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Āryavaidyan

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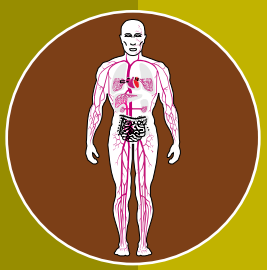

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February - April, 2012

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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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MACROSCOPICAL AND MICROSCOPICAL STUDIES ON THE FRUITS OF ŚIVALIṄGI (*DIPLOCYCLOS PALMATUS*)

T.R.Shantha, G. Venkateshwaralu, Shiddamallayya N, and V.Ramarao*

Abstract: Śivaliṅgi (*Diplocyclos palmatus*) is a rarely used medicinal plant in ayurveda with the fruits having important use in the area of reproductive medicine for female infertility, leucorrhoea and are used as aphrodisiac, tonic, etc. The potent usage of the plant, especially the fruits, in many folklore remedies has referred to in āyurvedic texts like Rājanighaṇṭu and Nighaṇṭuratnākara. The present study investigates the macroscopical and microscopical characters of the plant.

Introduction

Śivaliṅgi (*Diplocyclos palmatus* (L.) C. Jeffery, syn. *Bryonia palmata* L.) belongs to Cucurbitaceae family. It is an annual scaberulous scandent herbs, a slender much branched tendril climber, from a thick permanent root stock, tendrils bifid; leaves simple, alternate, membranous, 10-15 cm long, green and scabrid above, paler and smooth beneath, 5 lobed, deeply cordate base, lobes oblong lanceolate, margins sinuate denticulate. Flowers yellow, unisexual, males in small fascicles of 3-6, female flowers solitary or few; Fruits sub sessile, globose, smooth berry, brick-red when ripe with white vertical lines. The seeds are yellowish brown, similar to baccate, sub sessile, globose, smooth, bluish green, streaked with broad vertical lines[1]. Seeds resemble that of śivaliṅga (the phallus of Lord Śiva in Hindu mythology) (Fig I).

The plant is commonly found throughout India, from the Himalayas to Sri Lanka, Mauritius, tropical Africa, Malaya, Philippines, Australia on edges and bushes up to 1200m elevation and is naturally propagated by seeds. Locally the fruits of *Diplocyclos palmatus* are known as liṅgatondikai in Kannada, śivaliṅgakkāya in Malayalam, śivaliṅgakkāy in Tamil, liṅgadonda in Telugu[2] and ṣivaliṅgi in Gujarathi and Marathi and in English it is known as Lollipop climber (Fig. II). The plant has ascribed many synonyms like liṅgini, bahuputra, śyadīśvari, śaivamallika, liṅgi, citraphala, śivaja, śivavalli (Rājanighaṇṭu) which depict different characteristics of utmost important for facilitating its identification.

The plant has a fetid smell (durgandha), acrid (kaṭurasa), thermogenic (uṣṇa), anti-inflammatory (śophaghna), alterative, depurative and tonic and rejuvenative (rasāyana) properties, and is useful in vitiated conditions of vāta and pitta doṣas, cough, flatulence, skin diseases, inflammations and general debility[2] and also useful in sidhmakuṣṭha (psoriasis.).

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The fruit is bitter, aperient and has tonic properties.[1] The leaves are used as an ingredient along with Bengal gram flour in a special dietary preparation of the tribal Chhattisgarh as a tonic.[3] *Diplocyclos palmatus* is a known āyurvedic drug described in Rājanighaṇṭu and Nighaṇṭu-ratnākara. The fruit is used as an aphrodisiac, tonic as an antipyretic; seeds powder and roots are given to promote conception. Seeds and plant serve as tonic and aphrodisiac. Plant's various organs are used in headache, enlarged spleen, paralysis of tongue, colic pain, delirium and convolusions, foaming at mouth, syphilis, carbuncle, stomach swelling or tumor, constipation, phthisis and snakebite. Seed oil is a source of punicic acid (38.2%)[4]. In Siddha system of medicine, the whole plant is used as a laxative.

There have been very few studies on śivaliṅgi. The seeds are reported to contain 12% oil, 40% protein, iodine value of 171.5 (seed oil), saponification value 208.3, peroxide value of 0.3 and acid value of 2.9.[5] So far no study reports are available on macroscopy and microscopical studies on the fruits of śivaliṅgi.[6] G. Venkateswaralu, *et al* have carried out physicochemical and preliminary phytochemical studies on the fruits of śivaliṅgi.[7]

Indian folklore use

The leaves of the plant are generally applied as an anti-inflammatory paste. The seeds in combination with other medicinal herbs help conception and prevention of miscarriage. Traditional healers of Gulgul village, Chhattisgarh recommend the use of 3-4 seeds once daily in empty stomach for 1 to 2 months to beget a male child.[3] Gond and Bharia tribes of Patalkot valley worship this plant and they consider that, this herb is a boon for childless parents. Traditional healers of Gaildubba suggest a mixture of śivaliṅgi seeds with tulasi (*Ocimum basilicum*) leaves and jaggery in female infertility.[8] The seeds of are potentially contraceptive when used in combination with ginger (dry), pepper, root bark of vaṭa (*Ficus bengalensis*) and milk. Besides, the abortifacient action of śivaliṅgi seeds has also been

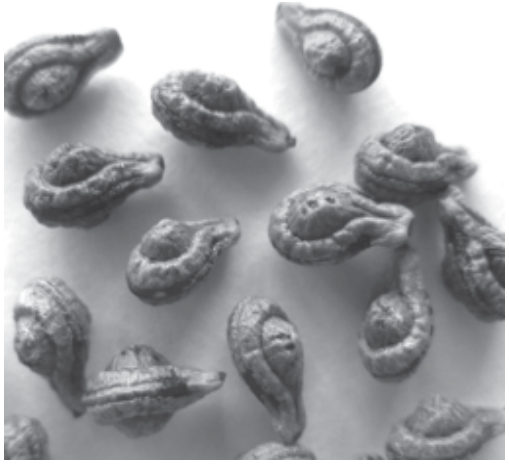

Fig. I. *Diplocyclos palmatus*
Macroscopical characters of seeds

Fig. II. *Diplocyclos palmatus* - Fruiting twig

reported. The seeds in combination with equal quantity of aśvagandha (*Withania somnifera*) roots, on consumption with cow's milk for six months, enhances the sperm count.[9] Increased spermatogenesis and a significant increase in sperm count in epididymis of the male albino rats with concurrent increase in serum testosterone and luteinizing hormone have reported with the use of śivaliṅgi seeds. The above studies clearly reflect androgenic activity and its effects on hypothalamic pituitary gonadal axis.[10]

Bhils tribe of Ratlam District (M.P), India, believe that the seeds has a power of amulet to ward off the evil spirits from children and so also the tribals used the seeds of śivaliṅgi, rai [*Brassica nigra* (L.) K. Koch] and urad [*Vigna mungo* (L.) Hepper] as an amulet and tied around the neck of the children to protect from evil spirits.[11]

Materials and methods

Fresh fruits of śivaliṅgi were collected from the surrounding areas of Bangalore, Karnataka. The fruits were dried, powdered and soaked in 70% alcohol for 24 hours, took freehand sections, cleared with chloral hydrate solution and water and stained with safranin according to the standard prescribed methods.[12,13]

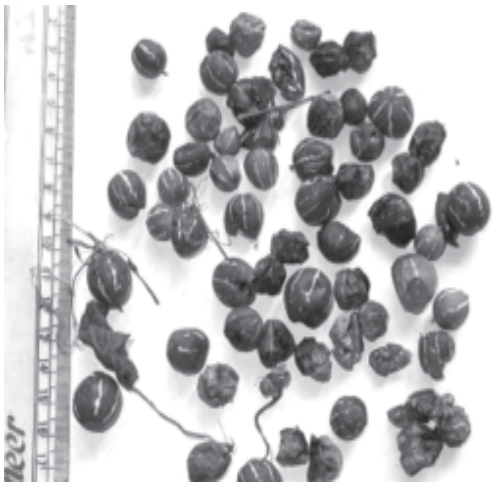

Fig. III. *Diplocyclos palmatus*
Fresh and dried fruits - Macroscopical characters

Macroscopical characters

Fruits subsessile globose, smooth berry, brick-red when ripe with white vertical lines, seeds yellowish brown, similar to baccate, sub sessile, globose, smooth, bluish green, streaked with broad vertical lines.[14] Seeds are yellowish brown and resemble that of śivaliṅga (the phallus of Lord Śiva). Fruits measure 1.3 to 2.5 cm in diameter; seeds small 5 to 6 mm. Seeds subpyriform, very turgid, surrounded by a very thick grooved crenulate ring on each side of which the tumid faces of the seed project.[1] (Fig. III)

Microscopical characters

Fruit

T.S. of the fruit circular in outline with a central wide fleshy portion occupying the major area of the section divided by placental portions into various compartments, 3 being more prominent, each containing 2 seeds with parietal placentation. T.S. of the fruit shows pericarp consisting of thick walled cells covered with thick cuticle, underneath this lies 3-6 rows of small sized thick walled cells of hypodermis. Mesocarp is wide, parenchymatous, traversed with only helical xylem vessels and long narrow secretory ducts. Mesocarp region is made up of thin-walled, compactly arranged parenchymatous cells filled with small simple starch grains and few oil globules. (Fig. IV a-f)

Seed

T.S. of the seed shows oval in outline with 2 broad wings like structures, where the outermost layer of testa is composed of long highly thickened/lignified many layered palisade like parenchymatous cells. In some of

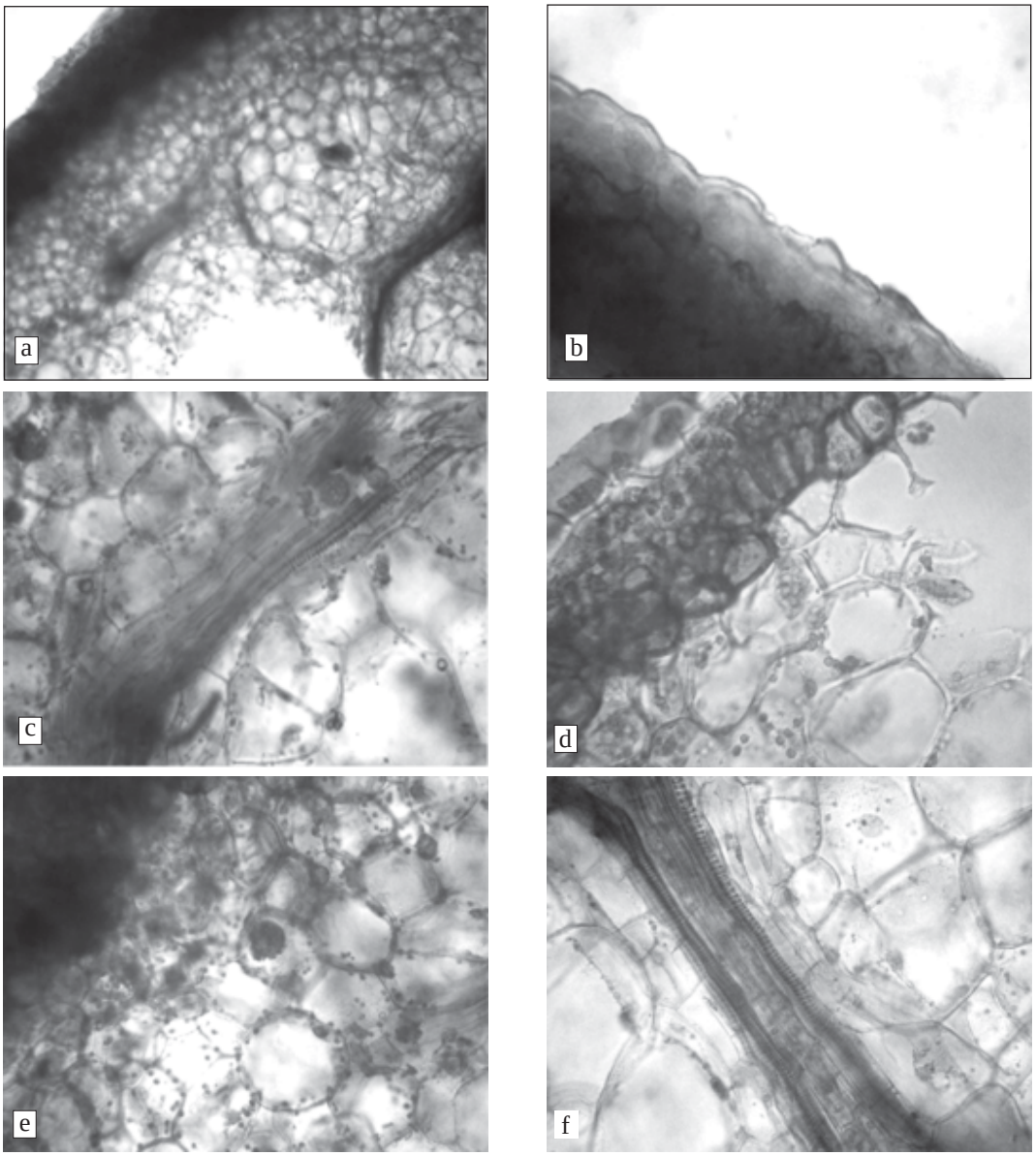

Fig. IV a-f. *Diplocyclos palmatus* - Microscopical characters of T.S. of fruit

a T.S. of the fruit 10x X 4 x; **b** A portion showing epidermis 10x X 10x; **c** Resin duct enlarged 10x X 10 x;

d Epidermis, hypodermis, mesocarp enlarged 10x X 10 x; **e** Mesocarp enlarged showing starch grains 10x X 40 x; **f** Helical vascular strand enlarged (10x X 40x)

the cells the center of the cells are occupied by small pits. Underneath this lies unevenly thickened collapsed rows of pigmented cells, followed by small sized palisade row of thickened parenchymatous cells and narrow brown coloured perisperm layer, embeded with a vascular strand at its lateral edges.Endosperm is wide, parenchymatous embedded with aleurone grains, fixed oilgloubles and simple starch grains. Embryo lies in the centre of the endosperm. (Fig. V a-e)

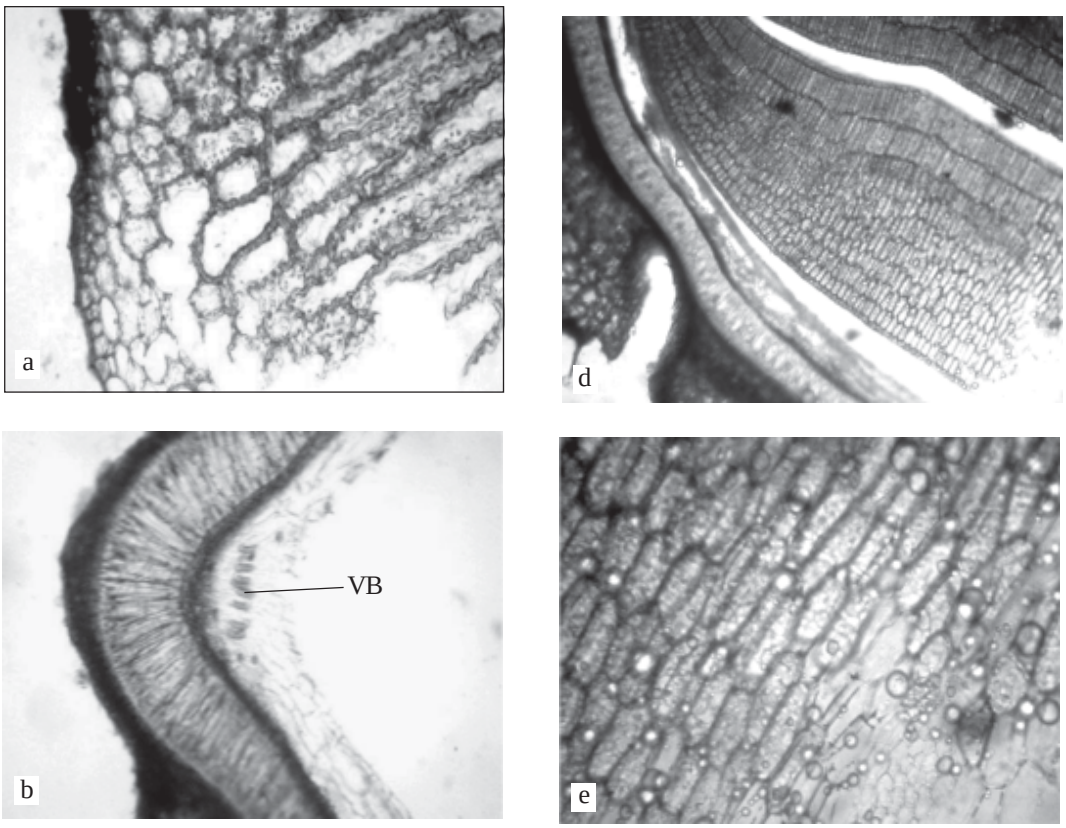

Fig. V a-e. *Diplocyclos palmatus* - Microscopical characters of T.S. of seed

a Outer testa 10x X 40 x; **b** Inner testa showing palisade tissue and vascular bundle (VB) 10x X 40 x; **c** Inner palisade enlarged 10x X 40 x; **d** Outer testa, palisade cells, and endosperm region 10x X 10 x; **e** Endosperm enlarged showing abundant oilgloubles and aleurone grains 10x X 40 x

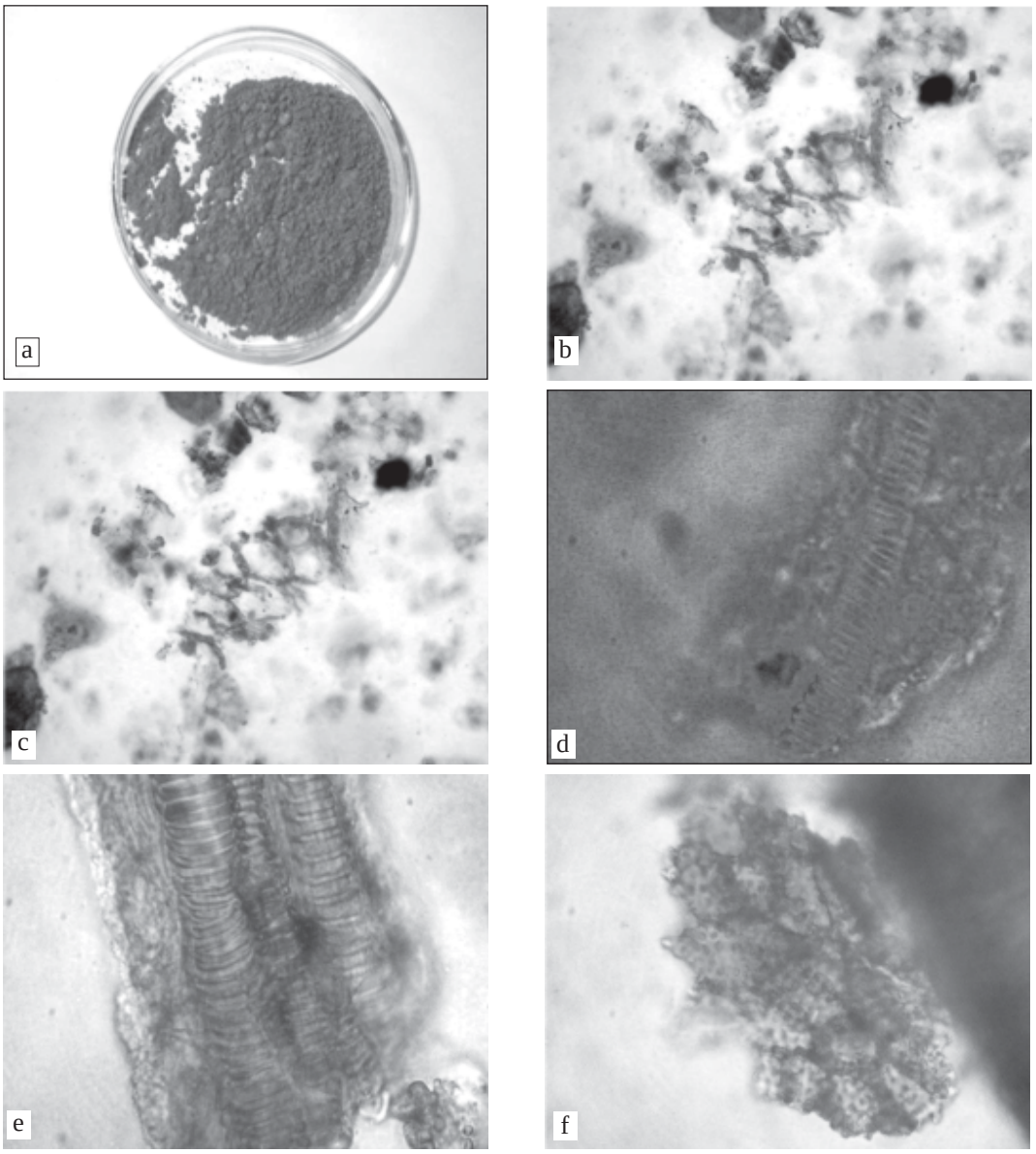

Fig. VI a-f. *Diplocyclos palmatus* - Powder study

a Powder macroscopy; **b** Different fragments of tissues 10 x X 4 x;
c Thin walled parenchymatous cells of endosperm 10 x X 40 x; **d** Helical xylem vessel 10 x X 40 x;
e Groups of helical spiral vessel 10 x X 40 x; **f** Palisade cells of outer testa 10 x X 40 x

Powder study

Powder light brown in colour; texture rough to touch; smell not characterictic; taste bitter. Powder treated with 2 to 3 drops of chloral hydrate and water, observed under the microscope showed the following different fragments of tissues: (Fig. VI a-j)

- Different fragments of tissues
- Thin walled parenchymatous cells of endosperm
- Helical xylem vessel
- Groups of helical spiral vessel
- Palisade cells of outer testa
- Thin walled parenchymatous cells of embryo
- Oil globules
- Aleurone grains
- Palisade cells of inner testa.

Diagnostic characters

Presence of - abundant vascular strands representing only xylem with helical/spiral thickenings in mesocarp region; oilgloubles and small starch grains abundantly in mesocarp region; 3-6 layered, compactly arranged small,

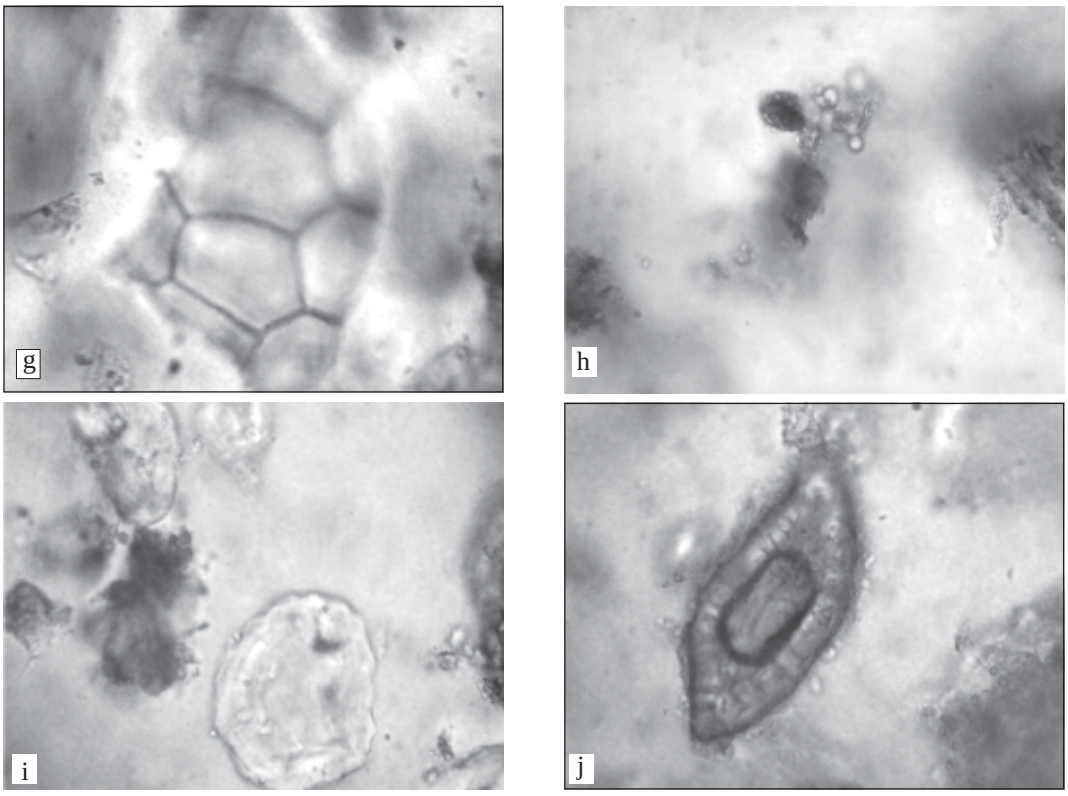

Fig. VI g-j. *Diplocyclos palmatus* - Powder study

g Thin walled parenchymatous cells of embryo 10 x X 40 x; **h** Oil globules. 10 x X 40 x; **i** Aleurone grains 10 x X 40 x; **j** Palisade cell of inner testa 10 x X 40 x

polygonal thick walled cells representing hypodermal cells; bicollateral vascular bundle in the seed; aleurone grains and abundant oilglobules in endosperm region; many layered, compactly arranged, elongated palisade like cells, which are thick walled constituting outer integument of the seed.

Summary and conclusion

The different parts of the medicinal herb śivaliṅgi have a long history of traditional usage in various parts of India since times immemorial. The principal usage of its fruits is in the areas of female infertility, pregnancy facilitation, aphrodisiac and tonic. The macroscopical, microscopical and powder studies revealed presence of abundant vascular strands representing only xylem with helical/spiral thickenings, oil globules and small starch grains abundantly in mesocarp region, 3-6 layered, compactly arranged small, polygonal thick walled cells representing hypodermal cells. bicollateral vascular bundle in the seed; aleurone grains and abundant oil-globules in endosperm region. Many layered, compactly arranged, elongated palisade like cells are thick walled constituting outer integument of the seed. Powder microscopical studies also revealed different fragments of tissues like thin walled parenchymatous cells of endosperm, helical xylem vessel, groups of helical spiral vessel, palisade cells of outer testa, thin walled parenchymatous cells of embryo, oil globules, aleurone grains, palisade cell of inner testa.

Acknowledgements:

The authors are very grateful to the Director General, CCRAS, New Delhi for evincing the interest to carry out the work.

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PUṢKARĀDI GUGGULU IN THE MANAGEMENT OF CORONARY ARTERY DISEASE - A STUDY

Mrityunjay Gautam[1] *et al**

Abstract: Coronary Artery Disease (CAD) is defined as an acute or chronic form of cardiac disability arising from imbalance between myocardial supply and demand for oxygenated blood and metabolic substrate requirements for maintaining adequate cardiac functions. A study was conducted for evaluating the efficacy of Puṣkarādi guggulu in the management of CAD. All the patients were assessed on various scientific parameters such as subjective, clinical, hematological changes, lipid profile and changes in ECG and TMT and the result were very encouraging.

Introduction

Coronary atherosclerosis is supposed to be a necessary precursor of CAD in majority of cases[1] and hyperlipidaemia is universally acknowledged to be a major risk factor for atherosclerosis.[2] WHO estimates that by the year 2020 the global number of deaths from CAD will have risen from 7.1 in 2002 to 11.1 million[3] and it will hold first place as 'major killer'.[4]

CAD occurs much more prematurely in India with 50% of all heart attacks occurring in patients <55 years old and 25% in those <40 years old.[5] At present approximately 70 million people, suffer from CAD in India.[6] Incidence of CAD has been rising for the last two or three decades in India.[7] Heart disease among Indians tends to be severe, malignant and diffuse (spread along an artery instead of in just one or two spots).[8]

It is difficult to give a specific correlation of CAD in āyurveda but on the basis of descriptions available in the āyurvedic classics, the manifestation of CAD resemble very closely with vātikahṛdroga[9] which is one of the five types of hṛdrogas. Chest pain is a predominant feature in vātikahṛdroga, which is also a classical symptom of CAD. There is similarity in timing, type, site of pain and symptomatology.[10]

While treating a patient of CAD on āyurvedic principles, the status of rasadhātu (plasma), rasadhātvagni (regulating metabolic principle of transformation of plasma), medodhātvāgni (regulating metabolic principle of transformation of lipid) and srotodusṭi (vitiation of microchannels) are to be considered. Vitiated medodhātu (disturbed lipid metabolism) leads to kha-vaiguṇya (disintegrity of the intima of

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Coronary Arteries), which results in sthāna samśraya (appearance of fatty streaks) of vitiated doṣas, ultimately producing srotosaṅga (obstruction in microchannels due to atherosclerosis) leading to CAD.[11.]

Drugs which possess properties like dīpana (digestive stimulant), pācana (carminative), lekhana (emaciating), cardiaotonic, yakṛt uttejaka (liver stimulants) and srotośodhaka (microcirculatory channel cleanser) may help in breaking down the chain of reactions in the development of atherosclerosis which is a precursor of CAD. Drugs, which possess such properties, may act at the root cause of CAD and check its progress.

The present clinical study was undertaken with the objective of clinical evaluation of a herbal compound drug Puṣkarādi guggulu in the management of CAD.

Materials and methods

The study was conducted on 45 patients of CAD (clinically diagnosed and confirmed by Tread Mill Test - TMT) selected from the Post Graduate Department of Kāyacikitsa (general medicine), Unit of National Institute of Āyurveda, Jaipur and Cardiology unit of S.M.S. Medical College and Hospital, Jaipur.

The patients were randomly divided into three groups consisting of 15 subjects each, i.e. Group 1 (Diltiazem), Group II (Puṣkarādi guggulu) and Group III (Diltiazem along with Puṣkarādi guggulu).

Exclusion criteria: - Patients with specific conditions like acute myocardial infarction, congenital anomalies, valvular disorders, hypertrophic cardiomyopathies, severe hypertension and congestive heart failure were not included.

Assessment criteria

Subjective parameters

Subjective improvement: - Increase in the feeling of well being, physical and mental fitness, if any, produced after the course of the therapy.

Clinical improvement: - A Symptom Rating Scale was developed to assess and accordingly various symptoms of CAD were graded into different grades as per the incidence of their severity - shortness of breath, chest pain, palpitation and fatigue (Table 1).

Objective parameters

Biochemical studies: - Serum cholesterol (mg/dl.), Serum triglycerides (mg/dl.), Serum LDL, VLDL and HDL (mg/dl.), ECG findings and computerized tread mill test (CTMT) findings.

Drug

The formulation Puṣkarādi guggulu is composed of three constituent drugs viz. i) puṣkaramūla (root of *Inula racemosa*) - 1 part, ii) olio-resin of guggulu (*Commiphora wightii*) - 1 part and iii) rhizome of śunṭhi (*Zingiber officinale*) - ½ part.

Preparation: - Purified olio-resin of guggulu is kept in little quantity of lukewarm water and stirred continuously until it is converted into a paste form. Fine powder of puṣkarmūla is added followed by śunṭhi. After preparing a homogenous mixture, tablets of 500 mg each are prepared.

TABLE 1
Symptom Rating Scale for CAD

Severity of symptoms	%	Grade
1. Nil	0	0
2. Mild	25	1
3. Moderate	50	2
4. Severe	75	3
5. Agonizing	100	4

Diltiazem (a calcium channel blocker) is known to be an effective antianginal agent whcih has a low side effect profile. Atenolol and Diltiazem, having intermediate actions between those of Nifedipine and Verapamil,[13] are similar in efficacy in increasing nonischaemic exercise duration in patient with variable threshold angina and act primarily by slowing the resting heart rate.[12,13] All calcium channel blockers relax arterial smooth muscles but they have little effects on most venous beds and hence do not affect cardiac preload significantly.[14] These drugs do not have any significant role as lipid lowering agents. Therefore, these drugs cannot act at the very root cause of the underlying disease Atherosclerosis or CAD. It is also evidenced by several studies that myocardial ischemia may aggravate in spite of regular use of Calcium channel blocker.[15]

Administration

Group I (modern medicine group) were treated with tablet Diltiazem 30 mg thrice a day (t.i.d.) with water at room temperature.

Group II (āyurvedic group) were treated with Puṣkarādi guggulu (2 gm.) - t.i.d. with lukewarm water.

Group III (mixed group) were treated with tablet Diltiazem 30 mg t.i.d. along with Puṣkarādi guggulu (2 gm.) - t.i.d. with lukewarm water.

Duration: - 45 days.

Result

All data were analyzed by using appropriate statistical methods. All values of qualitative variables were expressed in percentage and all values of quantitative variables were calculated as Mean, ± SD and p value.

Statistically, highly significant improvement ($p<0.001$) found in most of the clinical features of CAD in Group II patients. The level of serum cholesterol, LDL, VLDL and Triglycerides were decreased significantly ($p<0.005$) and the level of HDL was increased significantly ($p<0.01$) after the course of the therapy. Biochemical studies carried out in Puṣkarādi guggulu treated group revealed that the formulation has Hypolipidaemic effects. Studies on parameters like ECG and TMT ($p<0.005$ and <0.001 respectively) have revealed that Puṣkarādi guggulu has potent activities of increasing blood supply to myocardium (coronary vasodilation effects) with significant improvement of ST changes. It was also observed that Group III shows maximum improvement and Group II was more effective than Group I (Table 2 & 3).

Discussions

The properties like dīpana, pācana, lekhana of constituent drugs of Puṣkarādi guggulu help in breaking the samprāpti (pathogenesis) of atherosclerosis and check the progress of disease, CAD. Śuṇṭhi, has a corrective role on jaṭharāgni level (which helps to digest the food and undigested metabolites) and on dhātvāgni level (which regulates the lipid metabolism). Due to pharmacodyanamic properties like madhura vipāka (terminal stage of metabolism as an anabolic property) and snigdhaguṇa (unctuous property), śuṇṭhi produces anabolic effects on the body. Thus, it helps not only in breaking the pathogenesis of CAD but also in nourishing the body tissues. Puṣkaramūla is described to be the best drug to relieve pārśvaśūla (pericardial pain) and several clinical studies have shown that it worked as a coronary vasodilator,[16-18] whereas guggulu is a well known and

established hypolipidaemic and anti-atherosclerotic drug.[19-21] Considering the therapeutic properties of constituents of Puṣkarādi guggulu, it is proved to be a dependable āyurvedic preparation for the management of CAD.

It was observed that the patients developed a sense of well being, mental and physical fitness after the course of the therapy in all the three groups particularly in Group III (mixed group). Shortness of breath, chest pain and fatigue were relieved significantly high in all the three groups. However, palpitation was relieved significantly in Group I and II but the patients in Group III witnessed highly significant improvement in all the clinical symptoms of CAD. It may be due to the synergistic effects of both āyurvedic and modern drugs. Āyurvedic drugs potentiated the therapeutic activities of modern drug Diltiazem.

The trial drug revealed its efficacy on lipid profile; statistically highly significant reduction in the level of Serum cholesterol, triglycerides, LDL and VLDL, confirmed the potent hypolipidaemic activity of Puṣkarādi guggulu. On the other hand, the level of HDL increased significantly after the course of the therapy which showed its cardioprotective activities, because reverse cholesterol transport mediated by HDL may provide an independent pathway for removal of lipids from the atheroma.[22] HDL offers protective effects and helps in removing cholesterol from arterial wall. This process is thought to be antiatherogenic, consistent with the observation that raised levels of circulating HDL reduce the risk of CAD.[23]

Studies on parameters like ECG and CTMT have revealed that Puṣkarādi guggulu has potent

TABLE 2
Statistical analysis of various symptoms and physiological parameters in three groups

Parameters	Group I				Group II				Group III			
	Mean		SD ±	p	Mean		SD ±	p	Mean		SD ±	p
	BT	AT			BT	AT			BT	AT		
1. Clinical symptoms												
- Shortness of breath	2.43	1.78	0.74	<0.005	2.5	1.07	0.75	<0.001	2.71	1.07	0.49	<0.001
- Chest pain	2.08	1.08	0.60	<0.001	2.36	0.64	0.61	<0.001	2.61	0.61	0.57	<0.001
- Palpitation	2.67	1.33	1.21	<0.02	2.62	1.00	1.41	<0.025	2.55	0.55	0.50	<0.001
- Fatigue	2.14	1.21	0.61	<0.001	2.46	0.84	0.50	<0.001	2.35	0.50	0.76	<0.001
2. Physiological changes												
- Body weight	57.4	57.2	0.56	<0.10	57.4	56.60	0.98	<0.005	59.83	58.73	0.80	<0.001
- Pulse rate	81.73	80.53	2.76	<0.10	76.93	75.60	3.18	<0.10	79.72	78.00	2.25	<0.01
- Respiratory rate/min.	18.27	18.00	1.03	<0.20	17.3	17.07	1.03	<0.21	17.2	16.93	1.03	<0.20
- Systolic BP	137.47	132.93	4.27	<0.001	128	125.47	3.84	<0.025	128	122.53	4.46	<0.001
- Diastolic BP	85.33	82.13	2.96	<0.001	84.53	83.2	2.06	<0.025	83.07	78.93	3.50	<0.001

activities of increasing blood supply to myocardium (Coronary vasodilator effect). There was highly significant improvement in exercise tolerance after administration of Puṣkarādi guggulu. ST changes also were highly significantly corrected. The over all impression of TMT was highly significant which indicated improved blood supply to the cardiac muscles.

Puṣkarādi guggulu was well tolerated by all the patients. Rather, several studies showed that, guggulu may cause various side effects such as stomach discomfort or allergic rash as well as other serious side effects and interactions.[24] However, in this study, no side/toxic effects were reported by any of the patients. It was because simplest formulations of herbs were used in the study rather than using any extract or any active principle of the herbs.

Conclusion

Puṣkarādi guggulu is a safe formulation having potent hypolipidaemic and coronary vasodilator effects. It lowers the level of Serum Cholesterol, Triglycerides, LDL and VLDL. By increasing HDL, it shows cardioprotective effects. Thus owing to these therapeutic properties, the formulation is effective in the management and prevention of CAD.

TABLE 3
Statistical analysis of Laboratory parameters in three groups

Parameters	Group I				Group II				Group III			
	Mean		SD ±	p	Mean		SD ±	p	Mean		SD ±	p
	BT	AT			BT	AT			BT	AT		
1. Changes in Lipid Profile (mg/dl.)												
- HDL	46.86	47.61	20.21	<0.5	44.36	56.89	17.49	<0.01	42.47	57.46	15.22	<0.005
- LDL	76.91	67.75	135.58	<0.5	105.12	80.79	24.37	<0.005	110.92	67.31	42.66	<0.001
- VLDL	30.63	28.06	19.06	<0.5	36.14	26.33	11.76	<0.005	34.65	25.95	8.63	<0.001
- Cholesterol	154.67	144.07	52.07	<0.2	185.64	164.00	24.67	<0.005	188.06	148.44	40.31	<0.005
- Triglycerides	153.17	140.31	95.28	<0.5	180.80	131.65	58.54	<0.005	173.28	129.68	43.60	<0.005
2. ECG. Changes												
- Bipolar leads	1.40	0.80	0.55	<0.05	1.28	0.42	1.07	<0.05	1.20	0.20	0.71	<0.025
- Augmented leads	1.4	0.6	0.84	<0.05	1.00	0.33	0.82	<0.05	1.00	0.20	0.45	<0.01
- Precordial leads	4.6	2.4	2.28	<0.05	3.00	0.40	2.70	<0.05	5.25	0.75	3.00	<0.025
3. TMT Changes												
- Exercise time in minutes	6.39	7.02	0.86	<0.025	6.55	7.92	1.35	<0.005	5.67	7.20	0.99	<0.001
- Maximum ST changes (mm)	-3.25	-2.26	1.21	<0.01	-3.05	-1.66	1.06	<0.001	-3.02	-1.42	0.83	<0.001
- Impression	2.69	1.77	1.11	<0.01	2.71	1.36	0.89	<0.001	2.75	1.08	0.65	<0.001

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EFFICACY OF NĀGKESARACŪRṆA AND GODANTI BHASMA IN NON-SPECIFIC LUCORRHOEA (ŚVETAPRADARA)

Banani Das and Jayram Hazra*

Abstract: Leucorrhoea is a common irritating problem suffered by women. Usually it occurs in unhygienic conditions, but can also occur after some surgical procedures and at the time of delivery. In āyurveda, this condition is called śvetapradara as a symptom in various vaginal diseases (yonivyāpat). Various formulations are indicated in āyurvedic classics for the management of this condition. This paper evaluates the efficacy of Nāgkesaracūrṇa and Godanti bhasma in non-specific leucorrhoea.

Introduction

Leucorrhoea is a common gynecological problem. It is a condition where normal vaginal secretion increased in amount in various clinical conditions. However, it is often used to cover infective conditions of the vagina and cervix. It can be occur in all the age groups but is more common in sexually active women. About 20-30% of patients attending the Female Out Patient Department of National Research Institute of Ayurveda for Drug Development, Kolkata are suffering from this disease. Of the two types of leucorrhoea, the common type is caused by *Tricomonas vaginitis* and *Candida albicans* and non-specific type is due to *Staphylococci*, *Streptococci* (both hemolytic and anaerobic) and *E. coli* bacteria. Changes of vaginal pH i.e. acidity to alkanity, always favour the non-specific infection. In āyurveda, leucorrhoea is described as śvetapradara under the conditions like kaphaja, sannipātaja and upapḷuta yoniroga. Habitual use of kapha-promoting factors and suppression of natural urges lead to vitiation of vātadoṣa, which in turn carries with the vitiated kaphadoṣa to the vaginal region giving rise to painful yellowish or whitish discharge. The vaginal condition, thus influenced by kapha and vāta is known as śvetapradara. It is characterised by continuous flow of white (śveta), pale (pāṇḍuvarṇa) and slimy discharge (picchilasrāva) associated with localised burning sensation (dāha) and itching (kaṇḍū), backache (kaṭīśūla), general debility (daurbalya), constipation (koṣṭhabandha) and headache (śiraśśūla). Modern concept of symptoms and signs are red, tender vagina with irritation, dysurea with variable colour, consistency and amount of the discharge per vagina. Usually, in the allopathic system of medicine, most of the drugs fail to cure the

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disease completely and recurrence is common. Many formulations are indicated in āyurvedic system of medicine and are very cost effective. The present clinical study conducted at NRIADD, Kolkata evaluates the efficacy of āyurvedic preparations viz. Nāgkesaracūrṇa and Godanti bhasma in śvetapradara.

Materials and methods

A total of 36 patients with excessive white discharge per vagina, between the age group of 15-55 years were selected from the OPD of NRIADD after ruling out specific vaginal infection through wet vaginal smear; 4 patients were dropped out from the study.

Drugs: - Nāgkesaracūrṇa (powder of *Mesua ferrea* L.) and Godanti bhasma (calcinated gypsum - $CaSO_4$, $2H_2O$).

Mode of action: - Nāgkesara is a common plant seen all over West Bengal. It is acrid (kaṭu), bitter (tikta), astringent (kaṣāya) in taste; hot in potency (uṣṇavīrya), alleviating kapha-vāta (kapha-vātaghna) and anti-inflammatory (śophaghna). Godanti bhasma (calcinated ash of gypsum - $CaSO_4$, $2H_2O$) is cold in potency and beneficial in phthisis (kṣaya), anaemia (pāṇḍu), headache (śiraśśūla), and leucorrhoea (śvetapradara).

Dosage: - Nāgkesaracūrṇa and Godanti bhasma, 1 gm each with honey, twice daily for 30 days.

Inclusion criteria

- Age between 15 - 55 years
- Excessive white discharge per vagina
- Itching in vagina or vulva
- Duration of illness more than 3 months
- Cases of non-specific leucorrhoea

Exclusion criteria

- Pregnancy
- Anemia
- Sexually Transmitted Diseases
- Carcinoma of cervix
- Cervical fibroid
- Cervical erosion
- Pelvic inflammatory disease
- Vulvo vaginitis
- Genital Tuberculosis

TABLE 1
Parameters adopted and gradation

Sign & symptoms	Gradation
1. White discharge per vagina	
- Severe: Continuous, profuse discharge	20
- Moderate: Excess, on and off discharge	10
- Mild: Scanty white discharge	05
2. Pruritus	
- Severe: Intense itching in vagina/vulva	10
- Moderate: Itching limited to vagina/vulva	05
- Mild: Sometime itching in vagina/vulva	02
3. Cervical congestion	
- Severe: Congestion all around the cervix	10
- Moderate: Congestion over upper lip or lower lip of cervix	05
- Mild: Congestion around the os of cervix	02
4. Lower abdominal pain	
- Severe: Continuous pain, need analgesic	10
- Moderate: Time to time and difficulty to perform work	05
- Mild: Dull pain	02
5. Dysurea	
- Severe: Always burning micturation	10
- Moderate: Frequent burning micturation	05
- Mild: Occasional burning micturation	02
6. Low backache	
- Severe: Continuous pain even on rest	10
- Moderate: Pain during work	05
- Mild: Slight pain with on and off nature	02
7. Pain in external genitalia	
- Severe: Continuous intense pain	10
- Moderate: Time to time intense pain	05
- Mild: Occasional dull pain	02

Assessment criteria

Good response: 75-100% relief in the cardinal signs and symptoms; Fair response: 50-75% relief; Poor response: 25-50% relief; No response: Below 25% relief or no relief at all in the clinical signs and symptoms. The parameters adopted for gradation is shown in the Table 1.

Observations and results

Of 36 cases of non-specific leucorrhoea, the highest incidence was found in the age group of 26-35 years. The duration of illness in the patients under the study varied from 3 months to 4 years. (Table 2)

Analysis was done mainly on the basis of amount of vaginal discharge, pruritus and cervical congestion. 11 patients had severe discharge, 16 moderate and 5 cases showed mild discharge. After the treatment, the discharge relieved completely in 7 cases and it reduced to mild degree in 20 cases. Before the treatment, pruritus was severe in 7 cases and moderate in 22 patients. After the treatment, pruritus completely relieved in 10 cases and in 17 cases it reduced to mild grade. Cervical congestion was completely disappeared in 18 cases after the treatment. (Table 3)

On assessment of overall parameters, good response was found in 15 cases, fair response in 8 and poor response in 7 cases. 2 cases did not show any response (Table 4). On statistical analysis, efficacy of this treatment is found highly significant ($p<0.001$).

TABLE 2
Incidence of age and chronicity of disease

Particulars	No. of patients	%
1. Age group (years)		
15 - 25	12	33.33
26 - 35	18	50
36 - 45	04	11.11
46 - 55	02	05.55
2. Duration of illness		
3 months - 2 years	20	55.55
1 - 2 years	08	22.22
2 - 3 years	05	13.88
3 - 4 years	03	08.33

TABLE 3
Sign & symptoms before and after the treatment

Clinical features	BT		AT	
	No.	%	No.	%
1. White discharge P/V				
- Severe	11	34.37	1	03.12
- Moderate	16	50	04	12.5
- Mild	05	15.62	20	62.5
- No discharge	00	00	07	21.88
2. Pruritus				
- Severe	07	21.87	00	00
- Moderate	22	68.75	05	15.62
- Mild	03	09.37	17	53.12
- No pruritus	00	00	10	31.25
3. Cervical congestion				
- Severe	06	18.75	00	00
- Moderate	18	56.25	06	18.75
- Mild	05	15.62	08	25
- No congestion	03	09.37	18	56.25

TABLE 4
Result of the study

Response	No. of patients	%
1. Good	15	46.88
2. Fair	08	25
3. Poor	07	21.88
4. No response	02	06.25
Total	32	100

Discussion

The result of the treatment showed definite improvement in the signs and symptoms of śvetapradara. White discharge and cervical congestion were effectively reduced in a large number of cases. This may be due to the uṣṇa vīrya-kaphahara properties of nāgkesara. Disappearance of associated symptoms like pruritus, lower abdominal pain, low backache and burning micturation were also observed due to the properties of Godanti bhasma.

Conclusion

- Effective results were found in the reduction of white discharge and pruritus.
- Showed significant action on cervical congestion.
- Statistically highly significant action in overall parameters ($p<0.001$).
- Nāgkesaracūrṇa and Godanti bhasma are effective remedy in the treatment of non-specific leucorrhoea.

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EFFICACY OF A NUTRACEUTICAL DEVELOPED FROM AN ĀYURVEDIC FORMULATION IN THE GROWTH AND DEVELOPMENT OF INFANTS - A RANDOMIZED CONTROLLED TRIAL

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Abstract: Nutraceuticals is gaining interest among the consumers due to their potential health benefits. India is second largest producer of the food with plethora of nutritive and therapeutic compounds whose value is yet to be realised in modern market. The classical texts in āyurveda have various formulations which can be used as Nutraceuticals. Bālavilvamajjādi modaka mentioned in Aṣṭāṅgahṛdayam is described as a complementary food for weaning and is dīpana (digestive) in action. However, its efficacy as a weaning food is not evaluated using present clinical parameters. The present study clinically and statistically analyses the formulation in the form of granules developed from Bālavilvamajjādi modaka yoga as a weaning food for infants.

Introduction

Oh, God, give us food which does not cause any disease and gives us strength - Yajurveda.[1]

Every human being is the creator of his own health or disease. Good nutrition is the fundamental basic requirement for positive health, functional efficiency and productivity. Nutrition is important not only in promoting proper physical growth and development, but also in ensuring adequate immune competence and cognitive development.

The ancient ācāryas who described āyurveda as "science of life" had in-depth knowledge and understanding about the delicate relationship between food, nutrition and health. They realised the fact that food can be used as medicine. While describing treatments for various ailments, they have pointed out the role of diet regimen for curing/preventing that particular disease.

Pathyakalpana is a vast area dealing with different type of food preparation having tremendous healing properties. Ācārya Kaśyapa says that 'the food is said to be the cause of stability for all living beings and there is no medicament similar to diet. One is capable to be disease-free only with congenial diet. It is not possible to sustain life without diet even if endowed with medicine. That is why the diet is said to be the greatest medicament by physician.'

This judicious thinking is now accepted worldwide as a new emerging area of scientific interest - Nutraceuticals. The term 'nutraceutical' was coined by Stephen L. DeFelice in1989 from

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the words nutrition and pharmaceutics. It is defined as 'a food or part of a food that provide medical or health benefits including the prevention and treatment of diseases'.

Food or part of food which is being cooked or prepared using a scientific intelligence is an important tool to address most of the health care problems that are occurring due to DNA related disorders, age related disorders, nutrition related disorders like under nutrition and so on.

The nutritional needs of a child should be met from the time of birth through the phase of breast feeding and supplementary foods. In fact, infant feeding is the matter of great concern in the field of nutrition since malnutrition of early childhood has long term serious consequences as it impedes motor, sensory, cognitive, social and environmental development. The concept of nutraceuticals is now widely discussed in the area of child nutrition and it is one of the fastest growing segments of food industry, especially among affluent baby boomers.

Early weaning due to different causes is becoming a serious issue in our society. Introduction of a complementary food at the time of transition when the child accustoms semi solid foods is beneficial. An ideal complementary food should be easily available, palatable and cost effective. Nutritive value of the food should meet the requirement of growing infant. Traditionally and culturally acceptable and locally available weaning food is preferred.

The formulation named Bālavilvamajjādi modaka mentioned in the chapter of Bālopacaraṇīyam in Aṣṭāṅgahṛdayam (Uttarasthānam) is a complementary food for weaning and is dīpana (digestive) in action. Also the organoleptic character of the formulation has got much importance as it affects the intake of complementary food by the growing child. By this study an attempt is made to develop a user friendly nutraceutical formulation as a weaning food for infants and find out its efficacy in the growth and development of infants.

Aim and objectives

1. To develop a user friendly nutraceutical formulation as a weaning food for infants.
2. To evaluate the efficacy of the formulation in the growth and development of infants.

Pharmaceutical study

Bālavilvamajjādi granules

Preparation:- Lāja (parched rice), clean and dried pulp of vilvaphala (fruits of *Aegle marmelos*) and seeds of ela (*Elettaria cardamomum*) were finely powdered and homogenously mixed. Sugar candy was used in lieu of sugar as it has properties like balya and bṛmhaṇa and frequently used in pediatric formulations traditionally than the latter.

The proportion of ingredients is not mentioned in the classical texts. Lāja, vilva and ela were taken in the ratio 4:2:1. Four times of sugar candy was taken in relation to cūrṇa as the general rule. Sugar candy was completely dissolved in required quantity of water. It was filtered using a cloth to remove the impurities, if any.

The filtrate was taken in clean vessel and heated over mild fire. After reaching the proper pāka, (for getting the consistency of granules, pāka should be just above the lehapāka) the vessel was removed from fire. Powdered drugs were added into this and mixed well. After attaining the consistency of dough, it was pressed down through a suitable sieve of number10 superimposed on number 22. The granules were

dried by spreading and keeping them in hot air oven at a temperature not exceeding 60° C.

Dose

No specific dose is mentioned in the text. Since it is a food formulation, it has to be taken according to the digestive power of the child. Digestive power is depend upon the age of individuals. A trial dose of 30 g once daily was taken and fixed later.

Analysis

Bulk density is defined as the mass of the granule/powder divided by the bulk volume. It is important in the case of packing of granules and powders. Porosity is the total space present in a collection of powder/granules. Void porosity of granule is 54.3%. The value of void porosity denotes the granule has got a good disintegration and dissolution rate. It is also having good flow properties.

Angle of repose is the maximum angle possible between the surface of pile of powder/granule and the horizontal plane which determines the flow properties of granules. Angle of Repose of Bâlavilwamajjadi granule is 31°.24. The granules show a good reasonable flow property.

Analytical study

After preparation of the formulation, two samples were analysed in the laboratory: a) Sample 1 (raw) - Raw drugs without sugar and b) Sample 2 (B V Granules) - Bālavilvamajjādi granules

The organoleptic characteristics of analytical samples and the details of analytical specifications are shown in Table (1&2).

Qualitative analysis showed that the samples contain alkaloids, phenolics and flavanoids. Both samples contain high amount of flavanoids. Qualitative analysis of sample 2 for alkaloids showed more positive results denoting the presence of alkaloids in other ingredients. The TLC results indicate the presence of almost all the constituents of sample 1 in sample 2. Solvent system 1-Acetone, chloroform and benzene (4:4:1), showed more spots than solvent system 2 -Toluene and Ether saturated with 10% Acetic acid (1:1).

TABLE 1
Organoleptic characteristics of analytical samples

Characteristics	Colour	Odour	Touch	Taste	Consistency
Raw	Light yellow	Pleasant	Smooth	Bitter	Powdery
B V granules	Creamy	Pleasant	Hard	Sweet	Granular

TABLE 2
Details of analytical specifications

Analytical Specifications	Raw drugs*	B V Granules
1. pH	6.6	6.8
2. Loss on drying (%)	10.6	3.7
3. Total ash (%)	3.64	0.65
4. Water soluble ash (%)	1.82	0.3
5. Acid insoluble ash (%)	0.45	0.1
6. Cold water extractive (%)	34.26	84.6
7. Alcohol soluble extract (%)	5.72	5.18

*Without sugar

Nutritional study

Assessment of nutritional value is important in the case of food formulations. Nutritional studies of the formulation were carried out at National Institute for Interdisciplinary Science and Technology, Council of Scientific & Industrial Research, Thiruvananthapuram. Total calorie, percentage of carbohydrate, protein, fat and presence of micro nutrients were evaluated (Table 3). Micronutrients such as sodium,

TABLE 3
Nutritional % of BV Granules in100g

Nutrient	Calorie	Percentage
1. Protein	10.20	40.80
2. Carbohydrates	77.77	311.08
3. Fat	3.30	29.70
Total		381.58

potassium and calcium were found at 0.11, 0.31 and 0.08% respectively.

Methodology of clinical study

Study design: - The study design was a randomised controlled trial. 30 participants were selected as per inclusion and exclusion criteria and randomised in to study and control group comprising 15 each by simple random sampling. Both the groups were given a designed diet chart. Apart from that the study group was given the nutraceutical formulation. A detailed clinical examination was conducted before and after the study using a prepared clinical proforma. The effect of the formulation was assessed by evaluating the signs and symptoms.

Study setting and population: - The study was carried out in the Immunization Cell, Women and Children Hospital, Poojappura, Thiruvananthapuram. Selection of infants was done irrespective of sex, caste, religion and economic status, between the ages of 6 months to 12 months.

Inclusion criteria

1. Children who had started weaning
2. Maximum age limit up to 12 months

Exclusion criteria

1. Children of age below 6 months and above 12 months
2. Nutritional deficiencies associated with pathological conditions
3. Children with congenital abnormalities

Intervention schedule:- Two groups were made identical in all aspects except that in the study group, intervention 30g of Bālavilvamajjādi granules were given once daily along with required quantity of milk for a continuous period of 60 days. Milk was given since it is congenial to children. Both study and control group were given a designed diet chart and were subjected to intervention for a continuous period of 2 months.

Variables: - In this study the study drug, Bālavilvamajjādi granule was the independent or experimental variable. Growth and development along with morbidity was taken as dependent variable. Diet and activities of the child, medication and illness of both mother and child, different type of infections, environmental variations, poor hygiene, etc. are coming under intervening variables

Follow up: - Interventional schedules were advised for both study and control group and advised to attend the O.P at regular intervals to measure the morbidity if any, including weaning difficulties. Any change in the normal habits of the children was asked to be reported immediately. A specific data sheet of the reports for each participant was kept for the assessment of morbidity. Detailed evaluations were done before and after the intervention after 2 month for each participant.

Collection of data:- The data was collected by using prepared clinical proforma. Demographic data of the participants and data related to intervention were collected as per the protocol.

Assessment criteria

Assessment of both study and control groups were done before and after the study using relevant measures that are internationally accepted.

1. Measurement of morbidity-ill health which occurred with the child was recorded using the parameters of morbidity indices like Incident rate and Prevalence rate
2. Nutritional anthropometry include Length/ height, Weight, HC, CC, MUAC and BMI
3. Trivandrum Developmental Screening Chart.

Statement of major findings

The socio demographic data has high significance in a nutritional study. Out of the total 30 participants 80% were urban dwellers, 53% from the middle class family, 47% from poor category and none from a high class family attended the study. 60% of the parents were poorly educated and 40% moderately. Low educational status of parents adversely affects infant nutrition because they are unaware of the importance of proper weaning and improved weaning practices. Artificial feeding requires a significant expenditure and is a burden on low income group and poor families. Poor economic status thus indicates less resources and poor nutritional adequacy.

43.3% of participants were started weaning before the age of 4 months, which is much earlier than the time recommended by the WHO. 16.7 % started weaning at the age of 5 months and 30%started at 6 months. Only 10% were exclusively breast fed baby up to six months. Replacing breast milk with complementary food in early infancy makes the child undernourished.

46.6% started complementary feeding with tin food which is a bad practice when compared with traditionally and culturally acceptable weaning food. Remaining 53.4 % were started with other traditionally used items like ragi, banana, etc.

About 74% of participants were taking mixed diet during complementary feeding. In a balanced form, mixed dietary practices provide a rich source of amino acids and proteins from non vegetarian food. The digestive capacity of infants is unstabilised during the period of transition from breast feeding to complementary feeding. 16.7% were under weight at birth and 80% of the infants had optimal birth weight which has its own effect in the baby's growth potential in the later years.

After the interventional period of two months, its efficacy was assessed by using nutritional anthropometric measures like, Length/height, Weight, HC, CC, and MUAC. BMI was not taken as a parameter as it is reliable only after 2 years of age. On analyzing the parameters of growth, length and weight of study group have shown statistically significant difference when compared to control group. An increase in weight was seen both in study group and control group to be statistically highly significant with t-value 29 and p-value<0.001 and with t-value 11.311 and p-value <0.001 respectively. The study drug was significantly effective than control drug in increasing the weight of the child. An increase in length was seen both in study group and control group to be statistically highly significant with t value 11.167 and p<0.001 and with t value 7.302 and p value <0.001 respectively. The study drug was significantly effective than control drug in increasing the length of the child

None of the parameters (HC, CC and MUAC) in the study group, which received Bālavilva-majjādi granules along with diet chart, showed statistically significant difference when compared to the control group though there were improvements within the groups. Mean difference in chest circumference of the child

before and after intervention in study group was 1.1 and for control group it was 1.0933. Here 't' value is 0.063 and 'p' value is 0.95and thereby statistically not significant.

Mean difference in head circumference of the child before and after intervention in study group was 0.64 and for control group it was 0.6467. Here 't' value is 0.154 and 'p' value is 0.879 and thereby statistically not significant. Mean difference in mid-upper arm circumference of the child before and after intervention in study group was 0.3067 and for control group it was 0.3333. Here 't' value is 0.754 and 'p' value is 0.457and thus, statistically not significant.

Thus, the length and weight are very sensitive parameters compared to other anthropometric parameters.

The effect of granule along with prescribed diet schedule was assessed using approved TDS chart for assessing developmental milestones. Only children having normal developmental pattern for the age were assigned to the study. After the completion of the intervention, it was found that all the children in both groups had reached the developmental mile stones in time and had no significant difference between the study and control group.

Assessments of morbidity conditions like constipation, loose stools, regurgitation, recurrent respiratory infections and reduced appetite were monitored. 6 participants of the control group complained about reduction in appetite while only one complained in the study group. This may be due to the digestive action of the study drug that results in the increased digestive power. 4 participants of the control group had loose stools while none in the study group. Constipation developed in 2 participants of study group and in 4 participants of the control group. 5 participants of the control group and 4 participants in the study group showed symptoms of common cold and fever.

No adverse drug reactions were noticed during the course of study.

Probable mode of action

Bālavilvamajjādi modaka is indicated for complementary feeding and is dīpana (digestive in action). It contains four ingredients viz. phala majja of bāla vilva (unripened fruit pulp of vilva) ela, śarkkara (sugar), lāja saktu (puffed rice powder). Sugar candy was taken instead of sugar because it has the qualities alike to bṛmhaṇa (stoutness the body) and balya (bestows strength), the two main properties that should be needed for the proper growth and development in infants.

The digestive capacity of the child is not fully developed at the time of exclusive breast feeding. The breast feeding child (kṣīrapa) has equilibrium of agni which becomes unstable when intake of food (annaprāśana) is initiated. It is important to start weaning using a suitable formulation when child is accustomed to semisolid foods. The digestive action of this formulation helps to strengthen and stabilise the digestive fire.

Dīpana action of formulation can be described in terms of individual properties of its ingredients. Vilvaphala is having kaṭu tikta kaṣāya rasa. Kaṭurasa has got dīpana, pācana and rucya properties. Tiktarasa is dīpana, pācana rucya and medhya. Dīpana and pacana action of vilvaphala helps to strengthen and stabilise the digestive fire. In terms of action on different doṣas, vilvaphala is vātakaphahara and pittakṛt. Pittakara properties helps in agnidīpana.

Also, laghu rūkṣaguṇa, uṣṇa vīrya and kaṭu vipāka are contributing to the agnidīpana action. Ela is anulomana and dīpana. Anulomana of vāta causes proper functioning of agni.

Strengthening of jaṭharāgni exerts its effect on different dhātvagnis. It helps in the proper digestion and assimilation of dhātus right from rasadhātu to śukḷadhātu. The properly maintained agni will hinder the production of āma which in turn causes proper functioning of srotases and ultimately ends in effective dhātu pariṇāma. All these contribute to the proper growth and development of growing infants.

Out of the four ingredients, three are having madhura rasa. On analyzing vīrya, three drugs possess śītavīrya. Three out of four drugs are laghu. Two drugs, lāja and khaṇḍa sita are snigdha and bṛmhaṇa. Three drugs are having madhura rasa, śītavīrya, madhuravipāka and snigdhaguṇa which contributes to bhṛmhaṇa karma. The formulation has dominance of madhurarasa which is māmsa medha asthi vardhana, āyuṣya, indriyaprasādhana, balavarṇakara, prīṇana, jīvana, tarpaṇa, bṛmhaṇa and sthairyakara due to its śarīrasātmyatva. All these factors help in the proper growth and development of infants.

Ācārya Kaśyapa says that diet given to the child for growth and development should be madhura, snigdha, laghu, śīta and hita. Analysis of this formulation as a weaning food justifies the statement of ācārya.

Unripe vilvaphala cures colic arising from kapha, vāta and āma which may have a positive effect in curing one of the weaning dilemmas - intestinal colic. Unripe fruit cures diarrhea and dysentery. Vilvaphala is grāhi in nature. Feedback from the participants shows that formulation is not causing constipation in children.

Apart from the therapeutical properties, ela gives flavor and aroma to the formulation which facilitates intake of complementary foods by the infants. Presence of lāja reduces the heaviness of the formulation and provides a suitable environment for proper digestion of the formulation. It is nutritional with enough micro and macronutrients and contains trace amount of fat. Apart from this, it is the drug of choice for chardi (vomiting). Hence addition of lāja in the formulation will reduce two major conditions associated with weaning-vomiting, regurgitation.

Conclusion

Bālavilvamajjādi modka is a complementary food that is given during the time of weaning. The kṣīrapa has equilibrium of agni which became unstable while annaprāsana is started. This may cause various problems associated with weaning including constipation, loose stools and loss of appetite. The dīpana action of the formulation stabilises the gastro intestinal tract, thereby overcome the above said problems and this is evident from the study. Recent studies suggest that, the constituents present in vilva namely marmelosin and furocoumarin have potent digestive and anti-diarrheal action. The fruit pulp is very effective for diarrhea and dysentery. It is stomachic and is good in dyspepsia. It contain high amount of coumarins, steroids, and flavanoids. From the nutritional study, the formulation Bālavilvamajjādi granules provide reasonable calories from carbohydrate, fats and proteins. It also contains traces of micronutrients. Thus Bālavilvamajjādi granules can be included in the category of traditional nutraceuticals that are simple, natural whole food with newer information about their potential health benefits.

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EXCELLENCY OF ĀYURVEDA IN OLIGOSPERMIA (ŚUKRĀLPATA) - A CASE REPORT

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Abstract: Oligospermia means deficiency of sperm in the semen. The present case revealed the spermatogenesis effect of some āyurvedic medicines viz. Puṣpadhanva rasa, Vaṅgabhasma, Svarṇamākṣikabhasma, Agnituṇḍi vaṭi and Śatāvaryādi cūrṇa in a known case of oligospermia. The trial drugs were procured from the local market. These śukravṛdhikara drugs found to be improved remarkably the quality and quantity of sperm count. After two months of treatment, the semen analysis report was showed 'normospermia'.

Introduction

Oligospermia is a deficiency in the number of spermatozoa in the semen[1] and is a common finding in male infertility. Often semen with a decreased sperm concentration may also show significant abnormalities in sperm morphology and motility.

Oligospermia is defined as less number of sperm in the ejaculation of the male. Among infertile couple, 40% are due to the infertility of the male partner, while in 20% of these cases it is a combination of both male and female factors. Out of the several causes of male infertility, oligospermia is considered as an important cause.

As per āyurveda, oligospermia can be correlated with śukrakṣaya, even though none of the āyurvedic texts have mentioned about count of sperm or motility of sperm but mentions the quality of semen in the form of śudhaśukra lakṣaṇa. Śukra is the seventh dhātu of the body which is mainly responsible for santānotpatti (reproduction).[2]

Āyurvedic classics describe the śukradhātu as sphaṭikābha (white in colour), drava (liquid), snigdha (unctuous), picchila (sticky), guru (heavy), bahaḷa (viscous), madhura (sweet), madhugandhi (smelling like honey) and taila-kṣaudranibha (resembling oil and honey in consistency). This description aptly pertain to the semen (retas/śukra/vīrya) of the adult male which is responsible for reproduction[3]. This complex fluid is a mixture of secretion of vṛṣṇas (testes), adhivṛṣaṇika (epididymus), śukra-vāhinis (seminal vesicle), asthila (prostrate) and other glands situated nearby.

Āyurveda has a separate branch which deals with not only the treatment modalities related

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to śukrakṣaya (oligospermia) but also dealing with various other aspects regarding holistic approach toward better sexual health of an individual, under chapter of Vājīkaraṇatantra. Cakrapāṇi, commentator of Carakasamhita, has categorised vājīkaraṇa drugs into three viz. śukrasrutikara dravya, śukravṛdhikara dravya and srutivṛdhikara dravya.[4]

Case presentation

A male subject aged 33 years, married 2 years back, a mobile phone mechanic by profession, was examined in the hospital (OPD) on 26.10.2010 (OPD No 3065/10-11) for oligospermia. He had no previous history of mumps, orchitis, gonorrhoea, epididymis orchitis, and exposure to radiation or any toxin or chemical agent. He had suffered from jaundice and chicken pox in the childhood, and from depression in 2008.

He had done 6 months' conventional therapy for sterility but was unsuccessful. On examination, the body proportion was found to be thin and lean with moderately developed; the secondary sexual characters were belonging to vātapittaprakṛti and asthisāra. There was no any abnormal findings seen in the physical examination.

Treatment

The treatment was carried out with the following medicines (Table 1) for two months. During this

TABLE 1
Medicines used for the treatment

Name of drugs	Dose*	Anupana
1. Puṣpadhanva rasa	250mg	with honey
2. Vaṅgabhasma	250mg	
3. Svarṇamākṣikabhasma	125mg	
4. Tab Agnituṇḍi vaṭi	125mg	with water
5. Śatāvaryādi cūrṇa	3g	with milk

*Twice daily

TABLE 2
Result of semen examination

Particulars		Before treatment	After treatment	
			11.12.2010	20.01.11
01	Appearance	Whitish mucoid fluid	Whitish mucoid fluid	Whitish mucoid fluid
02	Liquefaction	35 minutes	30 minutes	35 minutes
03	Volume	4.5 ml	3.2 ml	2.8 ml
04	pH	7.7	7.4	7.7
05	Total sperm concentration	29 million/ml	50 million/ml	66 million/ml
06	% of motility	33%	42%	47%
07	% normal morphology	20%	28%	35%
08	Total Functional Sperm Concentration (TFSC)	2.9 million/ml	9.5 million/ml	15.9 million/ml
09	Motile Sperm Concentration (MSC)	9.5 million/ml	21.0 million/ml	31.0 million/ml
10	Sperm Motility Index (SMI)	79	136	178
11	MSC after 2 hrs	4.8million/ml	14.2million/ml	20.1million/ml
12	MSC after 4 hrs	1.2million/ml	3.4million/ml	8.2million/ml
13	Pus Cells	Occasional present	Occasional present	Occasional present
14	Red blood cells	Nil	Nil	Nil

period the patient was advised to take snigdha (oily) and santarpaṇa āhāra (nutritive diet like milk, blackgram, etc.) After the treatment, the report on 20-01-2011 showed marked improvement in the symptoms with a remark of 'normospermia'.

Observation and result

The patient had followed the diet and drug restrictions strictly. The semen analysis was made at regular interval. The result of semen examination is shown in Table 2.

Discussion and conclusion

Oligospermia is one of the most prevalent reasons for male infertility. The present finding based on sperm test and the effective management of oligospermia with āyurvedic formulations with no adverse effect highlights the promising scope of traditional medicines in the infertility disorders. Rasatantrasārasidhaprayogasamgraha (Part I), mentions that Vaṅgabhashma and Puṣpadhanvarasa act on reproductive system and improve quality and quantity of śukradhātu.[5]

After the treatment, the semen analysis report showed an increase of total sperm concentration to 66 million/ml which was 29 million/ml before the treatment. Percentage of motility, total function of sperm concentration and sperm motility index were also found to be increased markedly (Table 2).

The present study reveals the effective management of śukrālpata (oligospermia) by āyurvedic treatment, especially by particular rasauṣadhis.

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KAYYADEVA'S CLAIM OF APAKVA KADAḶĪPHALA IN MADHUMEHA - A CLINICAL STUDY

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Abstract: Madhumeha (diabetes mellitus) is considered as asādhya due to involvement of ojas. The pollutants in the environment and increased stress and strain in life contribute to ojakṣaya which could further deteriorate the condition and worsen the disease. The present study evaluates Kayyadeva's claim of efficacy of prayojyaṅga i.e. apakvaphala (unripened fruit) of kadaḷi (*Musa paradisiaca* L.) in madhumeha compared to its other parts i.e. flower and false stem. Total 30 patients were selected randomly and divided equally into 3 groups. Group A was treated with unripe fruit powder, group B with flower powder and group C with stem powder. It is concluded that all the 3 drugs have significant effect on diabetes mellitus; however, unripened fruit powder is more significant than other 2 parts of the drug.

Introduction

A specific part of a plant is told as useful part (prayojyaṅga) based on the accumulation of active principle in that particular part. This useful part is more potent to perform pharmacological actions than any other part of the drug. Hence this useful part can be considered as vīryavan (potent) through which karma can be expected. Keeping this in mind and so also Kayyadeva's suggestion of apakvaphala of kadaḷi (*Musa paradisiaca*) in madhumeha, the drug was selected. Simultaneously, the other parts i.e. puṣpa (flower) and kāṇḍa (false stem) also studied to substantiate the efficacy of the suggested prayojyaṅga.

The present study involves a comparative study of different parts of kadaḷi with special reference to madhumeha.

Drug review

According to Nighaṇṭu ādarś, it (kadaḷi) attracts people with its good qualities (or) it invites people to use it.[1] It is cultivated throughout India (Fig I). The properties and actions of its different parts are shown in Table 1.

Toxonomical classification:

- Kingdom — Plant kingdom
- Division — Phanerogams
- Sub division — Angiosperms
- Class — Monocotylydanae
- Series — Epigynae
- Order — Scintaminales
- Family — Musaceae
- Genus — *Musa*
- Species — *Musa paradisiaca*

Parts used: - Root, tuber, stem, leaves, flowers,

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unripened and ripened fruit

Posology:- Curnam - 1-3gm; svarasam - 10-20ml
Anupānam: - Water or honey.

Disease review

Prameha

It is a disease manifesting in one of the trimarmas namely vasti. Though it is an endocrinal problem, it is included under mūtravaha srotovikāra, because its manifestation is seen in mūtravaha srotas. The term prameha is literally derived by two words: 'pra' (excessive) and 'meha' (discharge). It means the frequent excretion of excessive urine.

The characteristics of prameha are: 1) cirakālīna (chronic), 2) ānuṣāṅgitva (relapsing type), 3) mahāgada [one of (eight) mahāgadas mentioned by Suśruta] and 4) bījadoṣat - kulaja vyādhi (congenital/hereditary/inherited disease). Its classification is shown in Chart 1.

Rūpa: - Prabhūta mūtrata, āvila mūtrata, pipāsa, tāluśoṣa, pipīlikābhisāraṇam and symptoms of ojakṣayam are the rūpas of madhumeha. The mūtra (urine) of a madhumehi (diebetic) will be similar to that of honey. Suśrutasamhita describes the patient suffering from madhumeha as desire of a man to stand while walking, to sit while standing, to repose while sitting and to sleep while lying.

Fig. I. *Musa paradisiaca*

Diabetes mellitus

Diabetes mellitus (DM) is a clinical syndrome characterised by hyper-glycaemia due to an absolute or relative deficiency of insulin, which affects the metabolism of carbohydrates, proteins and fats. Long-standing metabolic derangements are frequently associated with permanent and irreversible damage. Functional and structural changes in cells of the body, irrespective of presence of abundant glucose in extra cellular compartment there is a situation for cells, like starvation in the midst of plenty.

Classification: - On the basis of the etiology it is classified as: primary or idiopathic DM and secondary DM. Primary DM is further classified as Insulin Dependent Diabetes Mellitus (IDDM - Type 1 juvenile onset type) and Non Insulin Dependent Diabetes Mellitus (NIDDM - Type 2 maturity onset type). Gestational diabetes and Steroid induced diabetes come under Secondary DM.

Clinical features: - Thirst, polydypsia, polyurea, nocturia, tiredness and lassitude; weight loss, numbness or pain in the limbs, pruritis vulvae or balanitis; disturbances of vision, change in

Chart 1
Classification of Madhumeha

Nidānam	Dehaprakṛti	Doṣa	Sādhya/ asādhyata
Sahaja	Kṛśa	Vāta	Sādhya
Apathya	Sthūla	Pitta	Yāpya
		Kapha	Asādhya

refraction, impotence (in males); itching, long-term skin infection, ketosis and coma (seen in later stages) are the clinical features of DM. In advanced cases the patients show signs associated with diabetic retinopathy, diabetic neuropathy and nephropathy

Materials and methods

The clinical study was conducted at Dr. BRKR Govt. Ayurvedic Hospital, Hyderabad. Total 30 patients were selected and as the aim of the study was to compare the efficacy of the three parts of same drug, the patients were divided into 3 groups (10 subjects in each). Group A was treated with unripened fruit-powder, Group B with flower-powder and Group C with stem-powder. The Diagnosis of the patient was conducted on the basis of specially prepared case sheet where the assessing parameters would be of the subjective and objective.

Objective parameters: - Fasting blood sugar; post lunch blood sugar; random blood sugar and urine sugar.

Subjective parameters:- Āvila mūtrata, atisvedam, karapādadāham, pipāsa, prabhūta mūtrata, tāluśoṣam.

Inclusion criteria: - NIDDM without complications.

Exclusion criteria: - IDDM, Gestational DM

Drug, dose and administration

Three parts (flower, unripened fruit and stem) of kadaḷi were collected from the local market, dried in shade and powdered separately and stored in airtight containers. (Fig II)

TABLE 1
Properties of different parts of kadaḷi

Properties	Unripened fruit	Ripened fruit	Stem	Tuber	Flower	All parts
1. Rasa	Tikta Kaṣāya	Madhura Kiñcit Kaṣāya	Kaṣāya	Kaṣāya Madhura	Tikta Kaṣāya Madhura	
2. Guṇa	Guru Rūkṣa	Guru Śīta Snigdha	Guru Śīta	Rūkṣa Laghu Śīta	Rūkṣa	
3. Vīrya	Śīta	Śīta	Śīta	Śīta	Uṣṇa	
4. Vipāka	Madhura	Madhura	Madhura	Madhura	Madhura	
5. Actions according to doṣas	Kaphahara Pittahara	Pittahara	Rakta pitta hara	Kapha pitta hara	Tridoṣa hara	
6. Karma		Śoṇitāsthāpanam Balyam Māmsaḷam Jīvanīyam Viṣṭambhi Śukraḷam Rucyam Hṛdyam		Keśyam Dīpanam Raktaśodhaka Rajodoṣahara	Grāhi	Tridoṣahara

The unripened fruit powder was administered to Group A, flower powder to Group B and stem powder to Group C - each in a dose of 3g - BID with water as anupānam (additive) for 45 days.

Assessment:- The parameters were observed and recorded at the intervals of 15 days and results assessed and analysed statistically.

Results and observation

Distribution of patients in each range of FBS and PPBS (Group A, B&C) before and after the treatment is shown in Table 2. The Mean and S.D of FBS and PPBS in Group A, B and C before and after the treatment is shown in Table 3.

All the three drugs found effective in the clinical symptoms of prameha. In objective investigations, all the three groups showed higher significant reduction in FBS and PPBS. The unripened fruit-powder of kadaḷi (group A) showed significant effect in FBS and PPBS (Table 4). On comparative analysis, Group A showed significant effect over Group B and C in FBS and PPBS (Table 5). All the 3 drugs have definite effect on FBS and PPBS.

Discussion

Demographic observations on incidence of diabetic groups showed that most of the patients were male, middle aged, rich and middle class people. Males are more prone than females as they are usually subjected to stress. The incidence was more in the age group of 41 and above due to predominance of vāta (as madhumeha is a vātaja type of prameha). Regarding diet, the disease is more prone to non-vegetarian as it leads to obesity which precipitates diabetes.

Regarding nature of work disease is more in employees as these people are subjected to stress and strain. The disease is more prevalent among middle class and rich people due to their sedentary life style. According to residential

TABLE 2

Distribution of patients in each range of FBS and PPBS (Group A,B&C) before and after the treatment

Description	Group A				Group B				Group C			
	BT		AT		BT		AT		BT		AT	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
I. FBS % mg												
Below 110	1	10	8	80	1	10	7	70	1	10	6	60
111 - 120	1	10	1	10	2	20	2	20	2	20	3	30
121 - 130	4	40	1	10	3	30	1	10	4	40	0	0
131 and above	4	40	-		4	40	-		4	40	0	0
Total	10	100	10	100	10	100	10	100	10	100	10	100
II. PPBS % mg												
Below 180	-	10	8	80	-	-	7	70	0	10	6	60
181 - 200	2	20	1	10	3	30	2	20	5	50	2	20
201 - 220	5	50	1	10	4	40	1	10	4	40	2	20
221 and above	3	30	-		3	30	-		1	10	0	0
Total	10	100	10	100	10	100	10	100	10	100	10	100

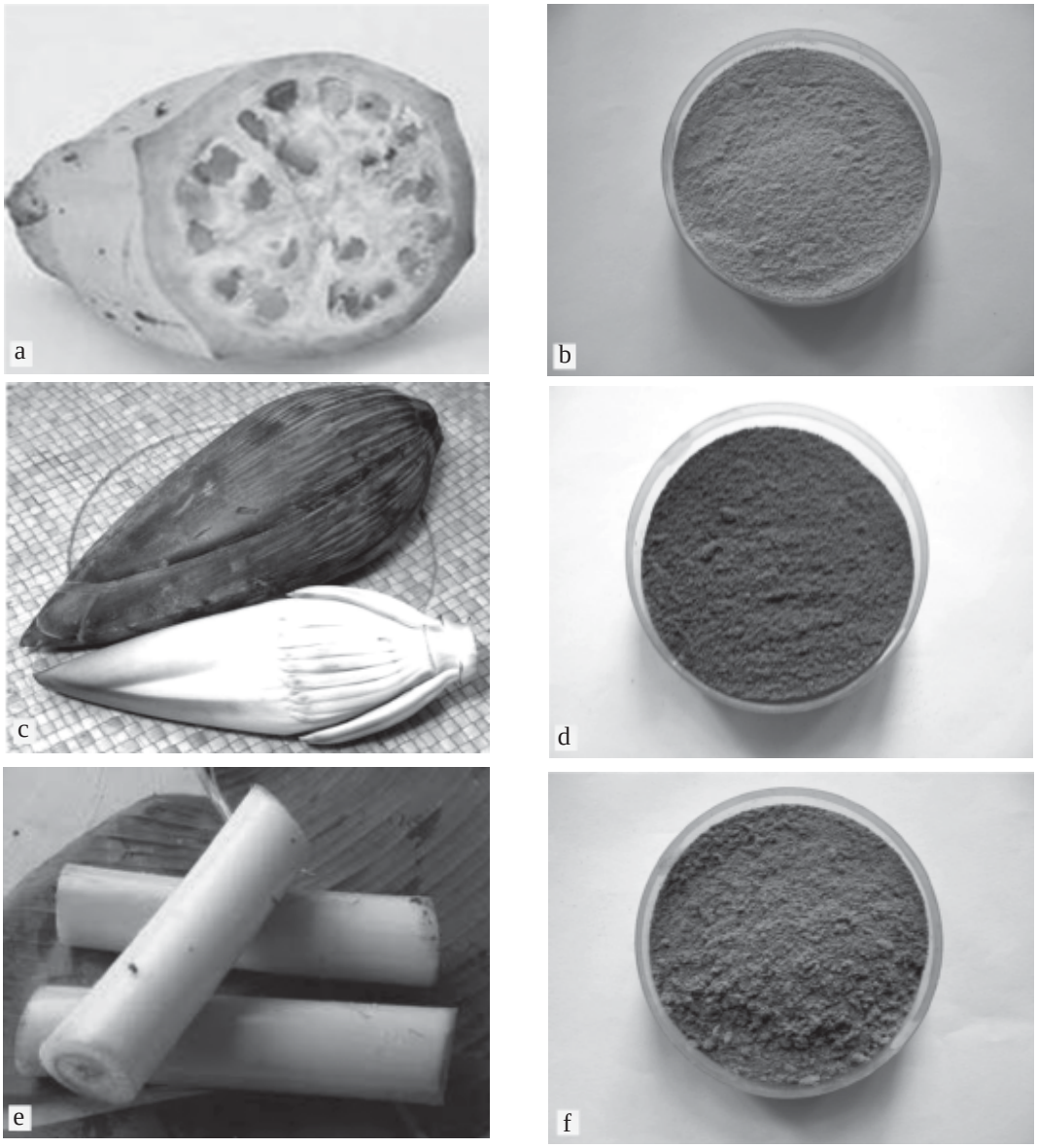

Fig. II. *Musa paradisiaca*

a Unripened fruit; **b** Unripened fruit-powder; **c** Flower;
d Flower powder; **e** False stem; **f** False stem powder

TABLE 3
Mean and SD of FBS and PPBS in
Group A, B and C before and after the treatment

Description	Mean		SD	
	BT	AT	BT	AT
1. FBS (mg/100 ml)				
- Group A	126	103	11.50	6.74
- Group B	125	105	10.50	6.99
- Group C	124	107	9.94	7.02
2. PPBS (mg/100 ml)				
- Group A	212	174	14.75	13.49
- Group B	210	178	16.32	13.99
- Group C	202	179	14.142	16.8

TABLE 4
Effect of unripened fruit of kadali on FBS & PPBS

Description	Mean	SD	't'	Diff.
1. FBS (mg/100 ml)				
- Group A	20	8.88	6.75	9
- Group B	23	9.42	7.32	9
- Group C	17	8.62	5.92	9
2. PPBS (mg/100 ml)				
- Group A	38	14.13	8.50	9
- Group B	32	15.19	6.66	9
- Group C	23	15.52	4.63	9

* P = <0.001

TABLE 5
Comparative objective analysis between group
A, B & C on FBS and PPBS (mg/100 ml)

Para-meter	Mean			SD	't'	Diff.
	A	B	C			
1. FBS	23	20	17	8.979	6.69	27
2. PPBS	23	20	17	8.979	6.69	27

*P = 0.001

areas the disease is more in urban areas due to industrialisation and increased population. These findings correspond to the causes of madhumeha.

Probable mode of action of drug: - Kadaḷi apakvaphala (unripened fruit) and puṣpa (flower) consists of tikta kaṣāya rasa, rūkṣa guṇa, kaphahara, grāhi and dīpana properties. Kadaḷi kanda possess kaṣāyarasa and dīpana properties. The relief from prabhūta mūtrata may be interpreted in terms of rūkṣaguṇa and grāhi karma. Kaṣāyarasa and rūkṣaguna act as kḷedahara and helps to remove obstruction from srotas. The dīpana karma will help increase agni. Āvila mūtrata is reduced due to tikta kaṣāyarasa and kaphahara property. Ātisvedam is reduced due to correction of agni by dīpana property. Tāluśoṣa can be attributed to udakavaha srotodusṭi as this drug contains more water content helps in correction of tāluśoṣa.

Conclusion

Based on statistical analysis of the clinical trial, it is concluded that the three different parts i.e. unripened fruit, flower and stem have significant hypoglycemic action and of them, the most significant is unripened fruit.

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GUṆA-EXPLICATORY TOOL IN ĀYURVEDA

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Abstract: The structural speciality of a dravya is its guṇa which alone is responsible for a specific function. Knowledge about guṇas is indispensable to explore and expound anatomy, physiology, pathology and pharmacology and also to determine the mode of approach (treatment) that should be adopted in a disease in āyurveda. Vimśati-guṇas could be defined as that which help to identify a dravya as well as that which help to perceive its nature of functioning. The āgantu doṣa guṇas interact with the śārīrika guṇas of sthānika doṣa (dhātus) resulting in various diseases (doṣa-dūṣya sammūrchana). Knowledge of guṇas of āgantu doṣa and the guṇas of sthānika doṣa help to attain the perfect understanding of a roga as well as the pertinent application of a treatment. Each guṇa is present in one bhūta or more than one bhūtas. A set of guṇas may take part in the pathogenesis. As many guṇas and many bhūta abnormalities are present in a samprāpti, diseases are treated with treatment principles rather than hostile guṇas alone. Guṇa viparīta treatment is done against āgantu doṣa guṇas with slight alterations according to bhūta predominance. Thus āturantarātma-praveśana is possible by exploring vyādhi (sthānika doṣa) guṇas, āgantu doṣa guṇas and finally by exploring the guṇas of bhūtas that are involved in the pathogenesis.

Doṣasāmya[1] or functional equilibrium is nothing but the normal and proper functioning of Pañcamahābhūtas (PMB) in the body. A function is performed by a structure or by a set of structures. The structural speciality of a dravya is its guṇa which alone is responsible for a specific function. Thus the nature of functioning is determined by the structural peculiarities or guṇas.[2] All the guṇas of PMB that function in a peculiar way are enumerated under one doṣa. So doṣas perform their functions in several ways through different structures (PMB) having different structural specialities (guṇas). Different functions of doṣas are done with specific guṇas. Finally each karma performed by a guṇa of a doṣa is by several bhūtas. Hence a complete knowledge about guṇas is indispensable to explore and expound anatomy, physiology, pathology and pharmacology in āyurveda.

Guṇas help to identify a dravya and also help to perceive its nature of functioning. The structural peculiarities of a somatic structure represent the functions already performed in the body while guṇas of extrinsic factors indicate the nature of effect it is going to perform in the body. Eg: the structural peculiarity that develops after stored energy (sneha) gets used up is rūkṣa. Hence

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rūkṣaguṇa of a somatic structure indicates energy utilising processes that have taken place. While rūkṣaguṇa of an extrinsic factor (eg: rūkṣaguṇa of black coffee) indicates the śoṣaṇakarma (energy utilisation processes) it is going to perform in the body. Thus the dravya-guṇas help to understand the nature of extrinsic factors, development of pathogenesis and also the mode of approach (treatment) that should be adopted in a disease.

Guṇas that help in judicious application of a treatment are 'parādi' guṇas.[3] Though these guṇas are present in dravyas, they only help to individualise the treatment and not in identification. Guṇas which help in sensory perception are 'viśeṣa' guṇas.[4] These guṇas are subjective and are not identified with karma alone in the body. Karmas of viśeṣa guṇas are explained in another manner based on their bhautic constitution with which they effect a list of activities peculiar to a rasa though they are a combination of vimśatiguṇas. Three types of character (temperament) determining factors (viz. satva, rajas and tamas) are called 'mahāgunas'. Gunas in an extrinsic factor are explained in five different ways collectively called as 'rasapañcaka' viz. rasa, guṇa, vīrya, vipāka and prabhāva. Rasa and vipāka are modes of action with respect to digestion and metabolism. Vipāka is a modified structural speciality (rasa) that develops due to interaction with agni in the body. Guṇa mentioned in the rasapañcaka represent the final effect that would be produced in the body by an extrinsic factor. All medicines act by vīryas, which are highly potent guṇas[4]. Prabhāva[5] is an unperceivable guṇa responsible for a special function. Dravyas act by guṇaprabhāva (guṇas irrespective of dravya), dravyaguṇa-prabhāva (guṇas dependent on a dravya) and dravya-prabhāva (unperceivable guṇas dependent on dravya). All the components of the rasapañcaka are those guṇas of dravyas that function in five different ways in the body. The most important set of guṇas are the guṇas of doṣas (śarīra) which are explained in ten pairs collectively called as 'vimśati' guṇas[6].

Āhāra consumed according to one's state and stage after digestion[7a] will be converted to sāra (nourishing part) and kiṭṭa (metabolic waste). By excessive use of dravyas having one or more guṇas, the respective doṣa guṇas get aggravated in the sāra and kiṭṭa. This excessively formed doṣa instead of nourishing the body gradually gets aggravated initially in the koṣṭha (caya-prakopa). Eventually further accumulation of doāṣa results in the spread (prasara) of the same all over the body. As this doṣa instead of nourishing the dhātus interacts with them, and is designated as āgantudoṣa. The doṣas that are responsible for the functioning of a dhātu are termed as sthānikadoṣas. Subsequent localisation of this āgantudoṣa in a dhātu paves the way for an interaction with the sthānika doṣa situated in that dhātu. The āgantudoṣa guṇas interact with the śārīrika guṇas of sthānika doṣa (dhātus)[7b] resulting in various diseases (doṣa-dūṣya sammūrcchana) or subdivisions of the same disease itself (eg:-10 types of prameha,18 types of kuṣṭha, etc.). Knowledge of guṇas of āgantudoṣa and the guṇas of sthānika doṣa help one to attain a perfect understanding of the roga[8] and thereby administering a suitable treatment.

Rūkṣa (āgantuvāta) + Sādhakapittaduṣṭi
↓
Rūkṣapāṇḍu

Kaṣāyarasa (vāta) + Madhura (ojus)
↓
Kaṣāyamadhura (madhumeha)

Role of guṇas in physiology

Snigdhaguṇa[9] of kapha is responsible for softness (mṛdu), unctuousness (snigdha), strength (ojus), complexion (varṇa) and it also is the energy source for all activities (bala). Guru guṇa is responsible for the increase in body mass (bṛmhaṇa) or regeneration. Guru and laghu also indicate the time taken for digestion and absorption. When maximum nourishment of a structure takes place, enzymatic activities decrease to prevent further nourishment of that structure resulting in śītaguṇa of kapha. Where as strong and stable nature is expressed by picchila and sthira guṇas respectively. Circulatory fat, oxygen (jīvana) and nourishment supply, increased adhesiveness (abhiṣyandi), well formed muscles and śukradhātu are effected by picchila guṇa. Even distribution of fat and muscle with intact elastic tissue account for śḷakṣṇa guṇa.

The prime guṇa of pitta is uṣṇa which causes digestion and metabolism in the body. Uṣṇa helps to convert food to dhātu (nourishment) and mala (metabolic waste), absorption, nourishment, perception, registration, retention, recalling capacity of the brain, thinking and all energy utilising processes. Structures having uṣṇaguṇa are given an independent status as agni. Functioning of uṣṇaguṇa is supplemented by snigdhaguṇa. When there is sufficient energy source (snigdha) and the structure is well built, the agni functions normally (ojus); just as when the wick is good and sufficient oil in the lamp, the flame will be strong and steady. If the oil is insufficient, the flame spreads onto the wick and burns out quickly. This kind of agni in the body is called tīkṣṇāgni.[10] Structures which are tīkṣṇa cause not only digestion and metabolism, but also produce burning, increased cohesiveness and spread of metabolites quickly through and across the channels. Tīkṣṇa (unopposed functioning of agni) causes movement of structures (āgantudoṣa) from koṣṭha[11] to śākha and madhyama roga mārga. While uṣṇa (normal agni) facilitates gati back to koṣṭha. When quantity of oil is more than sufficient, flame in the lamp will be enfeebled. The very same condition in a human body is called mandāgni (that slows down all activities). Proper digestion and metabolism facilitates well formed structures and easily utilisable energy resource (laghu) with which various activities are performed quickly, easily and effectively. Thus pitta has snigdha guṇa of kapha and laghu guṇa of vāta in common. Snigdha-uṣṇa-laghu guṇas pave the way for vātānulomana. Visra gandha though is pārthiva, putrefaction is effected by metabolic process. So visra is considered as smell of pitta, more specifically smell of rakta and sveda. Sāraguṇa could be understood well with electrolyte functions. Electrolytes help to generate action potential (preraṇa)[12a] and also help to maintain the fluid balance.[12b] Drava represents the fluidity[13] of pitta. Thus agni is different from pitta in that agni is uṣṇa alone (devoid of movement) and is responsible for the formation of doṣa-dhātu-ojus-varṇa and bala. Pitta differs from agni in that pitta has agni-jala constitution and has rasa, gandha, varṇa, movement and more important is that it can impair the functions of all structures including agni. Kindled jaṭharāgni causes digestion; meanwhile pācakapitta (pañcamabhūtātmaka) imparts transformation in rasa, gandha, varṇa, sparśa and mass (laghu guṇa). Vyavāyi and vikāsi guṇas are considered as potent forms of sāra and tīkṣṇa guṇas respectively.

Kapha structures are more or less stable. Pitta structures have limited movement and the doṣa that has movement all over the body and which is always in motion is vāta. Impulses have pulsatile nature (cala), utilise energy (rūkṣa)[14] and need clear channels (viśada)[15] with well formed light (laghu) constitution. Feedback mechanism (yogavahi) is done by anuṣṇa- śīta guṇa of vāta.

Rūkṣa performs śoṣaṇa karma which is energy utilisation that results in depletion of nourishment (sneha). Sequential, synchronous, synergistic functioning of receptors, hormones, electrolytes, etc. in tissues, organs and various systems results in anulomana. Proper functioning (vāyu) through clear channels (ākāśa) by well formed (agni) impulses paves for anulomana and is effected by laghu guṇa. Laghu guṇa causes quick (śīghrapaki)[16] and easy (asādakṛt)[17] execution of activities and thereby karmasāmarthya. When the energy source gets completely utilised, enzymatic activity for further energy utilisation decreases and results in śīta guṇa. As impulses need to pervade every where they have a minute structure because of which they become imperceptible. Khara is rough and tough structures are formed by the action of vāyu. Though khara guṇa is of pārthiva,[18] the compact structure is formed by agni-vāyu action as seen in asthi,[19] snāyu (kharapāka) and purīṣa. These structures help in dhāraṇa function. Cleansing (kṣāḷaṇa) and draining (śodhana) are the physiological functions of viśada.[15] Viśada helps to remove kapha (āpya) predominant structures from the circulation.[21] It has the role of transport proteins, reduces adhesiveness, or increases cohesive force and also reabsorption of metabolites in kidneys resulting in viśada urine. In brief, viśada controls circulatory kapha and maintains the clarity of channels while rūkṣa guṇa maintains equilibrium of structural kapha, kharaguṇa increases proteins, fibres and minerals in structures.

Disproportionate use of picchila and viśada hamper nourishment and oxygen supply. Disproportionate increase of picchila in circulation causes adhesion of circulatory kapha on to the wall of blood vessels (kaphāvṛta vāta) resulting in vaiśadya (deprived oxygen and nourishment absorption) in dhātus. Disproportionate increase of viśada guṇa by tiktarasātiyoga or by consumption of alcohol, causes excess clearance of kapha from circulation for energy utilisation and quick and easy pervasiveness of metabolites (alcohol) are facilitated. This also subsequently produces vaiśadya in dhātus. Likewise disproportionate sneha and rūkṣa spoil the cellular integrity. Increased rūkṣa[22] causes constipation also. Increased habituation of sneha causes delay of menopause.[23] Thus balanced functioning of hostile guṇas is indispensible for health.

Rasas in body constituents

Madhura is present in sthanya, rakta, śukra and ojus. Lavaṇarasa also is present in rakta. Normal taste of human urine is tiktakaṭu. Āhāra undergoes digestion in three stages. In the first stage, kapha gets aggravated in the body and the resultant effect in the koṣṭha is transformation of food into madhura predominant product. In the next stage, pitta predominant activity results in amḷata and vata predominant activity causes kaṭurasa in the transformed food that underwent digestion. The stages of digestion are explained with madhura-amḷa-kaṭu rasas. The state of sāra after digestion is explained with vipāka rasas. The vipāka rasas will be according to the consumed dravya and rasa of the dravya.

Kaṣāya (pṛthvi+vāyu) effect could be seen in stable and rigid structures having the function of dhāraṇa. The hostile guṇas[24] of madhura-amḷa-lavaṇa rasas are kaṭu-tikta-kaṣāya rasas respectively. Madhura increases kapha alone and kaṭu decreases kapha alone. Amḷa increases kapha pitta while tikta decreases kapha pitta. Lavaṇa increases kaphapitta and increases flow (viṣyandi) while kaṣāya decreases kapha pitta as well as flow of doṣas (stambhana).

Vīrya - potent guṇas

Though there are twenty guṇas, guṇas having potency or karmakaraṇasāmarthya are sorted by ācāryas in different ways into eight. Prime guṇa (in rasa, guṇa, vipāka or prabhāva) that is responsible for the initiation and performance of a function is regarded as vīrya. Ācārya Cakrapāṇi explains that āhāra is rasapradhāna and auṣadha is vīryapradhāna. Rasas are given importance in pathya, whereas vīrya is given importance in medication. Eight guṇas having independent karmakaraṇaśakti are guru-laghu (picchila-viśada), uṣṇa-śīta, manda-tīkṣṇa (mṛdu-tīkṣṇa) and rūkṣa-snigdha. All other guṇas act along with these prime guṇas or are complementary to the potent guṇas. Vīrya of rasas (viśeṣa guṇas) are also explained with aṣṭaguṇas. For e.g. madhura has maximum śīta, guru, snigdha vīryas. Lavaṇa is having maximum uṣṇavīrya, tikta is having maximum laghuvīrya and kaṣāya is having maximum rūkṣa guṇa.

Pathological effects

Extrinsic causes produce aggravation of doṣa (āgantudoṣa) along with sāra and kiṭṭa. The guṇas of āgantudoṣa will be according to the nature of extrinsic factors. These doṣas interact with dhātus and sthānikadoṣa guṇas resulting in the development of roga. Thus roga guṇas and roga kāraṇa guṇas are different. Uṣṇa guṇa is responsible for santāpa (jaṭharāgni-ūṣma + dhātvāgni-ūṣma + doṣoṣma = jvara). Calaguṇa[25] of āgantuvāta causes āgamāpagama, kṣobha–mṛdutva of temperature (remittent-intermittent), uṣṇa-tīkṣṇa guṇas of āgantupitta causes very high temperature and mandaguṇa of āgantu kapha causes mild temperature rise only in kaphaja jvara.

Roga guṇas are explained in respective chapters. Sūkṣma-manda guṇas are seen in viṣamajvara.[26] Drava-uṣṇa-sara guṇas are seen in atisāra. Uṣṇa-tīkṣṇa-drava properties in raktapitta,[27] picchila-madhura guṇas in prameha,[28] snigdha-picchila-guru-śīta guṇas in āmaja diseases and kharaguṇa is seen in aśmari. Modern diseases could also be pondered and explored with guṇas. Rūkṣa-śīta guṇas are observed in osteoarthritis, chala-laghu guṇas in hypertension, abhiṣyandi (picchila) and khara guṇas could be observed in atheroma and arteriosclerosis respectively. Doṣa guṇa-lakṣaṇas are explained as ātmarūpas and hence all the guṇas of a doṣa would not get aggravated in a disease (Table 1).

Pathological vaiśadya though is clearance of channels; kapha in circulation is removed for energy production and not for nourishment. Thus ajīvana (deprived oxygen supply) causes vaiśadya lakṣaṇas. Quick development of cell death (necrosis) or infrequent symptoms is indicative of vaiśadya; while gradual degeneration and continuous persistence of symptoms indicate raukṣya. Raukṣya, vaiśadya and kharatva are considered in rūkṣaṇakarma[31] itself as proper snehanakarma could alleviate all the foresaid complaints. Some diseases based on viśeṣaguṇa are shown in Table 2.

Guṇa viparīta cikitsa

Each guṇa is present in a single bhūta or more

than one bhūtas. A set of guṇas may take part in the pathogenesis. Initiative doṣa of that pathogenesis may be having another bhautic constitution as well as guṇas. Hence many bhautic guṇas take part and interact in a pathogenesis. Prakṛti-sama interaction results in the development of symptoms in accordance with guṇas, whereas vikṛti-viṣama interaction results in development of symptoms not in accordance with the participating guṇas due to the peculiarities of bhūtas taking part in it. Though the guṇa symptoms would not change, bhūtaguṇa initiating the pathogenesis may vary from bhūtaguṇa initiating the symptom. Hence in vikṛti-viṣama samavāya, prabhāva, tridoṣa duṣṭi (contradictory guṇas take part), ariṣṭa and svābhāvika (natural) diseases, guṇaviparīta treatment is ineffective.

TABLE 1
Examples of ātmarūpas

Ātmarūpa	Examples
01. Raukṣya	Degenerative changes (sandhigatavāta)
02. Śaitya	Different kinds of pain (harṣa, toda, ruk, āyāma)
03. Lāghava	Improper functioning (ākṣepaka,unmada) and loss of karmasāmarthya.
04 Vaiśadya	Ischaemic changes (ajīvana) [kaphāvṛta vāta, pāṇḍu, myocardial infarction]
05 Gati	Śvāsa, kāsa, hṛdgatavāta
06 Amṛtatva	Gulma
07. Anavasthitatva	Anavasthitacittatva
08. Auṣṇya	Jvara
09. Taikṣṇya	Bhasmaka,vidradhi, Madātyaya
10. Saratva	Atisāra
11. Dravatva	Raktapitta,vātarakta
12 Anatisneha	Kāmala[30]
13 Varṇa	Halīmaka
14. Visragandha	Raktapitta,vraṇa
15 Kaṭu-amla rasa	Amlapitta
16 Śaitya	Śvitra
17 Śaitya	Udarda, śīta meha
18 Sneha	Pāṇḍu,[30] pratiśyāya
19. Gaurava	Ūrustambha, pāṇḍu
20. Mādhurya	Ikṣumeha
21. Sthairya	Kuṣṭha, granthi
22. Paicchilya	Prameha
23. Mārtsnya	Kuṣṭha

In many diseases, utpādaka guṇas are different from vyañjaka guṇas. In dūṣīviṣajanyaśvāsa, utpādaka guṇas are viṣaguṇas and vyañjaka guṇas are śīta and abhiṣyandi. Kaphalakṣaṇas manifest in pāṇḍu which is a pittaduṣṭijaroga. Sādhakapitta activated by vāta causing ojoviśramśa (kapha) into rasavāhasrotas causes pāṇḍu. So other samprāptis (sāṅkhya, prādhānya, vikalpa, bala, kāla) are also equally important as that of vikalpa samprāpti (guṇa assessment). Laghu guṇa functioning is the combined activity of agni-vāyu-ākāśa bhūtas. Bhrama,[32] which is a laghuguṇa vṛddhi, is effected by vāyu-ākāśa bhūtas initiated by uṣṇaguṇa of agnibhūta. Loss of karmasāmarthya (eg: asamyak purīṣa vega-pravṛtti), which is a laghu dysfunction may be caused by agni dysfunction (improper digestion) or decreased peristaltic movement due to vāyu dysfunction (improper pācana) or ākāśa dysfunction (obstruction in excretory pathway). So in vikalpasamprāpti also bhūta predominance of the guṇa also has to be assessed and taken into consideration in treatment by an intelligent vaidya while administrating a treatment.

As many guṇas and many bhūta abnormalities are present in a samprāpti, diseases are treated with treatment principles rather than hostile

TABLE 2
Diseases based on viśeṣaguṇas

Viśeṣaguṇa	Vaidya-samvedya lakṣaṇa	Āture-samvedya lakṣaṇa
• Rasa		
- Madhura	Ikṣumeha	Prameha pūrvarūpa
- Amḷa	Nīlameha	Amḷapitta (amḷa-tikta-asyatva)
- Lavaṇa	Raktameha	Kaphajajvara
- Kaṭu	Hāridrameha	Paittikajvara
- Tikta-kaṭu	Normal urine	Kaphapittaja jvara
- Kaṣāya-madhura	Madhumeha	Hikka-pūrvarūpa, vātika arocaka
- Vairasya	Yuka-apasarpaṇa ena	Āgantuja-arocaka
• Rūpa	Pretarūpapuruṣa (udara), śarāvikā and kacchapikā	Svapne varṇa darśanam (raktapitta)
• Gandha	Viśragandhamañjiṣṭhameha, kṣayakāsa	Svagandhasya-asahiṣṇuta (medogatajvara)
• Sparśa	Gulma, plīihodara, sandhigatavāta	Antarvegi jvara, śitādi jvara, different kinds of pain
• Śabda	Mahāśvāsa, mahāhikka, āṭopa, kṣatakāsa (pārāvata), apatantraka (kapota)	Aśabda śravaṇam (nānātmaja vātavikāra, unmāda), śabda-asahiṣṇuta (rasakṣaya)

guṇas alone. Guṇaviparīta treatment is done against āgantudoṣaguṇas with slight alterations according to bhūta predominance. As taila[33] is having guṇas exactly opposite to all vāta guṇas (rūkṣa, śīta and laghu), taila is considered as the best choice for vāta. Madhurarasa subsides vāta by snehana and bṛmhaṇa, amḷa alleviates vāta by normalising gati (anulomana) and lavaṇa nullifies the śītaguṇa of vata by svedana. During caya, prakopa and prasara of āgantudoṣa, guṇaviparīta treatment would yield perfect cure. Hetuviparīta (āgantudoṣa) treatment is to be done initially without affecting the vyādhi (sthānikadoṣa) guṇas, as āgantudoṣaguṇas derange vyādhiguṇas secondarily only. In a chronic disease hetuvyādhiviparīta treatment principles are to be applied simultaneously without contradicting each other. Some guṇas and treatment principles are shown in Table 3.

Āturāntarātmapraveśana is possible by exploring vyādhi (sthānikadoṣa) guṇas, āgantudoṣa guṇas and finally by exploring the guṇas of bhūtas participating in the pathogenesis. Guṇas,

TABLE 3
Guṇa and treatment princiles

Guṇa	Treatment principle
Rūkṣa	Snehana
Laghu	Anulomana
Rūkṣa + laghu	Bṛmhaṇa
Śīta	Svedana
Viśada	Anulomana
Viśada + rūkṣa	Abhiṣyandi
Uṣṇa	Śita-stambhana
Tīkṣṇa	Snehana with śīta-manda
Drava	Grāhīśoṣaṇa
Picchila	Leghana
Sneha	Rūkṣaṇa
Guru	Laṅghana
Manda	Dīpana
Kaṭhina	Bhedana
Abhiṣyandi	Lekhana
Sthira	Svedana, chedana
Khara	Asthivahaśrotoduṣṭicikitsa

the explicatory tool in āyurveda if applied judiciously, affects a cure.

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ASSESSMENT OF MĀNASIKAPRAKṚTI BASED ON VERTICAL AND HORIZONTAL STUDY - A CRITICAL ANALYSIS

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Abstract: In āyurvedic clinical practice, there are different types of examination methods to know the normalcy of health and diseases. The examination of prakṛti is the initial step in daśavidhaparīkṣa. Prakṛti is the inherent characteristic property of an individual which refers to the genetically determined physical and mental makeup i.e. dehaprakṛti and manasaprakṛti. This study is an attempt to analyze critically and to find out common denominators of each division and subdivisions of manasaprakṛti. Important common features and differentiating features have been identified to make a comprehensive understanding for the assessment of manasaprakṛti in clinical settings.

Introduction

In āyurvedic clinical practice, there are different types of examination methods to know the normalcy of a person and diseases in all aspects such as prakṛti, vikṛti, sāra, samhanana, pramāṇa, sātmya, sattva, āhāraśakti, vyāyāmaśakti, and vayas, which are commonly used methods and is known as daśavidhaparīkṣa.[1]

The examination of prakṛti is the initial step in daśavidhaparīkṣa. Prakṛti is the inherent characteristic property of an individual which refers to the genetically determined physical and mental make up - dehaprakṛti and manasikaprakṛti.[2] The doṣas that ultimately emerge as predominant factor, determine the dehaprakṛti of a person. Seven types of dehaprakṛtis and their characteristic diagnostic parameters are described in āyurvedic classics.[3-6]

Mānasikaprakṛti is constituted by three mahāguṇas of sattva or kalyāṇabhaga, rajas or roṣabhaga and tamas or mohabhaga.[7] In addition to that, among the three qualities of manas, sattvaguṇa is prakāśaka, rajoguṇa is prāvartaka and tamoguṇa is niyamaka.[8] The three different types of mental faculties has subdivisions due to relative degree and variations in interaction of mahāguṇas. A total of sixteen types of mānasikaprakṛtis are described in main source books[9,10] but in Kāśyapasamhita, eighteen types have been described.[11]

In depth understanding of both kāyaprakṛti and mahāprakṛti are important for the diagnosis of disease and planning the appropriate therapy and management. This study is an attempt to find out common denominators of each division and subdivisions of mānasikaprakṛti.

Methodology

References to mānasikaprakṛti in the āyurvedic texts, especially Caraka and Suśruta Samhitas were used for the analysis. After tabulating all

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features, identification of the common denominators and main differentiating features of the three major mānasikaprakṛti and their subdivisions was done by analyzing vertically and horizontally.

Discussion

The three types of mental faculties viz. sāttvika, rājasika and tāmasika, have innumerable varieties. All these are there in an individual but do not manifest at the same time. An individual is said to belong to that particular type of mental faculty by which he is dominated. The same man may have different modifications of mind at different times. One cannot have different types of mind at the same time. They may occur consequently because of environmental and cognitive modifications.[12]

The sāttvika type of mental faculty is of seven types depending on the disposition of brahma, ṛṣi, indra, yama, varuṇa, kubera and gandharva. The rajas type is of six types depending upon the disposition of asura, rākṣasa, piśāca, sarpa, preta and śakuni. The tamas type of mental faculty is of the three types depending upon the dispositions of paśu, matsya and vanaspati.[13,14] All the subdivisions of prakṛti are nominated according to their resemblance in qualities to that of given names such as god, devil and animals, etc. This is known as personification and it shows syndromic approach of classification.

To determine the mānasika prakṛti of a person or patient, firstly, one must identify the main three types. Secondly, differentiating features of each sub types in both vertical and horizontal axis. For a quick view, determination of all the features is not necessary. For a detailed evaluation, the features of each subtype are needed to be considered in detail. In this study, important common features and differentiating features are identified as follows.

Sāttvika prakṛti

Common denominators

There are separate chapters in Bṛhattrayi describing the common denominators. It says that when the individual is endowed with the sāttvika type of mind by his previous life, then he can recall things even beyond that life; in other words, because of the continuity of the same mind, he can remember things of the previous birth; such individual is called jātismara.[15] In sāttvika prakṛti persons, the following characteristic features are mentioned which may be taken as common denominators for different types of sattvakāya.[16-18]

- A judicious regimen of diet (samvibhāgarucita)
- Absence of all killing and hostile propensities (anṛśamsyam)
- Forbearance (titikṣa)
- Truthfulness (satyam)
- Do wholesome activities (vacana and karma dharma)
- Belief in god (āstikyam)
- Spiritual knowledge (ñjānam)
- Intellect (buddhi)
- Good retention power or intelligence (medha)
- Memory (smṛti)
- Controlling power of mind and comprehension (dhṛti)
- Performing good deeds irrespective of consequences (anabhisaṅga).

In addition to the above, while considering the seven subdivisions of sāttvika prakāṛti, purity (śuci/śauca), freedom from passion (kāma), anger

(krodha), greed (lobhapeta), ignorance/ confusion (mohapeta), jealousy (īrṣyapeta), hospitality (priyātithitvata, atithivrata) and celebration of religious sacrifices (yañja) may also be taken as common denominators.[19,20]

Vertical study

Among sāttvikaprakṛtis, brahma, ārṣa and aindra have the common features i.e. i) constant reader of veda (abhyāso vedeṣu), ii) studying (adhyayanapara), iii) discussions (sambhāṣa) and iv) intellectual excellence (pratibhāsampanna).

Brahmasattva (similar to traits of Brahma) is having the following features:

- Power of discrimination (samvibhāginam)
- Orational power (vacana sampanna)
- Reply memory (smṛtimāna)
- Favourable disposition of all character (sarvobhūteṣu sama)
- Cleanliness in all aspects (śauca)
- Material and spiritual knowledge (ñjāna, viñjāna)
- No lordship (aiśvarya)
- No authoritative speech (adeyavākya)
- No maintenance of servants and dependants (bhṛtyānāmbharaṇam)

The features of ārṣasattva (similar to the traits of ṛṣis) are: i) no lordship (aiśvarya), ii) complete abstinence from carnal desires (brahmacaryāsevi), iii) eloquent (vacanasampanna), iv) skillful (viñjānasampanna) and v) wise (ñjānasampanna).

Aindra and yāmya sattvas have the following features: i) lordship (aiśvarya), ii) command/ maintain servants and dependents (adeyavākya and bhṛtyānām bharaṇam), iii) magnanimity (māhātmyam) and iv) superiority (aiśvaryalambhinam). In addition, carving for wealth (arthābhīrata) and proper satisfaction of desires (karmabhīrata) are unique features of aindra sattva (similar to traits of Indra).

The features of yāmya and varuṇa sattvas are: i) absence or exhibition of anger (madavarjita), ii) non vulnerable (asampanarya), devoid of - iii) illusion (mohavarjita), iv) fear (dhīram), v) malice (utthanavantam) - and vi) pleasure in proper place and forbearance (sthānakopa prasadam). Indication of action on time or promptness in action (prāptakāri), prompt action (prāptakāriṇam), observance of propriety of action (lekhasthavṛttam), non vulnerable (asampranarya) are the unique features for yāmya sattva (similar to the traits of Yama).

The characteristics of varuṇasattva (similar to traits of Varuṇa) are: i) brown huge pupil (paiṅgalyam), ii) golden colour of hair (hairikeśata) and iii) soft and sweet speech (priyavaditva).

The peculiarities of varuṇa and kubera sattvas are: i) like pleasure of recreation (sukhaviharaṇam) or fondness of an aquatic sports (ambhoviharata), like to exposure to cold (śītaseva). Kuberasattva (similar to traits of Kubera - a god of wealth), shows ability to earn and accumulate wealth (arthasyāgama - arthanityam), satisfies desires like for possession of palatial buildings (sthānasampanna), luxurious (upabhogasampanna), honourable (manasampanna), having good capacity for producing offspring (mahāprasvaśaktitvam).

The features of gandharva sattva (similar to traits of Gandharva) are: fondness for dancing (priyanṛtya), singing (priyagīta), music (priyavaditra); expertness in poetry (kuśalaśḷoka) and epics (kuśala purāṇa); fondness for perfumes (gandhapriyatva), garlands (mālyapriyatva),

unguents (anulepanitya), user of fine dress (vasannitya), showing keen interest in association of women and passion (strīvihārnitya).

Rājasa prakṛti

Common denominators

The rājasa type of prakāṛti promotes wrathful disposition. The common features of rājasa prakṛti are:[21,22]

- Feeling of much pain and misery (du:khabahulata)
- Roaming spirit (ātanśīlata)
- Non comprehension (adhṛti)
- Ego (ahamkāra)
- Untruthfulness (anṛtikatvam)
- Cruelty (akāruṇyam)
- Pride (ḍhambh)
- Overconfidence in own excellence (mana)
- Excessive happiness (harṣa)
- Passion/ excessive carnal desires (kāma)
- Excessive anger (krodha)

Moreover, when considering the subdivisions, bravery (śūram) or cowardice (bhīru), envious (asūyakam) and gluttonous (audārikam) features can also be identified as common denominators of rājasika prakṛti as they appear in many of subdivisions.

Vertical study

Among rājasa prakṛti, rākṣasa, paiśāca, sarpa, preta and śakuna sattvas have common features such as i) habit of fondness for non vegetarian food (āmiṣapriyata), ii) abnormal diet and regimens (vikṛta āhāraśīlam) and iii) excessive desire for food (āhārakāmam).

Asurasattva (similar to the traits of asura) and rākṣasa sattva (similar to the traits of rākṣasa), show jealousy toward others excellence (asūyakam). Asura and paiśāca sattvas (similar to the traits of paiśāca) have terrifying appearance or disposition (santrasa - raudram).

As an unique features of asura shows lordship or higher standard of living (aiśvaryavantam), movement of disguise (aupādhikam), indulgence in self praise (ātmapūjika), ruthlessness (ananukrośam), valours (dhīra) and dreadful (raudra).

Rākṣasa sattva and sarpa sattva (similar to the traits of snake) have intolerance (amarṣiṇam), irritable (tīkṣṇam), violence of weak point (cidraprahāriṇam), extremely vain and ignorant conduct (bhṛṣamantama) and anger (anubandhakopa); whereas rākṣasa shows fierce or intolerant (amarṣiṇam), solitary in habits (ekāntagrahita), excessive sleep (svapnabahula) and indolence (ālasyabahula).

Paiśāca sattva has unique features of unclean habits or disliking for cleanliness (śucidveṣam), fondness for women (strīlolupatvam) and liking for staying with women in lonely place (strīrahaskāmam).

Sarpasattva shows sharp reaction or brave when in wrathful disposition and coward when not in wrathful disposition (kṛuddhaśūram and akṛuddhabhīru), double dealing (māyanvitam) and laborious in character (āyāsinam). Unsteadiness (anavasthitam-amarṣaṇa) and irritability (tīkṣṇa) are present in both sarpa and śakuna sattva.

Śakuna sattva (similar to the traits of a śakuni or bird), shows attachment with passion or intemperate in sexual matter (pravṛdhakāmasevi - anuśaktakāmam), un-acquisitiveness (asamcayam) and fickle mind (anavasthitam).

Praita sattva (similar to the traits of a preta) is having i) utter want of knowledge as regards to duty and laziness (alasam), ii) misery (du:khaśīlam), iii) covetousness (du:khacara,

upacāra), iii) niggardliness (adataram) and iv) action without discrimination (asamvibhagam).

Tāmasa prakṛti

Common denominators

Tāmasa prakṛti is mainly characterised by ignorance. The following characteristics are mentioned separately as common features: [23, 24]

- Despondency and stupidity (viṣāditvam)
- Atheist (nāstikayam)
- Unrighteous (adharmaśīlata)
- Perversity (buddhernirodha)
- Ignorance or no of spiritual knowledge (añjānam)
- Less retention power and perverted intellect (durmedhastvam)
- Laziness or lethargy in action and speech (akarmaśīlata)
- Sleepiness or drowsiness (nidrālutvam)

The common features of subdivisions of tāmasa prakṛti are: hateful conduct and food habits (jugupsita-ācāra-āhāram), greediness for food (āhāralubdham) and constant eating (nityam-āhārakevale).[16]

Vertical study

The features of paśava sattva (similar to the traits of an animal) are: i) forbidding disposition (nirakariṣṇam), ii) excessive sexual indulgence (maithunaparam), iii) excessive sleep (svapna-śīlam) and iv) frequent sexual dreams (svapne-maithunanityata).

Matsya sattva (similar to traits of fish) shows: i) constant movement or fickle mind or unsteadiness (anavasthitam), ii) desire for water (toyakāmam - salīlārthita), iii) cowardice (bhīrum), iv) stupidity (maurkhayam) and v) intermissive quarrel (parasparābhimarda).

The characteristics of vānaspatya sattva (similar to traits of vegetable life) are: i) fondness of staying at same place (ekasthānrati), ii) absence of truthfulness (asatyavādi), iii) lazy (alasam), iv) devoid of religiousness (dharmavarjita:), v) devoid of desires (kāmavarjita:) and vi) lack of wealth (arthavarjita:).

Horizontal study

- Other than the above vertical analysis, mana-saprakṛtis also show horizontal similarities that are inter-group analysis or horizontal analysis.
- Yamya and varuṇa subtypes of sāttvika-prakṛti and asurasattva of rājasikaprakṛti show quality of lordship - higher standard of living or possessed with superiority (aiśvaryavantam).
- Varuṇa and kubera subtypes of sāttvika-prakṛti and matsyaprakṛti of tāmasa prakṛti are having fondness for aquatic sports or liking for pleasure of recreation and fond of water (ambhovihārata, toyakāmam).
- Gandharva subtype of sāttvikaprakṛti and paiśācaprakṛti of rājasaprakṛti are having fondness for women (strīvihārnitya - strīlolu-patvam).
- Rākṣasa subtype of rājasikaprakṛti and paśava sattva of tāmasaprakṛti show excessive sleep in character (svapnaśilam).
- Śakuna subtype of rājasikaprakṛti and paśava-prakṛti of tāmasaprakṛti show excessive sexual indulgence (maithunaparam).
- Rākṣasa, paiśāca, sarpa, preta and śakuna prakṛtis of rājasa prakṛti and paśava, matsya and vanaspatya of tāmasaprakṛti show hateful conduct of food and habits (kevala-mabhinivisṭamāhare, jugupsitācārāhāram or āhāralubdham).
- Asurasattva of rājasaprakṛti and matsya

sattva of tāmasaprakṛti show absence of truthfulness (asatyam).

Conclusion

Identification of mānasikaprakṛti is important for diagnosis of personality disorders (prakṛti vikāras). It is necessary in the treatment and management of different types of somatic, psychosomatic and psychic diseases. This study would help in development of a comprehensive understanding for further research and development of practical approach for the assessment of mānasikaprakṛti in clinical settings.

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Clinical observation

FOOT CRACK - A CLINICAL STUDY

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Introduction

Foot-crack is a dermatological disease like 'vipādika'. There is no specific cause or indication of the endemic nature of this disease. Of late, fairly a large number of vipādika cases have been reported in certain areas of Malappuram district, which has generated concern among the medical practitioners. Professionals from Arya Vaidya Sala Kottakkal visited the disease-stricken area to provide possible medical help and also to document the data of the particular population. This article briefly discusses the clinical experience of the physicians who were involved in the medical camp.

Details of the study

On 8th October 2011, an expert team of physicians from Arya Vaidya Sala, Kottakkal visited the school that reported the incidences of vipādika and after discussing the matter with the school authorities, a medical camp was arranged there on 14.10.2011.

A detailed case sheet containing personal details, symptoms, grade, history and result was prepared. In view of the symptoms of vipādika mentioned in the texts[1], the symptoms of pain, itching, blisters and discolouration were considered for case evaluation; fever, burning sensation and swelling were also incorporated in the symptoms taking their probability in vipādika. Each symptom was graded according to the severity and spread of the disease.

A total 122 cases were attended to in the Camp and according to the nature of the case, they were divided into three groups as follows:

- Group 1 - Vāta predominant vipādika (dry in nature) consisted of 75 patients
- Group 2 - Kapha predominant vipādika (wet in nature) consisted of 24 patients
- Group 3 - Pitta predominant vipādika (infective in nature) consisted of 23 patients

Treatment

- According to the severity, the patients in Group 1 i.e. vāta-predominant cases, were divided into two groups viz. mild and severe. Mild vipādika patients were advised application of *Vipadikari lepam* only. In the severe type, i) *Mahatiktakaghritam* (1 teaspoon at 6.00 am 6.00 pm) and ii) *Vipadikari lepam* (for local application) were prescribed.
- In Group 2 i.e. kapha predominant cases, i) *Mahatiktam kwatham tablet* (2 Nos. at 6.00 am and 6.00 pm), ii) kaṣāyadhāra (with triphala, dūrva and neem leaves) and iii) *Jeeventyadi yamakam* (for local application) were advised.

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- Group 3 i.e. pitta-predominant cases, were prescribed: i) *Mulakadyarishtam* mixed with *Saribadyasavam* (15 ml) with *Gopeechandanadi gulika* (1 No.) - twice a day after food; ii) *Valiyamadhusnuhee rasayanam* (1 teaspoon) - at bedtime; iii) kaṣāyadhāra (with triphala, dūrva and neem leaves) and iv) *Parantyadi cream* or *Ayyappala keratailam* along with *Tiktakaghritam* - for local application.

The medicines were issued free of cost for a period of two weeks.

Result

Of the 122 cases, 92 patients reported for review and the result was encouraging; while 13 cases got complete relief from the sign and symptoms, 40 cases showed excellent improvement and 32 cases showed moderate improvement (Table 1).

TABLE 1
Effect of the treatment in three groups

Description	No.	Total (%)
1. Complete relief		
- Group 1	10	
- Group 2	3	13 (14.14)
2. Excellent improvement		
- Group 1	24	
- Group 2	11	
- Group 3	5	40 (43.48)
3. Moderate improvement		
- Group 1	17	
- Group 2	4	
- Group 3	11	32 (34.78)
4. Mild improvement		
- Group 1	2	
- Group 3	1	3 (3.26)
5. No change		
- Group 1	2	
- Group 2	1	3 (3.26)
6. Grow worse		
- Group 2	1	1 (1.08)

Observations

One of the important point noticed was that all the patients were not having the same symptomatolgy. The three varieties of vipādika i.e. dry, wet and infected in nature were classified as predominant in vāta, kapha and pitta respectively and accordingly three categories of medicines were prescribed.

Of 122 patients, 52 were males and 70 females; 75 patients belonged to dry group, 24 to wet group and 23 patients to infective group of vipādika. Only 7 patients had a recent history of the disease (within a year), which indicates that the disease is not of a new generation. All the patients were lean in nature and under weight. 40 patients had poor appetite and 24 patients had poor bowel movements. Though digestion cannot be taken as a main reason, this

TABLE 2
Distribution of patients according to sex, history of illness, vitals, etc.

Description	No.
1. Sex	
- Male	52
- Female	70
2. History of illness	
- Below 1 year	7
- 1 to 3 years	40
- Above 3 - 5 years	47
- More than 5 years	28
3. Vitals	
- Poor appetite	40
- Poor bowel movements	24
- Poor sleep	5
- Poor urine output	1
4. Special remarks	
- History of kidney disease	1
- History of asthma	3
- History of leucoderma	1

could also be a contributory factor for the disease. Distribution of patients according to history of illness, vitals, etc. is shown in the Table 2.

Majority of the patients had poor foot-wear hygiene. From the initial assessment it was noticed that poor hygiene could be one of the causes for this disease and a list of do's and don'ts to maintain the foot hygiene and certain dietary regime was given to the patient as follows:

- Keep foot clean and tidy
- Avoid plastic footwear (use leather or canvas footweras)
- Wash feet with saline twice a day
- Keep the environment clean and tidy
- Avoid cold, fried and pickle items; and items that are difficult to digest
- Have periodic bowel purgation

Discussion

In āyurveda, the diseases of skin generally come under the category of kuṣṭha. The disease vipādika comes under one of the 20 types of kṣudrakuṣṭhas. Considering the site of disease and so also the symptoms like pain, itching, discolouration and boils, this ailment was correlated with vipādika.[1]

Conclusion

Āyurvedic treatment is effective in the management of foot crack. 85 out of 92 patients were benefited with the ayurvedic line of treatment. Further research to find out the cause of the disease is to be done.

Acknowledgement

We express our sincere gratitude to Dr. P.K. Warrier, Chief physician, and Managing Trustee, Dr. P. Madhavan Kutty Varier, Chief Superintendent and Additional Chief Physician and Dr. K. Muraleedharan, Superintendent and Additional Chief Physician - Arya Vaidya Sala, Kottakal.

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(अ.हृ., नि. १४/२३)

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EXCERPTS FROM CIKITSĀMAÑJARI - LXVI

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Abstract: The chapter 'Mukharogacikitsa' (treatment of face and mouth) continues. The causative factors of various diseases of soft palate and uvula (tālu) neck and throat (kaṇṭha) and their remedies are discussed in this issue.

Diseases of tālu

There are eight types of diseases affecting the soft palate and uvula (tālu) viz: i) tālupiṭaka, ii) gaḷaśuṇḍika, iii) tālusamhati, iv) arbuda, v) kacchapa, vi) pupputa, vii) tālupāka and viii) tāluśoṣa.

Vitiated vāta causes manifestation of multiple abscesses on the soft palate (tālu) with rough in nature and pain; this is termed as tālupiṭaka. They are thick and dense and exudation is present. Kapha and blood (rakta) vitiated at the root of uvula, appears smooth, edematous and depressed and exuding pus; this is termed as gaḷaśuṇḍika. In this condition, edema of the throat, burning, cough and vomiting are also present; at times, food may be ejected through nostrils.

Thickened midline of soft palate is tālusamhati. Abscess resembling the lotus flower on the uvula, caused by vitiated blood is arbuda. Suppuration and exudation from the soft palate and uvula is termed as tālupāka. Kacchapa is gradually increasing edema appearing like the turtle dorsum, painless, caused by vitiated kapha.

Pupputa is edema caused by vitiated śleṣma and meda; dark and coffee-brown in colour; thick and static. Thinning of the soft palate caused by vitiated vāta and pitta, fever and excessive exertion is termed tāluśoṣa. Among these, kacchapa, tālupiṭaka and arbuda are difficult to treat.

Śuṇḍika is treated with drugs that reduce kapha, by nasal medication (nasya), filling of mouth (gaṇḍūṣa) and fraying or rubbing (gharṣaṇa).

Enlarged and avascular gaḷaśuṇḍika that appears like ūrvāṛubīja (seed of *Cucumis melo* var. *utilissimus*) should be placed at the tip of the tongue, pulled with hook (badiśa) and excised with curved scalpel (maṇḍalāgra). The point of excision shall neither be at the root nor at the tip. Excessive excision will cause death due to severe bleeding and deficit excision will increase the disease.

Pupputa and kūrma (kacchapa) are treated by fraying and filling the mouth with honey and the powders of the following:

Marica	*Piper nigrum*
Ativiṣa	*Aconitum heterophyllum*
Pāṭha	*Cyclea peltata*

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Vaca	*Acorus calamus*
Kuṣṭha	*Saussurea costus*
Kuṭannata	*Cyperus esculentus*
Chinna	*Tinospora cordifolia*
Paṭu	Rock salt

Consolidated puppuṭa and kūrma (kacchapa) is to be frayed and rubbed with powders of the following:

Kaṭuka	*Picrorhiza kurrooa*
Ativiṣa	*Aconitum heterophyllum*
Pāṭha	*Cyclea peltata*
Nimba	*Azadirachta indica*
Rāsna	*Alpinia galanga*
Vaca	*Acorus calamus*
Ambu	*Plectranthus vettiveroides*

Unripe (non surgical) tālupāka is to be frayed with kasīsa (onsulphate), kṣaudra (honey) and tārkṣyaja (copper vitriol). Gargling with kaṣāya prepared with drugs having astringent (kaṣāya) or sweet (madhura) taste and cold potency is also indicated.

Ripe and spider-like split tālupāka is treated by rubbing with powder of drugs having pungent (tīkṣṇa) and hot (uṣṇa) properties. Drugs having bitter taste such as vṛṣa (*Justicia beddomei*), nimba (*Azadirachta indica*), and paṭola (*Trichosanthes lobata*) are used for preparation of kaṣāya for filling the mouth (kabaḷa).

In tāluśoṣa, consumption of ghee (medicated or plain) after food is advised. The patient should not be thirsty at the time of administration of medicated ghee. Drinking of water medicated with kaṇa (*Piper longum*) and śuṇṭhi (*Zingiber officinale*) is effective. Gargling (gaṇḍūṣa) with drugs that are sour in nature is also indicated. Nasya with oily (snigdha) soup prepared from the flesh of animals living in dhanva regions (geographically with less water, trees and hills), milk and medicated ghee is effective.

Kaṇṭharoga cikitsa

[There are five types of rohiṇi caused by deranged vāta, pitta, kapha, sannipāta and rakta. The term rohiṇi means ascending. In general these diseases spread very fast affecting multiple systems.]

Disease of the neck and throat (kaṇṭha) are thirteen as given below. In total, there are eighteen diseases when the five rohiṇi named above are also included.

- Kaṇṭhśālūka
- Vṛnda
- Tuṇḍikerika
- Gaḷaugha
- Valayam
- Gaḷāyuka
- Śataghnī
- Gaḷavidradhi
- Gaḷārbudam
- Vātika gaḷagaṇḍa
- Śḷaiṣmika gaḷagaṇḍa
- Medoja gaḷagaṇḍa
- Svaraghna

Vātarohiṇi:- It is bud-like growths (māmsāṅkura) affecting the lingual frenulum (jihvāprabandhaja); frightening, obstructing passage of food, progressing very fast, causing dryness of throat and mouth. Pain on the jaws and ears are also present. It is caused by vitiated vāta.

Pittarohiṇī:- Fever, localised burning, thirst, feeling as if fumes are coming from the throat and unconsciousness are present in this condition. The onset and development of the disease is rapid; the affected portion is highly sensitive to touch and redness and formation of pus is also very fast.

In kapharohiṇi, the lesion is slimy and pale. Raktarohiṇi is similar to pittarohiṇi, blisters are

present, tongue is ember coloured and pain of the ear is also present. In sannipātarohiṇi, the symptoms of all other rohiṇis are present in a mixed form and the formation of pus is deep.

Predominant vitiation of kapha in throat, thick elevated and static, coffee coloured, causing pricking irritation and dysphagia is termed kaṇṭhśālṣūka. Round, elevated, local swelling of the neck with warmth and fever is termed as vṛnda. Edema appearing like cotton seeds, hard in consistency, affecting the jaws and adjacent portions of the neck with little pain is termed as tuṇḍikerika. Severe edema affecting the neck and throat causing constriction like an elastic band is gaḷaugha; heaviness of head, salivation, lethargy and fever is also present in this condition.

Lesion similar to above, edema vertical, with little pain is valaya. Gaḷāyuka is a bud-like growth of the soft palate, caused by any one doṣa or all doṣas, with little pain, difficulty in breathing and swallowing, its root extensive. Severe pain, thirst, fever, headache and several wick-like thick growths affecting the throat are the features of śataghni. Extensive abscess affecting the throat, painful, secreting fowl smelling pus is gaḷavidradhi. Thick, non suppurative, painful edema affecting the root of tongue is gaḷārbuda. This is caused by vitiation of all doṣas.

Gaḷagaṇḍa is a disease affecting the neck due to vitiated vāta, kapha or lipid tissue (meda). In advanced stages, it is painful and the neck remains suspended like the testicle. Gaḷagaṇḍa caused by deranged vāta is either black or crimson, severe pricking pain is present and black lines are visible on the surface. In this condition, the patient feels that some paste is applied on the neck and as the disease advances, taste is indistinguishable.

Gaḷagaṇḍa caused by deranged meda increases kapha and as the disease progresses, body weight is increased. The voice becomes throaty, difficulty in speech and loss of voice may supervene. The movement of vāta is being blocked by kapha, dryness of throat is present and total loss of voice is seen. Difficulty in respiration is also present.

Among these diseases of the throat and neck, gaḷaugha, svaraghna, śataghnī, gaḷārbuda, valaya, rohiṇi caused by vitiation of tridoṣa and rakta and conditions where inspiration is difficult and total or partial loss of voice is present, are not curable. Gaḷagaṇḍa that is older than a year also is incurable.

Diseases of the throat where fever and other complications are present, sudation and pungent (tīkṣṇa) nasal medication, fraying and rubbing with medicated powder are to be done depending on the stage of the disease. Diseases of the throat are treated by bloodletting and pungent nasal medications.

A kaṣāya prepared from dārvītvak (bark of *Berberis aristata*), nimba (*Azadirachta indica*), tārkṣya (copper vitriol) and kaliṅga (*Holorrhena pubescens*) is advised. Prepare a kaṣāya with harītaki (*Terminalia chebula*) and consume with honey.

Fine powders of the following are rolled in śukta and gomūtra (cow's urine) to prepare pills. The powdered pill mixed in warm water is used for gargling.

Sreṣṭha	*Terminalia chebula*
	Phyllanthus emblica
	Terminalia bellirica
Vyoṣa	*Zingiber officinale*
	Piper nigrum
	Piper longum

Yavakṣāra	*Hordeum vulgare*
Dārvi	*Berberis aristata*
Dvīpi	*Solanum violaceum*
Rasñjana	Rasot
Pāṭha	*Cyclea peltata*
Tejinī	*Zanthoxylum rhetsa*
Nimba	*Azadirachta indica*

Intake of a kaṣāya prepared from the following added with a small quantity (3gms) of powdered kaṇa (*Piper longum*) and honey is very effective.

Kulathamūla	*Macrotyloma uniflorum*
Nirguṇḍi	*Vitex negundo*
Śuṇṭhi	*Zingiber officinale*
Vatsaka	*Holarrhena pubescens*

Consumption of Vilvadhānyādi kaṣāya added with devatāra (*Cedrus deodara*) and jīraka (*Cuminum cyminum*) and with honey and tippali (*Piper longum*) powder is prescribed. In the presence of fever, irrigation is indicated with a mixture of medicated ghee and sesame oil. Kaṣāya prepared from musta (*Cyperus rotundus*), parpaṭa (*Oldenlandia corymbosa*) and śuṇṭhi (*Zingiber officinale*) also is effective in this condition.

A paste prepared from the fine powders of the following, on external application in lukewarm, relieves pain and edema.

Niculạ	*Barringtonia acutangula*
Kaṭabhī	*Careya arborea*
Musta	*Cyperus rotundus*
Devatāru	*Cedrus deodara*
Mahauṣadham	*Zingiber officinale*
Vaca	*Acorus calamus*
Danti	*Baliospermum montanum*
Mūrva	*Chonemorpha fragrans*

Similarly, a paste prepared from the following also relieves pain and edema.

Punarnava	*Boerhavia diffusa*
Amṛta	*Tinospora cordifolia*
Musta	*Cyperus rotundus*
Devadāru	*Cedrus deodara*
Mahauṣadham	*Zingiber officinale*
Kuṣṭha	*Saussurea costus*
Eraṇḍa	*Ricinus communis*
Vaca	*Acorus calamus*

Whole body irrigation, inhalation of vapor arising from medicated milk and application of Triphalādi or Asanavilvādi tailam on head is indicated in diseases of the throat. Fine powder of triphala (*Terminalia chebula*, *Phyllanthus emblica* and *Terminalia bellirica*), thrikaṭu (*Zingiber officinale*, *Piper longum* and *Piper nigurm*), jātikka [*Myristica fragrans* (nut meg)] and karpūram (*Cinnamomum camphora*) can be used for nasya. All the treatments are to be done based on the condition of the diseases. Consumption of powders of triphala, trikaṭu and karpūra, mixed with honey after food is prescribed. Oil applied on the head shall be removed by rubbing coconut husk powder. Kaṣāya prepared from bala (*Sida alnifolia*) and haṭha (*Phyllanthus emblica*) can also be used for the same purpose. Application of fine powders of the following (well mixed) on the vertex is effective:

Iraṭṭimadhuram	*Glycyrrhiza glabra*
Sahasravedhi	*Ferula assa-foetida*
Mañjal	*Curcuma longa*
Karimjīrakam	*Nigella sativa*

Gomūtraharītaki or Gāḷakacūrṇa shall be rubbed on the lesions of the throat for proper secretion of exudates. Sesame oil medicated with sour buttermilk as liquid component, and the tuber of īzhaccempu (*Alocasia macrorrhiza*) as solid component, on application on the head relieves diseases of the throat.

Inhalation in diseases of the throat

Inhalation of fumes arising from medicated milk relieves pain quickly. Four or five nāzhi* of milk mixed with paste of jīraka (*Cuminum cyminum*) and paccappuzhuku (semen of civet) are boiled in an earthen pot. Inhale the fume arising from the pot; external fumigation is also effective.

Internal and external sudation of the throat and neck, and fraying are the treatment indicated in vātarohiṇi. Fraying is done by aṅgulīśastra (surgical blade) fixed at the tip of finger or fingernail dipped in common salt. Gargling (gaṇḍūṣa) with kaṣāya prepared from pañcamūla (roots of *Aegle marmelos*, *Gmelina arborea*, *Stereospermum colais*, *Oroxylum indicum* and *Premna corymbosa*) and nasya with sesame oil medicated with pañcamūla are also indicated.

In vitiated pitta, application of a paste made out of powders of sita (sugar), kṣaudra (honey) and priyaṅgu (*Callicarpa macrophylla*) are advised to promote secretion. Rubbing with fine powders of lodhra (*Symplocos cochin-chinensis*) and pattaṅga (*Caesalpinia sappan*) and filling the mouth (kabaḷa) with kaṣāya prepared from the same drugs are also effective.

Filling the mouth with kaṣāya prepared from drākṣa (*Vitis vinifera*) and parūṣaka (*Grewia asiatica*) is also indicated in pittarohiṇi. The same treatment is indicated in rohiṇi caused by vitiated rakta. Here, the patient should be made aware of the difficulty to cure the disease.

Śḷaiṣmika rohiṇi is treated by application of powders of agāradhūma (kitchen soot) and kaṭuka (*Picrorhiza kurrooa*). The powder may be rubbed (pratisāraṇa) on the affected region to promote exudation. Nasya and gargling with sesame oil medicated from the drugs given below is indicated.

*1 nāzhi = 192 ml

Apāmārgaphala	Fruit of *Achyranthes aspera*
Śveta	*Ocimum tenuiiflorum*
Danti	*Baliospermum montanum*
Jantughna	*Embelia ribes*
Saindhava	Rock salt

The same treatment is indicated in vṛnda, śālūka and tuṇḍikerika. After bloodletting, fine powders of the following are applied and kaṣāya prepared from them is used for gargling.

Śreṣṭha	*Terminalia chebula* *Phyllanthus emblica* *Terminalia bellirica*
Rocana	Ox gall
Tārkṣya	Copper vitriol
Gairika	Red ochre
Lodhra	*Symplocos cochin-chinensis*
Paṭu	Rock salt
Pattaṅga	*Caesalpinia sappan*
Kaṇa	*Piper longum*

Gaḷagaṇḍa caused by vāta is subjected to sudation and bloodletting. The abscess is tied with medicated poultice (upanāha) prepared from tila (*Sesamum orientale*), laṭva (*Carthamus tinctorius*), uma (*Linum usitatissimum*), priyāḷa (*Buchanania lanzan*), śaṇa (*Crotalaria retusa*) and rock salt. After healing of the wound, application of a medicated paste prepared from the following is effective to arrest further ripening.

Śigru	*Moringa pterygosperma*
Tilvaka	*Excoecaria agallocha*
Takkari	*Premna corymbosa*
Gajakṛṣṇa	*Scindapsus officinalis*
Punarnava	*Boerhavia diffusa*
Kāraskara	*Strychnos nux-vomica*
Amṛta	*Tinospora cordifolia*
Kola	*Ziziphus jujuba*
Ravimūla	Root of *Calotropis gigantia*

Consumption of sesame oil medicated with the kaṣāya of the following as liquid component and kṛṣṇa (*Piper longum*) and devatāru (*Cedrus deodara*) as solid component relieves gaḷagaṇḍa.

Guḍūci	*Tinospora cordifolia*
Nimba	*Azadirachta indica*
Kuṭaja	*Holarrhena pubescens*
Hamsapādi	*Adiantum lunulatum*
Bala	*Sida alnifolia*
Atibala	*Sida rhombifolia*

The above treatments are indicated in gaḷagaṇḍa caused by vitiated kapha. Sudation (svedana) and forced exudation (visrāvaṇa) are to be done repeatedly. External application of a paste prepared from the following is very effective:

Ajagandha	*Cleome viscosa*
Ativiṣa	*Aconitum heterophyllum*
Viśalya	*Gloriosa superba*
Viṣāṇika	*Gymnemma sylvestre*

Palāśakṣāra (alkali of *Butea monosperma*) is made to a paste with the fine powders of guñja (*Abrus precatorius*), alābu (*Lagenaria siceraria*) and śuka (*Albizia lebbeck*) added with cow's urine and haṭha (*Emblica officinalis*) kṣāra. Intake of this paste in suitable quantity is prescribed. During this medication, intake of a kañji (gruel) prepared with kodrava rice (*Paspalum scrobiculatum*) is prescribed for relief of śḷaiṣmika gaḷagaṇḍa.

Consume sesame oil medicated with drugs specified in vatsakādi gaṇa or paṭupañcaka (five salts). Fumigation, inhalation of medicated fume, induction of emesis (vamana) and nasal medication (nasya) that reduce kapha are to be followed.

Gaḷagaṇḍa caused by meda is subjected to bloodletting and all procedures that reduce kapha should be followed. Intake of drugs in Asanādi gaṇa, mixed with cow's urine is effective. In the absence of relief, it should be opened surgically and the resultant wound has to be treated as in the case of abscess (vṛaṇa).

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