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Āryavaidyan

लाभानां श्रेय आरोग्यम्

Of all the gifts,
the most precious is health

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THE ARYA VAIDYA SALA - KOTTAKKAL

āryavaidyan

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Aryavaidyan is intended to encourage scientific writing and intellectual interactions among scholars, academicians, practitioners and students of ayurveda and allied subjects like Siddha, Unani, modern medicine, etc.

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ANTIOXIDANT ACTIVITY OF KUṬAJA (*HOLARRHENA PUBESCENS*) LEAVES

Bindu. B, Usha. M, Girish Chandran. R.*

Abstract: This paper deals with antioxidant activity of kuṭaja (*Holarrhena pubescens*). Anti-oxidant acts as a major defense against radical mediated toxicity by protecting the damages caused by free radicals. The defense system to combat the potentially damaging effects of free radical species includes enzymes such as catalase, glutathione peroxidase, superoxide dismutase and non enzymes such as ascorbic acid, á-tocopherol and uric acid.

Introduction

Kuṭaja (*Holarrhena pubescens*) belongs to Apocynaceae family and is an indigenous medicinal plant known for diabetes. The bark and seeds are well known for the treatment of dysentery and diabetes. The ethanol extract of bark has been reported to have immune modulator and anti-bacterial in *in-vitro* (Chaterjee *et al*, 1999).

Antioxidants are exogenous or endogenous compounds acting in several ways including removal of 0_2, scavenging reactive oxygen/ nitrogen species or their precursors inhibiting ROS formation and binding metal ions needed for catalysis of ROS generation and up-regulation of endogenous antioxidant defenses. Antioxidant acts as a major defense against radical mediated toxicity by protecting the damages caused by free radicals. The defense system to combat the potentially damaging effects of fee radical species includes enzymes such as catalase, superoxide dismutase and non enzymes such as ascorbic acid á-tocopherol and uric acid.

A species that contain an unpaired electron and is capable of independent existence is known as a free radical. In simple words, free radicals are molecules that have lost an electron and try to replace it by reacting with other molecules. The most common cellular free radicals are superoxide radical, hydroxyl radical and nitric oxide.

There is a recent explosion of interest in bio-activity of phytoconstituents from a number of aromatic, spicy, medicinal and other plant that exhibiting antioxidant properties. Antioxidants have thus become a topic of interest due to its important role in preventing the formation of free radicals and reduction in biomarkers of oxidative damage.

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Materials and methods

Collection and authentication:- The leaves of kutaja, collected from Anna Herbal Garden, Chennai, Tamil Nadu and identified by Plant Anatomy Research Centre (PARC), Tambaram, Chennai (specimen voucher - PARC-2008-132), were shade-dried, grounded and stored dry until extraction.

Extraction of leaves:- The shade dried leaves were coarsely powdered, and the powdered material was extracted with ethanol (99% v/v) by cold maceration. The solvent was filtered and distilled off. Finally traces of solvent were removed under vacuum.

Assay for DPPH radicals scavenging capacity:- The effect of alcoholic extract on DPPH radical was estimated by (Lim *et al*, 2003) with minor modification. In brief, 2ml of DPPH in methanol were added to 50iL of various concentrations of extracts. The mixture was vortexed for 15 seconds and left to stand at 37°C for 30 min. The decrease in the absorbance at 515nm was continuously recorded in a spectrophotometer for 15 min at room temperature. All determination was performed in triplicate. The DPPH scavenging activity of extract was plotted against time and the percentage of DPPH scavenging ability of the sample was calculated from the absorbance value at the end of 15 minutes as follows: % Inhibition = (Absorbance control- Absorbance Sample) /Absorbance Control x 100.

Kutaja (*Holarrhena pubescens*) - Leaves

Deoxyribose protection against hydroxyl radicals:- Deoxyribose protection against hydroxyl radicals generated by reacting Fe^{3+}, EDTA, Ascorbic acid and H_2O_2 (Halliwell, 1994). In brief, 1ml of final reaction solution contained 500il of various concentrations of test materials, $FeCl_3$, EDTA, H_2O_2, deoxyribose and ascorbic acid in potassium phosphate buffer. Deoxyribose degradation by hydroxyl radicals was measured by using the thiobarbituric acid method. The reaction mixture was incubated for one hour at 37°C and further heated in a boiling water bath for 15 min after addition of 1ml TCA and 1ml of TBA and colour produced was measured at 532nm against a blank containing phosphate buffer. Quercetin was used as a positive control. The percentage of hydroxyl radical inhibition was calculated by following formula: % Inhibition = (Absorbance control - Absorbance Sample) /Absorbance Control x 100.

Nitric oxide scavenging activity:- Nitric oxide scavenging activity was measured by spectrophotometric method described by Sreejayan *et al*, 1997. Sodium nitroprusside in phosphate buffer saline was mixed with different concentration of extract dissolved in methanol and incubated at 25°C for 30 min. After 30 minutes, 1.5ml of the incubation were removed and diluted with 1.5 ml of Griess reagent. The absorbance was measured at 546nm used by the formula: % Inhibition = (Absorbance control - Absorbance Sample) / Absorbance Control x 100.

Result

Free radical scavenging capacity using DPPH generated radical was tested with different concentration of alcoholic extract (Fig. I). It was observed that the percentage of inhibition at 15 minutes of the tested materials to be following order with their inhibitory constant (IC_{50}) values and compared to standard Vitamin E 14.4mM. Fig. I depicts the ability of alcoholic extract to quench hydroxyl radical tested *in-vitro*. The results indicate that *Holarrhena pubescens* exhibited hydroxyl quenching with IC_{50} value of 32mM with standard Vitamin E with IC_{50} value of 18mM. Fig. I depicts the ability of alcoholic extract to quench NO radicals was tested *in-vitro*. The results indicate that kutaja exhibited IC_{50} value of 28mM compared with standard Vitamin E IC_{50} value of 18mM.

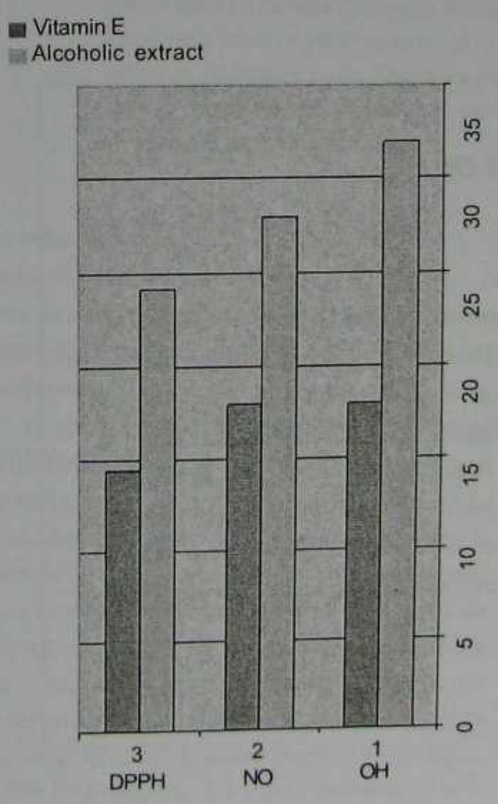

Fig. I.
Effect of alcoholic extract of the leaves of kutaja in various *in-vitro* free radical assays

Discussion

The results demonstrate that alcoholic extract possesses free radical scavenging and anti-oxidant capacity tested in *in-vitro*. The results from DPPH assay reveals that alcoholic extract of leaves showed efficient quenching of DPPH. Alcoholic extract has shown good inhibition in scavenging nitrates which is generated in *in-vitro*. The data explain the multiple free radical scavenging capacity and antioxidant capacity of crude alcoholic extract from the leaves of kutaja (*Holarrhena pubescens*) as compared with Vitamin E.

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PHYTOCHEMICAL VARIATIONS IN FRESH ROOT-JUICE AND MARKET SAMPLES OF POWDER OF ŚATĀVARI (*ASPARAGUS RACEMOSUS* WILLD.) - A PILOT STUDY

S.K. Hiremath*

Abstract: Śatāvari (*Asparagus racemosus* Willd.) is a tall climbing under-shrub with annual woody terete stem; flowers white, fragrant, in solitary or fascicled; berry 5-6 mm diameter and red. Roots are bitter, sweet, oleaginous, cooling, indigestible, tonic, aphrodisiac and are useful in dysentery, haemopathy and ophthalmopathy. Śatāvari root is used in various āyurvedic formulations in the forms of powder, decoction, etc. Fresh root juice or paste is advised to use in many formulation. Phytochemicals are active in fresh plant roots. Therefore fresh juice and market samples were analyzed for their phytochemicals. Significant changes in starch, steroids, tannins and phenolic compounds and pH were seen.

Introduction

Śatāvari (*Asparagus recemosus* Willd.) root is used as one of the main ingredients in various āyurvedic formulations in the form of fresh juice and powder. It is used to prepare kvātha (decoction), ghṛta (medicated ghee) taila (medicated oil), lehya (electuary) and āsava (self generated alcoholic preparations). This indicates that the phytochemical present in the root of śatāvari is not only aqueous soluble but also alcoholic and lipid soluble. Śatāvari juice is also used as bhāvana dravya in the formulation Candrakala rasa. This indicates that the svarasa (juice) used for the preparation of formulation, not only acts as a binding agent, but also imparts its qualities to the formulation. So many references are available in the classics indicating its use in fresh forms like juice or paste (Table 1). All these reveal the presence of active-principles that are more effective in fresh form. Considering the use of śatāvari in various formulation and forms, it was subjected to preliminary phytochemical screening.

Materials and methods

Fresh roots of śatāvari were collected from the Departmental herbal garden of Shri. B.M. Kankanawadi Mahavidyalaya Shahapur. The roots were thoroughly washed and measured as: a) length - 14-18cms, b) girth - 02-04-06cm and c) colour - pale yellowish-brown. The samples were divided into four groups i.e. i) Sample A - fresh juice (peeled), ii) Sample B - fresh juice (unpeeled), iii) Sample C - aqueous solution of powder (without boiling) market sample and iv) sample D - aqueous solution of powder (on boiling) market sample.

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The following methods were used to test various parameters[11].

1. Benedicts Test (test for reducing sugars):- Mix equal volume of Benedicts reagent and test the solution in the test tube. Heat in boiling water for five minutes. Solution appears green, yellow or red depending on amount of reducing sugar present in test solution.
2. Iodine Test (test for non-reducing polysaccharides - starch):- Mix 3 ml of test solution and few drops of dilute iodine solution; blue colour appears. It disappears on boiling and reappears on cooling.
3. Salkowaski reaction (test for steroids):- Add 2ml of chloroform and 2ml concentrated H_2SO_4 to 2ml of extract. Shake well. Chloroform layer appears red and acid layers show a greenish yellow fluorescence.
4. Foam test (test for saponins glycosides):- Shake the drug extract or dry powder vigorously with water. A foam persists.

TABLE 1

Formulations indicated in various ailments

Name of the yoga	Form/Officinal part	Indications
Śatāvari juice (single use)	Mūla svarasa	Pittaja śūla
Śatāvari lehya	Mūla svarasa	Sarvamūtrakṛchra, meha, raktapitta, halīmaka
Śatāvari ghṛta	Mūla svarasa	Mūtrakṛchra, mūtradoṣa, śarkara.
Vidāri ghṛta	Mūla svarasa	Smṛtivardhaka, vṛṣya, mūtrakṛchra, śarkara, aśmari, hṛdroga, pittajagulma,vātarakta, kāsa, śvāsa, urakṣata, tṛṣṇa, chardi, manovikāra, kamparoga, raktavamana, raktakṣaya, yonidoṣa, rājayakṣma, apasmāra, rajodoṣa, śukradoṣa
Bṛhat śyāmādi ghṛta	Svarasa / kvātha	Prameha, kḷaibya, vātaśoṇita, garbhadoṣahara
Bṛhat śatāvarī ghṛta	Mūla svarasa	Yoniroga, raktadoṣa, śukradoṣa, vṛṣya, pumsavana, kṣata, ksaya, raktapitta, kāsa, śvāsa, halīmaka, kāmala, vātarakta, visarpa, śiroroga, unmāda, arati
Nārāyaṇatailam	Mūla svarasa	Neurological diseases
Aṇutailam	Mūla kvātha	Manyāstambha, ardita, hanustambha, pīnasa, ardhāvabhedaka, śirakampa.
Mañjiṣṭhādi kvātha	Kvātha	Kuṣṭha, vātarakta, ardita, upadamsa, ślīpāda, paksāghāta, medodoṣa, netraroga.
Varuṇādi kvātha	Mūla	Aśmari, mūtrakṛchra
Candrakala rasa	Svarasa bhāvana	Mūtrakṛchra

5. Tests for tannins and phenolic compounds:- Add few drops of reagents - 5% $FeCl_3$ solution to 2-3 ml of aqueous or alcoholic extracts. Deep blue black colour appears.
6. Kellar-Killani Test (test for cardiac glycosides - deoxysugars):- Add glacial acetic acid to 2 ml extract, one drop of 5% $FeCl_3$ and concentrate. Reddish brown colour appears. Bluish green colour appears at the junction of the two liquid layer.
7. Bomtragers Test (for anthroquinons glycoside):- Add 3ml of extract to diluted H_2SO_4, boil and filter. Add equal volume of benzene to cold filtrate, shake well and separate the organic solvent benzene. Then add ammonia. Ammonia layer turns pink to red.
8. Dragedorff's Test (test for alkaloids):- Add few drops of dragedorfs reagent to 2-3ml of filtrate. Orange precipitation is formed.

Observation and discussion

Śatāvari is used in various diseases like burning micturation, dysentery, hæmopathy, ophthalmopathy, etc. It is also used as cooling, general tonic, aphrodisiac and evaluated for anti-oxidant and anti-ulcer activity[12].

The preliminary phytochemical tests carried out showed significant difference (Table 2). Steroid, tannins and phenolic compounds were absent in the fresh juice, whereas they were present in the powder (market sample). Also the change in pH was seen in the fresh juice. Starch was absent in the root whereas it was present in the powder (market sample). This presence of starch indicates adulteration.

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2. *Sahasrayogam*, Chaukhamba Prakashan.

TABLE 2

Result of different phytochemical tests

Test	Sample A	Sample B	Sample C	Sample D
Saponins	+	+	+	+
Carbohydrates	+ve	+ve	+ve	+ve
Tannins and Phenolic compounds	-ve	- ve	+ ve	+ ve
Alkaloids	+ve	+ve	+ve	+ve
Anthroquinons Glycosides	-ve	-ve	-ve	-ve
Cardiac glycosides	-ve	-ve	-ve	-ve
pH	5.45-5.46	5.88-5.99	5.40	
Sp gravity	1.0403	1,0483	1.01	
Steroids	-ve	-ve	+ve	+ve
Polysaccharides	-ve	-ve	-ve	-ve
Starch	-ve (T.S. of root)	-ve (T.S. of root)	+ve	+ve

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EFFECT OF ĀYURVEDIC TREATMENT ON TROPHIC ULCERS OF LEPROSY - A COMPARATIVE CLINICAL TRIAL

Sarita Gaikwad*, Pradip Y. Gaikwad**

Abstract: - A comparative clinical trial on trophic ulcers in leprosy was undertaken to examine the effect of āyurvedic treatment on healing of trophic ulcers. There were 31 subjects in the study group and 31 in control group. The subjects were given āyurvedic treatment and the control subjects were treated conventional allopathic line of treatment. The study proved that the āyurvedic treatment is a better alternative for treating trophic ulcers in leprosy.

Introduction

Chronic ulcers are commonly encountered in leprosy patients and are a major cause of disability. Chronic ulcers in the sole of foot are trophic in nature and the basic factor in their production is the involvement of posterior tibial nerve, the affection of this nerve producing loss of sensation on the sole of foot. Repeated injury and pressure of body weight acting on the denervated insensitive sole produce ulcers which are known as trophic ulcers. The ulcers get secondarily infected and may result in destruction of underlying bones and degeneration of joints[1-3]. The present study was undertaken to find the effect of āyurvedic treatment on trophic ulcers of leprosy and to compare efficacy of treatment with current line of allopathic treatment.

Material and methods

The study was a comparative clinical trial undertaken in Dr. Bandorawalla Leprosy Hospital, Pune. The Control group was from two Leprosy Homes at Dudulgaon and Nerali.

Selection criteria:- i) The age of the ulcer was to be 1 year or more, ii) The ulcers were not to be very deep, affecting bones and iii) Willingness to undergo the trial with readiness to follow the guidelines.

Total 62 patients i.e. 31 patients in the study group and 40 patients in the control group (i.e. from two Leprosy Homes) were selected. Of which, 9 patients from control group were left before completing the study period and 31 patients remained in the control group.

Study period: - March to June 2004

The study group subjects were physically examined and their ulcerative wounds were noted in terms of site, size, shape, discharge, floor and walls. Their random blood sugar, routine hemogram and urine examinations were carried out. Similarly the control group subjects were physically examined and ulcers were noted as for the study group.

1. *RMO and Head, Sassoon Hospital Pune:* 2. *Ast. Director of Health Services (Lep) & Administrator, Dr Bandorawalla, Lep Hospital, Kondhawa, Pune*

Local treatment (study group)

The ulcers of study group subjects were washed with the decoction of barks of udumbara (*Ficus racemosa*), nyagrodha (*Ficus benghalensis*) and aśvatha (*Ficus religiosa*). The barks of these plants contain anti inflammatory, antibacterial and healing properties (Bhāvaprakāśam)[4] due to the presence of tannin, silica and phosphoric acid. Every alternate day the infected ulcers were washed by cow's urine (which has antibacterial properties).

The ulcers were dressed with Vraṇaśodhana oil, which contains haridra (*Curcuma longa*), mañjiṣṭha (*Rubia cordifolia*), nimba (*Azadirachta indica*), madhuyaṣṭi (*Glycyrrhiza glabra*) dārvi (*Berberis aristata*), trivṛt (*Merremia turpethum*), seed of tila (*Sesamum orientale*) and saindhava (rocksalt). All these compounds have antibacterial, antileprotic, antislough properties and the oil itself produce the facilitating effect on healing.

On appearance of granulation tissue, the ulcers were dressed with Vranropaka oil, which contains extracts vaṭa (*Ficus benghalensis*), kadamba (*Neolamarekia cadamba*), udumbara (*Ficus racemosa*), karavīra (*Nerium* oleander), aśvatha (*Ficus religiosa*), arka (*Calotropis gigantea*), vetra (*Calamus rotang*), kuṭaja (*Holarrhena pubescens*) and plakṣa (*Ficus microcarpa*).

In the final stage, the ulcerated wounds were dressed with powder of triphala which helps healing at faster rate.

Systemic treatment (study group)

The study subjects were given musta (*Cyperus rotundus*) and triphala (*Terminalia chebula, Emblica officinalis* and *Terminalia bellirica*), 5g each twice daily. Musta acts as appetizer and removes the excessive secretions from the body. *Terminalia chebula* removes imbalance caused due to various factors and restorers body health. It has digestive, diuretic, astringent properties. *Emblica officinalis* contains tannin, calcium, iron, carotene and thiamine which help in healing the ulcers. It contains all the rasa except salty one. It has effect on nerve conduction and facilitates memory and intelligence.

TABLE 1

Comparison of study and control groups before the treatment

Particulars	Study group			Control group		
	Male	Female	Total	Male	Female	Total
1. Sex	21	10	31	22	9	31
2. Number of ulcers	28	10	38	26	11	37
3. Infected ulcers	4	1	5	4	1	5
4. Type of leprosy - PB	13	7	20	8	4	12
5. Type of leprosy - MB	8	3	11	14	5	19
7. Average age	58.19 years			54.00 years		
8. Median age of ulcer	20 months			24 months		
9. Average area of ulcer	13ccm			2.36ccm		
10. Type of ulcers:						
- Occurrent		3			5	
- Recurrent		32			30	
- Non healing		3			2	

Terminalia bellirica acts by rapid healing of ulcers. It possesses anti-inflammatory and astringent properties

The study subjects with infected ulcers were given haridra (*Curcuma longa*) 2g twice daily, as haridra has antibacterial, antioxidant properties. The patients were given sūkṣma triphala (in which the properties of triphala are enhanced to number of times and acts as an antibiotic) which was stopped when the infection was controlled and the patients were continued with musta and triphala.

The study subjects would have to be given special diet but due to unavoidable circumstances this was not possible or else the results could have been even better. The subjects were told not to add extra salt in the diet and not to consume pickle.

Local treatment (control group)

The ulcerative wounds were washed by savlon/ dettol, cleaned, dried and applied Soframycin ointment locally and dressed by sterile gauze and bandage. The infected wounds were washed with Eusol, dried and dressed with Magsulph - glycerin combination.

Systemic treatment (control group)

The control group subjects with infected ulcers were given antibiotics, anti-inflammatory drugs like Aspirin, Ibuprofen, Voveran (Dichlofenac) with Vit - C, which helps in faster healing.

Follow up: - The study subjects were examined once in a month. The control group patients were examined once in a week.

TABLE 2

Comparison of study and control groups after the treatment

Group	Improvement			No improvement
	100%	>50%	30-49%	
1. Study	8/38 21.05%	34/38 89.47%*	4/38 10.52%	-
2. Control	3/37 8.10%	16/37 43.24%	1/37 2.7%	20/37 54.05%

*χ^2 = 16.00; p<0.001 highly significant

Discussion and results

The study subjects were having 38 ulcers while the control group subjects 37 ulcers. The median age of ulcer in the study group was 20 months, while that in control group was 24 months. The average age of patient in study group was 58.19 years while that of control group was 54 years. Majority of the ulcers in each group were recurrent ulcers.

The ulcer of study group was 5.5 times bigger in size (i.e. the ulcer area of study group was 13 ccm while the ulcer size of control group subject was 2.36 ccm). The size of ulcer of study group reduced from 13 ccm to 3.01 ccm while the size of ulcer of control group subjects was 2.36 ccm, which in fact increased to 2.40 ccm.

In the study group, 89.47% ulcers showed more than 50% improvement; in other words 34 out of 38 cases showed improvement (χ^2= 16.00, p<0.001 highly significant) and 8 out of 38 cases were completely healed. The control group showed 43.24% improvement as 16 out of 37 ulcers showed improvement and only 3 out of 37 ulcers were completely healed.

TABLE 3

Comparision of improvement in size of ulcer before and after the treatment

Group	Sise of ulcer		Improvement
	BT	AT	
1. Study group	13 ccm	3.01 ccm	76.84%
2. Control group	2.36 ccm	2.40 ccm	-1.52%*

BT - Before treatment; AT - After treatment

* deterioration

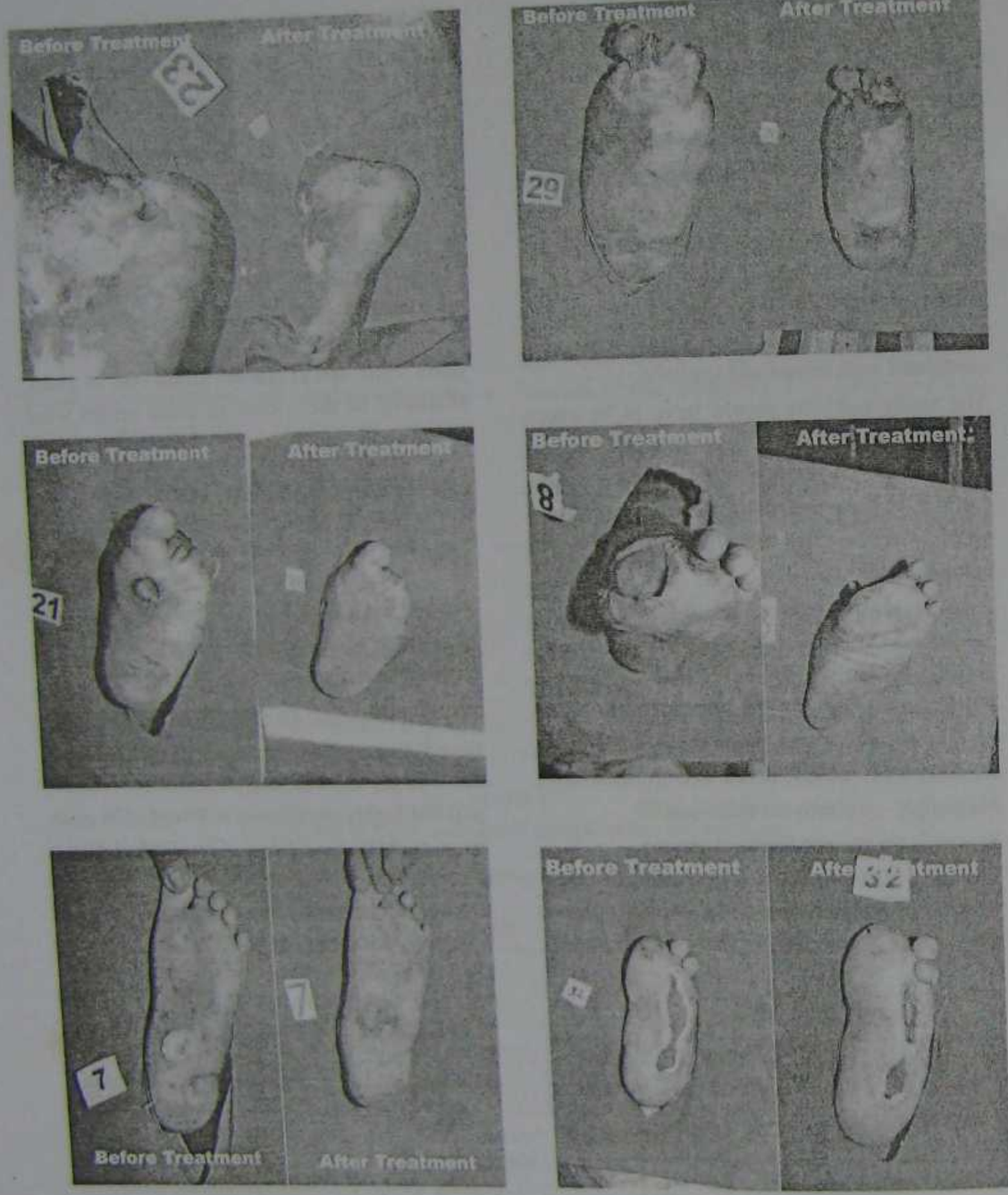

Fig. 1
Few photographs of ulcers before and after the treatment

In the study group there were 5 infected ulcers out of which 2 showed complete (100%) healing and the rest 3 showed more than 70% improvement. In the control group out of 5 infected ulcers, only one showed more than 50% improvement and there was no improvement in other 4 infected ulcers.

The study subjects showed marked improvement in other ailments like hyper acidity, chronic rhinitis, chronic constipation and their over all health improved. Comparison of both the group before and after the treatment is shown in Tables 1, 2&3 (Fig I)

Conclusion

The ulcer in study group showed quicker and better healing than that of control group subjects. The area of ulcer in the study group was 5.5 times more than the size of control group subjects. Yet there was 76.84% improvement was noted in them while in control group there was no improvement in 54% ulcers and the average size of ulcer increased by 1.72%

The therapy has shown outstanding effect in the management of ulcer in leprosy cases, hence it can be recommended for treating such cases. Director of Health Services of Maharashtra State has accepted the findings of the study and the protocol was agreed to be circulated to all Civil Hospitals, Rural Hospitals & Leprosy Hospitals/ Homes.

Acknowledgement

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A NEW FOLK MEDICINE FOR SNAKE BITE FROM KUMAUN IIIMALAYA

G. Bhattacharyya[1], G.C. Joshi, L. M. Tewari[2]

Abstract: In this short research communication, the botanical identification of an anti-venom folk medicine from Kumaun Himalaya has been described.The plant described here was found and identified during an ecolological floristic survey in a forest ecosystem of Kumaun. The plant has been recognized as an indigenous flora of the area. Though some of its other medicinal uses are known, its use as an anti-venom drug is being described for the first time.

Introduction

The loss of biodiversity has become a major threat to all ecosystems and an intensive study of the indigenous plants along with their uses has become quite essential. Many of these plants though being used as traditional medicine since ages are rarely known to the scientists. Indigenous system of medicine has a lot to offer to our ailing. Authentic drugs and discovery of new resources alone can ensure continued survival of this rich natural heritage.

Many folklores are current among the hill tribes about the miraculous cures of various ailments by herbalists living secluded life in the remote and high mountains of Kumaun Himalaya. It is admitted on all hands that there are medicinal plants in these mountains which are rich in different types of subtropical, temperate and alpine plants whose medicinal values are not yet completely known to science. During the course of a floristic survey, a new folk medicine for snake bite from Kalika Forest, under Kaligarh Forest Range of Almora District was noticed. It is locally known as 'Garoorbuti'. The herbalists give this plant's meshed root and therefore, its botanical identification was difficult. The plant was collected from the shady and moist rocks from Kalika forest, Ranikhet in the months of August-September, and later after a detailed study, it was identified as *Curculigo orchioides* Gaertn. belonging to the family Amaryllidaceae.

The efficacy of the root of this plant for the treatment of snake bites has been passed from generation to generation. This was kept as a secret and it will be useful if this is scientifically proved.

Methodology

The study site Kalika Forest, is situated at about 6 km away from Ranikhet on the Ranikhet - Almora road. The area is situated in Kaligadh Research Block of West Almora Division at an elevation of 1775 metres in the middle Himalayan zone. The mean annual rainfall is about 1500mm mostly during July to September. Floristic survey of the area was done on random basis. The ground flora was collected and identified. Herbarium was made according to the standard procedure. Discussions were held with a number of local inhabitants and herbalists regarding the traditional use of the said plant and its application procedure.

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Botanical description

Curculigo orchioides is a stemless, perennial herb, with leaves radical, sessile or narrowed to a short petiole, lancolate, or oblong-elliptic, acute or acuminate plicate, softly hairy to almost glabrous, 15-50 X 2-6 cm scapes stout, concealed by subterranean leaf bases (Fig Ia) with tuberous rootstock and fleshy roots (Fig Ib) and flowers sessile, distichous, yellow, the lowest hermaphrodite, upper male; ovary villous, usually subterranean with the perianth raised above the ground by a filiform scape; bracts white, membranous, lanceolate, acuminate; perianth tube protruded above the ovary; stamens 6, shorter than perianth lobes (Fig Ic); berries fleshy, beaked.

Flowering and fruiting: - July – November

Occurrence: - Common during rainy season, on grassy hillsides and slopes in Chir-Pine forests. Ranikhet, Chiliyanaula.

Habitat:- It is found in places that are up to 6000 feet above sea level. It is more commonly seen in temperate zonal climate. It is seen in countries like Africa, Middle East, Arabia, Pakistan and southern Asian Island. In India it is found everywhere but predominantly found in Deccan plateau area of Chota Nagpur. It is also commonly seen in South India.

Chemical constituents: - It contains starch 43.48 %, tannins 4.15 %, enzymes 14.18 % and ash 8.6 %. Besides, it also contains glycoside, orcinol-1-O-beta-D-apiofuranosyl - (1>6) -beta-D-glucopyranoside, curculigoside, syringic acid, curculigoside and curculigoside C.

Method of treatment

Decoction of ¼" root and 3 grinded black pepper seeds in ½ glass of cold water is given orally once to the snake-bite patient. Significant relief was observed after 2-3 hours. A paste of the root is also applied on the place of the wound. A second and third dose of the decoction is further administered orally at an interval of 6-8 hours.

Conclusion and discussion

Only one species of snake (Pit Viper) in Uttarakhand is deadly. This folk medicine has attracted considerable attention in recent years for its effect on snake bite as it is easily available and cheap to people living in remote and far-flung areas of the Himalayas. Its extensive use for the treatment of snake bite has been reported and confirmed by a number of local people who are aware of traditional medicines. It needs detailed chemical and pharmacological investigation to judge its anti-venomous action.

It has also been noticed in recent years that due to rampant soil erosion the existence of this herb is depleting. Therefore, it needs proper conservation in the original habitat.

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a

b

c

Fig 1 a-c : *Curculigo orchioides*
a Whole plant; **b** Tubourous root; **c** Flower

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SIMPLE DRUGS FOR THE MANAGEMENT OF OBESITY

Rukmini Bai Koti[1], P. Srinivas and R.K. Swamy[2]

Abstract: Life style disorders like obesity, diabetes and high cholesterol are prevailing factors today. Āyurveda suggests so many remedies to combat these diseases. The line of treatment and the usage of different drugs as per āyurvedic classics (by different scholars) were different. Individual definition for therapeutic actions (karma) of dravyas (drugs) like dīpana and pācana has been described by Śārṅgadhara. Here, an attempt is made to put forward the lekhana action (scraping) as referred to in Śārṅgadharasamhita.

Introduction

Classification of drugs in āyurveda is mainly based on the actions (karma) of the drugs. In Carakasamhita (Sūtrasthāna), based upon the actions like dīpanīya, chedanīya, lekhanīya, etc., the drugs are classified into daśaimāni-kaṣāya-varga. In Suśrutasamhita, the classification can be seen based on their clinical efficacy like medohara, vraṇahara, vranaropana, jvarahara, etc. Although classification is there in Samhitas from the earlier days, a clear-cut view regarding the definition of actions of drugs is clearly and accurately highlighted in Śārṅgadharasamhita. The lekhana (scraping) action and clinical efficacy of honey, hot water, vaca, and yava are discussed.[1]

Lekhana: definition

Lekhana means scraping. The drugs which removes/scrapes away all the unwanted tissues (dhātus) and metabolic wastes (malas) is known as 'lekhana' drugs. A lekhana drug is habitually vāyu and agni bhūta predominant[2]. Ḍalhaṇa defines lekhana drug as one that removes the kapha and medas[3]; whereas Gaṅgādhara explains that the drug that causes cracks in the skin while rubbing on the skin[4]. Scraping with an instrument or alkali is called lekhana in Śalyatantra[5].

Caraka has mentioned a lekhanīya group of ten drugs. Suśruta indicates Sālasārādi gaṇa as kapha, medo viśoṣaṇa.

The unwanted tissues/material in this context can be correlated with the undigested material which in turn is the root cause for the life style diseases. High cholesterol levels of the body/ excessive kapha is an important factor in producing these diseases.

Madhu (honey)

Caraka has included honey in the substances that are to be used regularly as hitāhāra dravya. It is a common practice since long to use honey as a vehicle (anupāna) with many medications and as a medicine itself. While describing the treatment modalities for sthūla (obese), Caraka mentions madhūdaka (honey-water) to be used as anupāna along with certain dravyas as āhāra[6].

Caraka describes 4 types of honey: a) Mākṣikam. It is the best in quality. It is from the reddish variety of honeybees and looks like tila oil in colour; b) Bhrāmaram is from bhramara type of honeybees and is white in colour; c) Kṣaudram from small type of honeybees and is brown in colour; d) Pauttikam is from puttika type of honeybees and has the colour of ghee.

Suśruta describes honey as sweet, astringent (anurasa), ununctous, cool; enlightens fire, improves colour of skin, improves voice, light, reduces obesity (as lekhana), good for heart (hṛdya), helps in union of broken parts (sandhana), healing of wounds (ropana), aphrodisiac, good for eyes, alleviates vitiated pitta, kapha, meda, hiccough, dyspnoea, cough, diarrhoea, worms, poisons and pacifies all three doṣas[7]. Suśruta has mentioned eight varieties: - a) pauttika, b) bhrāmara, c) kṣaudra, d) mākṣika, e) chatra, f) ardhya, g) auddalaka and h) dala.

Fresh honey nourishes, does not alleviate kapha, and is a purgative in nature. After it is old it reduces obesity, causes constipation (samgrāhi), scraps off unwanted tissue (lekhana) and pacify tridoṣas. Honey should not be heated or used along with hot substances except to produce emesis.

Honeybees produce honey from the nectar of flowers. Most micro-organisms do not grow in honey because of its low water content of 0.6. It is created by bees as a source of food. It is a mixture of sugars and other compounds.

Typical honey analysis: - Fructose - 38.5%, glucose - 31.0%, sucrose - 1.0%, water -17.0%, other sugars - 9.0% (maltose, melezitose), ash: 0.17%, other - 3.38%.

Honey is easily absorbed and utilized by the body. It contains about 70-80% sugar; the rest is water, minerals, and traces of protein, acids, and other substances. Honey may play a favorable role in protection against diabetes, overweight, and hypertension. Experimental evidence suggests that consumption of honey compared to some other sweeteners may improve blood sugar control and insulin sensitivity. Fructose found in honey may play an important role in mediating this benefit.

Niramuṣṇam (hot water)

The exact definition of uṣṇajala (hot water) is the quantity of water halved after boiling. Even though its therapeutic efficacy has mentioned by earlier ācāryas, the exact definition is seen in later samhitas like Bhāvaprakāśa, Śārṅgadhara-samhita and Yogaratnākara. Water boiled and reduced to ⅛th, ¼th or ½ of the original quantity or simply boiled are called uṣṇodaka (warm water)[8].

While dealing with jvaracikitsa (Cikitsāthāna), Caraka gives the benefits of hot water. When a patient is suffering from jvara (fever) caused by vāyu or kapha or both, and feel thirsty, then hot water should be given. If the thirst occurs because of paittika jvara or as result of the intake of alcohol, then cold water should be given. This cold water should, however, be boiled with bitter (tikta) drugs and allowed to cool. Both the hot water and cold water (the latter boiled with bitter drugs) are dīpana (digestive stimulant), pācana (carminative) and alleviate jvara. They help in cleansing the channels of circulation[9].

In Vimānasthāna, Caraka explains the logic behind consuming the hot water. The doṣa involved in the pathogenesis of fever is pitta and by nature it is hot. Physicians advise the

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patient suffering from fever to take hot water so that the immaturely formed doṣas, which are responsible for the disease, may get matured[10].

The site of origin of fever is āmāśaya (stomach). Usually the treatment of diseases originating from the āmāśaya is pācakakarma (drugs which bring about ripeness in the immature products). Hot water produces the pācaka property and is advised to the patient who is suffering from fever. It causes downward movement of vāta (flatus), stimulation of agni, easy digestion and drying up of kapha. Administering cold things (drugs) to cure diseases caused by hot things and hot drugs for diseases caused by cold things is one of the principles of āyurveda. This is applicable to other diseases also.

Suśruta, while dealing various drava-dravyas (liquid substances) in 45th chapter of Sūtra-sthāna, states that hot water destroys kapha, meda, vāyu and āma, and enlightens the fire (agnidīpaka), cleanses the bladder (basti śodhaka) and frees a person from dyspnoea, cough and fever. It is always wholesome (pathya)[11].

The use of hot water during cold, fever, diarrhoea and in certain physiological conditions like post natal period, post operative period is followed traditionally in India. The regular practice of hot water in Kerala state is a practical example for its usage in kapha predominant areas (jāṅgala deśa) and in kapha predominant diseases.

The basic pathological fact of a disease in āyurveda is āma. In treating the āma stage no drugs were advocated and the patient is asked to follow the laṅghana principle with only intake of uṣṇajala till his natural appetite is restored i.e. up to the complete āma pacana. Uṣṇajala consumed at night will mitigate diseases of kapha, rheumatism, obesity; it cleanses the urinary bladder; stimulate digestive fire, cures cough, dyspnoea and fevers.

Vaca (*Acorus calamus*)

Vaca is one of the extensively prescribed herbs in the Bṛhattrayi. The part used is rhizome. It is kaṭu and tikta in rasa; laghu and tīkṣṇa in guṇa; uṣṇa in vīrya; kaṭu in vipāka and leghanīya in karma. It is indicated in medoroga.

Physical constituents: - Moisture - 10.26%, dry matter - 89.74%, total ash - 6.481%, acid insoluble ash - 0.878%, water-soluble extract - 28.15%, ethanol - (80%), soluble extract - 42.02%.

Bhāvamiśra classifies vaca into five varieties: i) vaca (*Acorus calamus* Linn.), ii) pārasika vaca/ haimavati (*Iris germanica* Linn.), iii) kulāñjana/ mahābhari vaca (*Alpinga galanga* Willd.), iv) sthālagranthi/mahābhari (*Zingiber zerumbet* Rosc. ex. Smith) and v) dvipantara vaca (*Smilax china* Linn.). Bapalalji has pointed out sveta vaca and its synonym, as haimavati, which indicates the origin of this plant i.e. Himalayan species. Haimavati is found in Caraka's Lekhanīya mahākaṣāya. Suśruta has mentioned vacādi gaṇa in the 38th chapter of Sūtrasthāna.

Yava (barley)

Yava (*Hordeum vulgare*) is indicated in medoroga. The physical contents are: total ash - not more than 4%, acid insoluble ash - not more than 1.5%, water-soluble ash - not more than 4%, alcohol soluble extractive - not less than 2.5%, water soluble extractive - not less than 5.55. Pharmacological action – Hypocholestremic.

In Carakasamhita (Sūstrasthāna, 5th chapter), yava is included in the list of nitya sevana dravyas (to be taken regularly). And while describing pramehacikitsa, Caraka stresses the importance of yava[12]. Barley should represent the principal ingredient of food of the patient suffering from prameha.

The patient suffering from prameha given the manthas (flour of different types of corn) mixed with water, kaṣāya (decoctions) of barley powder and linctus prepared of barley. Various food recipes of barley like odana, which is prepared by boiling dried and crushed barley grains and removing the excess water; vātya, the preparation in which de-husked and crushed barley grains are boiled and the excess water is retained; saktu (roasted flour); āpūpa (pan-cake); dhāna (fried barley) should be taken by the patient suffering from prameha regularly to overcome the disease.

Therapeutic evaluation: - Barley contains approximately 10% dietary fiber and is easily cooked with rice, the dominant cereal to increase the intake of dietary fiber. A study was conducted involving three experiments to examine the influence of barley on blood lipids in human subjects. All subjects received boiled barley rice (50/50/w mix) supplement two times / day in place of rice for 2 to 4 weeks. In the normo-lipidemic subjects, serum lipids are unaffected by the ingestion of barley for 4 weeks. In twenty hyper-cholestremic men aged 41±5 years the ingestion of barley was associated with a significant fall in serum total cholesterol, LDL, phospholipid and LDL and VLDL lipoproteins.

Conclusion

Drugs possessing the lekhana action are used to treat kapha and medo-doṣa predominant diseases. In kapha and medodhātu diseases like kuṣṭha, prameha and medoroga, the dhātu pācana krama is disturbed and certain dhātus get extra nourishment and it causes diseases related to particular dhātus.

While describing a substance/drug, our ācāryas mention its indications and contraindications. Honey and hot water also contains contra-indications. Warm honey taken by an individual suffering from heat will be fatal. The explanation given is, during the collection of honey it is contaminated with poisonous material from the bees or from the various poisonous plants. The point is that all patients of fever should consume hot water and that persons suffering from pitta-jvara, giddiness, delirium and diarrhoea should not take hot water.

Adopting simple steps like consumption of boiled and cooled water with honey[13], daily intake of hot water adding yava in the diet are useful for the treatment of diabetes, obesity, etc.

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2. लेखनमनिलानलगुणभूयिष्ठम् (सु. सू. 41)
3. लेखनं कफमेदसो... डल्हण (सु. सू.)
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10. ज्वरितस्य कायसमुथ्तानदेशकालानभिसमीक्ष्य.....
(च. वि. 3)

11. कफमेदोऽनिलामघ्नं दीपनं वस्तिशोधनम्
(सु. सू. 45)

12. यवप्रधानस्तु भवेत् प्रमेही

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Clinical observation

SCOLIOSIS - A CASE STUDY

P.K. Warrier, P. Mohanan Warrier and K.V. Rajagopalan*

Basic concepts (modern view)

Definition: - Lateral curvature of spine.

Complications: - Deformity in the thoracic region transmitted to the ribs, producing asymmetry of the thorax and deformity of the ribs. Vital capacity of the chest is so seriously diminished. Succumbs to inter-current infection; compression of nerve-roots and cause severe neuralgic pain

Causes: - Congenital, postural, paralytic, spastic, pulmonary and idiopathic

Effects of severe scoliosis: - Loss of height and rib hump

Treatment: - Early diagnosis and prevention; exercise to encourage bending to the side of convexity, rotation exercise in the appropriate direction, de rotate the spine; sleep on the side of concavity, Risser jacket; surgical management

Case study

A nineteen year old girl from Saudi Arabia was admitted in the Ayurvedic Hospital and Research Centre, Kottakkal in June, 2007 for Idiopathic scoliosis. Her complaints at the time of admission were: i) concavity of trunk towards left side, ii) low back pain radiating to left leg, iii) pain on right hip joint, right calf muscle and hip muscles, iv) numbness of right leg and v) pain aggravates on sitting and lying positions. The patient was on calcium tablets regularly and on analgesics as and when required.

History: - The problem was started as low back pain in January 2007. The patient had a habit of using computer for long hours continuously. She was one of the four siblings of non-consanguineous parents; the others were normal. No relevant history of past illness.

Personal history: - The patient, tall about 5 feet 8 inches (weight 60 kg), had normal digestion, appetite, bowel movements, urine and sleep. Menstrual cycle was also regular with normal flow. She was a non-vegetarian and used to take cool drinks/cola everyday. Her pulse rate and blood pressure were under control.

Investigation report: - MRI of L.S Spine on 29/01/07 showed Scoliosis at lumbosacral region.

Treatment

Internal: - i) *Dadimadighrtam* (15-50 ml) (according to digestive capacity) in the early morning, followed by a small quantity of warm milk. Patient was advised to avoid breakfast and to take lunch when the ghee is well digested and hunger felt; ii) *Guggulutiktam kasayam* (15 ml) +

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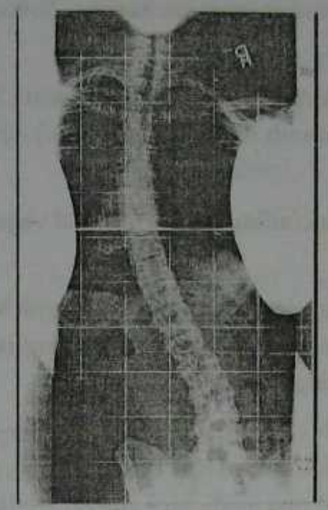

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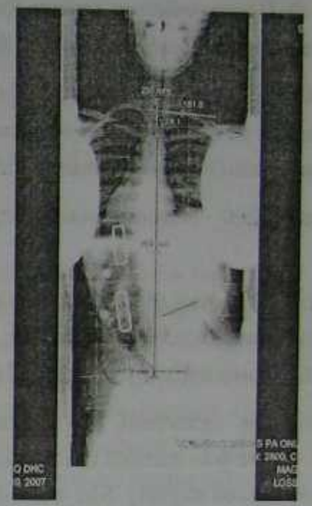

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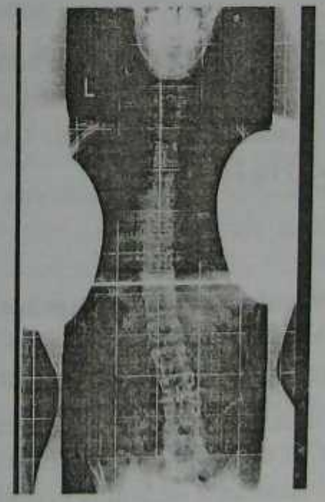

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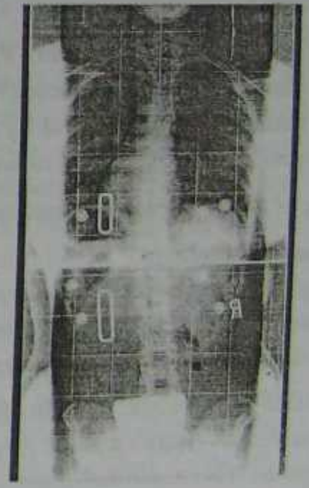

d

Fig.I a-c Radiological examinations

a Before admission; **b** 10th October, 2007; **c** 8th December, 2007

d After the treatment (February, 2008)

Dhanwantharam(101) (10 drops) before lunch and dinner and iii) *Ajasvagandhadi leham* (10g) at bedtime.

External: - i) *Dhanvantaram tailam* for the head and ii) *Dhanvantaram kuzhampu*, *Sahacaradi kuzhampu* and *Mahamashatailam* for the body.

Other treatments: - i) Picu + pizhicil - 18 days, ii) Picu + ñjavarakkizhi - 9 days, iii) Kṣīravasti - 3 days, iv) Snehavasti with *Satahvadi vastitailam* - 5 days, v) Veṣṭanam (with *Mahamashatailam*) - 20 days and vi) Upanāham (with *Mahamashatailam*) - 10 days

Recommended diet: - Non oily, non-spicy, light vegetarian food including fresh fruits and vegetables in plenty.

A bone scan took during this period reported that - 'Dorso lumbar vertebral spondylosis with lumbar scoliosis; bilateral sacro iliitis and Rt. knee joint arthritis possibility of spondyloarthropathy. ? Idiopathic scoliosis with stress induced reactive arthritis involving S1 and Rt. knee joint.'

After one months' treatment, her condition improved remarkably. The patient was discharged on 30.07.2007. There was marked relief in low back pain and pain on knee and hip. Postural abnormality of back also reduced slightly. She was advised to continue the internal medicines and oil application for six months at home.

(Patient continued the follow up and medicines. She used brace jacket also for almost 6-18 hours daily as advised by an Orthosurgeon)

Review and course of hospitalisation:- Patient was admitted again in July 2008 with the following findings: Scoliosis remarkably reduced (90%); Low back pain, knee pain, hip pain and radiating pain completely cured. Weight increased by 9 kg. (The use of brace jacket was reduced to 4 hours). Marked improvement noticed in the radiological examination also (Fi.g I a-c).

First course of treatment was repeated second time also.

Observations and findings

According to āyurveda the name of the disease stands only second; samprāpti and doṣadūṣyasammūrccana (etiopathogenesis) stands first. Patient's āhāra (diet) and vihāra (lifestyle) influenced doṣaduṣṭi (vitiation of doṣa) and thereby rogotpatti (manifestation of the disease)

Seeing the site (kaṭīpradeśa) and the dhātuduṣṭi (asthi) of the disease affected, it was understood that this was a case of vāta vitiation. As per the MRI report of 18/11/07, scoliosis manifested due to muscular spasm. This muscular spasm can also be considered as vātavikāra according to āyurvedic point of view.

Snehana, svedana, veṣṭanam, vasti and bṛmhana treatment are the main treatment modalities for vāta vitiated ailments. Here in this case, internal and external snehana was performed. *Dadimadi ghrta* was selected as the medicine of choice for internal snehana because: being especially indicated for rasa, rakta and māmsa duṣṭi, *Dadimadi ghrta* will help the metabolism of subsequent dhātus like asthi and majja also. It is indicated in mūḍhavātam which can be compared with muscular spasm and asthivikṛti. The same function was carried out by doing external snehana and svedana by modalities like pizhicil, ñjavarakkizhi, upanāham, veṣṭanam, etc.

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SCREENING OF HEPATOPROTECTIVE ACTIVITY OF LOHA-PARPAṬI

J. D. Kotabagi, S. S. Vaidya, Santhosh B and P.G. Jadar*

Abstract: Lohaparpaṭi is one of the mineral based preparations which belongs to Parpaṭikalpana and is said to be having properties like lekhanīya (scraping), rasāyana (rejuvenative), dīpana (digestive), pācana (carminative), raktavardhaka (haematinic) and āmahara (detoxifier). It is assumed that having such properties, it plays a major role in detoxification and excretion of endogenous and exogenous compounds. Hence Lohaparpaṭi was prepared by conventional method and its hepatoprotective activity was evaluated. The results showed that Lohaparpaṭi has a very good hepatoprotective property.

Introduction

Liver, which plays a major role in detoxification and excretion of endogenous and exogenous compounds, has been threatened today by the indiscriminate use of systemic agents like tetracycline, paracetamol, anti-tubercular drugs, oral contraceptive pills, chemicals used as food preservatives, agro chemicals, etc. In spite of tremendous scientific advancement in the field of hepatology, management of liver diseases is still a challenge to the modern science and the need of the hour is effective and safe hepatoprotective drugs. The present study was aimed to prepare Lohaparpati as referred to in the Bhaiṣajyaratnāvali[1], and also to evaluate its hepatoprotective activity in Albino rats exposed to CCl_4

Materials and method

Preparation

Śuddha parāda (purified mercury) and gandhaka (sulphur) - each 10gm, were triturated well in a clean khalvayantra (mortar and pestle) to form kajjali (a sulphur and mercurial preparation in black powder form). Then kāntalohabhasma (10gm) was added and triturated for one hour continuously to form homogenous a mixture. The mixture so obtained was then taken in a ghṛtalipta-lohadārvi (ghee-smeared iron ladle) and heated on mandāgni (moderate fire) till it melts completely. The melted material was poured on a ghṛtalipta-kadaḷīpatra (ghee-smeared leaf of *Musa paradisiaca*), which was kept on gomaya bed (a platform made by cow dung) and was immediately compressed by another ghṛtalipta-kadaḷīpatra for 1 minute. When cold (svaṅgaśīta), the thin flake (parpaṭi) was obtained.

Observations: - While pāka kalina (heat treatment), the kajjali started to melt in 5 minutes and in between 160°C and 180°C it looked like tailaba (oily) and attained piṇḍibhūta (confection-like) consistency. After the heat treatment (pāka paścāt), venation marks of kadaḷīpatra

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were observed on the parpaṭi, and when it was broken a 'kuṭ'-like sound was produced.

Experimental study

To assess the hepatoprotective activity of Lohaparpaṭi, hepatotoxicity was induced by CCl_4 in albino rats and parameters like enzyme study (SGOT and SGPT) and histo-pathological studies were carried out and the extent of regenerative changes were observed

Determination of LD_{50} and ED_{50} :- LD_{50} was determined by adopting Miller and Tainter (1954) method and the LD_{50} (mg/kg) of samaguṇajārita lohaparpaṭi (lohaparpaṭi prepared with equal quantity of mercury, sulphur and lohabhasma) using kāntalohabhasma was 2499.76±52. Then the ED_{50} (mg/kg) of the same was evaluated as $1/10^{th}$ of LD_{50} i.e. 249.9±5.2 by using Paget G. E. and Barnes J. M. Conversion table.

Method: - The method used for screening of hepatoprotective activity was Handa S. S. and Anupama Sharma (1990).

Animals: - Healthy young Albino Wistar Rats of either sex weighing between 150gm and 200gm, 8 -10 weeks old were used. The CPCSEA guidelines were followed for housing and feeding.

Grouping: - The animals were divided into three groups i. e. Group A (Control), Group B (CCl_4 treated) and Group C (samguṇajārita lohaparpaṭi and CCl_4) consisting of 6 animals in each group.

Mode of administration: - The suspension was prepared by mixing the powder of parpaṭi with 2% gum acacia and administered in a single dose by Gavages using a intra gastric tube

Procedure:- Group A served as control and received single daily dose of 1ml/kg i.p. (intra peritoneal) of sucrose solution for 4 days along with 1ml/kg s.c. (subcutaneous) of olive oil on 2nd and 3rd days. Group B received single daily dose of 1ml/kg i.p. (intra peritoneal) of sucrose solution for 4 days along with 2ml/kg of Carbon tetra chloride (CCl_4) s.c. (subcutaneous) dissolved in equal volume of olive oil on 2nd and 3rd days. Group C received single daily dose of 250mg/kg of formulation by oral route for 4 days and 2ml/kg of CCl_4 by i.p. route on 2nd and 3rd days.

All rats in all the groups were sacrificed on 5th day under light anaesthetic ether and blood from each rat was collected through retro-orbital plexus under ether anaesthesia for bio-chemical investigation i.e. SGOT and SGPT estimation. Blood was allowed to coagulate at 37°C for 30 minutes and the serum was separated by centrifugation at 2500rpm for 10 minutes. The liver of all the experimental animals were removed and processed immediately for histological investigation. The method used for screening of Hepatoprotective activity is shown in Table 1

Observation and results

Enzyme level:- The degree of hepatotoxicity developed can be known by elevated levels of SGOT and SGPT activity which is attributed to generation of CCl_4 free radical during metabolism by hepatic microsomes which in turn causes peroxidation of lipids of cellular membrane. The test group showed significantly reduced the elevated levels of SGOT and SGPT. The enzymatic levels of SGOT and SGPT are indicated in Table 2.

Histopathological:- Group A, B & C were observed under 100 x H.E. of magnification. Group A showed liver tissue within normal limits, normal hepatocytes, sinusoids, kupffer cells and architecture within normal limits, Group B showed hepatocellular necrosis and Group C showed normal hepatocytes and normal architecture.

TABLE 1
Method of screening of Hepatoprotective activity

Group	Days				
	1	2	3	4	5
A	SS	SS,OO	SS,OO	SS	Animals
B	SS	SS, CCl_4	SS, CCl_4	SS	were
C	TS	TS, CCl_4	TS, CCl_4	TS	sacrificed

*SS - Sucrose solution; OO - Olive oil; CCl_4 - Carbon tetra chloride in olive oil (1:1); TS - Test solution

TABLE 2
Enzymatic levels of SGOT and SGPT

Description	Group A (IU/L)	Group B (IU/L)	Group C (IU/L)
I. SGOT			
1	58	210	100
2	54	198	98
3	60	205	110
4	56	198	107
5	61	205	100
6	56	201	110
Mean	57.5	201.2	104.2
SD	2.665	3.189	5.456
SE	1.088	1.302	2.227
F Ratio		1035	
P Value			P<0.01*
II. SGPT			
1	64	130	96
2	67	127	91
3	71	129	98
4	66	131	89
5	72	134	88
6	68	130	92
Mean	68	130.2	92.33
SD	3.033	2.317	3.933
SE	1.238	0.9458	1.606
F ratio		687	
P value			P<0.01*

*Significant

Conclusion

The Lohaparpaṭi showed decrease in enzyme activity of both SGOT and SGPT which has been shown to be the inducer of the microsomal enzymes. Thus hepatoprotective action of this drug is likely to be due to its ability to induce microsomal enzymes; thereby accelerating the excretion of CCl_4. Also, the histopathological report has shown normal hepatocytes and normal architecture. Hence hepatoprotective activity of Lohaparpaṭi can be proved due to the combine effect of lekhanīya (scraping), rasāyana (rejuvinative), dīpana (digestive), pācana (carminative), raktavardhaka (haematinic) and āmahara (detoxify) properties of it.

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VĀTARAKTA (GOUT) - A CLINICAL STUDY

G.P. Upadhyay[1] and Anurag Girdhar[2]

Abstract: Joint diseases are becoming the main health problem in the present era. Gout (vātarakta) is a very painful condition and it curtails the output of day-to-day work of the patient. Elaborate descriptions of vātārakta in Samhitas show that it was one of the main articular diseases in the past itself. The present study is aimed to study the clinical pattern of vātarakta and to observe the efficacy of Punarnavāmṛtaguggulu in vātarakta patients.

Introduction

Vātarakta (gout) is a very painful condition. Descriptions of several disorders having symptom of pain, inflammation and burning sensation in the joints have been referred to in Vedic literature. There is a hymn in Atharvaveda: "*Whatever pain is there in my eyes, ankles and in feet, the water, the best healer among healers, may remove all that*"[1]

Sedentary lifestyle is one of the main etiological factors of vātarakta. Many people, due to their non-manual work practices, are having sedentary life style. When aggravated vāta is obstructed by aggravated rakta, thus obstructed vāta again vitiates the rakta. This pathological state is known as vātaśoṇitam or vātarakta[2]. While Suśruta describes vātarakta along with other vātavyādhis (vāta disorders), Caraka describes it separately due to its specific nidāna (causative factor), samprāpti (pathogenesis) and cikitsa (management). Small joints of feet and hands are mainly affected in vātarakta.

Āyurvedic scholars have correlated vātrakta with gout. In 1848 Dr. A.V. Garod from London, first recognized that there is increase in Serum Uric Acid level in patients of gout. The aetiology and symptomatology of gout is very much similar to that of vātarakta.

Gout (also called metabolic arthritis, Greek name: podagra, from pod - foot and agra - trap) describes a number of disorders in which crystals of monosodium urate monohydrate derived from hyperuricaemic body fluids give rise to inflammatory arthitis, tenosynovitis, bursitis or cellulitis, tophaceous deposits, urolitiasis and renal disease. The fundamental biochemical hallmark of gout is hyperuricaemia.

Hyperuricemia can result from increased production or decreased excretion of uric acid or from a combination of the two processes. Uric acid is the end product of metabolism of purines. Purines and pyrimidines are the bases that when linked to sugars (ribose and deoxyribose) and phosphate groups, create the nucleic acids that comprise the building blocks of RNA and DNA.

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This study was planned to find out the efficacy of Punarnavāmṛtaguggulu in gout. Punarnavāmṛtaguggulu is referred to in the chapter of Vātarakta in Cakradatta. The formulation contains guḍūci (*Tinospora cordifolia*), guggulu (*Commiphora mukul*), triphla (*Terminalia chebula, Phyllanthus emblica* and *Terminalia bellirica*) and varṣābhū (*Boerhavia diffusa*) for the preparation of kaṣāya (decoction); and danti (*Baliospermum montanum*), citrakamūla (root of *Plumbago zeylanica*), kaṇā (*Piper longum*), viśva (*Zingiber officinale*), phalatrika (triphla), guḍūci, viḍaṅga (*Embelia ribes*), tvak (*Cinnamomum cassia*) and trivṛtā (*Merremia turpethum*) as prakṣepa dravyas.

Material and methods

The clinical study was divided into two groups: a) study of general clinical features with laboratory findings of vātarakta patients and b) the effect of Punarnavāmṛtaguggulu on vātarakta patients.

The patients were randomly selected from the OP and IP of Roganidāna and Kāyacikitsa Department of Pakwasa Samanwaya Rugnalaya, Shree Ayurveda College, Nagpur and were assessed on the bases of following criteria:

Inclusion criteria: - Patients who have i) signs and symptoms of vātrakta mentioned in āyurvedic texts and ii) joint pain and objective evidence of gout i.e. increased serum uric acid. (Patients were registered on special performa and were diagnosed on the bases of subjective and objective criteria of vātarakta).

Exclusion criteria:- Patients suffering from Rheumatoid Arthritis or Osteoarthritis; having history of Tubercular joint, Leprosy or Psoriasis, blood cell diseases; patients with malignancy and those who were not able to continue the treatment.

A detailed history was taken followed by general examination and all the findings were noted down in a specifically prepared performa after doing trividha, aṣṭavidha, and daśavidha parīkṣas. Severity of symptoms were marked with self evaluation method and indicated by (+). Assessment of signs and symptoms were done on the day of registration, and after every 15 days up to 45 days. Lab investigations on Hb%, TLC, DLC, ESR, Serum Uric acid, Urine R/M, etc. were done.

Assessment criteria:- The results were studied according to sex, age, education, āhāra-vihāra (diet and lifestyle regimen), satva, sātmya, prakṛti, and statistical analysis were presented. The result was assessed on the bases of following findings:

- Subjective parameters: All signs and symptoms were given scoring according to their severity by self evaluation method. Symptoms of vātarakta were given scores ranging from 0, 1(+), 2(++) and 3(+++). Each + indicated 1 unit and 33% severity. ++ indicate 66% severity and +++ indicates 100% severity of symptoms.
- Objective parameters: Serum Uric Acid, ESR, TLC, DLC, UrineR/M, etc.

Drug and administration:- The drug Punarnavāmṛtaguggulu was prepared in the form of vaṭi (tablet) weighing 500mg each. 2 tablets thrice in a day after meals with water were administered orally for 45 days and follow-up were done for 15 days

Observation

Of 35 patients registered, 4 patients were excluded on account of irregular follow up.

Parameters such as sex, age, occupation, history, symptoms and prakrti are shown in Table 1.

TABLE 1
Distribution of patients according to sex, age, etc.

Parameters	Total (in %)
1. Sex	
- Male	62.86
- Female	37.14
2. Age	
- 41-50 years	31.43
- Above 50	68.77
3. Occupation	
- Business	40
- Clerical job	11.43
- Others	20
- Housewives	28.57
4. Addiction	
- Tobacco chewing	48.57
- Alcohol	40
- Taking tea/coffee	37.14
- Betel nut	17.14
- Smoking	31.43
5. Family history	
- Positive	68.57
6. Symptoms	
- Interphalangeal joints (especially distal interphalangeal joints) of -	
- Foot	60
- Hand	37.14
- Ankle	48.57
- Knee	34.29
- Metatarsophalangeal joints	31.43
- Wrist joint	20
- Metacarpophalangeal joints	17.14
- Elbow joint	8.57
7. Types	
- Vāta-paittika vātarakta	28.57
- Vāta-śleṣmaka vātarakta	22.86
- Vātaja vātarakta	14.29
- Pittaja, pitta-śleṣmaka and sannipātika vātarakta	(each) 8.57
- Raktaja vātarakta	5.71
- Kaphaja vātarakta	2.86

Result

The following signs and symptoms were included in the study: i) sandhiśūla (joint pain), ii) bheda (throbbing pain), iii) toda (pricking pain), iv) sparśāsahatva (tenderness), v) suptata (numbness), vi) sphuraṇa (pulsating pain), vii) śotha (swelling), viii) vaivarṇya (discoloration), xi) stambha (stiffness), xii) saṅkoca (contracture), xiii) praśoṣa (atrophy), xiv) vepathu (tremors), xv) dāha (burning sensation), xvi) mada (drowsiness), xvii) sveda (sweating), xviii) tṛṣṇa (thirst), xix) bhrama (giddiness), xx) cimicimayan (tingling sensation), xxi) kaṇḍu (itching), and xxii) guruta (heaviness).

Wilcoxon Signed Rank Test was applied on the signs and symptoms of vātarakta. There was a significant relief in all the symptoms. Maximum effect was observed in dāha (90.91%), kaṇḍu (87.80%) and sparśāsahatva (84.09%). Paired 't' test was applied on the laboratory investigations. In urine examination, effect on Albumin, R.B.C., casts and epithelial cells was analysed. Casts and epithelial cells were found reduced significantly from urine samples after medication. (Table 2)

Conclusion

Vātarakta is a vātapradhāna (vāta predominant), tridoṣaja vyādhi, and rakta is the main dūsya. Available description of vātarakta in āyurvedic classics is comparatively applied and scientific; the etiological factors, preclinical symptoms, clinical symptoms and line of treatment are applicable today also. Vātarakta chiefly involves small joints of extremities. The involvement of the joints is asymmetrical. Ignorance of the rules of taking meals and sleep, described in the

TABLE 2
Effect of Punarnavāmṛtaguggulu

	TLC	DLC				ESR (mm in 1st hr.)	Hb%	UA
		P	L	E	M			
Mean (BT)	9906.5	64	28.5	4.06	3.42	32.13	11.4	6.62
Mean (AT)	7758.06	59.13	32.2	4.26	3.93	18.61	11.97	4.89
SD	1075.13	7.12	5.235	1.83	2.23	6.462	0.529	0.742
SE	193.092	1.276	0.94	0.329	0.40	1.16	.095	0.133
't' value	11.126	3.817	-3.95	-0.59	-1.29	11.65	-6.1	13.04
'p' value	<0.001*	<0.001*	<0.001*	>0.1**	>0.1**	<0.001*	<0.001*	<0.001*

*Significant; ** Insignificant

BT = Before Treatment; AT = After Treatment; SD = Standard Deviation; SE= Standard Error; TLC = Total Leucocyte Count; DLC = Differential Leucocyte Count; P = Polymorph; L = Lymphocyte; E = Eosinophils; M = Monocytes; ESR = Erythrocyte Sedimentation Rate; UA = Uric Acid

āyurvedic texts are main cause. Males are more affected than females. Gout mainly affects the person of age more than 40 years. There are more chances of occurrence in person with positive family history of any articular disease. Diet control is must for the treatment of vātarakta, because some food materials (e.g. beer) not only increase urate production but also block uric acid excretion from kidney. People having addiction to alcohol, tea, coffee, etc. are more affected by gout. In the present study, no toxic effect of the therapy observed on the patients.

Clinical study of Punarnavāmṛtaguggulu on 31 vātarakta patients showed statistically result on clinical presentation as well as laboratory findings.

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COMPARATIVE CLINICAL EVALUATION OF ŚUṆṬHI (*ZINGIBER OFFICINALE*) AND MARICA (*PIPER NIGRUM*) IN HYPOTHYROIDISM

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Abstract: Āmadoṣa should be considered as a causative factor of hypothyroidism. In this present study, śuṇṭhi (*Zingiber officinale*) and marica (*Piper nigrum*), both digestive and carminative drugs, were evaluated for their activities on patients of hypothyroidism. The drugs were given in the powder form in 12g per day in two divided doses. Both the drugs were found to be effective on hypothyroidism. Śuṇṭhi powder has been found to be better activity profile than marica powder.

Introduction

Endocrine system has got the prime importance in the human biology. The most common disorder in this system is hypothyroidism. The prevalence is more in female than in male. The ratio in male and female is 1:6[2]. In the Himalayan region and some other countries as Central Africa, where the dietary iodine is less, the persons are more prone to develop the disease[2]. Among the countries after Brazil maximum numbers of thyroid disorders are reported from India[1].

The description of glands, symptoms and functional abnormalities of vāta-kaphaja śotha mentioned in āyurvedic classics is matching with hypothyroidism[3]. Different āyurvedic classics give the prime role of kāyāgni (digestive fire) in the formation of metabolic disorders. Body constantly reacts with oxygen in breathing and energy is produced in terms of agni by different metabolic procedures. As a consequence of this activity, highly reactive molecules termed as āmadoṣa or free radicals are produced due to impairment of kāyāgni. Free radicals interact with the molecules within the cells. This can cause oxidative damage to proteins, membranes and genes, kāyāgni related to the factors concerned with the gastro intestinal digestion and in its wider sense to metabodism events of the body. Āmadoṣa or free radicals are related with the metabolic disturbances engendered due to the impairment of āntarāgni or agnidusti[4].

Thyroid hormones are associated with the oxidative and antioxidative status of the organism. To develop hypothyroidism, thyroidal cells are exposed to endogenous H_2O_2 that events as a cofactor for the iodination of thyroxin precursors. The gland has high level of selenium - containing proteins including peroxide-detoxicating enzyme proteins. The

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selenium containing proteins are involved in thyroid hormone synthesis, by protecting bio synthetic processes against the toxicity of free oxygen radicals[5].

Almost all the āyurvedic classics have recommended digestive and carminative drugs in agnidusti (faulty digestive power). Śunṭhi and marica are taken in the study to evaluate their activities over the hypothyroidism and against the oxidative injury in a comparative manner.

Materials and methods

Test drugs: - Śunṭhi and marica were collected in powered form from the Apothecary Department of I.P.G.A.E.& R. at S.V.S.P. Hospital.

Inclusion criteria: - Patients having the symptomatology of primary hypothyroidism attending the OPD of S.V.S.P. Hospital were selected for this study irrespective of age, sex, religion, occupation, etc.

Exclusion criteria: - Patients of euthyroid and hyperthyroid.

Assessment criteria: - The results of the therapy were assessed after completion of treatment schedule on the basis of improvement in the selected signs and symptoms based on both āyurvedic and modern descriptions and investigation conducted before and after the treatment. On the basis of improvement in the conducted laboratory investigations, the results of therapy were categorized under four categories viz. marked improvement, moderate improvement, mild improvement and no change.

Posology:- i) Drug - Powder of dried rhizome of śunṭhi (*Zingiber officinale*) and powder of dried fruit of marica (*Piper nigrum*), ii) Dose - 12g per day in two divided doses, iii) Duration - 90 days.

Direction and diet: - The drugs were prescribed to be taken 30 minutes before food. No synthetic thyroid hormone is prescribed. Patients were advised not to take curd, jaggery, fatty foods and beans, cabbage, leafy vegetables, etc.

Follow up: - All the patients were reviewed after each 15 days and haematological and biochemical reports were reviewed after each 45 days for a 90 days schedule.

Study protocol:- Total 22 patients were registered for the clinical trial and divided randomly into 2 groups. Group A and B were treated by śunṭhi and marica (12 g/day in two divided dose) respectively.

The treatment schedule was continued for 90 days. Unwanted effects of drugs, if any, during the total period were noted. Laboratory investigation of blood and serum of each patient was carried out before commencement and after completion of the treatment.

Statistical analysis:- The obtained data were analyzed statistically. The values were expressed as Mean ± S.D. (Standard Deviation) and Mean ± S.E.M. (Standard Error of Mean). The data were analyzed by student's 't' test. A level of 'P'<0.05 and 'P'<0.001 were considered as statistically significant and highly significant respectively. Level of significance was noted and interpreted accordingly.

Distribution of patients: - Out of 22 patients, 86.6% were female and 13.4% male. 63.63% belonged to the age group of 16-35 years and relatively lower number of patient (36.37%) was from the age group of 35-60 years. All the 22 patients completed the treatment and follow up schedule.

Results

Effect of test drugs on general symptoms:- The data revealed statistically highly significant (<0.001) decrease in body weight in both treatment groups and statistically significant increase in pulse rate in Group A (<0.05) and highly significant in Group B (<0.001).

Effect of therapy on clinical parameters:- Clinical parameters analysis of the data related to improvement in different treatment groups reveal 20% of pallor, 42.85% of weakness, 38.9 % of goiter, 68.6 % of constipation, 68.2 % of hoarseness of voice, 69.4% of oedema, 76.6 % of infertility and 10 % of menorrhaegia got improved in the Group A, in Group B the improvement data were 20 %, 64.9 %, 84.7%, 6.20 %, 80.14 %, 73.3 %, 66.6 % and 16.6 % respectively.

Effect of test drugs on haematological parameters: - The data pertaining to the effects of test drugs on haematological parameters revealed an increase in haemoglobin percentages in both the groups. Least increase has been found in Group A and marked increase has been observed in Group B. Both the data were found to be statistically highly significant (<0.001) (Table 1)

Effect of therapy on biochemical parameters: - Fasting blood sugar level was increased in both the groups. Least increase was found in Group A and marked increase observed in Group B [both were statistically highly significant (<0.001)]. The data related to serum cholesterol level revealed statistically significant decrease (P<0.05) in Group A and highly significant decrease (P<0.001) in Group B. (Table 2)

TABLE 1
Effect of therapy on haematological parameters

Group	Haemoglobin level (g %)	
	BT	AT
Group A (śunṭhi)	9.97 ± 0.75	11.8 ± 0.56*↑
Group B (marica)	9.96 ± 0.38	11.9 ± 0.26**↑

Mean ± SEM; BT = Before Treatment; AT = After Treatment; *P<0.05 = Statistically significant; **P <0.001 = Statistically highly significant; ↑Increase.

Effect of test drugs on thyroid profile: - Statistically significant increase within its normal limits (P<0.05) in T_3 level in Group A was observed. In Group B the data was statistically non-significant. Statistically significant increase within its normal limits (P<0.001) in T_4 in both the treated Groups were found. TSH level was decreased in both of the treatment groups, data of Group A was found to be statistically highly significant (P<0.001) and data of Group B was statistically significant (P<0.05). (Table 3)

Effect of therapy on Lipid Peroxidation Product (L.P.P.):- L.P.P. level was decreased in both of the treatment groups, and both the data were

TABLE 2
Effect of therapy on biochemical parameters

Group	Fasting Blood Sugar (mg/dl)		Cholesterol (mg/dl)	
	BT	AT	BT	AT
Group A (śunṭhi)	94.7 ± 3.2	111.8 ± 11.76**↑	215.09 ± 10.4	202 ± 11*↓
Group B (Marica)	88 ± 6.86	173.4 ± 77.0**↑	257.0 ± 1.92	185 ± 3.71*↓

Mean ± SEM; *P<0.05 = Statistically significant; **P <0.001 = Statistically highly significant.
↑= Increase; ↓ = Decrease

TABLE 3
Effect of therapy on thyroid profile

Group	T_3(i g/ml)		T_4(i g/ml)		TSH(i g/ml)	
	BT	AT	BT	AT	BT	AT
Group A (Sunthi)	96.15 ± 36.1	123.08 ± 34.8*↑	06.26 ± 0.025	8.75 ± 0.35**↑	17.75 ± 12.87	5.74 ± 0.07**↓
Group B (Marica)	102.7 ± 41.78	116.79 ± 48.35↑	6.65 ± 1.22	8.58 ± 0.8**↑	16.8 ± 13.6	5.67 ± 0.49*↓

Mean ± SEM; *P<0.05 = Statistically significant; **P <0.001 = Statistically highly significant.
↑= Increase; ↓ = Decrease

found to be statistically significant (P<0.05). (Table 4)

Discussion

Analysis of the data related to improvement in general symptoms in two groups revealed that the drugs in separate form inhibit weight gain as a result the massive decrease of body weight which is a common characteristic feature of primary hypothyroidism[2]. The symptomatic improvement was also seen at the level of pulse rate might be due to decrease of P_{CO2} in arterial blood[6], particularly in group B and least in A.

The data of haematological and biochemical parameters reveals that the both drugs are effective to increase haemoglobin level as well as decrease the lipid per oxidation[1] by which

TABLE 4
Effect on lipid peroxidation product (LPP)

Group	LPP (mg/ml)	
	BT	AT
Group A (śuṇṭhi)	1.9 ± 0.316	1.03 ± 1.11*↓
Group B (marica)	1.74 ± 0.28	1.02 ± 0.15*↓

Mean ± SEM; BT = Before Treatment; AT = After Treatment; *P<0.05 = Statistically significant; **P <0.001 = Statistically highly significant; ↓Decrease

pallor and weakness are clinically improved. Goiter being a main clinical feature is effectively decresed[6]. The drugs are effective on intestinal mobility by acting on pituitary hypothalamus axis and increased the intestinal mobility[2] and reduced constipation. The data shows that both the drugs are effective to decrease the infiltration of much body tissue by mucopolysaccharides, hyalurinic acid and chondroitin sulphate[2] resulting the hoarseness of voice is clinically improved. Oedema is clinically corrected by reducing the infiltration of dermis[2]. Also both the drugs are effective to reduces polyglandular endocrine deficiency and improve the gonad at function[6] and infertility and menorrhagia are clinically improved.

Almost all the metabolic activities are enhanced by the both drugs and increases the oxi-haemoglobin in the blood resulting the incensement of Hb%. It reveals from the above data that the drugs are effective to increase fasting. Blood sugar may be decreased by reducing circulating auto antibodies as well as acting against blocking the TSH receptors[6] and cholesterol level is also decreased perhaps by reducing lipid peroxidation and infiltration of dermis[2]. By analyzing the data of thyroid profile reveals both the drugs are effective to increase T_3 & T_4 within its normal range by reducing lipid peroxidation and TSH concentration[7], and decrease TSH level through reducing lipid per oxidation and acting against blocking the TSH receptor by auto antibodies[6]. Also the good effect seen in lipid per-oxidation level is increase in antioxidant level in blood through inhibiting auto immunity against thyroid hormone resulting decrease in the L.P.P. level[8].

Conclusion

On the basis of the obtained subjective and objective data, it may be concluded that both the drugs should be considered as effective on the patients of hypothyroidism and śuṇṭhi powder has better activity profile than marica on hypothyroidism.

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SADYOVAMANA (QUICK EMESIS) - AN EMERGENCY CARE

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Abstract: Sadyovamana (quick emesis), which denotes the process in which the vamanakarma (emesis) is carried out immediately without any pūrvakarmas (pre-operative procedures) or snehana/svedana (oleation/sudation), may be used externally for very little duration. This paper deals how sadyovamana can be adopted in emergency situation.

Introduction

Pañcakarmas are to be carried out when the doṣas are in upasthitāvastha (latent state) after proper snehana and svedana. Here, Cakrapani says upastitha doṣa means the doṣas which got pradhāna avastha (prominently distinct). Before administering pañcakarma, the physician should have the insight of doṣa, kāla, beṣaja, etc. in order to achieve the good result.

Utpatti and nirukti: - The term sadya means tatkṣaṇe (immediate) or tatkāle[1] (at that moment); talkālam[2] (that time); vamana means "vama luṭ mardane, chardane or niścharane"[1&4].

'Sadya' means immediately or at the moment. Hence sadyovamana denotes that the process in which the vamanakarma is carried out immediately without any pūrvakarmas or sneha svedana used externally for very little duration. The concept of sadyovamana is narrated by Cakrapāṇidatta in his commentary on Carakasamhitha[5]. He says that if the doṣas are already in utkleśaṇāvastha (excited state), say in jvara (fever), it is not necessary to administer snehana (oleation) and svedana (sudation).

Sadyovamana is indicated in the following conditions:

Jvara (fever):- In kaphajajvara, if it is located in stomach (āmāśaya) and is in the excited stage (utkḷeśaṇāvastha), it must be eliminated by vamana. Here one can interpret that it is sadyovamana because sneha/sveda is carried out for exciting the doṣa (doṣa utkḷeśaṇa) as well as to bring back the doṣas from extremities (śākha) to GI tract (koṣṭha), which is already there in kaphjajvara. Suśruta has the same opinion in this regard.

Hikkaśvāsa (hiccup and breathing difficulty):- Hikka and śvāsa are āśukāri vyādhis (diseases that need emergency care) hence needed āśukāriciktsa (emergency treatment); and in these, doṣas are in utkleśaṇāvastha (excited state). In this case, vamana must be carried out with dadhi (curd), masthu (supernatant portion of curd), etc. by that more kapha utkḷeśaṇa take place and vamana can be carried out quickly. Vamana is more ideal treatment for hikka and śvāsa than virecana (purgation) due to their origin.

Viṣa (poison):- As that of hikka and śvāsa, viṣa cases needed immediate attention. Vamana karma should be conducted within 4 hours with lavaṇajala (rocksalt water) or pure water i.e. in the first viṣavega (stage of poison). In this context, it is obvious that it is sadyovamana because viṣa is the āganturoga (disease caused by external forces) where doṣotkḷeśaṇa is a prime factor. Also lakṣaṇas (symptoms) like praseka (excessive salivation), aruci (distaste) indicates bahudoṣa avastha (excessive state) of kapha in the stomach so it should be eliminated immediately.

Āmajīrṇa (indigestion):- Āmajīrṇa occurs due to kapha utkḷeśa (excitement); and there will be guruta (heaviness), śotha (swelling), udgāra (belching), etc. Here vamana should be conducted with root of vaca (Acorus calamus) + lavaṇajala (rocksalt water), dhānyaka (coriander) + śuṇṭhijala (dried ginger water). Here it is obvious that vamana should be immediate because snehana is contraindicated in āma (indigested food essence), which is toxic in nature.

Grahaṇi (sprue-like syndrom):- Grahaṇi is caused by vidagdhāhāra (sharp and hot food) and if the person is having vidhāha (buring in GI tract), aruci (distaste), gaurava (heaviness) and āmaliṅga (symptoms of āma), it should be treated with sadhyovamana with the sukhoṣṇāmbu (lukewarm water) or with phalakaṣāya (decoction of madanaphala).

Alasaka (a kind of indigestion):- Here sadyovamana must be carried out in the beginning itself because in alasaka, vitiated doṣas do not come out and in later course, will lead to formation of āmaviṣa (toxic food essence) which is difficult to treat. In this situation doṣas are in prabūta utkḷeśāvastha hence they should be eliminated with śalavaṇa uṣṇavāri (lukewarm salt water).

Āmaja tṛṣṇa (thirst caused by āma):- Though vamana is contraindicated in tṛṣṇa (thirst), if the symptoms such as aruci (distaste), adhmana (flatulence), and kapha presaka (nausea) are present, then it should be eliminated by sadyovamana. As these symptoms indicate bahudoṣāvastha (excessive doṣa both in quality and quantity), sadhyovamana is to be carried out.

Vamana and virecana vyāpat (complications due to emesis and purgation):- Atiyoga (over action), ayoga (weak action) and mithyayoga (improper action) are the vyāpats (complications), which arises due to the ignorance of physician, patient or drug. Vyāpats are emergency situations that are to be managed immediately; the following are few examples:

1. Hṛdgraha (cardiac spasm): - Hikka (hiccup), kāsa (cough), parśvapīḍa (pain the flanks), kiṭikiṭāyana (tooth gnashesing) and tongue-turning inward may develop because of veganigraha of pītauṣadha (suppression of the urge of manifested emesis). Here the physician should conduct sadyovamana in order to retrieve the tongue. Cakrapāṇi says that vamana should be conducted if the person is conscious and that it should be conducted with madhurauṣadhis (sweet drugs) if it is pittajamūrca (fainting); in kapajamūrcha it should be conducted with the help of kaṭu auṣadhis (pungent drugs). He also says that if the person is mūrchita (unconscious), then sadyovamana must be induced with the help of aṅguli (fingers).

2. Kḷama (mental fatigue):- In snigdha (oleated) and mṛdukoṣṭha (laxed bowel)

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person, if very mild drug is administered, the excited kapha obstruct pitta and vāta and causes klamavyāpat (mental fatigue complications). Here Caraka says that utkliṣṭa kapha must be immediately eliminated by vamana. Here it is easily understood that kapha is already in utkliṣṭāvastha and the word āśu denotes immediate vamana i.e. sadyovamana.

Sāvaśeṣa auṣadha vyāpat (complication of residual drug):- If the given auṣadha, either for vamana or virecana, not kicking out the doṣas and instead causing parśvaśūla (pain in the flanks), mūrcha (fainting), parvabedha (pain in different joins) hṛlassam (nausea), etc. then the residual drug should be eliminated through vamana. As doṣa is already in utkleśāvastha due to sāvaśeṣa auṣadha, it can be eliminated by sadyovamana. Ācārya says that sadyovamana should be the mode of treatment not only in vamana-sāvaśeṣa-auṣadha but in virecana-sāvaśeṣa-auṣadha also. Scientifically it is clear that sāvaśeṣa auṣadha remains in āmāśaya hence vamana should be the mode of treatment.

3. Ūrdhavagamana of virecana vyāpat (complication due to the reverse movement of purgative drug): - In this complication, all the symptoms are indicative of excited doṣa. Hence vamana should be conducted, that too sadhyovamana. Ḍalhaṇa says that in this condition pitta is the vitiated doṣa hence vamana is indicated because vamana can be carried out up to pittantam (pitta at the end). It is the tadarthakāri cikitsa.

Discussion

Sadyovamana is prescribed in emergency conditions provided the case is fit for it. This procedure is very effective and less time consuming. In sadyovamana the doṣas are already in the koṣṭha and in utkleśāvastha (excited state). In sadyovamana also we can see the symptoms as that of classical vamana like hṛllāsa (nausea), lālāsrava (excessive salivation) and svedapra-dhurbhāva (appearance of sweat). There is no direct reference to sadyovamana in classics; however, the references are scattered; and of course, as said in śāstra, the text is only the guidelines for treatments and it is the duty of the physician to explore[6].

Conclusion

Āśukāri cikitsa (emergency treatments) is unique in āyurveda. Practicing this can provide immense relief to the patient according to the condition and diseases as an emergency care.

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ROLE OF VĀTA IN SUKHAPRASAVA (EUTOCIA)

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Abstract: Every pregnant woman and her family aspire for an easy normal delivery with a perfect child. The same is put in the frame of sukhaprasava in the āyurvedic classics. Āyurveda can come out with some solutions in the present scenario with increasing incidences of operative deliveries and raising demands for normal deliveries. Vibhūvāta plays a crucial role in maintaining the pregnancy from day one till the delivery. Hence during the pregnancy through adopting the ideal garbhiṇīparicarya (regimen for pregnant woman) and by avoiding the garbha upaghātakarabhāvas (pregnancy destructing activities) one can fulfill her desire for a sukhaprasava.

Introduction

Motherhood is the special gift offered only to the females by god. Explanation of this unique experience, its joy and satisfactions are beyond the magnitude of words. This beautiful experience of pregnancy is not nearly a journey of joy, it is a journey of physical, psychological and social changes. Everyone aspire that end of this journey should also be very smooth and comfortable with minimal pain, discomforts and interventions. But in the present scenario with the drastically increasing rates of Caesarean Section, more of instrumental and interventional deliveries.., question arises in the mind why this? Reasons may be varied like more sedentary, stressful life style, poor pain tolerance, poor bearing down efforts demands for elective C.S. to reduce the discomfort to absolute nil.

Concept of sukhaprasava

Efforts have been made since time immemorial to ease this pain and to make this event a pleasurable one or sukhaprasava. The word sukha stands for an easy, happy or comfortable state or experience i.e. *anukūla vedanīyam sukham*. Amarakośa explains prasava as the process of garbhamocana, mokṣaṇa i.e. mukti or release from (intra uterine stay) garbhavāsa to the foetus. Śabdasāgara explained prasava as bringing forth, generation, procreation, bearing or production; According to Monier Williams, it is bringing forth easily or happily.

Sukhaprasava also include the well being of child and mother both during and after labour. The mode of delivery and the extent of asphyxial insults are important factors in delivery. The quality of physical and mental well being of the

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child birth may lead to different degrees of encephalopathy which are permanent. Similarly complications of difficult labour may end up with hysterectomies, Simmond's disease, extensive fourth degree perineal injuries leading to permanent rectal incontinences, urinary complaints, dysparunia, prolapse of uterus, etc. psychological impact of a difficult labour case also can permanently scar the mind of a patient. Hence sukhaprasava should bring sukha to all, not only to the mother.

Essentials for sukhaprasava

The word sukhaprasava is used in the classics while explaining the preparations for an easy labour as Sukhaprasavakara yogas. Another indirect reference of this is given in Carakasamhita (Śārīrasthānam,2/6) - *'sukhi sukham ca sañjāyate'* is referring to 'sukhaprasava' and the factors responsible for it are told as śukra, asṛk (male and female seed), ātma (soul), āśaya (uterus), kālasampat (time factor), garbhiṇi upacāra (ante natal care) in the form of āhāra and vihāra.[9]

Formation of an ideal garbha take place when śukra, asṛk and ātma - these three with their best qualities, unite. To achieve the best qualities of these, couple should under go pre-conception care or ideal grabhadānasamskāra.

Āśaya or the garbhāśaya is the place where the foetus is nourished for the whole course of pregnancy when it is diseased or abnormal with any congenital or acquired defects then the intrauterine stay or the descent of the foetus may be abnormal one.

Kāla (time) here can be taken in two senses, one is kāla in relation with seasons, seasonal variation in śarīrabala and doṣa avasthas affecting labour and pregnancy; another kāla is maternal age, where the age of mother has a direct relationship with the outcome of pregnancy and labour. If the age of mother is above 30 or below 18 the morbidity rates, complications, foetal defects are more. Prime gravidas above 30 years are considered as high risk pregnancies are more prone for surgical deliveries.

Āhāra, vihāra and upacāra of garbhiṇi are given highest importance in all the classics elaborate monthly regimen of dietetics are said by different classics

Timely delivery with mature body (paripūrṇa deha) is also a criterion to consider for the sukhaprasava. Total period of gestation for the maturity and delivery of the foetus is considered as 280 days from the 1st day of the last menstrual cycle and 266 days from the day of ovulation. In āyurveda, prasavakāla starts from the beginning of 9th month till the completion of 12 months wherein 9-10th month are the best period, 11 and 12th being moderate or madhyama prasavakāla. Before the 9th month and above 12th month it is akālaprasava and is vikārakāri or vaikārika. Once again vitiation (duṣṭi) of apānavāta is responsible for the premature or postmature delivery (akāla or kālatīta prasava).

Modern concept of normal labour is described as the process by which the products of conception when they attain maturity are expelled by the mother. To say it as normal it should fulfill following criteria which are very much similar to the āyurvedic descriptions.

- Spontaneous in onset and at term
- With vertex presentation
- Without undue prolongation
- Natural termination with minimal aids
- Without having any complications affecting the health of mother or the baby

Role of vata

In the tridoṣātmakaśarīra, pitta and kapha being paṅgu, are carried to their respective functioning organs through the vāta only which is having the capacity to move; thus running the body machine. All the systems and organs of the body including the urogenital system are governed by the vāta. Hence it is said that vāyu is the controller of the system ('tantrayantradhara').

Prāvartaka: ceṣṭanām - it is said that '*sarva hi ceṣṭa vatena, sa prāṇa: prāṇinām smṛta:*' all the subtle or evident movements related to reproduction are done by guṇas of 'vāta', for example; release and movement of strībīja (ovum), upward movement of pumbīja (sperm), union of the both, fertilization, further divisions and ultimately the movements of garbha in the passage to come out into the outer world are not possible without vāta.

Gatī ityadau - 'Ādi śabdena ākuñcana prasāraṇādīnām grahaṇam' - In the functions of vyāna movement or 'gati' is one of the important functions. Thus the contraction ākuñcana, prasāraṇa - relaxation, with respect to uterine musculature, the retraction movements are the special functions of vyānavāta along with the sthānikavāyu apānavāta, "*apāno apānaga:*" – for the territory of 'apana' i.e the pelvic cavity. Apānavāta is responsible for all the movements of this region like śukra (sperm), ārtava (ovum), garbha (foetus), śakṛt (feaces) and mūtra niṣkramaṇa (micturition) karmas cannot take place without the 'apānavāta'. Hence here also any vitiation of vāta particularly of apānavāta, can adversely effect the movements of these vāyu and may adversely effect the expulsive movements of uterus.

Karta garbhākṛtīnām - Dividing the cellular mass into different structures, causing hollow viscera, channels and muscles and thus giving proper shape to the foetus which can pass through the pelvic passage is the function of vāta. In cases of abnormal growth or in cases of foetal malformations easy expulsion of the foetus or possibilities of sukhaprasava becomes a question. Śukragatavāta and vātavikṛti in garbhāvastha may cause preterm or post term labour (akāla or atikāla prasava), death of foetus (garbhanāśa) or any kind of deformity (virūpata or vikṛti) of garbha.

On analyzing the descriptions of garbha upaghātakarabhāvas (dont's of pregnancy), it can be seen that most of them are simply the causes of vātaprakopa and they are said to cause disturbance in the continuity and maintenance of pregnancy. Unmārgagatavāta causing the dryness in the nourishing channels of the foetus (śoṣaṇa of rasavāhidhamanis) produces an emaciated or dried up foetus which quivers very slowly - is the description of Suśruta regarding garbhavyāpats. Ḍalhaṇa added absence of ojus due to vyānavikṛti as the hidden cause for it. In miscarriages (garbhasrāva and garbhapāta), vāta is one of the intrinsic factors responsible according to Suśruta. Delayed labour (viḷambita prasava), obstructed labour (garbhasaṅga), retained placenta (aparāsaṅga) - in all these pathologies, controlling and treating the vikṛta vāta is important. In cases of obstructed labour (mūḍhagarbha), vitiated apāna causing the stupification (sammohana) of garbha is leading to obstruction or delay in the delivery.

Considering the crucial role of vāta in conception till delivery the month-wise regimen (māsā-

numāsika pathya) is designed in āyurveda. All the diet (āhāra) and life style (vihāra) advised for a pregnant here are mainly snigdha, uṣṇa, bhṛmaṇa which helps in maintaining the fine equilibrium of vāta and hence it's proper functioning. In the uses of follwing antenatal care (garbhiṇīparicarya), anulomana of vāyu is said as an important benefit of it. Nearing to labour normal functioning of prasūtimāruta i.e apānavāyu brings down the head of the foetus downwards into the pelvic cavity from its upward direction (ūrdvaśiro avasta) without which sukhaprasava is not possible.

Suśruta in Śārīrasthāna has clearly mentioned that '*Anulome hi vāyau sukham prasūyate nirupadrava ca bhavati*' which is seconded even by Vāgbhaṭa which means anulomana of vāyu is very important for sukhaprasava. Though pañcakarmas are contraindicated during pregnancy, in the 8th and 9th month anuvāsana, āsthāpana bastis, yoni picu with vātahara taila are indicated to ensure the normal anulomanagati of vāta nearing to labour.

Avi - '*Garbhaniṣkramaṇakāla śūlaviśeṣa*'. Avis are described as the painful contractions during labour. The power factor of labour is nothing but the apānavāta. They represent the contraction, relaxation/retraction of uterine smooth muscles facilitating labour. Apānavāta and vyānavāta are responsible for timely onset, smooth progression and normal power of these avis. At the time of labour the avis are further being assisted by the grāhiśūla referred by Kaśyapa. If the avis are mild and delayed it may cause distress in labour. In case of prolonged labour with hypotonic uterine contraction baby is more prone for distress. Hence in the onset and further continuation of these pains till the expulsion of foetus vāta plays the key factor. For all the ākuñcana and prasāraṇa of organs vyānavāta is invariably involved so also in case of uterine contractions of labour. Thus the power factor of labour is entirely relying on the smooth functioning of these vātas. That is the reason why vātanulomana is specifically emphasized. Any vikṛtis in the later months of pregnancy may manifest in the form of power failures or abnormalities like uterine inertia hypo or hypertonic or inordinate uterine contractions failing to dilate the cervix and descend the foetus downwards.

Conclusion

Āyurveda can come out with some solutions in the present scenario with increasing incidences of operative deliveries and raising demands for normal deliveries. Hence during the pregnancy through adopting the ideal garbhiṇīparicarya and by avoiding the garbha upaghātakara bhāvas one can fulfill their desire for sukhaprasava.

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MITRAPAÑCAKA - A CRITICAL REVIEW

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Abstract: A set of drugs used for apunarbhava-bhasma-parīkṣa, especially dhātus' bhasma, are named as mitrapañcaka. Scientifically, these drugs in terms of their chemical composition and the possible reactions taking place when mixing with samples of various bhasma, are quite difficult to assess.

Introduction

Bhasmas or rasauṣadhis are prepared adopting standard operative procedures (SOP) mentioned in the classical textbooks of Rasaśāstra; because apakva bhasmasevana leads to many dangerous ill effects in the body. To over come this, one should identify the pakvata and apakvata of bhasma before administration. Different tests are mentioned in Rasaśāstra texts to authentify whether these bhasmas are prepared properly or not, in which, apunarbhava parīkṣa is an important one. Here, the prepared bhasmas are tested to check the metals or minerals are getting back into its original form even after making bhasma of it. To perform this test a set of drugs are used under the name of mitrapañcaka in Rasaśāstra

Aim and objectives: - To highlight the hypothesis of mitrapañcaka used in apunarbhāva parīkṣa referred to in the Rasaśāstra texts for bhasma preparations especially by minerals and metals.

Materials and methods

Rasaratnasamuccaya describes the constituents of mitrapañcaka[1] as: i) ājya/ghṛta, ii) guñja, iii) ṭaṅkaṇa, iv) kṣaudra/madhu and v) guḍa (each 1 part). Rasataraṅgiṇi mentions guggulu in place of guḍa[2]. Different Rasaśāstra texts have been described about mitrapañcaka (Table 1)

1) Ghṛta (ghee):- Of all the ghees of animal kingdom i.e. cow, she-buffalo, goat, sheep and she-camel, the best is goghṛta (cow's ghee). It is rasāyana, netrya, and dīpana, kānti-varṇakara, medhya and sthairyakara. It increases dhī, dhṛti, medha; agnibala, āyu, śukra and cakṣuṣya. It is found beneficial for bāla and vṛddha and are used in conditions like kṣata-kṣīṇa, parīsarpa, amlapitta, viṣa and unmāda[3].

Milk-fat is known as ghṛta. It is prepared by heating butter or cream over 100°C to remove water content by evaporation. The residue is filtered out. The composition of pure cow's ghee[4] is: a) moisture (14.4%), b) fat (32.4%), c) protein (36.0%), d) lactose (12.0%) and e) ash (5.2%). The colour depends upon the carotene content. Ghee contains approximately 8% lower saturated fatty acids, which makes it easily digestible. These lower saturated fatly acid are most edible fat which are not found in any other edible oil or fat. Melting point of ghee is 35°C, which is less than normal body temperature.

Lipophilic action of ghee facilitates transportation to a target organ and final delivery inside the cell because cell membranes also contains lipid. Other constituents of ghee are:

Triglycerides	97-98%
Diglycerides	0.25-0.4%
Monoglycerides	0.016-0.038%
Ketoacid glyceride	0.015-0.018%
Glycerylesters	0.011-0.0015%
Free fatty acids	0.1 - 0.44%
Phospholipids	0.2 - 1.0%
Sterols	0.22- 0.41%
Vitamin A	2500 IU/100 gms
Vitamin D	8.5×10^{-7} gm/100 gms
Vitamin E	24×10^{-3} gm/100 gms
Vitamin K	1×10^{-4} gm/100 gms

2) Guñja (*Abrus precatorius*)[5]:- It comes under upaviṣa; belongs to Fabaceae family. Its main properties are: i) rasa - tikta, kaṣāya; ii) guṇa - laghu, rūkṣa, tīkṣṇa; iii) vīrya - uṣna; and iv) vipāka - kaṭu. It is pittavātahara. Rogaghnata: - kuṣtaghna, vraṇaropaṇa, vedanāsthāpana and khālitya.

Seeds contain poisonous proteins, a fat splitting enzyme, glucoside abrussic acid, haemagglutinin and albuminous substance named 'Abrin'; the active principle is of the nature of a toxalbumin similar in action to the resin of castor seeds. Like all albuminous seeds, it also looses its activity when boiled.

Abrin contains two fractions: i) globulin and ii) albumose - estimated bitter alkaloids, which won't allow the metal to get liquefy with organic matter.

TABLE 1
Mitrapañcakas according to different texts

Name of texts	Gr	Ma	Ta	Gn	Gd	Gu
Rasārṇava	+	+	+	+	+	-
Rasaratnasamuccaya	+	+	+	+	+	-
Rasendracūḍāmaṇi	+	+	+	+	+	-
Rasendrasārasaṅgraha	+	+	+	+	+	-
Āyurvedaprakāśa	+	+	+	+	-	+
Rasataraṅgiṇi	+	+	+	+	-	+

Gr - Ghṛta; Ma - Madhu; Ta - Taṅkaṇa; Gn - Guñja; Gd - Guda; Gu - Guggulu

3) Ṭaṅkaṇa (borax)[6]:- This comes under the group of kṣāra. The main properties are: i) rasa - kaṭu ii) guṇa - rūkṣa, uṣṇa, tīkṣṇa and sara. It is kaphavātahara and pittakara. Karma:- kaphadrāvaka, hṛdya, balya and agnidīptikara. Rogaghnata:- ādhmana, sthāvara viṣahara, kāsa and śvāsa, strīpuṣpajanana, balya, vraṇaropaṇa and mūḍhagarbha pravartaka.

It is composed of boric acid and soda; if exposed to the air it becomes opaque. Its molecular weight is 381.37 gm; the other compounds are[7]:

Na	: 12.06%
Boron	: 11.34%
Hydrogen	: 5.29%
Oxygen	: 71.32%
Na_2O	: 16.25%
B_2O_3	: 47.24%
H_2O	: 47.24%
Oxide	: 100%

It is colourless to white in colour, 2-2.5 hard with a specific gravity of 1.7. It is diuretic, emmenagogue, astringent, antacid, local sedative and antiseptic.

Madhu (honey)[8]:- It possesses the properties like, chedi, vraṇaropaṇa and sandhāna. It helps in treating diseases like tṛt, śleṣma, hidhmā, asṛkpitta, kuṣṭha, chardi, śvāsa, kāsa and atisāra.

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It consists of: i) fructose (45%), ii) glucose (35%) and iii) sucrose (2%). It also contains minerals such as Potassium, Ca_2+, Mg_2+, Iron, Copper Mn, P,S and Cl in traces; and acids like acetic, buteric, citric and succinic. It is rich in protein such as Phenylalin aspertic acid, lucin, asparagin, nicotinic acid and ascorbic acid.

Guggulu (*Commiphora wightii*)[9]:- This belongs to Burseraceae family, having the properties: i) rasa - tikta, kaṭu, ii) guṇa - laghu, rūkṣa, tīkṣṇa, viśada, sūkṣma and sara. It is kaphavātahara; dīpana, anulomana, vraṇaropaṇa, vedanāstāpana. Rogaghnata: śothahara, arśoghna, kṛmihara, maṇdala kuṣtha.

It contains: i) Oleoresin - Z-guggulsterone, E-guggulsterone, ii) gum - Guggullignans I & II, guggul tetrols, mukulol, allylcembrol, C-27 Guggulusterol I, II & III. It tries to identify the metallic active part in the ash.

Guḍa (jaggery)[10]:- Guḍa is kaphakāraka; mūtrapurīṣa-kaphapravartaka; kṛmi janaka. It increases majjā, rakta, meda, māmsa and kapha. Purāṇa guḍa (old jagery) is said to be hṛdaya balyakara and pathya. Nūtana guḍa (new jaggery) is kaphakāraka and mandāgnikāraka. Jaggery is carboxy alkaline group, which is characterised by salty and unctuous property. It binds the carbonated part and helps in separation of metal from its mixture.

Procedure:- Apunarbhava parīkṣa is carried out in the following way: Guggulu, guñja (in powdered form), cow's ghee, honey and ṭaṅkaṇa are mixed thoroughly and the mixture is mixed with equal quantity of bhasmas of tāmra, loha and abhraka and then strongly heated in an earthen pot.

Observation

After heating, if the charred mass shows shining metal particles in it, it is said to be incomplete or not complying with test of apunarbhava. If it does not contain any shining particles, it is said to be apunarbhava.

Discussion

The apunarbhavata is mainly compared with the saturated mass of the element after subjecting for reduction process. According to Bhor's Reduction theory when the burnt salt of metals (mārita bhasma) is mixed with alkali and organic medias and subjected for intense heating, there should not be alteration in the phase of a salt. This theory can be corelated with aim of apunarbhava parīkṣa of bhasma which mentioned in Rasaśāstra texts shows scientific idea of ācāryas to fix the criteria for prepared bhasma of dhātus or rasa for their safe administration.

Hypothetically we can take ṭaṅkaṇa as an alkali media and the remaining are organic media; bhasma is a redacted salt. When these are mixed all together in equal proportion and subjected for heating in the mūṣa in a optimum temperature till all the organic materials get burned completely, there should not be fumes coming out of mūṣa. Such charred masses when examined under the light, should not be any shiny metallic luster. This gives significant property of bhasma. If there is a luster then the bhasma is again to be subjected for puṭapākaprakriya.

Conclusion

Mitrapañcaka group varies from one text to another. Mitrapañcaka is mainly used in bhasma parīkṣa i.e. apunarbhava parīkṣa of bhasma. It helps to make quality bhasmas for internal use safely and efficaciously. Mitrapañcaka acts as metal scavengers to identity the free metallic particles in bhasma. If the metal is not completely converted into its oxide or if it is half way converted, on its reduction it will decompose to give the metal, which has the property of exhibiting luster.

The mixture of guggulu, guñja, taṅkaṇa, ghṛta and honey provide a reducing environment and in this reducing environment, the bhasma is heated strongly. Thus in this process the half done oxide of the bhasma decomposes to give back metal, which shines in the charred mass. If bhasma is complete i.e. all the metal completely converted into its oxide it will not decompose to give the metal back even after heating strongly in the reducing atmosphere like mitrapanchakas

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STANDARDIZATION OF AVALEHA (WITH SPECIAL REFERENCE TO CITRAKAHARĪTAKI)

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Abstract: When the decoctions are dehydrated to a semisolid form, it is known as rasakriya or avaleha. Rasakriya is a dehydrated decoction whereas when sweet substances are added during solidification with some prakṣepa, it is known as avaleha. For the standardization of herbal preparation, organoleptic characters with physico-chemical standards like pH value, ash content, etc. and T.L.C. pattern are essential tools. This paper deals with standaridsation of avaleha with special reference to Citrakaharītaki.

Introduction

Bhaiṣjyakalpana, an important branch of āyurveda, denotes the meaning of pharmacy. It covers the area of identification of material, collection, preservation, storage, processing, packing, dispensing, including quality control and standardisation and new drug development. It mainly deals with the preparations based on plant, animal and mineral origin of material. Plant based basic formulations are mainly juice, paste, decoction, cold and hot infusion. Many derivatives like powder, pills, confections, oily preparations (medicated ghee and oil) and fermentive preparations are derived. Avaleha's popularity is based on its palatability, longer shelf life, low dose, quick action, easy dispensing and handling.

Avalehakalpana is a derivative of decoction. When decoctions are dehydrated to semisolid is known as raskriya and if added sweet substances and prakṣepa to it during the solidification is known as avaleha. Avalehas which chiefly contain harītaki (*Terminalia chebula*) are grouped like Agastyaharītaki, Kamsaharītaki, Dantīharītaki, Vyāghrīharītaki, Citrakaharītaki, etc.

Citrakaharītaki

Citrakaharītaki is an avalehakalpana described by Vṛandamādhava for the first time in the treatment of pratiśyāya. Later, Cakradatta, Yogaratnākara, Yogataraṅgiṇi, Bhaiṣajyaratnāvali and Gadanigraha also have described it. Minor difference is found in Yogataraṅgiṇi and Yogaratnākara as they have mentioned pañcmūla in place of daśamūla.

It is named as Citrakaharītaki because citrakamūla (root of *Plumbago zeylanica*) and harītaki cūrṇa (powder of *Terminalia chebula*) are the two main ingredients of this formulation. The other ingredients are āmla (*Emblica officinalis*), vilva (*Aegle marmelos*), agnimantha (*Premna corymbosa*), śyonāka (*Oroxylum indicum*), pāṭala (*Stereospermum colais*), gambhāri (*Gmelina arborea*), śāliparṇī (*Pseudarthria viscida*), pṛśniparṇī (*Desmodium gangeticum*), bṛhati (*Solanum* anguivi), kaṇṭakāri (*Solanum surattense*), gokṣura (*Tribulus terrestris*), amṛta (*Tinospora cordifolia*), śuṇṭhi (*Zingiber officinale*), marica (*Piper nigrum*), pippali (*Piper longum*), tvak (*Cinnamomum verum*), ela (*Elettaria cardamomum*), patra (*Cinnamomum tamala*), yavakṣāra (*Hordeum vulgare*), honey and jaggery. All these ingredients with particular weight combined pharmaceutically and Citrakaharītaki is prepared. Its therapeutic indications are kāsa śvāsa, hikka, pīnasa, gulma, mandāgni, śotha, udāvarta, arśa, bhagandara, kuṣṭha, etc.

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Materials and method

Decoctions of citraka, amṛta and daśamūla (each 1.150 ltr) were mixed in 1.150g jaggery and filtered. Then harītakicūrṇa (740g) and āmla svarasa (1.100 ltr) were added and mild heat applied till avalehasiddhilakṣṇas appeared. Then heating stopped and yavakṣāra, śuṇthi, marica, pippali, tvak and patra - each 22g - was added; honey (100g) was added on the second day. In this way, 3 samples of Citrakaharītaki were prepared and tried for evaluation of phy-sico-chemical parameters and standardisation.

Organoleptic parameters: - Colour, smell, touch and taste were noted. These give primary idea about the quality of different formulations.

Physio-chemical tests

1. pH value:- The pH value of an aqueous liquid may be defined as the common logarithm of the reciprocal of the Hydrogen ion (H*t) concentration expressed in grams. The pH value represents the acidity or alkalinity of an aqueous solution. The pH value of the liquid is determined potentiometrically by means of glass electrode and a suitable pH meter. The determination is carried out at room temperature using 10% weigh/volume solution in carbon dioxide free distilled water, filtered through a dry filter paper. Operated the pH meter and electrode system according to introduction calibrated the apparatus. Using buffer solution with pH 2 and 9.2 washed the electrode with carbon dioxide free distilled water. Immersed the electrode in the filtrate obtained by 10% weight/volume aqueous suspension of sample solution and measured the pH at the same temperature as per the standard solution.
2. Loss on drying:- The amount of volatile matter of any kind can be driven off under the condition specified. The loss in weight in percentage [weight/weight (w/w)] was determined by the following procedure: Weighed a glass stopper shallow weighing bottle and put the accurately weighed sample in it. Placed the loaded bottle in a drying chamber (oven), removed the stopper in the chamber, dried the sample to the constant weight at the prescribed temperature i.e. 110°c in an electric oven. After drying, closed the bottle promptly and allowed it to cool at room temperature in a desiccator before weighing. The percentage of loss on drying was calculated.
3. Ash content: - This parameter is helpful in knowing the organic and inorganic matter percent in a drug. Generally at 450°C to 500°C

or above, most of the organic compound decomposes to carbon dioxide and water. Inorganic non-volatile matter remains as residue. Procedure: Incinerated about 2 to 3g accurately weighed drug sample in a silica crucible previously cleaned, dried and weighed at a temperature not exceeding 450°C to 550°C in a muffle furnace until it is free from carbon. Then it is cooled in a desiccator and weighed and calculated the percentage of ash.

4. Acid insoluble ash: - This parameter is quite helpful in characterizing the specific minerals elements which are not soluble in inorganic acids. Procedure: Boiled the ash obtained from the above method with 25 ml of dilute Hydrochloric acid for 5 minutes; collected the insoluble matter on an ash less filter paper, washed with hot water and ignited to constant weight at ± 800°C, and calculated the percentage of acid insoluble ash.
5. Alcohol soluble extractive: - Weighed approximately 5g of Citrakaharītaki in 100 ml methanol. Heated on water-bath for 30 minutes and left for over night. Then filtered the solution in previously weighed 100 ml beaker and washed the residue with warm alcohol till complete extraction. Evaporated the filtrate on water-bath and dried in oven at 110°C till get constant weight. The percentage of alcohol soluble extractive was calculated.
6. Water soluble extractive:- Proceeded as directed for determination of alcohol soluble extractive using distilled water instead of alcohol, and calculated it.
7. Estimation of reducing sugar: - Estimation of sugar was done by volumetric titration method.

Preparation of reagents:- Copper sulphate solution (Solution-A), potassium sodium tartrate (rochelle salt) solution (Solution-B), soxhlet modification of Fehling's solution, hydrochloric acid - Sp. Gr.- 18 at 20°C (approximately 12 N), standard invert sugar solution, methylene blue indicator and standard copper sulphate solution were prepared.

Procedure: - Placed the weighed sample into a 250 ml volumetric flask and diluted with about 150 ml of water. Mixed thoroughly and made the volume 250 ml with water. Solutions A and B (5 ml each) were taken in a porcelain dish using a separate pipette. Added approximately 12 ml of sample solution from a burette and heated to boiling over an asbestos gauge. Added one milliliter of methylene blue indicator and while keeping the solution boiling, completed the titration within three minutes. The end point being indicated by change of colour from blue to red, noted the volume (H) in ml of sample solution required for the titration.

Total reducing sugar, percent by mass = 250 x 100 x S/ H x M (Where - S = strength of copper sulphate solution, H = volume in ml of sample solution required for titration and M = mass in g of sample)

8. Total reducing sugar after inversion in samples: - Added one ml of hydrochloric acid to 100 ml of the stock sample solution and heated the solution to near boiling and left over night. Neutralised this inverted sample solution with sodium carbonate and determined total reducing sugar as described above.
9. Sucrose percent by mass is calculated as: [(reducing sugar after inversion, percent by mass) - (reducing sugar before inversion, percent by mass)] x 0.95
10. TLC: - Thin Layer Chromatography (TLC) is a technique in which a solute undergoes distribution between two phases, a stationary phase acting through adsorption and a mobile phase in the form of a liquid. Depending on the solvent system, this helps fairly to distinguish the individual chemical constituents in the formulation by calculating the Rf value. A visual comparison of the size and intensity of the spots usually serves for semi quantitative estimation.

    Sample application: 1.0 g of each sample was extracted separately with 100 ml methyl alcohol on water bath under reflux condition for an hour. It was then filtered and washed the residue three times with methyl alcohol. TLC of these extracts was carried out on silica gel G. Coloured substances were seen directly when viewed against the stationary phase while the colorless species were detected by spraying the plate with appropriate reagent (5% sulphuric acid, $FeCl_3$ solution and keeping in Iodine chamber) which produced coloured areas in the region which they occupy. (Rf = Distance from starting line to the center of the zone / Distance from starting line to the solvent front.)
11. Refractive index: - The refractive index of a substance with reference to air is the ratio of sine of the angle of incidence to the sine of the angle of refraction of a beam of light passing from air into the substance. It varies with the wavelength of the light used into measurement unless otherwise prescribed the refractive index is measured at 25°C with reference to the wavelength of the D line of sodium (x= 589.3 nm). The temperature should be carefully adjusted and maintained since the refractive index varies significantly with temperature.

    Procedure: 5g of the three samples were dissolved in 50 ml water separately and filtered. The filtrate was then used for measurement of refractive index by portable Refractometer RA = 130.

Observations and discussion

Organoleptic tests are very important because palatability of a drug is dependent upon these characters. Taste of prepared drug is kashaya because harītaki is its main ingredient and its pradhāna rasa is kaṣāya (astringent), colour is dark brown with specific smell. The pH of Citraka harītaki is approximately 4.30. It indicates the presence of acid contents in it. Inorganic ash content is found 5.10 %. Solid content is about 20%. Acid insoluble ash is 0.30 %. Alcohol soluble extractive is 49 %. Water soluble extractive is 65 %. Total sugar is 50 %. Free reducing sugar is 38 % and non reducing sugar is 12 % approximately. Presence of reducing sugar indicates mono and disaccharides sugar i.e. Glucose, fructose, etc. Refractive index is 1.3440. TLC is considered to be very useful parameter for evaluating quality and maintaining batch to batch variation of āyurvedic formulations. In solvent system, Ethyl acetate: methanol: water = 77:13:10, two spots of Rf value 0.5, 0.8 and in n-butanol: acetic acid: water = 4:1:5, two spots of Rf value 0.3, 0.8 were found which are indicative of presence of certain alkaloids in Citrakaharītaki. (Tables 1 & 2)

Conclusion

Now a day, Citrakaharītaki is available in the market which is prepared by many pharmacies and its consistency, colour, and taste varies

TABLE 1
Organoleptic and physico-chemical characters

Parameters	Characters / Value
1. Organoleptic:	
- Colour	Dark brown
- Smell	Specific
- Touch	Sticky
- Taste	Kasaya
2. Physico-chemical:	
- pH value	4.30
- Ash content	5.15
- Loss on drying	20%
- Acid insoluble ash	0.30%
- Alcohol soluble extractive	49%
- Water soluble extractive	65%
- Free reducing sugar	38%
- Total reducing sugar	50%
- Sucrose	12%
- Refractive index	1.3440

batch to batch. To establish the standard, some chemical norms and successive parameters are needed for the quality control; this study was aimed in this context.

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TABLE 2
TLC Pattern of Citrakaharītaki

Mobile phase	Stationary phase	Result
1. Ethyl acetate : Methanol : Water = 77:13:10	Silica gel g	Under visible-chromatogram observed one separate spot at Rf 0.75 Under U V 254 - No florescent zone Under U V366- 2 florescent zone at Rf - 0.87, 0.5 On exposure to iodine vapors - grayish-brown spot at Rf - 0.75
2. n-Butanol: Acetic acid: Water = 4:1:5	Silica gel g	Under visible-chromatogram observed 2 spots of black colour at Rf - 0.3, 0.875 Under U V 254- No florescent zone Under U V366- 2 black spots at Rf - 0.3, 0.875 On exposure to iodine vapors - two brown spot at Rf - 0.7, 0.3

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A CRITICAL APPRAISAL OF KḶAMA VIS-A-VIS CHRONIC FATIGUE SYNDROME

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Abstract: The experience of fatigue is probably as ubiquitous as that of three basic biological functions of hunger, sleep and sexual appetite, and at any given time approximately 20% perceive it to be a problem. Āyurvedic classics describe the precise relationship between śārīrika (physical) and mānsika (mental) aspects of human being in a great depth, and imbibe a meticulous description and approach in various aspects of fatigue, its psycho-patho-physiology and management.

Introduction

Āyurvedic literatures describe fatigue in the forms of śrama, kḷama, ālasya, glāni and tandrā. Kḷama has been referred to in the Śārīrasthāna of Suśrutasamhita[1]. The word kḷama originates from Sanskrit root - क्ळमु ग्लनु क्ळमनाम क्ळम:, which means fatigue manifest along with depressed state of mind. It indicates the mental state of -

1. Feeling of fatigue without any physical activity. This can not be explained on the basis of any medical or psychological illness. In case of kḷama, fatigue is devoid of breathlessness, which is commonly seen in case of physical exertion. There is hindrance in knowing/perceiving of the objects of sensory organs/external sensory perceptions, because of easy fatiguability and consequent distraction of the mind.

2. The intimate relationship between mind and body is clearly observed in case of chronic fatigue syndrome, the patients come with physical complaints, but since the physician can find no evidence of any physical disease, he prefers to diagnose the patient as suffering from Chronic Fatigue Syndrome (CFS).

In this connection, other related clinical conditions like tandrā, śrama, ālasya and glāni are discussed in āyurvedic texts need to be studied thoroughly and differentiated clinically to have a clear grasp of the concept. Suśrutasamhita refers to tandrā as i) inability to know the object of sensory organs, ii) heaviness of body, iii) yawning, iv) activity resembling sleeping tendency and v) easy fatiguability (neurasthenia)[2].

The word 'śrama' originates from Sanskrit root - श्रमौ तपसि स्वेदे च श्रमनाम श्रमद्वा, परिश्रम, चेष्टा, प्रयत्न, which indicates physical activity/physical exertion leading to fatigue. It is used in the meaning of fatigue due to labour in which the sensory organ's perceptions are intact.

The word 'āyāsa' originates from Sanskrit root - यासु प्रयत्ने, आयासनाम आशयै: प्रयत्न, which means prayatna, prayāsa or kaṣṭa. There is a definition

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to ālasya in Suśrutasamhita[3]. The characteristic features of ālasya are: i) desire to adopt pleasurable things, ii) discarding tendency towards unpleasurable things and iii) lack of enthusiasm for works that are within easy means of a person.

In the same context, Suśruta has described glāni. The word glāni originates from the Sanskrit root - ग्लै हर्षये ग्लानं ग्लानि, which means of avasāda, kḷānti and thakavata. Suśruta defines it in reference to fatigue[4]. Glāni has the features of tandrā with sweetness of mouth, tightness over precordial region, dizziness and lack of interest in taking food (anorexia).

Aetiology of chronic fatigue syndrome, according to āyurveda, includes all those factors which principally cause aggravation of kapha and tama at psychosomatic axis. Suśruta has been described the features of kapha predominance in the body[5]. Aggravation of kapha causes śauklyama (palor), śaityama (coldness), stairyama (steadiness), gaurava (heaviness in body), avasāda (depression), tandrā (yawning) and nidra (excessive sleep), sanṣiāsthiviśḷeṣa (dislodged bony articulation) are emphasized during kaphavṛddhi.

Suśrutasamhita describes the features of tama-predominant mana (mind)[6] as: i) depressed mood, ii) hindrance in the knowledge of the objects of sensory organs/external sensory perceptions, iii) impairment of memory or concentration/low level of intelligence, iv) lack of physical and other activities, v) sleeping tendency.

In the light of all the above mentioned facts, it can be concluded that excess of kapha and tama and quantitative or qualitative reduction of vāta doṣa can potentially cause chronic fatigue syndrome and kḷama like clinical condition.

Kḷama may, in some conditions, be physiological in origin in addition to being a pathological entity. For example, in the case of nidra (sleep), kḷama is produced which is physiological in origin[7].

There are many other pathological conditions which comprise kḷama as one of the important clinical feature: i) vegāvarodha of apānavāyu[8], ii) symptoms of pittaja-hṛdaya-roga[9], iii) prodromal symptoms of jvara[10], iv) prodromal symptoms of kuṣṭha[11], v) symptoms of pāṇduroga[12], vi) prodromal symptoms of grahaṇi[13], vii) symptoms of grahaṇi[14] and viii) ativyāyāma (excess exercise)[15].

It has also been mentioned as nānātmaja paittika vyādhi[16]. Chronic fatigue syndrome (CFS) is now recognized as a clinically defined entity. There are no pathognomic tests, nor a definite treatment leading it to be regarded as a medically unexplained condition. Diagnostic criteria of CFS can be summarily described as below:

Both the major and minor criteria must be present (Holmes, *et al)* - a) 6 of 11 minor symptoms and 2 of 3 signs; or b) 8 of 11 minor symptoms.

Major criteria:- i) Fatigue lasting longer than 6 months, 50% reduction in activity and ii) no other medical or psychiatric condition that could cause the symptom.

Minor criteria: - The following symptoms must begin after the onset of fatigue:

- Low grade fever (99.5 - 101.5°F)
- Sore throat
- Painful cervical or axillary lymph nodes
- Generalised muscle weakness
- Myalgia
- Fatigue lasting longer than 24 hours after moderate exercise

- Headache
- Migratory arthralgia (without joint swelling or redness)
- Sleep disturbance
- Neuropsychological complaints photophobia, visual scotoma, forgetfulness, irritability, confusion, difficulty in concentration, depression.
- Acute onset.

Signs: - The following are the signs to be documented by physicians at least one month apart: i) low grade fever, ii) non-exudative pharyngitis and iii) cervical/axillary lymphadenopathy.

Management

Based on the āyurvedic principles and the constructed āyurvedic pathogenesis on the basis of available descriptions, the line of management of kḷama can be formulated as follows:

- Samśodhana therapy (pañcakarma cikitsa)
- Svedana (specially rūkṣasveda) and pācana[17]
- Vyāyāma (exercise)
- Abhyaṅga
- Use of drugs of Śramahara mahākaṣāya.
- Use of pramāthi dravyas like vacā and marica
- Medhya dravyas
- Kaphahara cikitsa
- Rasāyana therapy
- Satvāvajaya cikitsa

Sanśodhana therapy: - Sanśodhana therapy is a unique bio-purification therapy described in āyurvedic classics. It is unique in several senses, firstly because this therapy is based on the concept of bio-purification, a concept based on eradication of the disease-causing humours from the body, which no other system has addressed. This therapy aims not just pacifying the symptoms of the disease, but at rooting out the disease completely. It is useful in many chronic debilitating conditions where no other option remains for the patient. Pañcakarma therapy is also useful in detoxification of the endo-toxins present in biological system and cleansing up micro channels of the body. It is equally effective in treating the physical as well as mental disorders. It is very useful in chronic fatigue syndrome and in treatment of kḷama as is evident from the verses of Carakasamhita[18].

Śraramahara mahākaṣāya:- The following drugs described under this formulation are useful singly or in combination for the treatment of CFS (kḷama): i) drākṣā (*Vitis vinifera* of Vitaceae) ii) kharjūr (*Phoenix sylvestris* of Arecaceae), iii) priyāḷa (*Buchanania lanzan* of Anacardiaceae), iv) dāḍimā (*Punica granatum* of Punicaceae), v) phalgu (*Ficus carica* of Moraceae) and vi) ikṣu (*Saccharum officinarum* of Poaceae).

Medhya dravyas:- Āyurvedic nootropic and psychotropic medicines like aśvagandha (*Withania somnifera*), kapikaccu (*Mucuna pruriens*), vacā (*Acorus calamus*), guḍūci (*Tinospora cordifolia*), yaṣṭimadhu (*Glycyrrhiza glabra*) kūśmāṇḍa (*Benincasa hispida*) and jaṭāmānsi (*Nardostachys grandiflora*) are useful in the chronic fatigue syndrome. They also act as immuno-modulators in CFS which are comparable to immunoglobulin used in modern medicine in this condition.

Pramāthi dravya: - These groups of drugs like vacā and marica cleanse the different channels, that may be of macroscopic or microscopic of level. In the pathogenesis of kḷama, mārgāvarodha of vāta is also important which has been mentioned in the complication of vasti therapy, hence it is indicated to use these medications.

Abhyaṅga, svedana (especially rūkṣasveda) and pacana[19]; use of rubefacient oils like Mahāviṣagarbha taila, Pañcaguṇa taila and Saindhavādi taila for oleation and massage followed by different types of fomentation; and use of pācana dravyas like śuṇṭhi (*Zingiber officinale*), pippali (*Piper longum*), etc. goes a long way in the treatment of kḷama (CFS).

The essence of the Satvāvajaya treatment in kḷama involves reassuring the patients that they do not have a life threatening disease and promoting acceptance of the illness without trivialisation. Caraka advocates rasāyana therapy in the management of kḷama[20]. Rasāyana measures improve the functions of body and sensory organs; it plays an important role in therapeutic as well as preventive aspects of health and diseases. Carakasamhita has been described the specific effects of rasāyana therapy[21].

Conclusion

It is evident from the analysis of āyurvedic concepts (of glāni, śrama, tandrā and kḷama) that kḷama, as a specific psychopathological entity, is comparable to Chronic Fatigue Syndrome (CFS). Its management can be comprehensively done by the therapeutic measures discussed in this article. The use of medhya dravyas, rasāyana dravyas, abhyaṅga and sveadana are specifically useful in the management of kḷama as well as CFS.

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1. योऽनायासः श्रमो देहे प्रवृद्धः श्वासवर्जितः ।
   क्लमः स इति विज्ञेय इन्द्रियार्थप्रबाधकः ॥
   (सु. शा. 4/51)
2. इन्द्रियार्थेष्वसम्प्राप्तिर्गौरवं जृम्भणं क्लमः ।
   निद्रार्त्तस्येव यस्येहा तस्य तन्द्रां विनिर्दिशेत् ॥
   (सु. शा. 4/49)
3. सुखस्पर्शप्रसक्तित्वं दुःखद्वेषणालोलता ।
   शक्तस्य चाप्यनुत्साहः कर्मत्वालस्यमुच्यते ॥
   (सु. शा. 4/52)
4. वक्त्रे मधुरता तन्द्रा हृदयोद्वेष्टनं भ्रमः ।
   न चान्नमभिकाङ्क्षेत ग्लानिं तस्य विनिर्दिशेत् ॥
   (सु. शा. 4/54)
5. श्लेष्मवृद्धौ शौक्ल्यं शैत्यं स्थैर्य्यं गौरवमवसादस्तन्द्रा निद्रा सन्ध्यस्थिविश्लेषश्च ॥ (सु. सू. 15/15)
6. तमसास्तु-विषादित्वं नास्तिक्यमधर्मशीलता
   बुद्धेर्निरोधोऽज्ञानं दुर्मेधस्त्वमकर्मशीलता
   निद्रालुत्वश्चेति । (सु. शा. 1/18)
7. यदा तु मनसि क्लान्ते कर्मात्मानः क्लमान्विताः ।
   विषयेभ्यो निवर्तन्ते तदा स्वपिति मानवः ॥
   (च. सू. 21/35)
8. *Carakasamhita*, Śārīrasthānam, 7/12
9. Ibid, Sūtrasthānam, 17/33
10. Ibid, Cikitsāsthānam, 3/28
11. Ibid, 7/11
12. Ibid, 16/24
13. *Aṣṭāṅgahṛdayam*, Nidānasthānam, 8/22
14. *Suśrutasamhita*, Uttarasthānam, 40/170
15. *Carakasamhita*, Sūtrasthānam, 7/33
16. *Śārṅgadharasamhita*, Pūrvakhaṇḍam, 7/117
17. *Carakasamhita*, Sidhisthānam, 7/15-20
18. दौर्बल्यं लाघवं ग्लानिर्व्याधीनामणुता रुचिः ।
    हृद्वर्णशुद्धिः क्षुत्तृष्णा काले वेगप्रवर्तनम् ॥
    बुद्धीन्द्रियमनःशुद्धिर्मारुतस्यानुलोमता ।
    सम्यग्विरिक्तलिङ्गानि कायाग्नेश्चानुवर्तनम् ॥
    (च. सू 16/5-6)

    हृदिन्द्रियशिरःकोष्ठे संशुद्धे वमनादिभिः ।
    मनःप्रसादमाप्नोति स्मृतिं संज्ञां च विन्दति ॥
    (च. चि. 9/28)
19. *Carakasamhita*, Sidhisthānam, 7/15-20
20. ..... देहेन्द्रियबलं परम् (च. चि. 1/1/7)
21. .... निद्रातन्द्राश्रमक्लमालस्यदौर्बल्यापहरमनिल-कफपित्तसाम्यकरं..... (च. चि. 1/2/3)

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