar) - 10 gm, and vi) sindūra - 10gm.

Dose: - The dose of decoction was given (average 40 ml twice daily) on the basis of severity of disease and strength of the patient (rogibala).

Preparation of Siktādi lepa: - Wax and guggulu was added to heated mustard oil. After lowering the flame, powdered tutha, manaśśila and sindūra was added and mixed thoroughly to prepare the lepa.

Dose: - Twice daily locally on eczematous patches.

**Therapeutic study**

Group I (trial group):- Out of 25 patients, 8 patients never took any medicine for the disease, and rest 17 patients were either treated by Allopathy or Homeopathy but wanted āyurvedic management due to failure or recurrence.

Group II (combined Group):- In this group 15 patients were selected who received both āyurvedic and modern drugs.

Group III (Control Group) - 10 patients in this group were given only modern drug i.e. Betnesol/Betamethsone in tapering dose along with Betnovate N (Betamethasone 17-valerate + Neomycin) ointment topically twice daily.

Follow up:- All the patients included in the study were called for regularly at 15 days interval and

TABLE 1
Effect on sign and symptoms in different groups

| Group | Cured (excellent) | | Improved* | | No response | | Deteriorated | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % |
| Group-I | 15 | 60 | 8 | 32 | - | - | 2 | 8 | 25 | 100 |
| Group-II | 12 | 80.0 | 3 | 20.0 | - | - | - | - | 10 | 100 |
| Group-III | 10 | 100 | - | - | - | - | - | - | 10 | 100 |

were finally assessed after termination of treatment.

**Assessment criteria**

The main criteria of the therapeutic trial were based on the complete regression of lesion with normalization of haematological values and complete absence of sign and symptoms. The next criteria for assessment were based on the satisfaction reported by the patients.

Excellent response: - Patients with 100% regression in the lesion, complete absence of sign and symptoms, normalisation of haematological abnormalities, negativity in stool examinations and normalisation of liver functions test were noted.

Moderate response: - Patients with less than 100% regression in the lesions along with moderate relief in sign and symptoms and improvement in laboratory investigations.

Poor response:- Patients with very little relief in sign and symptoms along with minimal changes in laboratory findings.

No response:- Patients with no improvement in either sign and symptoms or laboratory investigations were placed under no response category.

Deteriorated:- Patient with increase in number of lesions, exacerbation of the existing lesion along with increased severity of the symptoms with some toxic effect and abnormal laboratory investigations.

**Results and discussion**

Out of 25 patients in group-I, 15 were cured, 8 were improved and 2 were deteriorated while in group-II, out of 15 patients, 12 were cured and the rest 3 only improved. In group-III all 10 patients were cured. The effect on sign and symptoms and laboratory investigations in different groups are detailed in Tables 1-4.

Group-I (trial group): - After one week use of trial drug, itching and its frequency of paroxysms reduced while burning sensation persisted in some cases. Serous pus discharge from lesion got reduced; vesicles and papules

TABLE 2

Effect on laboratory investigations in Group-I (Trial group)

| Observation | Mean | | SD | SE | t | p | Result |
|---|---|---|---|---|---|---|---|
| | BT | AT | | | | | |
| TLC | 8998.62 | 8426.30 | 287.01 | 57.402 | 9.97 | p<0.001 | HS |
| Polymorphs | 67.26 | 73.28 | 4.32 | 0.864 | 6.97 | p<0.001 | HS |
| Lymphocytes | 23.7 | 22.53 | 5.02 | 1.004 | 1.16 | p>0.05 | NS |
| Eosinophils | 8.52 | 3.98 | 2.10 | 0.42 | 13.19 | p<0.001 | HS |
| Monocytes | 0.52 | 0.21 | 0.78 | 0.156 | 1.99 | P<0.05 | NS |
| Hb | 11.92 | 12.46 | 1.32 | 0.264 | 2.21 | p<0.001 | S |
| ESR | 32.64 | 23.18 | 10.01 | 2.002 | 4.73 | p<0.001 | HS |
| Serum Bilirubin | 0.82 | 0.72 | 0.20 | 0.04 | 2.5 | p<.02 | S |
| SGOT | 34.39 | 29.82 | 5.98 | 1.196 | 3.82 | P<.001 | HS |
| SGPT | 41.63 | 38.72 | 3.82 | 0.764 | 3.81 | p<.001 | HS |
| Alkaline phosphate | 326.89 | 251.2 | 72.30 | 14.46 | 5.37 | p<.001 | HS |

N=25, HS=Highly significant, NS=Non significant, S=Significant

reduced in size and number. After two weeks of treatment, there was reduction in itching, and vesicles also subsided. Hyper-pigmented macule reduced in its pigmentation. The cases with lichenification and fissuring showed reduction in hardness as well as fissuring in it.

By 4-6 weeks itching was more or less absent. Rarely paroxysms of itching persisted. The vesicles and papules subsided. Lichenifilation reduced, fissuring was absent. Skin colour changed with slight hyper-pigmentation. By 8 weeks, some cases were totally free from all sign and symptoms, but to prevent recurrence, treatment was continued to 12-16 weeks. It was noted that 60% patients were completely free from all sign and symptoms, 32% reported improvement and while 8% were deteriorated.

Group-II (combined group):- Reduction in itching was noted within 2-4 days. Discharge reduced within 1-2 day and at the end of 1 week intensity and frequency of itching subsided completely.

After 2 weeks, thickening of skin was reduced and by the end of fourth week, 80% were completely free from symptoms while 20% improved moderately. 2 patients' complaint of sleeplessness, thirst and digestive disturbance could overcome by reducing oral dose of betnesol.

Group-III (control group):- Reduction in itching was observed within 2-4 days; sign of discharge started reducing within 24 hours of treatment and completely stopped within a week. Formation of vesicles, papule, crusts were not seen further; After 4 weeks, itching was reduced to a great extent; scaling hyper-pigmentation, lichenification regressed.

After 8 weeks, sign and symptoms disappeared in most of cases; only in few cases symptoms persisted, but completely disappeared after 12 weeks of treatment. During the systemic therapy with Betnesol (Betamethasone), it was noted that few patients complained of sleeplessness, thirst, polyurea and digestive disturbance which

TABLE 3
Effect on laboratory investigations in Group-II (Combined group)

| Observation | Mean | | SD | SE | t | p | Result |
|---|---|---|---|---|---|---|---|
| | BT | AT | | | | | |
| TLC | 8720.12 | 7609.54 | 345 | 89.10 | 12.46 | p<0.001 | NS |
| Polymorphs | 71.40 | 60.40 | 12.80 | 3.315 | 3.32 | P<0.01 | S |
| Lymphocytes | 21.12 | 34.78 | 3.18 | 0.821 | 16.64 | p<0.001 | HS |
| Eosinophils | 7.20 | 4.82 | 1.08 | 0.28 | -8.5 | p<0.001 | HS |
| Monocytes | 0.28 | 00 | 0.48 | 0.12 | 2.33 | p<0.02 | S |
| Hb% | 11.52 | 12.34 | 1.50 | 0.39 | 2.10 | p>0.05 | NS |
| ESR | 28.60 | 31.72 | 13.16 | 3.40 | 0.92 | p<0.05 | NS |
| Serum Bilirubin | 0.62 | 1.01 | 0.48 | 0.12 | 3.25 | p<0.01 | S |
| SGOT | 37.08 | 42.01 | 2.85 | 0.74 | 6.10 | p>0.001 | HS |
| SGPT | 50.38 | 36.51 | 26.23 | 6.77 | 2.05 | p>0.05 | NS |
| Alkaline phosphate | 283 | 312.10 | 42.60 | 11.0 | 2.65 | p<0.02 | S |

N=15; HS=Highly significant; NS=Non significant; S=Significant.

TABLE 4
Effect on laboratory investigations in Group-III (Control group)

| Observation | Mean | | SD | SE | t | p | Result |
|---|---|---|---|---|---|---|---|
| | BT | AT | | | | | |
| TLC | 8620 | 7870 | 2254.75 | 71.394 | 10.50 | p<0.001 | HS |
| Polymorphs | 74.01 | 72.10 | 11.96 | 3.782 | 0.505 | p>0.05 | NS |
| Lymphocytes | 29.01 | 28.01 | 3.80 | 1.201 | 0.77 | p>0.05 | NS |
| Eosinophils | 8.20 | 3.30 | 2.18 | 0.689 | 7.11 | p<0.001 | HS |
| Monocytes | - | - | - | - | - | p>0.05 | NS |
| Hb% | 11.9 | 12.01 | 1.80 | 0.569 | 1.64 | p>0.05 | NS |
| ESR | 21.04 | 20.03 | 8.20 | 2.59 | 0.39 | p>0.05 | NS |
| Serum Bilirubin | 0.92 | 1.01 | 0.36 | 0.11 | 0.82 | p<0.05 | NS |
| SGOT | 48.31 | 45.46 | 3.34 | 1.056 | 2.69 | p<0.05 | S |
| SGPT | 61.34 | 58.79 | 11.70 | 3.700 | 0.69 | P>0.05 | NS |
| Alkaline phosphate | 342 | 312 | 75.82 | 23.97 | 1.25 | p>0.05 | NS |

N=10; HS=Highly significant; NS=Non significant; S=Significant.

could overcome by supplementing some other drugs and or by reducing the dose of drugs.

**Conclusion**

Vicarcika or eczema is a chronic disease marked by remissions and exacerbations. The āyurvedic compounds Laghumañjiṣṭhādi kvātha orally and Siktādi lepa locally are effective for the treatment of eczema.

The experience gained during the course of the study and LFT examination (S. Bilirubin, SGOT, SGPT, S. Alkaline phosphatase) before and after treatment express that drugs tried are safe to use for long time. Its preparation is simple convenient, economical without any toxic effect

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# PREVENTION AND MANAGEMENT OF DISEASES BY RASĀYANA THERAPY

G. D. Gupta. R. K. Agarwal and N. P. Rai*

Abstract: Agni (digestive fire) plays a significant role in the maintenance of a healthy life and in the genesis of disease as well. It has been explained that every aspect of life is governed by agni; similarly, disease is governed by the formation of āma (undigested toxic substances). Āma is produced due to perverted function of agni. Āma produces diseases by three mechanisms: improper nutrient production, obstruction in the channel and toxin production. Similar type of pathology of disease has been described by modern science. Here, an attempt has been made to evaluate the effect of Rasāyana therapy in the prevention and management of diseases.

**Introduction**

In the series of ideas for long and healthy life, the great physicians, Caraka has given the concept of rejuvenation for prevention and management of disease. Now with the development of science, etiology and pathogenesis of disease has been elaborately described.

**Etiology of disease**[4]

Genetic cause: - Diseases are produced due to genetic causes, which cannot be treated, for they are produced due to our pūrvajanya karmas (deeds of previous birth).

Acquired: - These can be explained by the following etiology: 1. Hypoxia, 2. Physical injury, 3. Chemical injury, 4. Infection, 5. Nutritional, 6. Immunological and 7. Psychological .

All the above etiologies[4] cause cell injury by common pathology which can be described under four headings: i. hypoxia[5] or inappropriate oxygen supply defect at dhatu level, ii. ischemia[6] or in appropriate blood supply obstruction in channels, iii. toxemia[7] or toxin product produced by cell or by external pathogens disturbance at agni level and iv. psychological factor[8].

**Hypoxia**

Improper oxygenation of blood causes decrease of oxygen supply to the tissues, which produces hypoxic changes by disturbing energy producing system of cell. Anaerobic glycolysis causes decrease in ATP production and lactic acid accumulation. This alters the pH of cell and hampering Na+ K+ ATP pump. This ultimately alters the whole metabolism of cell and produces abnormal products. These metabolic products are considered as dhātu. In this way hypoxic cell injury can be consider as a defect at dhātu level.

**Ischemia**

The obstruction in blood vessels (artery, vein and lymphatic) causes decreased perfusion of blood to the tissues. This makes deficient oxygen and essential nutrients supply and

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hampers the drainage of metabolites. These two ways of pathology causes disturbance in cell function and ultimately causes cell injury.

**Toxemia**

In the process of metabolism, body is continuously producing some toxins which are harmful to the body and also some toxins are inhaled and ingested in daily activities. These toxins are detoxified and exerted by the body continuously. If any derangement in this process of detoxification and excretion, will cause accumulation of toxins and produces cell injury.

Āyurveda has explained the above mechanism of metabolism and detoxification under the physiology of agni. Caraka has explained that if agni is in proper functioning, a person can live long and healthy life; and if it is deranged, it will produce disease. The cessation of its functions will result in death.

**Psychological factor**

These factors produce cell injury which is not clear till today. But it has been proposed that all above pathogenesis will go all along with some unknown pathology in this case.

**Preventive measures**

In the contest of Rasāyana, Caraka has described many unwholesome dietary regimen (grāmya āhāra)[9] as follows:

Diet:- Avoid intake of: a) sour, saline, pungent, and alkaline foods, b) dry vegetable, meat, sesame seeds, paste of sesame seeds and pastries, c) germinated cereals and pulses, freshly harvested corn with bristles, d) ingredients that are mutually contraindicated, unwholesome, unctuous saline and abhisyandi and e) softened, heavy, putrid and stale foods.

Dietetic behavior: - Avoid: a) irregular intake of food or taking food before the previous meal is digested, b) day sleep, over indulgence in sex and alcoholic drinks, d) excess and strenuous exercises and e) excess fear, hunger, grief, greed, infatuations and overwork. Along with this series, Śārṅgadhara has divided the changes in the body and their maintenance by rasāyana[10] (Table 1)

While classifying rasāyana, Caraka refers to ajāśrika rasāyana[11] that can be used in our daily routine to prevent diseases - e.g. milk and ghee.

**Management**[12]

As per the pathology, āyurveda explains actions of rasāyana at four levels: i) rasadhātu, ii) channels (blood vessels), iii) agni (detoxification and excretion of toxins) and iv) psychology.

Rasādhatu:- Rasāyana drugs increase the quality of rasadhātu so that it carries/supply proper

TABLE 1

Changes in the body and its maintenance by rasāyana therapy according to Śārṅgadhara

| Decades | Changes | Rasāyana |
|---|---|---|
| I | Bālya (childhood) | Vaca, kaśmari, gold |
| II | Vṛddhi (growth) | Kaśmari, bala, aśvagandha |
| III | Chhavi (complexion) | Āmalaki, louha |
| IV | Medha (intelligence) | Śaṅkhapuṣpi, jyotiṣmati |
| V | Tvak (skin health) | Priyala, somarāji, Bṛṅgarāj |
| VI | Dṛṣṭi (vision) | Triphala, śatāvari, jyotiṣmati |
| VII | Śukra (semen) | Pippali, ātmagupta |
| VIII | Vikrama (valour) | No medicine |
| IX | Buddhi (wisdom) | No medicine |
| X | Karmendriya (physical activity) | No medicine |
| >X | Cetna (spirituality), Jīvita (life) | No medicine |

oxygen and nutrients to the tissues and results in better nourishments and proper functions of dhatu; e.g. śatāvari (*Asparagus racemosus*), āmalaki (*Emblica officinalis*), nāgabala (*Sida cordata*), amṛta (*Tinospora cordifolia*), bhallātaka (*Semecarpus anacardium*) and madhuyaṣṭi (*Glycyrrhiza glabra*).

Channels: - Rasāyana drugs help in cleaning obstructions of channels for proper perfusion of tissues; e.g. śilājit (bitumen) and guggulu (*Commiphora mukul*).

Agni:- Rasāyana drugs are helpful for maintaining homeostasis between anabolism and catabolism; they act as free radicals scavengers; e.g. pippali (*Piper longum*), āmalki (*Emblica officinalis*) and harītaki (*Terminalia chebula*).

Psychology: - Āyurveda describes this under acāra rasāyana[13].

Āyurveda explains different types of rasāyana drugs according to diseases[14] (Table 2)

**Admistration**[15]

Kuṭipraveśika:- In this procedure, first the patient is purified (externally and internally by pañcakarma) and made free from diseases. Then he has to be shifted to a place where all facilities are available. Then rasāyana drugs are used under proper supervision of physicians.

Vātatāpika**:** - In this procedure rasāyana drugs are used with no specific restrictions and precaution.

**Conclusion**

Today medical science is giving emphasis for prevention and maintenance of health. By the above description, we can understand the mode of action of rasāyana and its use for prevention of disease and maintenances of health. It also covers some aspect of disease management.

TABLE 2

Different types of rasayana drugs indicated according to diseases

| Diseases/system | | Rasāyana drugs |
|---|---|---|
| 1. | Heart | Śālaparṇi, arjuna |
| 2. | Tuberculosis | Nāgbala, pippali, śilājit, |
| 3. | Anemia | Louha |
| 4. | Ghout | Amṛta, bhallātaka |
| 5. | Diabetes | Śilājit, haridra, āmalaki |
| 6. | Uriticaria | Haridra |
| 7. | Respiratory | Bhallātaka |
| 8. | Obesity | Harītaki, guggulu |
| 9. | Skin | Tuvaraka |
| 10. | Mental | Maṇḍūkaparṇi, śaṅkhapuṣpi |

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## NOTE TO THE CONTRIBUTORS

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

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

- Matter can be sent by surface mail prepared in Laser Jet print or e-mail. Devanagiri scripts/diacritical marks may please be avoided in e-mail.