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Āryavaidyan

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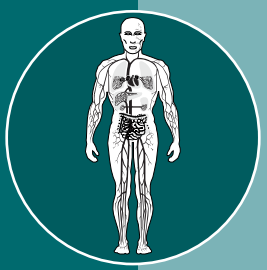
the most precious is health



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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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तद्विद्याचार्यसेवा च बुद्धिमेधाकरो गणः ।।

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learning other disciplines and
serving the preceptor - these factors
endow one with intelligence and memory

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MĀTRĀVASTI VERSUS DRUG RESISTANT TREMOR IN PATIENT SUFFERING FROM PARKINSON'S DISEASE - CASE REPORTS

Rao B.C.S. and S. Sahoo*

Abstract:- Tremor at rest is one of the cardinal symptoms of Parkinson's disease and the first sign in about 75% of patients. A minority of patients will present with tremor as the predominant symptom throughout the course of the disease (tremor dominant Parkinson's disease). Anti-parkinsonian drugs usually provide effective treatment for bradykinesia and rigidity, whereas drug treatment of tremor may be more difficult. Parkinsonian tremor is sometimes resistant to currently available medication or sufficient pharmacotherapy may cause intolerable side effects and lead to discontinuation of treatment (drug resistant tremor). Stereotactic neurosurgery with deep brain stimulation (nucleus ventralis intermedius thalami, subthalamic nucleus) or thalamotomy may lead to excellent tremor reduction, but is at least in the short term an expensive approach with rare but potentially severe side effects, and is limited to specialised centres. An attempt was made to treat four patients suffering with Parkinson's disease who were receiving a stable anti-parkinsonian medication with levodopa/decarboxylase inhibitor preparations, and/or selegiline and/or amantadine.

Introduction

Parkinson's disease (PD) belongs to a group of conditions called motor system disorders, which are the result of the loss of dopamine-producing brain cells. The four primary symptoms of PD are tremor or trembling in hands, arms, legs, jaw, and face; rigidity or stiffness of the limbs and trunk; bradykinesia or slowness of movement; and postural instability or impaired balance and coordination. As these symptoms become more pronounced, patients may have difficulty in walking, talking or completing other simple tasks. PD usually affects people over the age of 50. Early symptoms of PD are subtle and occur gradually. In some people the disease progresses more quickly than in others. As the disease progresses, the shaking or tremor, which affects the majority of PD patients may begin to interfere with daily activities. Other symptoms may include depression and other emotional changes; difficulty in swallowing, chewing and speaking; urinary problems or constipation; skin problems; and sleep disruptions.

Objective:- To report role of mātrāvasti as an add-on therapy on Parkinson's tremor in 4 cases.

**Advanced Centre for Ayu, in Mental Health & Neurosciences, NIMHANS, Hosur Road, Bangalore - 560 029*

How to diagnose the PD

There are currently no blood or laboratory tests that have been proven to help in diagnosing sporadic PD. Therefore, the diagnosis is based on medical history and a neurological examination. The diagnosis of PD is based on finding a combination of rigidity, tremor, slowness of movement and lack of balance. The patient is often brought to the physician by the spouse and may not even be aware of any symptoms. The patient's lack of awareness may represent denial or a real inability to perceive the physical symptoms or depression. Computed tomography (CT) or magnetic imaging (MRI) is useful in excluding other causes of symptoms such as tumors or multiple small strokes. MRI is especially useful in excluding shrinkage of the brainstem and cerebellum, conditions that may be associated with some of the PD+ disorders.

What is a drug resistant tremor

Patients had to full fill the criteria of marked and drug resistant tremor during their medical history - subjects either failed to experience a clinically relevant and useful improvement in tremor under an optimised anti-parkinsonian therapy with various agents, or side effects encountered under an effective anti-tremor therapy were intolerable.

Case reports

During a 4-year period between 2006 and 2010, we observed four male patients aged in between 58 to 73 years, suffering with drug resistant tremor of Parkinson's disease at our advanced centre for Āyurveda in Mental health & Neurosciences (ACAMH&NS), NIMHANS, Bangalore. All four patients were known cases of PD and were on modern conventional treatment from past two to three years. Patients with modern treatment responded well to their complaints like bradykinesia and rigidity, but not for their tremor at rest and writing tremor (micrographia). These patients were admitted at our Āyurvedic ward and given vasti treatment periodically as an add-on therapy.

Drug resistant tremor versus mātrāvasti

Mātrāvasti is a special treatment in āyurveda for vātavyādhis. In this treatment, certain herbal oils are applied through the rectum on a daily basis. Mātrāvasti has a lubricating, balancing, nourishing, strengthening and pacifying effect. It also works as rejuvenator, immuno-modulator and nutrient and subdues elevated vātadoṣa. Here the patients suffering from PD with poor response with respect to their complaint tremor with available modern conventional therapy were treated with mātrāvasti using Balātaila. Balātaila has vātaśāmaka and rasāyana properties and the treatment lasts for a period of 14 days, of three consecutive months initially, followed by a maintenance therapy of mātrāvasti twice in a year.

Method of administration of mātrāvasti

Patients were asked to take light meal i.e. neither too snigdha nor too rūkṣa and not more than three fourth of the usual quantity. Before administration of vasti, abhyaṅga with Balātaila on the whole body (sarvāṅga) followed by bāṣpasvedana was done as pūrvakarma. Sarvāṅga abhyaṅga was done approximately for 30 minutes; after abhyaṅga, patients were subjected to baṣpasvedana for approximately 10 min. For this, Daśamūla decoction was used. After these pūrvakarma, the patients were advised to take left lateral position with left lower extremity straight and right lower extremity flexed on knee and hip joint. The patients were asked to keep his left hand below the head. Balātaila

was applied to anus in small amount. 80 ml of lukewarm Balātaila was taken in an enema syringe and rubber catheter oleated with taila was attached to it. After removing the air from enema syringe, rubber catheter was administered into the anus of the patients up to the length of 4-5 inches. The patient was asked to take deep breath while introducing the catheter and drug. During the administration of medicated oil precaution was taken to avoid entrance of vāyu into the pakvāśaya as which may produce abdominal pain. After the administration of vasti, patients were advised to lie in supine position, and patient's buttocks were gently tapped and legs were raised few times so as to raise the waist. After a while patients were advised to get up from the table and to take the rest.

Efficacy criteria:- The primary end point was the absolute change in tremor score in two tremor self rating scales based on a patient's diary.

Patient's diary: - The patient's diary consisted of two tremors self rating scales: 1) Impairment of daily living by tremor and 2) severity of tremor.

Impairment of daily living by tremor is a 21 item checklist of daily living tasks (for example, cutting with a knife, using a spoon and brushing teeth). The best performance for each item per day was rated using a four point scale (0, no difficulty; 1, slight difficulty; 2, considerable effort; and 3, cannot be fulfilled). The maximum score was 63 points.

Severity of tremor was rated on a five point scale (0, missing; 1, mild; 2, moderate but occasionally occurring; 3, moderate but persisting; and 4 severe) with the items rest tremor, postural tremor, and impairment by tremor (maximum score 12 points). Ratings were performed every 2 hours of the waking day. In both scales a reduction in total score indicates improvement. Each scale was used on 3 consecutive days immediately after completion of each course of mātrāvasti. The scores of these 3 days were averaged.

Results

Four patients dominated with resistant tremor were responded well with mātrāvasti. 25 percent of response was estimated through Patient Dairy Assessment Tool after an initial course of 14 days and overall response (about 40 percent) by the end of 3rd course of therapy.

Discussion

In āyurveda, it is known as kampavāta, a neurological disorder affecting 1% of the population over age 65 and is the fourth most common neurological degenerative disorder found in the elderly. Direct reference to the Parkinson's disease in the ancient āyurvedic literature is sparse and refers only to related symptoms including tremors. Thus, the condition is referred to in the modern āyurvedic literature by various names for tremors: Kampavāta (tremors due to vāta), vepathu (shaking, as in being off track or out of alignment), prevepana (excessive shaking), śirakampa (head tremor), spandana (quivering) and kampana (tremors).

Etiopathogenesis (nidāna samprāpti)

With ageing, apānavāyu accumulates (sañcaya) and may become aggravated (prakopa). When this is combined with a vāta increasing lifestyle and constitutional tendencies, the stage is set for vāta to overflow (prasara) into circulation. Overflow causes vyānavāyu to become disturbed within the rasadhātu. Systemic signs of vāta disturbance, such as dryness of the membranes of the body, occur. Vāta may

relocate (sthānasamśraya) to any dhātus that are weak. When a preexisting weakness resides in the tissue of the brain, this becomes the site of relocation and thus we have a condition of vāta (prāṇa, samāna and vyāna) in the majjādhātu, damaging portions of the brainstem and causing altered coordination and tremors.

Additional components of the pathology which are commonly present include vāta (vyāna) entering māmsadhātu causing muscle rigidty and prāṇakṣaya (diminished prāṇa) in the manovaha śrotas causing depression.

Treatment (cikitsa)

Āyurvedic treatment for this condition centers around the treatment of vāta disturbance. Oleation and fomentation form the basis of the constitutional treatment. Oleation through massage (abhyaṅga) and enema (vasti) are indicated.

Mātrāvasti - mechanism of action

Mātrāvasti with Balātaila has proved as an effective antiparkinsonian agent with respect to reduction of parkinsonian tremor when added to a stable antiparkinsonian medication. The mean improvement in tremor in patients suffering with PD was - 40% in favour of mātrāvasti. The improvement may be attributed to the properties of Balātaila due to its vātaśāmaka and balya which help in breaking the pathogenesis thereby reducing the impairment as well as the severity of the tremor as estimated by self rating scales based on a patient's diary.

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SCREENING OF MICROBIAL LIMIT TEST OF AN ĀYURVEDIC NUTRITIVE POWDER

Vinuta, Dhanalaxmi Rane and Rudramma Hiremath*

Abstract: Plant based drugs may have contamination of microbes due to their source. A nutritive powder (that constitutes carbohydrates, proteins and micronutrients) was prepared by green gram, wheat, red rice, ragi, dry ginger, long pepper, black pepper, liquorice and sugar candy. The microbial test carried out on the raw drugs as well as on the finished products showed presence of *S. aureus* in long pepper and liquorice. *P. aeruginosa* was present in ragi, long pepperi and sugar candy. *E. coli* was present in green gram, ragi, black pepper and liquorice. The Microbial Limit Test (MLT) showed no micro organism in the nutritive powder.

Introduction

Food is described as mahābhaiṣajya[1] (superior medicine or drug) in the āyurvedic classics. For maintenance of health, additional supplement also plays a vital role. Demand for therapeutic herbal and neutraceutical preparations has increased greatly in the past few years.

An āyurvedic nutritive powder was prepared by green gram (mudga - *Vigna radiata*), wheat (godhūma - *Triticum aestivum)*, red rice (śāli - *Oryza sativa* var. *navara*), ragi (ragi - *Eleusine coracana*), dry ginger (śuṇṭhi - *Zingiber officinale*), long pepper (pippali - *Piper longum*), black pepper (marica - *Piper nigrum*), liquorice (yaṣṭimadhu - *Glycyrrhiza glabra*) and sugar candy (khanda - *Saccharum officinarum*). The combination of *Zingiber officinale*, *Piper longum* and *Piper nigrum* is called trikaṭu, which is a bio-enhancer. *Glycyrrhiza glabra* is an excellent intellect promoter and tonic.[2]

Plant materials carry a number of bacteria and fungi.[3] Contamination and microbial growth occur during harvesting, handling and production. Among such microbes some are helpful in treating diseases and some are harmful. The microbes like *E. coli, S. aures, P. aeruginosa, S.abony*[4] produces harmful effects. As the use of herbal preparations is increasing, there is an urgent need to have knowledge about the different total growth of microbial content. For plant-origin drug, WHO has developed the technical guidelines for the assessment of microbial quality of herbal drugs to ensure that the product is free from risk.[5] In the present study, an āyurvedic nutritive power was prepared and the microbial limit test (MLT) was carried out to identify the presence of different organism in the raw materials used.

Materials and method

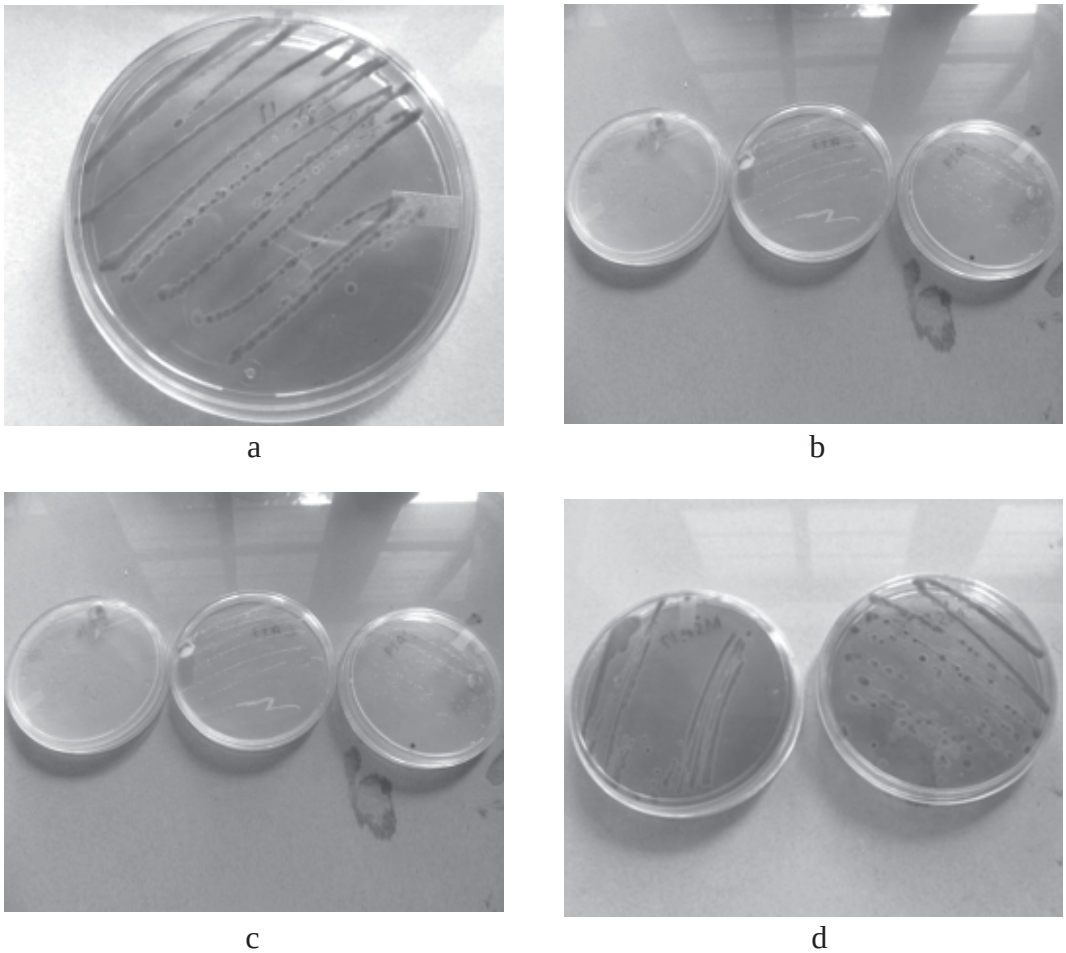
The nutritional used[6] for evaluation of microbial limits were procured from Himedia laboratories Ltd., in ready-to-use dehydrated media.

**Dept. of Bhaishajyakalpana, KLEU Shri B.M.K Ayurved Mahavidyalaya, Shahpur, Belgaum, Karnataka*

Preparation of nutritive powder: - Green gram, wheat, red rice and ragi, were roasted and powdered separately. All these powders along with powder of dry ginger, long pepper, black pepper, liquorice and sugar candy were mixed homogenously and stored in a clean container.

MLT was carried out in Microbiology Department of Central Research Facility, Shree BMK Ayurveda Mahavidyalaya, Shahpur, Belgaum. (Fig. I)

Strains used: - 1) *Staphylococcus aureu*s, 2) *Pseudomonas aeruginosa*, 3) *Escherichia coli* and 4) *Salmonella abony*



a b c d

Fig. I. Microbial Limit Test
a) *Escherichia coli*; b) *Pseudomonas aeruginosa;* c) *Salmonella abony;* d) *Staphylococcus aureus*

Microbial limit test

Detection of specific organisms:- Methods prescribed in Ayush/WHO guidelines were used to test microbial quality. Four specific pathogens viz. *Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli* and *Salmonella abony* were checked for their presence. Isolated organisms were identified using morphological, cultural characteristics and biochemical test.

Identification of microbes:- The specific organisms obtained after testing were further confirmed by biochemical testing and other selective media.

Results

Raw material:- The study showed that all the component drugs were contaminated with microbes except godhūma, śāli and śuṇṭhi. The result of MLT is showed in Table 1.

Nutritive powder:- It showed under the limit.

Discussion

Raw materials of herbal medicinal products may usually be contaminated by bacteria and moulds from soil. Contaminated water, atmosphere, harvesting, drying, storage conditions and improper handling will influence the microbiological quality of herbal drugs.[8] The presence of microbial contaminant in pharmaceutical products can reduce or even inactivate the therapeutic activity of the final products. So it is very important to ensure the lowest possible level of microorganisms in the raw material.

TABLE 1
Result of Microbial Limit Test of raw drugs

Drugs	*S.a*	*P.a*	*E.c*	*S.ab*
1. Mudga	-	-	+	-
2. Godhūma	-	-	-	-
3. Śāli	-	-	-	-
4. Ragi	-	+	+	-
5. Śuṇṭhi	-	-	-	-
6. Marica	-	-	+	-
7. Pippali	+	+	-	-
8. Yaṣṭimadhu	+	-	+	-
9. Khaṇtaśarkara	-	+	-	-

** S.a - Staphylococcus aureus; P.a - Pseudomonas aeruginosa; E.c - Escherichia coli; S.ab - Salmonella abony*

P. aeruginosa is primarily a soil bacterium and the cause of various infections, e.g. of burns and the urinary and respiratory tracts,[9] *E. coli* is an intestinal bacterium and is an indicator for contamination by feaces, causes food poisoning.[10] *S. aureus* causes skin infection and *S. abony* causes waterborne diseases. According to WHO report, *Salmonella* food poisoning is a major problem and it can infect plants cells and successfully evade all the defense mechanisms of plants.[11]

Acknowledgement:
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ANTI-ALLERGIC PROPERTIES OF ANŪRJATĀRI YOGA- A CLINICAL STUDY

Nisha Gupta* and Om Prakash Upadhyaya**

Abstract: Allopathic system contributes numerous drugs of anti-allergic action but their grave side effects cannot be ignored. Āyurveda promises good remedies for allergic diseases. If the immune system is strengthened, early sensitization to various allergens is inhibited and as a result lesser secretion of IgE and mast cell stabilization are possible. Both these objectives were taken into consideration while selecting the anti-allergic preparation Anūrjatāri yoga. A clinical study was conducted on 60 patients of respiratory and skin allergy. The result was significant and promising in the symptomatic relief along with immunomodulation.

Introduction

Clinical studies in āyurveda on diseases like anūrjata (allergies) are an area full of challenge as well as provide new hopes in the field of medicines. Management of anūrjata with modern medicine is not very satisfactory. Patient has to rely upon anti-allergic drugs like antihistamines for a long period, of course, with the associated gifts of adverse effects.

Aims and objectives:- 1) To study a drug compound in the management of anūrjata of prāṇavaha and rasavaha srotas. 2) To establish the drug of viṣaghna (anti-poisonous) effect clinically as an anti-allergic drug.

Materials and methods

Selection of patients:- Sixty patients of anūrjata were selected randomly irrespective of age, sex and religion from the O.P.D. and I.P.D. of Arogyasala, National Institute of Ayurveda, Jaipur. The subjects were divided in two groups viz. Respiratory allergy (RA) and Skin allergy (SA)

Diagnosis criteria:- Patients having signs and symptoms of allergy as mentioned in the allopathy medicine and relevant classical references. Detailed history was taken on the basis of a specially designed performa incorporating all the signs and symptoms of disease.

Laboratory investigations:- Routine haematological investigations like Hb gm%, TLC, DLC, TEC and ESR were carried out in all patients to assess the condition of the disease and rule out any other pathology. Among the biochemical investigations IgE evaluation was done in all the patients.

Study design:- 60 patients were randomly

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selected and equally divided into two groups, viz. Group A - Respiratory allergy (RA) and Group B - Skin allergy (SA). Patients of anūrjata primarily with the symptoms of prāṇavaha srotas (respiratory allergy) were studied in Group A and those of anūrjata of rasavaha srotas (skin allergy) studied in Group B.

Drugs and posology:- 10 gm of Anūrjatāri yoga was administered to all the patients in both groups twice a day with hot water. The duration of therapy was two months.

Assessment criteria:- All the patients were examined four times during the therapy. The improvement was assessed by relief in signs and symptoms of anūrjata of both srotas (Table 1). Pathological changes were also taken into consideration for the assessment. All the signs and symptoms were scored depending upon their severity to assess the effect of therapy objectively before and after treatment.

Selection of the drug: - The formulation was selected from the Kalpasthāna of Śusrutasamhita.[1] Kalpasthāna of Śusruta differs from other treatises of Bṛhattrayi by incorporating distinguished and invaluable treasure of drugs that detoxify and purify the body. In the phenomenon of allergy, the toxins accumulated in the body predispose it to hypersensitivity to various allergens thereby produce numerous chemical mediators and result in the clinical manifestations. The manifested disease depends upon the srotas involved. Wherever the srotodusṭi is seen doṣas abode there to produce disease by doṣa-duṣya sammūrcchana. However, the chemical mediators and the phenomenon involved are same in all kinds of allergic diseases. This perspective was considered for the selection of group of drugs namely sindhuvāraka, puṣkaramūla, punarnava, śirīṣa, viḍaṅga and kurabaka. Manaśśila was added to increase the potency of the compound. This formulation was named as Anūrjatāri yoga in the present work. It carries

TABLE 1
Signs and symptoms of anūrjata of both srotas

Sl.No	Prāṇavaha srotas	Rasavaha srotas
1.	Nāsākaṇḍu (Nasal itching)	Tvagkaṇḍu (Itchy skin)
2.	Kṣavathu (Sneezing)	Tvagraukṣya (Dry skin)
3.	Nāsāsrāva drava (Runny nose- clear discharge)	Koṭha (Hives)
4.	Nāsāsrāva ghana (Runny nose- cloudy discharge)	Piḍikā (Rashes)
5.	Nāsāvarodha (Stuffiness)	Tvagrāgimā (Erythema)
6.	Gandhanāśa (Loss of smell)	
7.	Śvāsa (Shortness of breath)	Akṣirāga (Red eyes)
8.	Śuṣkakāsa (Dry cough)	Akṣikaṇḍu (Itchy eyes)
9.	Ghurghuraka (Wheeze)	Akṣisrāva (Watering of eyes)
10.	Viśuṣkāsya (Dryness of mouth)	Akṣiśotha (Swelling of eyelids)
11.	Tṛṣṇa (Thirst)	Jvara (Fever)
12.	Svarabheda (Hoarseness of voice)	

viṣaghna and immuno-modulatory properties and is beneficial to patients of all sort of allergy.

Preparation:- The formulation was prepared as referred to in the text with a minor modification by inclusion of manaśśila (purified by ārdraka svarasa). The ingredients of Anūrjatāri yoga are shown in Table 2. The drugs were ground into fine powder and purified manaśśila was added. Thirty kg of kurabaka pañcāṅga (whole plant) was prepared to make its decoction. All the drug-powder was given bhāvana in the decoction and dried completely. 10 kg of sugar was dissolved in 20 litres of water and boiled till a sugar syrup of two thread consistency is obtained (i.e. when touches with forefinger and thumb, it turns into two threads between the two fingers when separated). The whole powder was added to this syrup and mixed uniformly. The mixture was dried, passed through a granulator to make fine granules of Anūrjatari yoga. The rasapañcaka of Anūrjatari yoga is shown in Table 3.

TABLE 2
Ingredients of Anūrjatāri yoga

Drug	Part used	%
1. Sindhuvāraka (*Vitex nugundo*)	Root	17.64
2. Puṣkaramūla (*Inula racemosa*)	Root	05.88
3. Punarnavā (*Boerhavia diffusa*)	Whole plant	17.64
4. Śirīṣa (*Albizia lebbeck*)	Stem bark	17.64
5. Viḍaṅga (*Embelia ribes*)	Fruits	17.64
6. Kurabaka (*Barleria prionitis*)	Whole plant	07.35
7. Manaśśila (Realgar)		01.51
8. Ārdraka (*Zingiber officinale*)	Rhizome	
9. Sugar		14.70

Result and discussion

Maximum number of patients in RA group had symptoms like kṣavathu, nāsākaṇḍu, nāsāsrāva drava, śvāsa, ghurghuka, śuṣkakāsa and viśuṣkasya in great severity followed by akṣikaṇḍu, akṣirāga and akṣisrāva in association. Symptoms like nāsāsrāva ghana, nāsāvarodha, gandhanāśa, tṛṣṇa, svarabheda were traced in some of the patients. Patients in SA group primarily showed maximum of tvagkaṇḍu, tvagraukṣya and kotha along with great association of akṣikaṇḍū, akṣirāga and akṣisrāva.

Highly significant relief ($p<0.001$) was seen in all the symptoms in RA group other than svarabheda (significant) and kṣavathu, nāsāsrāvadrava, śvāsa, śuṣkakāsa, ghurghuraka and tṛṣṇa of SA group.

Significant increase (7.00%) in Hb% in SA group indicates haemopoietic properties of the trial drug by improving the quality of rasadhātu. This was achieved by its āmapācaka and srotośodhaka properties of puṣkaramūla and punarnava by virtue of which dhātvāgnimāndya of rasadhätu is cured, srotas are cleared of impurities, slug, etc. Purified state of rasadhātu results in better circulation and thereby raktadhātu formation. In RA group, significant increase (7.92%) in neutrophils, decrease (8.16%) in lymphocytes and significant decrease in monocytes is suggestive of immuno-modulatory activity of the drug. Eosinophils are the chief cellular component in the inflammatory reactions of the body. Significant reduction in eosinophils (29.17%) and in TEC (30.33%) in Group RA indicates the anti-inflammatory and anti-allergic properties of the drug. Significant reduction of ESR in both groups (26.59% in RA

TABLE 3
Rasapañcaka of Anūrjatāri yoga

Drug	Rasa	Guṇa	Vīrya	Vipṭka	Prabhāva
Sindhuvāraka	Kaṭu, tikta	Laghu, rūkṣa	Uṣṇa	Kaṭu	Vātakapha śāmaka
Puṣkaramūla	Tikta, kaṣāya	Laghu, tīkṣṇa	Uṣṇa	Kaṭu	Kaphavātahara
Punarnavā	Madhura, tikta, kaṣāya	Laghu, rūkṣa	Uṣṇa	Kaṭu	Tridoṣaghna
Śirīṣa	Madhura, tikta, kaṣāya	Laghu, rūkṣa	Anuṣṇa	Kaṭu	Tridoṣaghna
Viḍaṅga	Kaṭu, kaṣāya	Laghu, rūkṣa, tīkṣṇa	Uṣṇa	Kaṭu	Kaphavātahara
Kurabaka	Tikta, madhura	Laghu	Uṣṇa	Kaṭu	Kaphavātahara
Ārdraka	Kaṭu, kaṣāya	Laghu, snigdha tīkṣṇa	Uṣṇa	Madhura	Kaphavātahara
Manaśśila	Tikta, kaṭu	Guru, snigdha	Uṣṇa	Kaṭu	Kaphavātahara

and 40.08% in SA), IgE (42.93% in RA and 36.86% in SA) are indicative of anti-inflammatory activity, anti-allergic and immunomodulatory activities of the trial drug.

Statistical evaluation of overall subjective parameters shows highly significant result in both groups. As far as laboratory findings are concerned, results were relatively more significant in RA group compared to SA. Severity and incidence of symptoms were switched over to mild after the administration of trial drug for two months.

Possible mode of action

For a drug to act as anti-allergic it must carry the properties of dīpana, pācana, tridoṣaghna, rasāyana, viṣaghna, srotośodhaka, śothahara, śvāsahara, kāsahara, kaṇḍughna and tvacya. All the ingredient drugs of Anūrjatari yoga are well established for the requisite properties. Their mechanism of action in anūrjata is:

- Most of the drugs are of kaṭu tikta rasa, laghu rūkṣa guṇa, kaṭu vipāka and uṣṇa vīrya. All these properties make them agnidīpaka and āmapācaka. So, on reaching pittasthāna, agnidīpana and āmapācana take place.
- Tīkṣṇa guṇa makes drug possible to penetrate deep into the srotas and bring about srotośodhana by removing the saṅga. This is seen as bronchodilatation in prāṇavaha srotas and increased sweating in tvak representing rasavaha srotas.
- The medicated āhārarasa with āmapācana properties is carried to the samarasadhātu. This alleviates dhātvāgnimāndya of rasadhātu and successively of all dhātus. On alleviation of dhatvāgnimandya, sarvadhātu-sarata is achieved which results in ojovṛddhi. This further enhances bala or vyādhikṣamatva of patient in general.
- By āmapācana in rasadhātu, malarūpa kapha or āmaviṣa is decreased. This results in srotośodhana. So, normal functioning of srotas is retained and normal immune strength is recovered and tolerance to various anūrjaskara factors is exhibited by specific srotas. As well, these drugs restore the natural state of srotas by healing the kha-vaiguṇya.
- The tridoṣaghna properties of punarnava and śirīṣa make them to act like rasāyanas. These enhance the immune status in body. By virtue of madhura rasa punarnava, śirīṣa and kurabaka act as detoxifying agent (viṣaghna) and act as ojovardhaka remedy.

- Drugs like puṣkaramūla and manaśśila act directly on the prāṇavahasrotas and increase the local immunity along with alleviation of localized symptoms. Sindhūvāraka and viḍaṅga directly effect on rasavaha srotas (skin) and increase its integrity by improving circulation and removing impurities by their detoxifying and antiseptic nature.

Conclusion

Anūrjatāri yoga is efficacious in alleviating and reducing the morbidity of anūrjata. Its viṣaghna effect is clinically established as an anti-allergic and a safe alternative medicine. No adverse effect was observed during the study period of trial drug. Regular use of this formulation performs the function of abhisamskāra, the most important property to counter the evil effects of allergens.

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COMPARATIVE STUDY OF TWO SETS OF UNANI FORMULATIONS ON THE EJECTION FRACTION IN CHRONICALLY FAILING HEART (*SAQOOT-E-QALB MUZMIN*)

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Abstract: Most of the Unani physicians have described Zof-e-Qalb (Cardiac weakness) as the etiological factor of various cardiac diseases rather than a disease itself. At present no such term exists which may alternatively be used for Zof-e-Qalb but after going through the Unani literature it is apparent that it can almost be synchronised with the description of heart failure (Saqoot-e-Qalb) of present era. A study was conducted to compare the efficacy of two groups of Unani formulations in the cases of chronic heart failure with respect to their ejection fraction.

Introduction

Most of the Unani physicians have described *Zof-e-Qalb* (Cardiac weakness) as the etiological factor of various cardiac diseases rather than a disease itself. But some physicians refer it as a separate clinical entity. Ibne Sina has suggested that such condition develops due to *Su-e- Mizaj* (ill temperament) while effective contraction of the heart indicates its normal functioning.[1] The causes of *Zof-e-Qalb* or heart failure mainly effects the muscles of heart as a primary or secondary cause, therefore, E. Braunwald has called it Myocardial failure.[2]

The heart failure can be simply defined as the heart cannot maintain an adequate cardiac output or can do so only at the expense of an elevated filling pressure.[3] Almost all forms of heart diseases if not treated well in time, may lead to acute or chronic heart failure. It is important to appreciate that congestive heart failure is just like anaemia or fever which itself is not a disease but the manifestation of a clinical illness or syndrome.[4]

In the present study the cases of chronic congestive heart failure due to Aortic and Mitral valve diseases were taken. Fairly sensitive objective parameter that is measurement of ejection fraction of left ventricle which physiologically coincides with the right ventricular function[5] was assessed before and after the clinical study. Hence by assessing the ejection fraction of left ventricle the function of the right ventricle can also be deduced to a great extent.

The management of *Zof-e-Qalb* in Unani system of medicine depends upon the following parameters:[5-7]

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Regimental therapy

1. *Lateef, Kaseerul Taghzia wa Zood Hazm Ghizaon ka Istaimal* (Light, nutritive and easily digestible diet)
2. *Namkeen Ghizaon se parhez* (Salt restricted diet)
3. *Shahmi Ghizaon se Parhez* (Low fat diet)
4. *Laheem wa Shaheem Afrad ka Wazan kam Karain* (Weight reduction of obese and overweight)
5. *Sharab Noshi se Parhez* (Cessation of alcohol intake)
6. *Tafreehi Awamil* (Stress reduction and to provide friendly atmosphere)
7. *Moatadil Riyazat* (Moderate exercises)
8. *Dalak* (Massage)
9. *Fasd* (Venesection)

Pharmacotherapy

1. *Mudir-e-baul Advia* (Diuretic drugs)
2. *Murraqat Advia* (Diaphoretic drugs)
3. *Muffarah Qalb Advia* (Exhilarant drugs)
4. *Muqawwi Qalb Advia* (Cardio-tonic drugs)
5. *Muqawwi Quwa Mudabbira badan wa quwa tabiya Advia* (Immuno-modulator drugs)

Presently, different drugs are available in Western Medicine to treat the heart failure but still digoxin is the corner stone, which is an alkaloid extracted from the herb *Digitalis lanata* (common foxglove). As it has very narrow therapeutic and toxic level, a small negligence in dose calculation may lead to atrial or ventricular arrhythmia. In other words only experienced physician and cardiologist can use this drug.

There are various drugs in Unani system of medicine which have cardio-tonic property with little or no side effects. Two clinical studies carried out in the department of Moalejat to evaluate the efficacy of Unani drugs in the context of Congestive Heart Failure found to be effective to some extent. Here is a comparative study to find the efficacy of two combination.

Material and method

The study was carried out by two groups of researchers from the period 1998 to 2000 and 2001 to 2003 on 30 and 20 patients respectively at Ajmal Khan Tibbiya College Hospital, Aligrh Muslim University, Aligarh.[8,9] Here, it is important to emphasise that in the following study only the ventricular function of patients suffering from congestive heart failure due to aortic and mitral valve involvement is given. The patients of congestive heart failure were selected randomly. The diagnosis was made on the basis of clinical history, physical examination, routine investigations, renal and hepatic function test, Chest X -Ray (PA view), ECG and two dimensional echocardiography.

In the first group, the drug *Jawahar Mohra* and *Khameera Abresham Sada* were given in the dosage of 32 mg and 6 gm orally twice a day for 42 days, whereas in the second group, the drug *Safoof-e-Amla, Gul-e-Gaozaban, Qust-e-Sheerin* and *Sharbate Unsul* were given in the dosage of 6 gm and 10 ml twice a day again for 42 days (Table 1 & 2). Both group of drugs were obtained from Dawakhana Tibbiya College, Aligarh Muslim University, Aligarh.

The clinical assessment in both the studies was done at weekly interval while the echocardiography was done before and after the trial in both studies i.e. 0 day and 42th day. The formula for the calculation of ejection fraction and its normal value is given as follows:

TABLE 1
Test drug combinations used

DC* No.	Name of Test Drug Combination	Ingredients	Scientific /English Name
1.	Jawar Mohra	Zahar Mohra khatai Marvarid Busd Kaharba Lajward Yaqoot Yashab Zamrad Aqeeq Warq-e-Nuqra Mastaghi Warq-e-Tila Jadwar Khatai Narjeel khatai Ambar Mushk	Silicate of Magnesia & Iron *Mytilus margaritiferus* *Corallium rubrum* *Vateria indica* *Lapis lazuli* *Diamond rubinus* Green gasper jade Emerald Cornelion Silver *Pistacia lentiscus* Gold *Delphinium denudatum* *Lodoicea maldivica* Ambergris *Moschus moschiferus*
	Khamira Abresham Sada	Mommimae Abresham Badranjboya Gaozaban Tukhm Faranjmushk Gul-e-Gaozaban Kaharba Busd Yashab Gul-e-Surkh	Mumia *Bombyx mori* *Melissa officinalis* *Borago officinalis* *Ocimum gratissimum* *Onosma bracteatum* *Vateria indica* *Corallium rubrum* Green gasper jade *Rosa damascena*
2.	Safoof -e-Amla, Gul-e-Gaozaban, Qust-e-Sheerin & Sharbate Unsul	Amla Gul-e-Gaozaban Qust-e-Sheerin Unsul	*Phyllanthus emblica* *Onosma bracteatum* *Saussurea costus* *Urginea indica*

(Manzar, 2000; Faiyaz, 2003)

*Drug combination

TABLE 2
Regimen of test drug combinations used

DC* No.	Name of Test Drug Combination	Dose and Timing	Duration
1.	Jawahar Mohra	32 mg×BD	42 days
	Khameera Abresham	6 gm×BD	42 days
2.	Safoof-e-Amla, Gul-e-Gaozaban wa Qust-e-Sheerin	6 gm×BD	42 days
	Sharbat-e-Unsul	10 ml×BD	42 days

(Manzar, 2000; Faiyaz, 2003)
*Drug combination

$$\text{Ejection Fraction \%} = \frac{(\text{LVIDd})^3 - (\text{LVIDs})^3 \times 100}{(\text{LVIDd})^3}$$

where, 'LVIDd' is left ventricular internal dimension in diastole and 'LVIDs' is left ventricular internal dimension in systole. (Normal Values: LVIDd: 2.5 cm- 3.6 cm; LVIDs: 2.3 cm-3.9 cm; Ejection fraction %: 60-75%)

Keeping in view the changes in the clinical and biochemical follow up, which requires extensive detail and space, only the very objective parameter to assess the ultimate efficacy of drug and the results of improvement in the changes of ventricular function in the form of ejection fraction is given. The results of first and last day of therapy were compared to each other so that the same patient acted as his own control.

Observations

The patients (30 Nos. in first group and 20 Nos. in second group of either sex) belonged between the age group of 15 to 69 years. Most of the patients belonged to phlegmatic and bilious temperament.

Result

Before starting the treatment the mean ejection fraction in the first group was 38.67% which was increased after 42 days of treatment to a level of 55.12% (Table 3). There was simultaneous improvement both in LVIDd as well as LVIDs. This effect is attributed to the cardiotonic properties of *Jadwar;* also, its positive ionotropic and chronotropic effect due to the assimilation of cardiac glycogen.[10] The other ingredient-drugs like *Busd, Yaqoot, Zamarud, Lajward, Warrqe Nuqra* and *Warqe Tila* also have cardiotonic effect.[10,11] *Abresahm* and *Badranj boya* increase the microcirculation in the resistance vessels of myocardium thereby increase the cardiotonic activity. These drugs also decrease the heart rate due to decrease level of catecholamines, thereby increase end

TABLE 3
The comparative effectof drugs on mean ventricular dimension and resultant ejection fraction in two groups of studies

S. No.	Name of the drug	Before Treatment (0 Day)			Before Treatment (0 Day)		
		LVID (d)	LVID (s)	EF (%)	LVID (d)	LVID (s)	EF (%)
1.	Jawahar Mohra and Khameera Abresham sada	6.25 cm	5.31 cm	38.67	5.93 cm	4.54 cm	55.12
2.	Safoof -e-Amla, Gul-e-Gaozaban, Qust-e-Sheerin and Sharbate Unsul	6.39 cm	5.26 cm	44.22	5.88 cm	4.53 cm	54.27

(Manzar, 2000; Faiyaz, 2003)

diastolic filling of ventricles.[12] *Abresham* also has cholinergic effect which also decreases heart rate and thereby facilitates the ventricular filling again.

Before starting the treatment, the mean ejection fraction in the second group was 44.22% which was increased after 42 days of treatment to a level of 54.27%. There was simultaneous improvement both in LVIDd as well as LVIDs. In this group of study, the drugs *Unsul* and *Qust-e-sheerin* have strong diuretic effect[13,15] while *Amla* and *Gul-e-gaozaban* have mild diuretic effect[13, 14] which decrease the preload and improve the functioning of heart. Moreover, these drugs have cardiotonic effect which invariably improves the renal perfusion; as a result of this activity of Renin-Angiotensin Aldosterone is decreased and helps to decrease the preload again.

Discussion

The bronchodilator and diuretic[13,14] properties of the drugs decrease the preload and after load, which improve the systolic and diastolic compliance and finally improve the systolic function of the heart. The drugs improve the congestive features of heart failure as a result of secretion of adrenaline which also decrease the heart rate thereby facilitating ventricular filling and mounting ventricular wall tension.

Conclusion

Improvement in the ejection fraction of both the groups found to be similar but it was seen that the drugs of the first group improve the ejection fraction more than the second group and hence it is recommended that in severe heart failure drugs of first group should be used while in less severe form second group drugs may be used.

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ROLE OF PSYCHOLOGICAL FACTORS IN THE ETIOPATHOGENESIS OF PSORIASIS

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Abstract: Ekakuṣṭha (psoriasis) is one of the dermatologic diseases responsible for great deal of unhappiness and feeling of depression. This Psychosomatic disorder is the resultant of vitiation of both śārīrika and mānasika doṣas. Manobhāvas further deteriorates the function dhātus and ojus too. Ekakuṣṭha, though being a physical disorder, manas plays as major role in its etiopathogenesis. Different studies in modern science also reveal facts in relation to mind and skin.

Introduction

To a certain degree every emotion finds some bodily expressions. These psychic expressions which afflicts systemically immunologically known to be the cause and triggering factor of ekakuṣṭha (psoriasis). The word 'kuṣṭha' is a broad term, which covers almost all the skin diseases. Kuṣṭha is produced invariably by vitiation of the seven factors i.e. 3 doṣas and 4 dūṣyas. But different types of pain, colour, shape, specific manifestation, etc. are found in kuṣṭha because of amśāmśakalpana of the doṣas. Accordingly, Caraka mentions kuṣṭha of innumerable types, but for systemic study they are classified into two major groups i.e. 7 mahākuṣṭha and 11 kṣudrakuṣṭha. Ekakuṣṭha is one among kṣudrakuṣṭha. Psoriasis, its symptoms simulate with ekakuṣṭha, is one of the most common dermatologic diseases, affecting up to 1 to 2 percent of the world's population. Psoriasis can be a very persistent complaint. It does not kill but it is responsible for great deal of unhappiness feeling of depression at some point. So, psychological aspect of psoriasis is most important in the etiopathogenesis and management.

Review

In recent years there has been an increasing awareness about the close relationship between 'psyche' (mind) and 'soma' (body), and in every branch of medicines, including dermatology; a large group of chronic illnesses are being designated as 'psychosomatic'. Psychosomatic disorder like psoriasis (ekakuṣṭha) are associated with skin problems that are not directly connected to the mind but that react to emotional states, such as stress.

Āyurveda explains the role and involvement of manas and śarīra in the manifestation of disease. Caraka has mentioned that depending upon the specific nature of the nidana and also specificity

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of the dūṣya afflicted, doṣa when aggravated, manifests innumerable types of disease.[1] When allow to persist for long time afflicted, these psychic disorders viz. kāma, etc. and somatic disorder like jvara, etc. may get affected with each other.[2] Cakrapani opines four possibilities in this context i.e. i) śarīrāṇām śarīrena, ii) manasānam manasena, iii) śarīrāṇām manasena and iv) manasānam śarīreṇa. Varying degree involvement of both mental as well as physiological aspects are present in all kinds of disease. Rajas and tamas are pathogenic factors of manas.

Influence of the psyche:- Ekakuṣṭha is the resultant of vitiation of both śarīrika and mānasika doṣa. The direct psychological references are available in the etiological factors of kuṣṭha.

Karma afflicts manas:- Antisocial and misbehaviour and sinful activities like blaming of good persons like saint; murder, stealing others properties, etc. have also been mentioned as the nidāna of kuṣṭha.[3] Bhaya (fear), krodha (anger), śoka (grief), etc. are originated by such activities leading to vitiation of doṣa and thereby kuṣṭha. Nidānas like pāpakarmas even causes affliction to the second generation.[4] This observation highlights the seriousness of psychic factors in the etiology of kuṣṭha.

Manobhāvas afflict dhātus: Rasa is mainly affected dūṣya in case of ekakuṣṭha. While explaining the srotoduṣṭi nidānas, Caraka mentions that over-worrying (cintyānām ca aticintanāt) is one of the nidāna of rasavaha srotoduṣṭi. Rasavaha srotoduṣṭi is also an after effect on ajīrṇa, which is also caused by disturbed state of mind. Even though food is in proper quality and wholesome, it would not digest properly if the person is affected by worry (cinta), grief (śoka), fear (bhaya), etc.[5] The causes of āma includes kāma (lust), krodha (anger), lobha (greed), moha (confusion) and śoka (grief).[6] Svedavaha srotas is also important in the pathogenesis of ekakuṣṭha. Krodha, śoka and bhaya cause svedavaha srotoduṣṭi.[7]

Manobhāvas afflict ojus:- Ekakuṣṭha is a vātakapha pradhāna disorder. Among the different etiological factors, different mānasika bhāvas like cinta, śoka, bhaya are prominently described for vāta vitiation. Vāta prakṛti persons are more prone to anxieties and worries. Prākṛta kapha is explained as balya and ojaskara. Any impairment (duṣṭi) in kapha leads to abnormal functioning of ojas. Ojas can be roughly correlated with immunity. So, the above condition may be understood in terms of immunological disorders especially having psychological origin.

Kuṣṭha afflicts manas:- Psoriasis is a chronic disease that can have substantial psychological and social impact on a patient's life. For the patient, psoriasis can be far more than 'just a skin disease'. The psychological impacts are likely to be heightened when the onset of disease is early in life, when the patient is most vulnerable to psychosocial trauma. Number of studies has shown that psychological stress is often caused by psoriasis, and can be a factor in 'flares' of psoriasis. The way in which stress, depression and anxiety influence the course of psoriasis is not known. Some studies suggest that the influence may be through an effect on the immune system.

Mind and skin

Embryologically, both the skin and brain are derived from the ectoderm hence close psychological relationship between the mind and the skin. Wittkower opines, "It is a

reasonable estimate that emotional factors are of significant etiological importance in something between one quarter and one-half of all skin diseases." In India, about 10 to 15 percent of cases affecting are mainly the educated, economically well-off classes. Poor, uneducated people are relatively free from them. Hence the importance of emotional factors in the etiology of skin diseases varies considerably in hospital and private practice. Wittkower has summarized the direct and indirect influence of the mind on the skin as follows:

- The symptoms or signs may be completely psychogenic, e.g., some cases of pruritis and hyperhidrosis.
- The emotional factor is often the most important feature in reactions of hypersensitivity, e.g., some cases of pruritis, exzema, urticaria and prurigo.
- A normal emotional manifestation in the skin may occur too easily and be maintained, e.g. rosacea and hyperhidrosis.
- Emotion may be one of the excitants setting off or aggravating virus and other infections, e.g., recurrent herpes and sycosis barbae. Emotional disturbances may predispose to in infections e.g. recurrent herpes and sycosis barbae.
- Emotional disturbances may predispose to skin infections, e.g., hyperhidrosis leading to tinea pedis and various infections.
- Emotional conflicts may increase the risk of exposure to venereal diseases, or increase the chance of drug intoxication or increase the risk of dermatitis, e.g., compulsive neurosis leading to excessive use of soap or antiseptics.
- The gratification of itching if inhibited in one skin area, may be satisfied elsewhere, because one area is less forbidden than another, e.g., some cases of neurodermatitis, flexural prurigo and excoriated eruptions.

Conclusion

Skin is directly related with manas. Caraka has mentioned that the skin, sensory organ of touch, pervades all over the body. It is always in association with mind also. The mind again pervades the sense of touch.[8] So there is a close association with mind and skin. Any imbalance in the mind affects the skin and any abnormalities of the skin affect the mind, which forms a vicious circle. In nutshell, various psychological factors are having influence in etiopathogenesis of ekakuṣṭha. Skin-mind relationship at once makes us aware that skin diseases cannot always be treated as superficial, somatic lesions; they are, in fact, multi factorial in origin, and are conditioned by varied constitutional and environmental factors.

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ŚVĀSA (WHEEZING) - A CLINICAL STUDY

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Abstract: In Carakasamhita some classification are made based on karmas called as guṇas (pharmacological actions) and based on it the drugs are classified into 50 groups. Kaṇṭhyamahākaṣāya is one such group which is said to be more effective in curing the aliments of voice and its related organs. A case of COPD (tamakaśvāsa) was treated with the syrup prepared out of Kaṇṭhyamahākaṣāya. The formulation found to be effective in relieving the symptoms.

Introduction

Āyurveda gives the physician opportunity to incorporate new medicaments in the explained conditions and name the newly diagnosed conditions based on doṣa and dūṣya. Keeping this point a case study was done on COPD (tamakaśvāsa).

Case report

OPD No : 36965
IPD No : 2346
DOA : 10/11/12
DOD : 25/1/13

A patient aged 64 years developed with complaints of difficulty in breathing on lying in supine position, walking and in sitting position associated with wheezing was admitted in the OPD. The patient was habituated to smoking for more than 50 years, with 6-7 packs of beedi and cigar per day. The patient had tried to stop smoking for 2 months and reduced the quantity of beedis; since then he developed wheezing, difficulty in breathing with sputum and throat pain. Dyspnoea on lying down for 2 minutes was also there and he had to sit for a while with deep breathing for relief. He was a welder by profession.

Lab investigation (11/11/12):

Hb - 14 gm%
TC - 7100 cells/u
DC - P-62%, L-33%, E-4%, M-1%
ESR - 25mm
RBS - 127 mg/dl
Urine - Albumin, sugar, micro - absent

X-ray reports (11/1/13):- Secretions seen at the bronchial tree.

Examination of respiratory system:- Trachea was centrally placed and shape of the chest normal. The transverse diameter was greater than AP diameter. On auscultation, rales were heard all over the chest, crepitations heard at base on both the sides.

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Medication

Kaṇṭhyagaṇamahākaṣāya (syrup) - 2 tsp TID after food.

Drug preparation: - The drugs indicated in the above formulation were prepared into kaṣāya and accordingly śarkara kalpana was prepared. The ingredient drugs of the formulation are:[1]

1. Śāriba (*Hemidesmus indicus*)
2. Ikṣumūla (*Saccharum officinarum*)
3. Madhuka (*Glycyrrhiza glabra*)
4. Pippali (*Piper longum*)
5. Drākṣa (*Vitis vinifera*)
6. Vidārika (*Pueraria tuberosa*)
7. Kaitarya (*Myrica nagi*)
8. Hamsapādi (*Adiantum lunulatum*)
9. Bṛhati (*Solanum anguivi*)
10. Kaṇṭakāri (*Solanum surattens*)

Discussion

The conditions of the patient at different stages during the study are shown in Table 1.

COPD can be co related to the condition tamakaśvāsa as it simulates many features like ghurghuraka (ghur ghur sound on breathing due to obstruction to the air pathway), śvāsa prapīḍana (miserable dyspnoea), kāsa (cough), anidra (sleeplessness) and śayana śvāsa pīḍana (exacerbated dyspnoea on lying down).

TABLE 1
Conditions of the patient at different intervals

Date	Complaints and improvement
19.11.12	Cough with dryness of mouth
25.11.12	Cough with expectorant
29.11.12	Wheeze and crepitation
07.12.12	Cough with yellow sputum
27.12.12	Throat pain
05.01.13	Throat pain with crepitations and wheeze, cough (Kaṇṭhyagaṇakaṣāya-śarkarakalpana adviced)
07.01.13	Throat pain reduced competely. Crepitations and rhonchi +++
17.01.13	Crepitations and rhonchi ++
21.01.13	Crepitations and rhonchi +
25.01.13	Discharged with symptomatic relief and found no changes in X-ray.

As tamakaśvāsa is śleṣmapittaja vyādhi, the medication required should be opposite to the properties of the doṣas involved. The drugs chosen for the intervention i.e. Kaṇṭhyagaṇa have the following properties:

1. Vidārigandha is vāta-pittahara, kapha-nissāraka and kaṇṭhya. The juice of vidāri, ikṣu, drākṣa is used in raktaja svarabedha with ghṛta, śarkara and madhu.
2. Hamsapādi is kapha-pittahara, kaṇṭhya, kāsahara and śvāsahara. The fronds are used against cough and cold. It is a good expectorant and helps in asthma. In asthma the stem bark of *Bridelia retusa* (asana) along with that of *Terminalia bellirica* (vibhitaki) and the roots of *Adiantum lunulatum* (hamsapadi) are crushed in equal proportions and taken in a size of red gram once daily for three months. Consumption of decoction of maidenhair (hamsapādi) helps in shortness of breath.[2]
3. Kaṇṭakāri is kapha-vātahara, kāsahara, kaṇṭhya, hikkānigrahaka and śvāsahara. Its fruit juice is used in sore throats and rheumatism. Plant powder is anti-tussive and its effect on bronchial asthma and non-specific cough has been explained as due to depletion of histamine from lung and its expectorant action as due to inorganic nitrogen content. Root is an expectorant. It helps to soothe the bronchial chords and thus calms the irritation in the throat.[7]

4. Śāribā is tridoṣahara. It is anti inflammatory, anti viral and bacterial.

5. Bṛhati is kapha-vātahara, kāsahara and śvāsahara. Bṛhatimūla kaṣāya acts as anti inflammatory drug and reduces the incidence of formation of granuloma tissue, reduces the number of fibroblast and decreases the collagen content. It doesn't have any hepato-cellular damage and gastric ulceration.[3]

6. Pippali is vāta-śḷeṣmahara and has property of ūrdvabhāgahara, śvāsa-kāsahara and yogavāhi. It is an anti tussive in āyurvedic formulations. The crude extract of *P. longum* as well as piplartine, one of its alkaloids, suppresses the cilliary movements of the oesophagus of the frog, which may be due to the suppression of cough reflex, as a bronchodilator. *Piper longum* has shown to reduce the passive cutaneous anaphylaxis in rats and protect guinea pigs against antigen-induced bronchospasm. It provides better circulation of blood and enhances the immune system. The rasāyana improves lung health. It helps in detoxifying lung and kidney and cleaning the lymph glands.[4,5]

7. Madhuka is tridoṣahara, kaṇṭhya and kāsa-śvāsahara. It acts as expectorant. Glycyrrhizin exerts a local effect in the GIT upon ingestion. The effect can best be described as slight irritation of mucus membranes. This helps to loosen tenacious sputum and promote its removal from respiratory tract. As immuno-modulator in intraperitoneal treatment, it was found to enhance total white blood cells (WBC) count. Maximum total WBC count was increased to 114.9-18%. It remarkably inhibited delayed type hypersensitivity reaction. The results indicate immuno-mudulatory activity of Glygrrhizic acid.[6]

8. Ikṣu is vāta-pittaśāmaka and raktapittahara and kāsa-śvāsa hara; 9) kaitarya is kapha-vātahara.

10. Drākṣa is vṛṣya and pittahara. Drākṣa is grinded and kalka prepared. It is indicated in kāsa with sarpi and madhu. Kaitarya, bṛhati, pippali and kaṇṭakāri are uṣṇa, and vidārikanda, hamsapādi, śāriba, madhuka, ikṣu and drākṣa are śīta in vīrya. The drugs present in the gaṇa are kaphaśāmaka and kāsa-śvāsahara.

Pippali is yogavāhi and it carries the drugs to the minute parts of the respiratory tract and helps in vilayana of kapha by uṣṇavīrya. This helps in the proper movement of the vāyu in the tract and helps to prevent śvāsakṛcchrata and śayana śvāsa pīḍana. The drugs like vidārikanda, hamsapādi, kaṇṭakāri and madhuka are kaṇṭhya and helps in the relieving throat pain and irritation to it. Drākṣa is balya, bṛmhaṇa and helps in getting back the normal strength of the patient and stabilises mind by saumanasya janana property. Madhuka helps in displacing the kapha from its place of accumulation and it also helps in bala vṛddhi. Kaṇṭakāri is having uṣṇa vīrya and helps in curing all the 5 types of kāsa.

Conclusion

Kaṇṭhyagaṇamahākaṣāya has local effect on kaṇṭha and generslized action on respiratory tract. The patient had symptomatic relief and no changes found in the X-ray.

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ACCELERATED OXIDATION STUDY OF MŪRCHANA TAILAM, DHĀNVANTARAM TAILAM AND SESAME OIL TREATED WITH SINGLE PLANT

Sadanandan K*

Abstract: Pre-processing (mūrchana) of sesame oil, castor oil and ghee, has specified in the classical texts like Bhaiṣajyaratnāvali as well as in the API (part II) formulations. The following samples were prepared: 1) Mūrchana tailam, 2) Dhānvantaram tailam from sesame oil, 3) Dhānvantaram tailam from mūrchana tailam and 4) Sesame oil containing 0.08% Butylated Hydroxy toluene (BHT). The acid value and peroxide value of these oils were compared after a) heating at 105^0C in an electrical air oven with thermostat control for 72 hours and b) after heating over a boiling water bath (oil temperature raised to 95^0C under a current of air). In both the experiments it was found that the process of mūrchana improved the oxidative stability than of raw sesame oil. Of 15 samples prepared with single medicinal plant, it was found that the oils prepared with āmalaki (*Phylanthus emblica*), haridra (*Curcuma longa*), kuṣṭha (*Saussurea costus*) and yaṣṭīmadhu (*Glycyrrhiza glabra*) have exceptional stability towards accelerated oxidation.

Introduction

Sesame oil is a major ingredient used in majority of medicated oil preparation and has been extensively studied for its medical application. During the preparation of medicated oils, the oil is heated and boiled with aqueous herbal decoctions, juices, herbal powders, milk, etc. under constant stirring for a long time till the moisture content is minimum as observed by the texture of the herbal residue left in the processing vessel. Thus the oil is more prone to oxidative and thermal degradation with the formation of volatile and non volatile decomposition products. So, a review of chemical changes of oils, like formation of free fatty acids and peroxides which affect the shelf life, strength and product purity, after the process is essential. The process of taila-mūrchana has referred to in the classical text Bhaiṣajyaratnāvali and later published in API (Part II) formulations. The refining process of sesame oil, taila mūrchana, is introduced due to the changes in the production methods of sesame oil.

Four groups (A,B,C, and D) of medicated oils were prepared viz. (A) Mūrchana tailam,[1,7] Dhānvantaram tailam I (with sesame oil base) and Dhānvantaram tailam II (with Mūrchana

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tailam) as per the textual procedures[1] and (B) Sesame oil containing synthetic antioxidants. The following were studied:[2] (i) the peroxide values of oil group A at 95^{0}C in a current of air at every hour intervals of heating,[2] (ii) the acid value of group A and B oils at room temperature after heating the oils to105^{0}C for 72 hours and testing acid value after an interval of 24 hours of heating.

Eleven numbers of medicated oils were prepared as group C by treating sesame oil with single medicinal plant selected from the formula of Mūrchana tailam. Four medicated oils were prepared as group D by treating (a) *Saussurea costus* and sesame oil (b) *Glycyrrhiza glabra* and sesame oil (c) *Tinospora cordifolia* and sesame oil and (d) *Piper longum* and sesame oil. The peroxide values of oils at 95^{0}C in a current of air at every two hours intervals of heating were studied and compared.[2]

Materials and methods

The sesame oil and other herbs for taila mūrchana and raw herbs for Dhānvantarm tailam were collected from raw material store of Vaidyaratnam Oushadha Sala (P) Ltd, The authenticity of ingredients were checked and confirmed.

The preparation of - i) Mūrchana tailam[1] ii) Dhānvantaram tailam I and II were carried out in the laboratory as per the procedure given in the Ayurvedic Pharmacopoeia of India.[1]

0.08 g BHT (AR quality Merck) dissolved in 100g sesame oil under mild heating and stirred till all the BHT completely dissolved in the oil.

Preparation of eleven numbers of oils with individual herbs mentioned in the formula of Mūrchana tailam and four more common raw herbs were carried out as follows:

The raw herbs were cleaned, washed, dried and finely powdered that it passes through 40 # sieve. 20 g powder mixed with 400 ml water and 200 g sesame oil was boiled in one liter SS vessel till the volume reduced to half. The whole material kept over night. In the next day, the oil mix was heated till the residue left in the vessel is free from moisture. The oil recovered by filtration through muslin cloth. The procedure repeated for all selected herbs.

Analysis

1. The physicochemical standards like Saponification value, Iodine value, Refractive index, Specific gravity, Acid value, Peroxide value of Sesame oil, Sesame oil containing BHT, Mūrchana tailam and Dhānvantaram tailam I and II were determined by standard methods.[1]
2. Samples of Sesame oil, Mūrchana tailam, Dhānvantaram tailams containing BHT, each 25 g in 500 ml beaker, were heated at 105^{0}C in an electrical air oven with thermostat control for 72 hours. After every 24 hours 4 to5 gram of samples from oils withdrawn and acid value was determined. (Table 1 & Fig. I)
3. The samples of Sesame oil, Mūrchana tailam and Dhānvantaram tailam I and II - 30 grams each - were taken separately in big boiling tubes and kept dipped in water to the height of oil in a boiling water bath and maintained the oil temperature to 95^{0}C; air was passed through these oils from a compressor at the rate of 4.5lit/minute for eight hours. The peroxide value[2] was determined after every hour by withdrawing 2 to 3 gram of oil samples, and continued till the end of eight hours of heating. (Table 2, Fig. II)
4. The samples of sesame oil and oils prepared

TABLE 1

Acid value changes of oils

Name of oils	AV* (BH)	AV (AH) at 105^{0}C		
		24 hrs	48 hrs	72 hrs
1. Sesame oil	2.93	3.60	5.26	9.30
2. Mūrchana tailam	3.92	4.08	5.20	7.41
3. Dhānvantaram tailam-I	2.57	3.31	5.18	7.68
4. Dhānvantaram tailam-II	2.67	3.25	5.06	7.50
5. Sesame oil (0.08% BHT)	2.93	3.05	3.96	5.72

* AV (BH) - Acid value before heating (i.e. at 0 time); AV AH - Acid value after heating

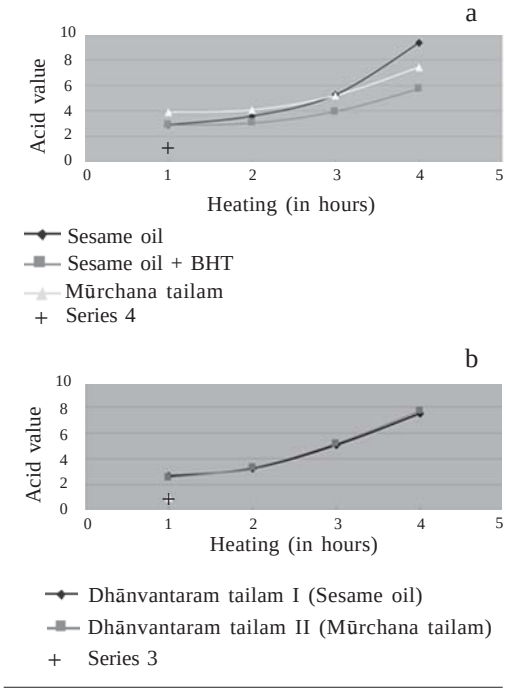

Fig. I. Acid value changes by heating at 105 ^{0}C a) Sesame oil, Sesame oil + BHT and Mūrchana tailam; b) Dhānvantaram tailam from Sesame oil, Dhānvantaram tailam from Mūrchana tailam

TABLE 2

Peroxide value changes of oils

Heating of oils (in hrs)	Peroxide value of oils			
	SO (mEq/kg)	MT (mEq/kg)	DT I (SO)	DT II (MT)
1	12.9	12.58	12.00	14.40
2	15.2	14.20	12.53	16.52
3	16.7	14.76	13.40	17.0
4	20.5	16.20	13.96	17.50
5	22.0	18.30	14.50	18.42
6	22.7	18.60	15.50	18.93
7	26.0	19.90	17.40	20.10
8	28.30	20.60	18.30	23.50

*SO - Sesame oil; MT - Mūrchana tailam; DT I Dhānvantaram tailam I (prepared from Sesame oil) DT II (Dhānvantaram tailam II (prepared from Mūrchana tailam)

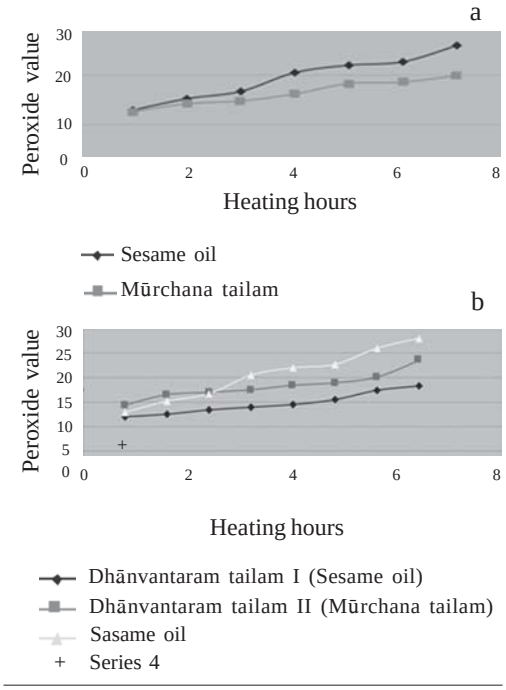

Fig. II. Peroxide value changes: a) Sesame oil, Mūrchana tailam; b) Dhānvantaram tailam from Sesame oil and Dhānvantaram tailam from Mūrchana tailam

using single herbs - 30 g each - were taken separately in big boiling tubes and the peroxide value[2] was determined as mentioned above (Table 3).

Results and discussion

The saponificaton value, iodine value, refractive index, specific gravity, acid value and peroxide value and the physicochemical standards of the oils are checked for authenticity and quality control of raw oil and finished products.[3,4] The oxygen is taken up by oils/fat with the formation of peroxides.[5] The measurement of acid value and peroxide value identify the degradation and spoilage occurred to oils formed during its preparation and the determination of peroxide value after accelerated oxidation identifies the stability of oils towards oxidation. The acid value increases in all the oils at the initial phase of heating, but the rate of increasing is high for sesame oil and least for sesame oil containing BHT. The rate of increasing of acid value in Mūrchana tailam was in between the above two oils (Table 1, Fig. I).When sesame oil converted to Mūrchana tailam, there was an initial increase of acid value, but heating continuously at a constant temperature, the rate of increase of acid value was less for Mūrchana tailam than sesame oil. The acid value increase of Dhānvantaram tailam I and II were more or less behaving similar during heating. Increasing rate of acid value of these oils is less than sesame oil. A slight increase found in peroxide value is due to the repeated heating (first to prepare Mūrchana tailam and then to Dhānvantaram tailam). The presence of natural antioxidants in the herbals retards the oxidation of Mūrchana tailam, Dhānvantaram

TABLE 2

Peroxide values of oils prepared with single herbs with different time of heating at 95^{0}C under a current of air.

Name of herb treated with Sesame oil	Part used	Bfore heating (mEq/kg)	After heating at 95^{0}C (mEq/kg)			
			2 hours	4 hours	6 hours	8 hours
1. *Rubia cordifolia*	Root	25	30.6	37.1	42	50
2. *Terminalia chebula*	Fruit rind	20.85	22.72	29.33	29.66	31
3. *Terminalia bellirica*	Fruit rind	23.5	27.4	30.64	33.7	36
4. *Phylanthus emblica*	Fruit rind	6.34	8.25	10.30	12.2	14.0
5. *Coleus vettiveroides*	Root	25.2	36.1	40.2	44	51
6. *Curcuma longa*	Rhizome	13.5	19.5	20.3	22	26
7. *Cyperus rotundus*	Rhizome	29.2	40.8	59.97	64	69
8. *Symplocos racemosa*	Stem bark	36.9	46.7	61.1	76.0	91.9
9. *Pandanus odoratissimus*	Root	37.2	58.25	77.6	92	-
10. *Ficus bengalensis*	Leaf bud	31.5	40.7	57.8	72	88
11. *Cinnamomum tamala*	Stem bark	20.4	30.4	38.80	46.0	57.0
12. *Saussurea costus*	Root	16.7	17.47	19.5	21	24
13. *Glycyrrhiza glabra*	Root	14.5	14.88	15.80	16.0	17.9
14. *Tinospora cordifolia*	Dry stem	30	40.1	53	67	81
15. *Piper longum*	Fruit	25	35	51	64	77

tailam and some of the oils prepared using single herbs. Out of 15 tailams prepared by single herbs, four had more oxidative stability than sesame oil due to the natural antioxidant present in these herbs. The change of smell of sesame oil was noted when peroxide value crosses 20 mEq/kg. It takes 4 hours for sesame oil to cross this value and no smell change to Mūrchana tailam, Dhānvantaram tailam I and II even after 7 hours of heating in a current of air. The determination of acid value and peroxide value were carried out by titration methods as referred in Pharmacopeias. Newer method like Rancimat method[2] appears to be more suitable for determining the oxidative stability of oils as well as for identifying, measuring and comparing the effectiveness of different herbal antioxidants.

Conclusion

It is important to find out the stability of oil products during shelf-life. Prolonged heating of oils makes the oil less stable and gets deteriorated easily. Taila mūrchana found to be a process of refining of sesame oil to improve the keeping quality of medicated oils as observed from the accelerated oxidation studies. The accelerated oxidation studies are to find out whether a particular oil or fat can withstand storage over a certain period. The rancidity of oils can be checked by the accelerated oxidation studies. The peroxide value and subsequent estimation of Malonaldehyde level [Thiobarbituric acid (TBA) is not estimated in the present experiment] after a definite time of heating at constant temperature and under constant aerating conditions, would also stand good as a standard. The Mūrchana tailam and Dhānvantaram tailam are processed (heated) oils. The stability of these oils found more than that of sesame oil. The improved oxidative stability of these medicated oil is due to the natural antioxidants derived from the herbs used for the process. Of 15 herbs selected and oils prepared with single herbs, identified that four oils have more resistance towards oxidative degradation viz. oils prepared with i) *Sassurea costus,* ii) *Glycyrrhiza glabra* (3) *Phyllanthus emblica* and iv) *Curcuma longa*. On scrutinizing the formula of 70 medicated oils of Sahasrayogam, more than 60 medicated oils contain these ingredients either as single or in combination which can improve the shelf-life of the oil. Depending on the presence of these herbs or other herbs which can act as natural antioxidant or not, the stability of oil will change, some oils are more stable towards accelerated oxidation some are least stable and some may be in between these values. Identification of the herb that acts as antioxidant and its proper use in the formulation of medicated oils will improve the shelf life as well as the quality.

Acknowledgment

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CRITICAL ANALYSIS PATHOPHYSIOLOGY OF NEOPLASM WITH REFERENCE TO ARBUDA

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Abstract: Cancer is not a single disease but consists of many disorders that share a profound growth dysregulation. There are numerous literatures with regard to understanding the pathogenesis of this particular disease but still there are many areas where contemporary science has failed to explain. In āyurveda, arbuda is disease in which neoplasm is being included. Arbuda is considered as one among karmajavyādhi i.e. the influence of the deeds of previous life is responsible for the causation of disease in present life. This unique concept which is explained in āyurveda has answer for many unsolved questions related to disease neoplasm. Also, the particular explanation of samprāpti of diseases in the form of ṣaḍkriyākāla is the unique concept of āyurveda. An attempt is made here to explain the pathophysiology of neoplasm with āyurvedic perspective.

Introduction

Neoplasm is the area of interest in conceptual, analytical and clinical study. The incompleteness in understanding the samprāpti may be one of the causes for the disease to remain in mystery still. Multifactorial and ediopathic causes, complex pathogenesis, unpredictable transformations and deadly symptoms make the disease more notorious. The area that the contemporary science failed to explain, has scientifically described in āyurvedic classics very yore. This article aims at throwing light towards that area where science and technology meets philosophy.

Arbuda as karmaja/doṣaja vyādhi

In āyurveda we can explain the etiopathogensis of arbuda by understanding the concept of karmajavyādhi. Vyādhis can be understood on the bases of nidānas in the form of doṣaja, karmaja, and doṣakarmaja.[1a] Doṣaja are those caused by deeds of present life which causes duṣṭi of doṣas. It is also called as pauruṣa.[2a] Karmajavyādhis are those which are caused by deeds of past life. It is also considered as daiva.[2] One should suspect the vyādhi as karmaja or doṣakarmja when the disease is gravies and the person has not indulged in much of doṣaduṣṭikara āhāra and vihāra.[1b] Daiva is the deciding factor in determining the intensity in rogakāla even for a jitendriya person i.e. one who has control over senses.[2b]

Dharmādharmakarma associated with ātma

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decides to which yoni one should take janma.[2c] Depending on the karma, the ātma will take birth in garba which are formed by union of śukra and śoṇita which can either be śudha or dūṣita. Thus if the person takes birth in duṣṭabīja, then the person will be more susceptible to diseases and added with his present karma. Or also due to pūrvajanmakṛtakarma and karma done in the present life, the person will get the entry of duṣṭi in the form of bījaduṣṭi and can be carried to next generation and produce disease to their offsprings. Even the intensity of the duṣṭi gets multiplied by the karma of the same person and also of the karmaphala of pūrvajanmakṛtakarma of ātma of their progeny.

Here, bījaduṣṭi can be considered as mutations. It is the permanent change to DNA which are acquired either by hereditary or various external factors such as chemicals, radiations or virus. Mutations affecting germ cells are transmitted to the next progeny producing inherited disease. While the mutations affecting somatic cells give rise to various cancers and congenital malformations. It is a multi-step process at both the phenotypic and the genotypic levels, resulting from the accumulation of multiple mutations.[3a] With respect to neoplasm, these mutations may occur by 3 mechanisms, i.e.-

- Point mutations i.e. an alteration of a single base in the DNA chain.
- Chromosomal translocation i.e. transfer of a portion of one chromosome carrying protooncogene to another chromosome and making it independent of growth controls.
- Gene amplification i.e. increasing the number of copies of DNA sequence in proto-oncogene leading to increased or over expressed gene product.[4a]

In normal cell growth, regulatory genes control mitosis as well as cell aging, terminating in cell death by apoptosis. In normal cell growth there are 4 regulatory genes:[3b]

- Proto-oncogenes are growth - prompting genes
- Anti-oncogenes are growth-inhibiting or suppressor genes
- Apoptosis regulatory genes control the programmed cell death
- DNA repair genes are those normal genes which regulate the repair of DNA damage that has occurred during mitosis and also control the damage to proto-oncogenes and anti-oncogenes.

In cancer, the transformed cells are produced by abnormal cell growth due to genetic damage to the normal controlling genes. The factors responsible for activation of proto-oncogenes and such are mutations, whose cause are either unknown or hereditary or acquired. Unknown causes are karmaja, hereditary causes are due to bījaduṣṭi, and acquired are due to doṣa-karmaja.

Thus, corresponding abnormalities in these 4 cell regulatory genes can be understood on the bases of the variations in the attributes of tridoṣas.

In garbhāvastha, vāta helps in proper cell division and growth. Activation of proto-oncogenes or inactivation of anti-oncogenes both can lead to uncontrolled proliferation of cells which can be attributed to variation to vibhajanakarma in vātadoṣa.[5a]

Pitta is responsible for proper energy utilization, transformations and attaining maturity in the cells. Abnormal apoptosis regulatory genes

which act as oncogenes or anti-oncogenes can be attributed to variation of pacanakarma in pittadoṣa.[2d]

The above-said genetic damage associated with variation in genes involved in DNA repair can lead to accumulation of more number of cells into mass formation in proliferation phase. This can be attributed to variation in kaphadoṣa as gurutva and mahatva, ghanatva, mūrttatva or massiveness are attained by the clonal cells can be attributed to kaphadoṣa.[5b]

Oncogenesis according to ṣaḍkriyākāla

Sañcaya[5c]

The triggering factors or carcinogenic factors in the form of āhāra and vihāra can stimulate vāta and causes abnormal cell division, i.e. cell multiplication and multiplied cells accumulate together. This accumulation of cells can be considered as sañcaya of doṣas.

Prakopa[5d]

In prakopāvastha there is mass formation and also gets more complicated by neovascularisation. There is explanation of neovascularisation in āyurvedic classics in the context of arbuda where it is said that the siras gets blocked and again newly gets sprouted.[6] Cancer cells can stimulate neo-angiogenesis, during which new vessels sprout from previously existing capillaries.[3c]

Neovascularisation in neoplasm not only supplies the tumour with oxygen and nutrients but also elaborate a few growth factors for the progression of primary tumour.[3c]

Prasara[5e]

In prasarāvastha there can transport or spread of the primary lesion which can be either local infiltration of neoplasm that form nonmalignant tumour i.e. granthi. Distant metastasis occurs which is hallmark for malignancy that can be karkaṭaka arbuda.

Malignant neoplasms disseminate by one of the 3 pathways: a) seeding within body cavities, b) lymphatic spread and c) hematogenous spread.[4b]

In āyurveda, rasa[2e] and rakta[5f] dhātus play an important role in prakopa and prasaraṇa of doṣas from place to place. Rakta along with rasa are the prime circulatory dhātus which provide nourishment and life to every single cell in the body. But when they gets vitiated it can also spreads nuclei of disease from its origin to other parts of the body.

Sthānasamśraya[5g]

This is the stage where doṣadūṣyasammūrchana occurs at the site of khavaiguṇya,[5h] the place where has any structural or functional deformity or any week susceptible area where a disease can manifest. Generally the lodging of the tumour cells i.e. the site of extravasation and the organ distribution of the metastases generally can be predicted by location of primary tumour and its vascular or lymphatic drainage. However, in many cases the natural pathways of drainage are do not followed for distribution of metastasis and such organ specificity may be related to the expression of adhesion molecules by tumour cells whose ligands are expressed preferentially on the endothelium of target organs. After extravasation, tumour cells are dependent on receptive stroma for growth. Thus, tumours may fail to metastasize to certain target tissues because they present a non-permissive growth environment.[3d] So where the tissues are week and present an environment to grow tumour

only the metastasis occur and starts developing secondaries.

Vyakta[5i]

In vyaktāvastha the patient starts manifesting the symptoms for the disease. In most of times the patient starts experiencing the symptoms only after the metastasis has occurred and metastatic cancers may be found at the same time as the primary tumor, or months or years later.

In āyurveda the symptoms of arbuda[5j] are mentioned as:

- Māmsamabhipradūṣyam - damage of muscular, connective and epithelial tissues
- Vṛttam, sthiram - growth is strong and hard
- Mandarujam - pain is not present except final stage
- Mahāntam - deep routed
- Ciravṛddhi - chronic in nature and gradual in development
- Apākam - non-suppuration
- Māmsopacayam - tumour is formed by unnecessary and uncontrolled abnormal proliferation of tissue

When the arbuda attains its rūpāvasth, kapha will be the predominant doṣa hence the lakṣaṇas mentioned are more likely related to kapha.[5k]

Both benign and malignant tumours cause local effects on the host due to their size or location, like compression, mechanical obstruction, tissue destruction, infarction and hemorrhage.[4c]

Bedha[5l]

Bedhāvastha is complications of the disease condition caused by its chronicity. In arbuda, adhyarbuda and dvirarbuda are considered in bedāvastha where the pathogenicity is again repeated by repetition of kriyākāla in new sthānas or āśayas. When one tumour is superimposed on the previous one, it is known as adhyarbuda and when two tumours appear simultaneously or one after the other it is known as dvirarbuda.[5m] Thus because of multiple kriyākālas with the involvement of multiple āśayas or mārgas, make this disease more dreadful and impossible to treat.

Also, in bedāvastha, patients with advanced and disseminated cancers terminally have asthenia (emaciation), and anorexia, together referred to as cancer cachexia (wasting).[4c] Exact mechanism of this phenomena is not clear but this concept has clearly explained in āyurveda as when there is vṛdhi of specific dhātu occurs in the body, then simultaneously the hrāsa of the dhātu, which has opposite characters, will occur.[2f] Here, when māmsopacaya occurs in particular area, deterioration of other dhātus, which are having opposite guṇa like rasa and rakta, occurs in the body causing anemia and other symptoms like emaciation, mal-nourishment, etc.

Conclusion

Arbuda is a tridoṣaja vyādhi with multifactorial in its causation. The external factors that cause the disease may be a trigger for the disease but the predisposing causes are still unknown. Daiva or puruṣa both held responsible for sufferings and vipāka-kāla of the karma is necessary for the manifestation of disease and also for relieving from the disease.[2g] A weak daiva get subdued by the strong puruṣakāra, similarly a strong daiva subdues weak puruṣakāra,[2h] hence an attempt has to be made to make our puruṣakāra strong enough to subdue the effect of daiva and thus bring about more quality into the life than quantity.

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PHARMACEUTICAL STANDARDIZATION OF RASASINDŪR

Neetu Singh and Anand Chaudhary*

Abstract: Rasasindūr is a kūpīpakvarasa prepared in specially designed pharmaceutical operations characterised with specific temperature range, duration and proportion of constituent ingredients i.e. pārada and gandhaka. Rasasindūr is very similar to the structure of red sulphide of mercury.

Introduction

At the stage of its inception āyurvedic medicines were dominated by the herbal origin but later Rasaśāstra was advanced and the knowledge of pharmaceutics and therapeutics efficacy of metals and minerals developed. The medicines of metals and minerals origin are collectively called as rasauṣadhis (herbo-mineral formulation). The rasauṣadhis have incorporated in the mainstream of āyurvedic treatment from 10th century onwards due to its unique properties such as smaller dose, quick action, high potency, longer shelf-life and palatability.[1]

Predominantly these rasauṣadhis are credited as rasāyana to prevent jara (geriatric condition) and vyādhi (disease) to maintain the health. In this cluster of medicines, pārada (mercury) and its preparations are significant as they do potentially upgrade the properties of the other drugs too. The pharmaceutical processes which inculcate therapeutic properties to pārada are called mūrcchana e.g. kajjali, parpaṭi, sindūr, khalviya rasa and poṭṭali.[2] Sindūrakalpa is prepared by kupīpakva rasāyana which are prepared from pārada and other ingredients in a specifically designed kūpi (glass bottle) adapted with individualized intermittent heating pattern by vālukayantra or EMF.

Rasasindūr is a kūpīpakvarasāyana prepared by using either samguṇa (pārada:gandhaka 1:1) or a ṣaḍguṇa (pārada:gandhaka 1:6) kajjali. Bhāvana of vaṭajaṭasvarasa (expressed juice of aerial root of *Ficus bengalensis*) is given to the kajjali and is filled up till 1/3rd of the kūpi. It is heated in three stages viz. mild, moderate and strong, using vālukayantra or EMF for a definite period of time in each stage.[3]

Materials and method

Samples of samaguṇa balijārita Rasasindūr and ṣaḍguṇa balijārita Rasasindūr were prepared in three separate durations i.e. 6, 24 and 144 hours as referred to in the classics. Prior to the main operations, śodhana of pārada and gandhaka and preparation of kajjali were done.

Pharmaceutical procedures

A) Śodhana of pārada[3]

Śodhana of pārada was carried out in two

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stages. Pārada was triturated with equal quantity of sudha (lime powder) for 3 days (on average 18 hours). Then sudha was removed by filtering using a fine cloth and pārada was collected. The collected pārada was again triturated with equal quantity of peeled laśuṇa (*Allium sativum*) and half the quantity of saindhavalavaṇa (rock salt) till the colour of the mass turns to black.

B) Śodhana of gandhaka[4]

Śodhana of gandhaka is performed for removing the physical and chemical impurities. Gandhaka was heated to melting and dipped into bhṛṅgarāja svarasa by filtering with cloth.

C) Preparation of samaguṇa kajjali[3]

Purified pārada and gandhaka was taken in equal proportion and grinded in a khalvayantra (mortar and pestle made of iron 32 rotation/mt) till the mass turns to black. In other words, it took 25 hours of grinding during which approximately 550 ml of vaṭjaṭa svarasa used for bhāvana.

D) Preparation of ṣaḍguṇa kajjali[3]

Purified pārada and gandhaka were taken in a ratio of 1:6 and grinded till a blackish mass appeared. It took 45 hours for grinding during which approximately 650 ml of vaṭajaṭa svarasa was used for bhāvana.

E) Preparation of Rasasindūr[3]

Rasasindūr was prepared by samaguṇa and ṣaḍguṇa kajjali by subjecting it to heating schedules of different durations. The pattern of the temperature followed in each schedule was 6 hours, 24 hours and 7 days (Fig 1).[5] The bottle was prepared by giving 7 layers of mud-smeared cloth to withstand the temperature and pressure. The maximum quantity of kajjali was taken so as to fill 1/3rd of the bottle. The standardized temperature pattern i.e. mandagni (moderate heating range from room temperature to 200^{0}C approx .) fuming stage, madhyamagni (medium heating range from 200 to 400^{0}C) melting stage and tīvrāgni (profound heating range from 400 to 600^{0}C) flaming stage, was adopted. For each type of experimentations three trials were conducted for the reproducibility of the results.

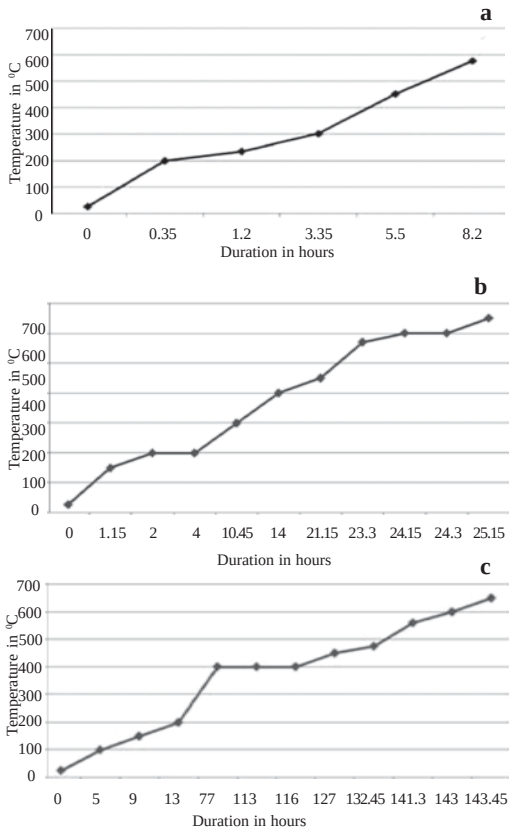

Fig. 1. Duration of temperature patern of Rasasindūr prepared
a) 6 hours; **b**) 24 hours; **c**) 7 days

Observations and results

During the procedure of sāmānyaśodhana of pārada, it was observed that the pārada before trituration was covered with a blackish layer, which was reduced and pārada appeared brighter in colour after śodhana. The initial

weight, final weight, loss/gain and percentage yield of material after procedures of purification of pārada, gandhaka and preparation of samaguṇa kajjali and ṣaḍguṇa kajjali are shown in Table 1.

Purification of gandhaka was performed by melting and dipping into bhṛṅgarājasvarasa. Approximately 12 kg of bhṛṅgarāja was utilized for obtaining 18 liters of svarasa. Gandhaka obtained after śodhana was bright yellow in color.

The completion tests were carried out, i.e. the colour of the kajjali appeared black and fine like collyrium, and when placed on the palm and rubbed with a drop of water and exposed to sunlight, there was no shining (niścandrata) in the rubbed substance. The colour of ṣaḍguṇa kajjali was lighter than samaguṇa kajjali.

The salient observations of preparation of Rasasindūr can be summarized as: initially, the kajjali fumed at 165^{0}C; the melting of the kajjali took place at 200^{o}C; flame started appearing in the kūpi at the range of 465- 475^{0}C; flame was extinguished at the range of 580-600^{0}C; appearance, disappearance and re-appearance of the red shining particles were observed in all the trials. Interestingly, it was noticed that ten layer of kapaḍmiṭṭi (mud) was better to check the deformity of bottle in the samples Rasasindūr of seven days durations, which was common when it was prepared in kūpi which was only seven layered. Details of yield of samples are shown in Tables 2.

Discussion

Several sectors of scientists, scholars and society are now scared of about safety of herbo-mineral formulations of āyurveda due to submission of strained results. Even in these odd reports, there is space to think about the reasons thereof. It has been assumed that in most of the cases there was manufacturing compromises or planning defect in administration of dose and duration of these kinds of medicines.

Studies carried out by R.T. Sane and others on the role of garlic in the purification of mercury by using HPLC technique, shows that zinc as an impurity is being effectively removed from the mercury by trituration with garlic.

TABLE 1
The quantitative data after śodhana of pārada and gandhaka and preparation of kajjali.

Procedure	Ingredients	Initial weight (in kg)	Final weight	loss/gain	% yield
1. Purification of					
- Pārada	Pārada	3.500	3.115	.385	89.00
- Gandhaka	Gandhaka	6.500	6.030	0.470	92.76
2. Preparation of					
- Samaguṇa kajjali	Pārada + gandhaka	4.5 (2.250 pārada + 2.250 gandhaka)	4.365	0.135	97.00
- Ṣaḍguṅa kajjali	Pārada + gandhaka	4.410 (0.630 pārada + 3.780 gandhaka)	4.242	0.168	96.00

TABLE 2
Preparation of Rasasindūr by Samaguṇa and Ṣaḍguṇa kajjalis (each batch consists of 3 samples)

Samples	Duration	Practical yield (gm)	% yield
1. Samaguṇa kajjali			
1	6 hrs	163.2	93.79
1	6 hrs	154.8	88.96
1	6 hrs	96.6	55.51
2	24 hrs	170	98.04
2	24 hrs	156	89.65
2	24 hrs	114.4	65.74
3	7 days	153	87.93
3	7 days	98	56.32
3	7 days	158	90.80
2. Ṣaḍguṇa kajjali			
1	6 hrs	37.6	75.56
1	6 hrs	39	78.37
1	6 hrs	38.8	77.97
2	24 hrs	38.6	77.57
2	24 hrs	36	72.34
2	24 hrs	35.4	71.14
3	7 days	38	76.36
3	7 days	40	80.38
3	7 days	38	76.36

Weight of kajjali - 300 gm
Theoretical yield:- Samaguṇa kajjali = 174 gm; Ṣaḍguṇa kajjali 49.76 gm

Kajjali can be chemically described as black sulphide of mercury (HgS). As described by Mellor, a black amorphous sulphide is produced with the development of heat when the two elements are triturated at ordinary temperature. It may be explained as the application of the mechanical energy provided by a ball mill to a nonstoichiometry mixture of elemental mercury and sulphur permits the formation of metacinnabar (HgS black) as the only phase of HgS. The mechanism of the process according to the SEM study starts with the formation of microspheres of Hg with the adequate superficial tension to favour the adhesion of the S particles.[6]

Āyurvedic classics have detailed the preparation of kajjali by using ½ the quantity of gandhaka till 6 times to the quantity of pārada. Considering the formation of kajjali in stoichiometric proportions, only 1/6.25 part of gandhaka is generally required for the formation of kajjali, the black sulphide of mercury (HgS). Any of the elements if added remains in the free elemental state. Classics might have fixed the ratio of ardhaguṇa to have complete reaction of pārada with gandhaka and to have the free elemental state of gandhaka only and not of pārada. The completion test of kajjali, niścandrata (absence of shining due to mercury) explained in the classics support the above fact. Thus it is evident that both the kajjali types are having an excess of gandhaka.

It is to be understood that for therapeutic application, pārada is processed with other substances to form compounds having specific properties. This type of specific conversion of pārada to its compounds is called mūrcchana. The second opinion is that for the formation of the compounds, gandhaka jāraṇa is an important process where gandhaka in different proportions alone or along with other minerals and metals are added to pārada and allowed to burn with the help of fire and thus enhancing the potency of pārada.[7]

In the process of preparation of Rasasindūr the black sulphide of mercury is subjected to heat to remove/burn extra sulphur present and finally sublimed to be converted into the red sulphide of mercury (Rasasindūr) at the neck of the kūpi.

The X-ray diffraction analysis revealed the structure of the different products formed. The

conversion of the cubical form of the kajjali to the hexagonal form in the formation of Rasasindūr is notable. The structure of both the samaguṇa kajjali and ṣaḍguṇa kajjali matches with synthetic meta-cinnabar. The matching structure of the compound Rasasindūr formed from the samaguṇa kajjali in 6 hours and 24 hours was identified as synthetic cinnabar. The matching structure of the compound formed from samaguṇa kajjali in 7 days and ṣaḍguṇa kajjali in 6 hours, 24 hours and 7 days was identified as natural cinnabar[5] (Table 3)

It is submitted that Rasasindūr may be chemically considered as the red sulphide of mercury. The reference books of inorganic chemistry, Latimer and Hildebranch describe the preparation of red sulphide of mercury by subliming mercury and sulphur together. Geoffry Wilkson states that black sulphide of mercury is unstable with respect to red sulphide of mercury and changes to red form when heated or digested with alkali polysulphide.

These findings are further substantiated by the investigation done at the Department of Physics of Banaras Hindu University which established that Rasasindur contain mercury sulphide (crystalline in nature with crystallite site ranging from 25-50 nm) associated with several organic macromolecules derived from the plant extract used during the processing of drugs. Several macro/trace elements are also found to be present in different amounts, which are bio-available and responsible for adding to the medicinal values to Rasasindūr.[8]

Conclusion

It is submitted that temperature pattern followed in this study may be considered for further studies. The structure of the Rasasindūr samples found matching with the natural cinnabar prepared from ṣaḍguṇa kajjali irrespective of durations or from samaguṇa kajjali in longer duration (7 days).

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TABLE 3
X-ray diffraction analysis of different samples of Rasasindūr with corresponding matches

Sample	Matching with
1. Samaguṇa kajjali	Synthetic Metacinnabar
2. Ṣaḍguṇa kajjali	Synthetic Metacinnabar
3. Rasasindūr (Samaguṇa kajjali- 6 hours)	Cinnabar Synthetic (Hexagonal form)
4. Rasasindūr (Samaguṇa kajjali- 24 hours)	Cinnabar Synthetic (Hexagonal form)
5. Rasasindūr (Samaguṇa kajjali- 7 Days)	Cinnabar Natural (Hexagonal form)
6. Rasasindūr (Ṣaḍguṇa kajjali- 6 hours)	Cinnabar Natural (Hexagonal form)
7. Rasasindūr (Ṣaḍguṇa kajjali- 24 hours)	Cinnabar Natural (Hexagonal form)
8. Rasasindūr (Ṣaḍguṇa kajjali- 7 Days)	Cinnabar Natural (Hexagonal form)

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FISTULA-IN-ANO : SETON VERSUS KṢĀRASŪTRA - A CASE STUDY

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Abstract: Traditional kṣārsūtra therapy for fistula-in-ano, can be compared with the seton therapy used by modern surgeons as a conventional therapy. In high anal and trans-sphincteric fistulae, when complete track excision is not indicated, partial fistulectomy is done and in the remaining track, a non absorbable suture material i.e. seton is tied which is tightened over a period of weeks. It gradually transects the muscle by pressure necrosis and fibrosis. A case of fistula-in-ano, having two tracks of same length was treated with kṣārsūtra and seton therapy simultaneously for a period of four weeks. Comparative healing period was studied in both tracks and found that the track in which kṣārsūtra was inserted healed more rapidly than the track treated by seton therapy.

Introduction

Fistula-in-ano is an age-old common condition prevalent all over the world. A retrospective study from India reported anal fistula to constitute 1.6% of all surgical admissions. Fistula-in-ano is a disease of anus and rectum and forms quite a large share of all the diseases of this part of the body. It is characterized by single or multiple external openings with purulent discharge in the perianal area. Fistula must have three components viz. primary opening, secondary opening and a tubular passage between the two for free movement of discharge. This disease usually occurs as a sequel to some type of ano-rectal abscess. There may be primary anal gland infection causing abscess in: a) perianal, b) ischiorectal, c) submucous and d) pelvirectal region. Though a benign condition, fistula-in-ano leads to major physical, psychological and social problems due to persistent discharge through external opening on perianal region. It is said to be very notorious disease due to its high recurrence rate.

Various scientists have classified fistulae depending upon different factors. Milligan and Morgan have classified fistulae according to their relationship to the anal sphincters and in particular to the ano-rectal ring. This classification is more practicable and applied by the majority of surgeons. Later, Goligher, according to his large experience, modified this classification as below:

- Subcutaneous
- Low anal
- High anal
- Ano-rectal (ischiorectal, pelvirectal)
- Sub-mucous (High intermuscular)

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Management of fistula-in-ano

Fistula is primarily a surgical disease. The procedure of operations was aware since early times and has mentioned by ācārya Śusruta very yore. Many earlier surgeons had attempted for stimulating natural healing of a track by injection of various medicines into fistulous tracks. The medicines used are 3-4% solution of silver nitrate, bismuth paste, solution of quinine and urethrane. But all these only represented temporary cessation of the discharge. According to Goligher these treatments are of no use. He suggested surgical treatment.

Seton therapy: - The use of Seton is indicated particularly for patients with track traversing the sphincter musculature high in the anal canal or even just above the ano-rectal ring. Seton is basically a non absorbable monofilament suture material. It is inserted through the external opening using a fine button-hole probe and drawn through the internal opening and tied externally and is tightened over a period of weeks. It will gradually transect the muscle by pressure necrosis and fibrosis. Seton is tightened on subsequent weekly visits until it is pulled through over 6--8 weeks.

Āyurvedic concept

Fistula-in-ano can be compared with bhagandara mentioned in āyurvedic compendia. Ācārya Śusruta includes this disorder in eight mahāgada and describes the surgical procedure commonly for all types of bhagandara. He categorizes bhagandara mainly into two types: a) paracīn bhagandara (blind internal fistula) and b) avācīn bhagandara (blind external fistula)

In the case of avācin bhagandara, with the help of a probe whole track is incised with sharp instrument and laid open. In blind internal type, bhagandara yantra is introduced into anus and patient asked to strain. While straining the probe is introduced into internal opening and then excised. The track is cauterized with agni and kṣāra. Śusruta has detailed the surgical approach involving excision of fistulous track, also emphasizing the necessity of a parasurgical approach since the surgical excision often cause recurrence.

Kṣāsūtra therapy is primarily mentioned by Śusruta in the management of sinus occurring in emaciated, week and panic patients. Though there is no direct reference to Kṣārasūtra therapy in Bhagandaracikitsa, he has mentioned it in Nāḍīvraṇacikitsa. Today Kṣārasūtra therapy in bhagandara is a widely accepted practice in āyurveda.

Kṣāsūtra:- It is a medicated thread, prepared by coating the barber's thread with several coatings of snuhi latex, apāmārga kṣāra and haridra. This combination helps in debridement and lysis of the tissues. Cutting and healing of the fistula track occurs simultaneously which avoid recurrence and sphincteric complications such as incontinence.

Basically, the mechanism of both seton and kṣāsūtra are the same. The drugs used in kṣāsūtra and their role in healing mechanism is briefly discussed in this study.

Case report

A 55 year old male patient visited OPD of Salyatantra, Govt. Ayurveda Hospital, Nagpur with complaint of pus discharge from perianal region since fifteen days. No history of tuberculosis, ulcerative colitis or any other major disease was noted. Local examination revealed two external openings at perianal region, one at 10 O'clock position and other at 2 O'clock. After probing, it was found that a probe through external opening at 10 O'clock is extending into anal canal about 8 cm in length, and opening

into anal canal at 10 O'clock while through the external opening at 2 O'clock, a track of length 8 cm extending in anal canal and opening at 12 O'clock position.

Treatment

Partial fistulectomy on both side and insertion of kṣāsūtra in one track and seton in other track were the procedures planned. For this purpose, the patient was advised to admit in the hospital. All the routine blood investigations showed normal in range. Patient was informed about the procedure and all the preoperative preparations were done.

Operative procedure: - The patient was made into lithotomic position. Under all aseptic precautions and under spinal anesthesia lord's anal dilatation was done. A probe pointer director was passed through the external opening at 10 O'clock and partial fistulectomy was done. About three centimeter track was excised and in the remaining track kṣāsūtra was inserted. The procedure was repeated through the external opening at 2 O'clock and prolene 1-0 was inserted in another track and the complete haemostasis was achieved. After completion of procedure, antiseptic dressing and T-bandage were done. The entire procedure was uneventful. Patient was shifted to ward in stable vital condition.

Follow up: - On the 7th day of surgery, the kṣāsūtra changed and seton tightened. The patient was discharged and advised weekly follow up. Initially length of kṣāsūtra was 5 cm and that of seton was 5.5 cm. After 30th day, the length of kṣāsūtra was 3 cm. The seton was removed and measured which was found to be 5 cm.

Discussion

Kṣāsūtra is medicated with herbs i.e. apāmārga kṣāra, snuhīkṣāra and haridra which exhibits lekhana, vraṇaśodhana, ropana and krimighna properties. Hence it acts by debridement, draining of pus and cutting of the track which helps in faster healing as compared to the seton. Seton facilitated draining and cutting but no debridement, hence its healing is delayed as compared to the kṣāsūtra. As both the threads were tied in same patient, in same perianal region, there would be same biochemical and physiological field and same tissue reaction, hence avoiding the individual bias. The variation in healing period proves that time taken by both the threads for healing is different.

Conclusion

Kṣāsūtra is very effective and safe in treating fistula-in-ano. While considering healing of tract, kṣāsūtra is more advisable than seton as it showed better results in the present case.

Acknowledgement

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KAṬĪVASTI AND YOGA THERAPY IN THE MANAGEMENT OF LOW BACK ACHE - A CLINICAL STUDY

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Abstract: Ācārya Caraka has stated 'vāyustantrayantradhara' means vāta is responsible for the normal state of functioning of all the organ of the body. In degenerative disorders, vāyu is responsible for pathogenesis as well as their manifestation and vātanāśaka treatment is advised in such disorders. A single blind study was conducted to establish the effectiveness of kaṭīvasti and yoga therapy in low back ache. The result showed marked reduction in low back pain.

Introduction

Low back ache is a second most common disease that human beings come across. About 80% of the population complains about it at some time in their life. In about 78% of men and 89% of women the cause is non specific. Low back ache affects the daily routine of patients and leads to disability. The anatomy of spine and modern life style has added a high range of susceptibility for diseases. Mostly wrong postures working on computers for several hours, driving, etc. has increased the incidence. Other factors like traumas either during road accidents or other injuries also cause similar problem. A wide range of etiologies, started from minor trauma to carcinogenic conditions, are noted as causes of low back ache. The causes of LBA can be divided into primary and secondary types. The causes directly associated with the lower back structures i.e. lumbo-sacral vertebrae, ligaments, muscles, etc. can be classified under the primary cause; whereas a radiating pain from nearer viscera's like intestine, uterus, bladder, etc. are considered secondary causes. It has been found that management of low back pain by modern medicine is not efficacious for long term use. Āyurveda is a medical science, it ensures a healthier and longer life to human being. From ancient period to till date āyurveda plays an important role towards providing health and healthy life style. Ācārya Caraka has stated that "vāyustantrayantradhara", vātadoṣa in its normal state of functioning sustains all the organ of body. In degenerative disorders, vāyu is responsible for the pathogenesis as well as their manifestation. So vātanāśaka treatment is advised in these disorders. Yoga's primary emphasis is general well-being by way of integration. While practicing yoga for

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improving, regaining or retaining a general good health, a person surprisingly finds that some of his more specific health problems have disappeared.

Aims and objective:- To establish the effectiveness of kaṭīvasti and yoga therapy in low backache.

Materials and methods

The trial drug:- Kṣīrabalā taila was prepared in the pharmacy of IPGA & R at SVSP Hospital as referred to in the Ayurvedic Pharmacopoeia of India.

Selection: - 30 patients under the age group of 18-60 years were selected from the OPD of Kāyacikitsa, IPGAE & R at SVSP Hospital irrespective of age, sex and occupation and were randomly distributed into two groups: Group A&B.

Inclusion criteria: 1) Cases of low back pain of different degree, stiffness, pain radiating to the back of the leg, S.L.R.T. 40 degree; 2) diagnosed cases (>2 years) that not receiving any other treatment from outside.

Exclusion criteria: 1) Those with evidence of malignancy, tuberculosis; 2) complicated with DM, post CVA, CRF; and 3) cases with evidence of I.V.D.P.

Laboratory investigation: 1) Routine blood examination TLC, DLC, HB%, ESR, PPBS; 2) Radiological examination X-ray L/S spine AP & Lateral view.

Treatment: - Group A comprised of 18 patients were treated with Kṣīrabalā taila basti. Group B (12 patients) were treated with yoga therapy i.e. group of āsanas (backward bending āsana followed by matsya kridana āsana)

Follow up: - The patients were asked to come and attend O.P.D for 1 month for check up.

Observations and results

The effectiveness of the kaṭīvasti and āsanas in group A and B were assessed according to the relief in the subjective and objective parameters. Intensity and duration of pain were assessed followed by stiffness. In group A, the scoring before the treatment was: a) Low back pain 2.75; b) duration of low back pain 2.75, c) stiffness 2.17 and d) SLRT 2.00; which, after the therapy, were reduced up to 2.42, 2.25, 1.67 and 1.67 respectively. The scoring of all these parameters reduced to 21%, 18%, 23.04%, and 16.50% respectively.

Discussion

Kaṭīvasti is a type of snigdhasvedna. During kaṭīvasti, lukewarm oil is poured on lumbar region (affected part). This leads to muscular relaxation and dilatation of blood vessels and increases blood circulation to the tissue. This is the local effect. It helps vasodilatation and increase blood supply to the focal (concerned) part. Vasodilatation also increases vascular permeability. At damaged/affected part the tissue osmotic pressure (TOP) would increase, which, in turn, causes propagation of metabolites into the systemic circulation. Ultimately, these metabolites through the veinous circulation comes to liver and kidney where it detoxified.

Kaṭīvasti - mode of action

- Local hot oil fomentation → vaso dilation → decrease congestion → increase sweat → increase elimination of toxins → tissue relaxation → decrease spasm → decrease pain.
- Medicated oil is used in kaṭībasti. It is prepared by the combination of various

ingredients which have anti inflammatory property. Different types of alkaloids present in the medicated oil are having the property of relaxation and anti inflammation.

- The bones, muscles, tendons, and ligaments of the lower back, perform a number of important functions i.e. structural support for the lumbar spine, allow forward and backward movement at the waist. Multifidus is a deep back muscle that runs along the spine. It works together with the transversus abdominus to increase spine stability and protect against back injury or strain during movement or normal posture. Transversus abdominus muscle is the only muscle that consistently attaches into the thoraco lumbar fascia, a structure considered to assist in the support of the lumbar spine. Regular practicing of āsana (forward and backward bending āsana) increases the flexibility of spine, muscle, tendon and ligaments. In some patients it may occur due to herniation of an intervertebral disc. Acute lumber disc herniation is often precipitated by trauma, usually by lifting heavy weights while the spine is flexed. The nucleus pulposus may bulge or rupture through the annulus fibrosus, giving rise to pressure on endings in the spinal ligaments, changes in vertebral joints or pressure on nerve roots. According Dr. Robert Martin, "Complete extension (bending backward) practiced with complete flexion (bending forward) aids the spine to become properly positioned for balance. In bending position (backward) each segment of the spine rotates on its transverse axis." Dr. Martin called extension (bending backward) an "uncommon position" which "helps to correct the basic structural faults produced by excessive partial flexion (bending forward)". In backward bending reduction and centralization of pain due to the anterior migration of nuclear tissue and the reduction of forces acting on pain-sensitive tissues, since extension may transfer compressive forces from the disc's vertebral body unit to the apophyseal joints so that nuclear pressure is reduced. In this way backward bending āsanas provide traction and encourages the vertebral column to resume its normal shape and release the compression of spinal nerves.

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THERAPEUTIC POTENTIALS OF TUTTHA DESCRIBED IN SAMHITAS AND RASAŚĀSTRA - A REVIEW

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Abstract: Tuttha formulations are indicated in skin diseases, ulcer, sinus, worm infection, vitiligo, obesity, pain, asthma, hyper acidity, hemorrhoids, diseases of eyes, etc. and also mentioned as krimighna. A review of classical texts showed that tuttha is such a mineral that becomes more potent after proper purification and incineration and that it is recommended more as external applications both in Samhitas and Rasaśāstra. This paper is an attempt to review the therapeutic uses of tuttha formulations described in Samhitas and Rasaśāstra texts.

Introduction

The human body needs a number of minerals in trace (milligram) quantities. These include iron, copper, zinc and other minerals. Copper is essential for proper functioning of organs and metabolic processes. The human body has complex homeostatic mechanisms, which attempt to ensure a constant supply of available copper, while eliminating excess copper whenever this occurs. However, like all essential elements and nutrients, too much or too little nutritional ingestion of copper can result in a corresponding condition of copper excess or deficiency in the body, each of which has its own unique set of adverse health effects.[1] Tutthabhasma is a preparation, in which copper is the main content. This mineral is selected for review for its therapeutic potentials described in classical ayurvedic texts since this particular mineral is not widely practiced.

Objectives: - To review therapeutic uses of tuttha formulations described in the Samhitas and Rasaśāstra texts and to assemble the scattered references done on tuttha formulations during the samhita period and modern period to find its significance in the present era.

Materials and methods

The classical texts of āyurveda i.e. Caraka-samhita, Śusrutasamhita and Aṣṭāṅgasamgraha, and Rasaśāstra texts like Rasataraṅgiṇi, Rasaratnasamucchayam, etc. were screened and the references found on tuttha and its synonyms were grouped into category named therapeutic usage in different dosage form of tuttha.

Results

Carakasamhita:- It mentions tuttha in treating kuṣṭha. The terms used for tutthas are:

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amṛtasaṅga, mayūraka tuttha and kharparika tuttha. Caraka indicates tuttha in kuṣṭha and netraroga only. The therapeutic use of tuttha referred to in Carakasamhita is shown in Table 1.

Śusrutasamhita:- It is a work comprehending the surgical traditions of Indian medicine. It mentions mayūrakatuttha and kharparikatuttha. In the classification of dravyas, tuttha is classified under ūṣakādigaṇa and mentions that it pacifies kapha and cures the diseases like aśmari, mūtrakṛchhra, śarkara, meda and gulma. Other than this, tuttha is also indicated in vraṇa and kuṣṭha in the form of taila or cūrṇa and in netraroga in the form of añjana or varti. The therapeutic use of tuttha described in Śusrutasamhita is shown in Table 2.

Aṣṭāṅgasaṅgraha:- Vāgbhaṭa attributes in common with Caraka and Śusruta. It mentions the properties of tuttha as kaṭu, kṣāra, kaṣāya, viśada, laghu, lekhana, bhedi, cakṣuṣya, kaṇḍughna, krimighna and viṣaghna. Like Śusruta, it is classified in ūṣakādigaṇa. No synonyms are mentioned other than the word tuttha. Tuttha is repeatedly indicated in netraroga in different types of añjana. The therapeutic use of tuttha described in Aṣṭāṅgasaṅgraha is shown in Table.3.

Āyurvedic classics describe the therapeutic effect of tuttha in netraroga, kuṣṭha, vraṇa, indralupta, śiroroga, bhagandara, upadamśa, ahipūtana, arśas, gudavraṇa, bhūtaghna, mukharoga and lūṭapraṭiṣedha in descending order.

Rasaśāstra texts: - Sixteen important classical texts like Rasendracūḍāmaṇi, Rasaratna-samucchaya, Rasendracintāmaṇi, etc. were studied and various formulations of tuttha compiled. The texts describe the therapeutic effect of tuttha in kuṣṭha, śvitra, amḷapitta, vibandha, prameha, hṛdroga, arśa, viṣaghna, medahara, dāha and śūla in descending order (Table 4).

TABLE 1
Therapeutic use of tuttha described in Carakasamhita

Reference	Term used	Dosage form	Indication
Sūtrasthānam, 3/10-12	Amṛtasaṅga, Tuttha	Pradeha	Kuṣṭha
Cikitsāsthānam, 7/102	Tuttha	Taila, alepa, udvartana, pragharṣaṇa, avacūrṇana	Kuṣṭha
Cikitsāsthānam, 7/108	Māyūrakatuttha, Kharparika tuttha	Taila (Tiktaikṣuvakādi taila)	Kuṣṭha
Cikitsāsthānam, 7/114	Tuttha, Amṛtasaṅga	Taila (Kanakakṣīri taila)	Kuṣṭha (maṇḍala kuṣṭha)
Cikitsāsthānam, 7/120	Tuttha	Ghṛtataila preparation (Vipādikahara ghṛtataila)	Kuṣṭha (vipādika, carmakuṣṭha, eka kuṣṭha, kiṭibha kuṣṭha, alaśāka kuṣṭha)
Cikitsāsthānam, 26/250	Tuttha	Varti (Sukhavaṭi varti)	Netra roga (timira, paṭalagata, kāca, mala)

TABLE 2
Therapeutic use of tuttha described in Śusrutasamhita

	Reference	Term used	Dosage form / Kriyākalpa	Indication
1	Sūtrasthānam, 38/37-38	Karparika	Ūṣakādi gaṇa	Kaphahanti, meda, aśmari, śarkara, mūtrakṛcchra, gulma·
2	Cikitsāsthānam, 1/97	Tuttha	Ālepa	Durudhatvat kṛsṇanām pāṇḍukarma hitam
3	Cikitsāsthānam, 2/69	Tuttha	Taila	Vraṇaropaṇa
4	Cikitsāsthānam, 2/73	Tuttha	Taila	Vraṇaropaṇa
5	Cikitsāsthānam, 2/82	Tuttha	Taila	Vraṇaropaṇa-sādya vraṇa, duṣṭavraṇa
6	Cikitsāsthānam, 2/89	Tuttha	Taila	Vraṇaśodhana
7	Cikitsāsthānam, 8/43	Tuttha	Yoga	Bhagandara -vraṇaśodhana
8	Cikitsāsthānam, 9/10	Tuttha	Lepa	Kuṣṭha
9	Cikitsāsthānam, 9/27	Tuttha	Lepa	Śvitra
10	Cikitsāsthānam, 9/61	Tuttha	Taila (Mahāvajraka)	Sarva kuṣṭha, gaṇḍamāla, bhagandara, ghora nāḍīvraṇa, ghora duṣṭavraṇa
11	Cikitsāsthānam, 18/54	Tuttha	Cūrṇa	Vraṇa-granthi, apaci, arbuda, galaganda
12	Cikitsāsthānam, 19/40	Tuttha	Cūrṇa	Upadamśa
13	Cikitsāsthānam, 19/45	Tuttha	Cūrṇa	Vraṇa, visarpa
14	Cikitsāsthānam, 20/24	Tuttha	Kalka	Indralupta (kṣudraroga)
15	Cikitsāsthānam, 20/59-60	Tuttha	Kepa	Ahipūtana
16	Uttarasthānam, 11/12	Tuttha	Añjana	Balasagrathita, śleṣma abhiṣyanda
17	Uttarasthānam, 12/13	Tuttha	Añjana	Rakta abhiṣyanda
18	Uttarasthānam, 12/16	Tuttha	Añjana	Rakta abhiṣyanda
19	Uttarasthānam, 14/5	Tuttha	Pratisāraṇa	Lagaṇa, bhedya roga
20	Uttarasthānam, 14/9	Tuttha	Rasakriya	Krimi granthi, bhedya roga
21	Uttarasthānam, 17/40	Tuttha	Añjana	Pitta timira
22	Uttarasthānam, 18/95	Tutha (kharparika), uttama (Mayūragrīva)	Añjana (Bhadrodaya)	Dṛṣṭi roga - netraroga
23	Uttarasthanam, 18/105	Tuttha	Varti	Sarva vikāra - netra roga
24	Uttarasthanam, 24/37	Tuttha	Kaṣāya/taila	Pratiśyaya

TABLE 3

Therapeutic use of tuttha described in Aṣṭāṅgasamgraha

Reference	Term used	Dosage form / Kriyākalpa	Indication
1 Sūtrasthānam, 12/18	Tuttha	-	-
2 Sūtrasthānam, 16/15	Tuttha	Ūṣakādi gaṇa	Kṛcchra, aśma, gulma, meda, kaphāpaham
3 Cikitsāsthānam, 10/9	Tuttha	Taila	Anuvāsana, arśa
4 Cikitsāsthānam, 21/96	Tuttha	Ghṛta/taila	Kuṣṭha - vipādika, carmakuṣṭha, ekakuṣṭha, kiṭibha, alasaka
5 Cikitsāsthānam, 21/106	Tuttha	Taila	Kuṣṭha - vātakaphakuṣṭha, maṇḍala, dadru, koṣṭha kṛmi, pāma, vicarcika
6 Cikitsāsthānam, 21/109	Tuttha	Cūrṇa	Sravati kuṣṭha
7 Cikitsāsthānam, 22/30	Tuttha	Rasakriya	Sarvakuṣṭhaghni - śvitra, maśaka, tilaka, carmakila, granthi, arbuda
8 Cikitsāsthānam, 22/37	Tuttha	Lepa	Kuṣṭha, kilāsa, tila kāḷaka, maśaka, durnāma, carmakila
9 Uttarasthānam, 2/125	Tuttha	Lepa	Gudavraṇa
10 Uttarasthānam, 8/22	Tuttha	Ghṛta	Bhutaghna, grahaghna
11 Uttarasthānam, 16/27	Tuttha	Cūrṇa - (Bhāskaracūrṇa)	Timira, kāca, arma, naktāndha, raktarāji
12 Uttarasthānam, 19/4	Tuttha	Vidalaka	Abhiṣyanda (vātapitta hara)
13 Uttarasthānam, 19/45	Tuttha	Varti	Sarvaśḷeṣmaja akṣi rogaghni
14 Uttarasthānam, 19/49	Tuttha	Varti	Sarvākṣiroga
15 Uttarasthānam, 19/63	Tuttha	Piṣṭa	Sarvābhiṣyanda ruk
16 Uttarasthānam, 19/67	Tuttha	Añjana	Sarva śleṣmaja akṣiroga
17 Uttarasthānam, 19/68	Tuttha	Añjana	Dṛk utkopa
18 Uttarasthānam, 19/75	Tuttha	Varti	Vātada abhiṣyanda, timira, kukūṇaka, pothaki, piḍaka, pilla
19 Uttarasthānam, 19/77	Tuttha	Añjana	Sarvābhiṣyanda, śukḷa arma, śirājāla
20 Uttarasthānam, 19/79	Tuttha	Añjana	Timira, arma, keḷda, kāca, kaṇḍughna
21 Uttarasthānam, 20/30	Tuttha	Aścotana	Bahuvarṣānām pilla
22 Uttarasthānam, 20/33	Tuttha	Añjana, cūrṇa, aścotana	Pilla
23 Uttarasthānam, 26/12	Tuttha	Pratisāraṇa	Mukharoga
24 Uttarasthānam, 26/50	Tuttha	Cūrṇa, avacūrṇana, taila	Vraṇaśodhana, ropaṇa
25 Uttarasthānam, 28/18	Tuttha	Dhūma	Śiroroga
26 Uttarasthānam, 28/34	Tuttha	Lepana	Indralupta
27 Uttarasthānam, 28/44	Tuttha	Lepana	Śiroroga
28 Uttarasthānam, 31/29	Tuttha	Taila	Ropaṇa
29 Uttarasthānam, 33/41	Tuttha	Lepa	Vraṇaśodhana, māmsakṛt
30 Uttarasthānam, 37/32	Tuttha	Lepa	Kṣudraroga
31 Uttarasthānam, 39/7	Tuttha	Lepa	Dadru, upadamśa, vraṇa
32 Uttarasthānam, 44/68	Tuttha	Añjana	Lūtāpratiṣedha

TABLE 4
Therapeutic indications of tuttha in various Rasaśāstra texts

Vyādhi prabhāva	RRS	RT	Ra	RJN	BR	YR	AP	Rm	BYT	SS	Rv	BRS	RSS
01 Śvitra	+	+	+	-	-	-	-	-	-	+	-	+	-
02 Kuṣṭha	+	+	+	+	+	+	+	-	-	+	-	+	+
03 Prameha	-	+	-	-	-	+	-	-	-	-	-	-	-
04 Amḷapitta	+	+	-	-	-	-	-	-	-	+	-	+	-
05 Hṛdroga	+	+	-	-	-	-	-	-	-	-	-	-	-
06 Arśa	+	-	+	-	-	-	-	-	-	-	-	-	-
07 Viṣaghna	+	-	+	-	-	-	-	-	-	-	-	-	-
08 Vibandha	+	-	-	-	-	-	-	-	-	+	-	+	-
09 Śūla	+	+	-	-	-	-	-	-	-	+	-	+	-
10 Kṛmi	+	+	+	-	-	+	-	+	-	-	-	-	+
11 Medoroga	-	+	-	-	-	+	-	-	-	-	-	+	-

'+' - mentioned; '-' - not mentioned
*RRS - Rasaratnasamucchayam; RT - Rasataraṅgiṇi; Ra - Rasāmṛtam; RJN - Rasajalanidhi; BR - Bhaiṣajyaratnāvali; YA - Yogaratnākara; AP - Āyurvedaprakāsh; Rm - Rasendramaṅgaḷa; BYT - Bṛhat Yogataraṅgiṇi; SS - Sārṅgadharasamhita; Rv - Rasārṇava; BRS - Bṛhat Rasarājasundara; RSS - Rasendrasārasaṅgraha.

Pharmacotherapeutic properties: - The properties of tuttha are shown in Table. 5

The review showed that tuttha is used for wide range of diseases. It came to be known in āyurvedic practice since Carakasamhita. Caraka advocated its external use and later, Śusruta recommended its dosage form both internally and externally. Since then various scholars have indicated it in the diseases of skin, eye, wound and other specific ailments. Many references also can be traced where the metallic powders are applied to the eyes. Samhitas consider the therapeutic effect of tuttha to be mainly in external use. But Rasaśāstra describes the therapeutic effect of its external use in kuṣṭha (leprosy), śvitra (vitiligo) and recommend its internal use in amḷapitta (hyperacidity), vibandha (hard bowels), prameha (diabetics), hṛdroga (heart disease), arśas (hemorrhoids), viṣa (toxic effects), meda (obesity), dāha (burning sensation) and śūla (pain).

Discussion

There is no emphasis to purification and conversion to micro-fine powders specific to tuttha in the samhita period. But in later period, replacement of tuttha by artificial preparation has mentioned. According to Rasajalanidhi, that

TABLE 5
Pharmaco-therapeutic properties of of tuttha

Rasa	:	Kaṭu, kaṣāya
Guṇa	:	Laghu, khara, visada, uṣṇa
Vīrya	:	Uṣṇa (Ra.), śīta (A.P.)
Vipāka	:	Kaṭu
Karma	:	Lekhana, bhedana, vamaka, cakṣuṣya, rasāyana, balya, kṛmighna, medohara, tvakdoṣahara, recikara, recaka, nāḍī-balakāraka, vahnikaraṇa, vayasthāpaka.
Doṣa-prabhāva	:	Kapha-pitta hara
Vyādhi-prabhāva	:	Kuṣṭha, amḷapitta, śvitra, vraṇa, arśa, prameha, kṛmiroga, vibandha, hṛdroga, viṣaghna and śūlahara.

which occurs in nature is called as sasyaka and that which is made artificially is called as tuttha and in the absence of former later can be used.[2] Another popular text Rasatarańgiṇi explains the detailed method of purification, incineration and therapeutic potency of tutthabhasma.[3] During transitional period of Rasadśāstra (8th to 20th AD) lot of texts were written which show a number of therapeutic usages of tuttha after purification and incineration.

It is explicable from the review Rasaśāstra texts that the usage of Tutthabhasma found to be increased in Rasaśāstra period in comparison to its therapeutic indications in Samhita period. Also, it is clear that metallic preparations have held a significant role in āyurvedic pharmaceuticals since antiquity. They evolved by specific methods and various pharmaceutical techniques like śodhana (purification), māraṇa (incineration), etc. which have their own significance in detoxifying and increasing the therapeutic potential of minerals.

Conclusion

This review of Samhitas and Rasaśāstra reveals that tuttha is indicated on extensive range of diseases and the maximum recommendation in Samhitas and Rasaśāstra texts is about its external application. Internal administrations of tuttha found to be increased in manifolds after the advent of purification and incineration processes in the Rasaśāstra period compared to Samhita period.

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Clinical observations

ĀYURVEDIC MANAGEMENT OF ULCERATIVE COLITIS

Nikam Dattatrya and Bhakuni Harish*

Abstract: Ulcerative colitis (UC) is a form of inflammatory bowel disease (IBD). There are many tools available for diagnosis of ulcerative colitis but no satisfactory treatment is available. In āyurveda, this condition is considered under the heading raktātisāra. A case of ulcerative colitis managed with āyurvedic treatment is discussed here.

Introduction

Ulcerative colitis is a form of colitis, a disease of the colon (large intestine), which includes characteristic ulcers or open sores. The major symptoms of UC are diarrhea, rectal bleeding, tenesmus, passage of mucus and crampy abdominal pain.[1] It is an intermittent disease with periods of exacerbated symptoms and or periods that are relatively symptom-free. There is no satisfactory treatment available in modern medicine till date. This condition can be correlated with raktātisāra as its symptoms are quiet similar to UC i.e. blood mixed with stool, foul smell, pain in abdomen, burning sensation in the rectum and excessive thirst.[2]

Case report

A 24 year old unmarried male patient, residing in Jaipur, was visited the OP of Arogyashala, National Institute of Ayurveda, Jaipur on 23rd June 2012 with chief complaint of bleeding per rectum after defecation and mild burning sensation during defecation since 10 days. There was no any H/o mass prolapse per rectum and constipation. Vitals were within normal limit. Sleeping pattern was normal, appetite mildly diminished, altered bowel habit i.e. 2-3 frequency per day with soft consistency of stool and mucus at the end of defecation.

Per rectum examination by proctoscopy showed: normal sphincter tone, congested rectal mucosa and inflamed with very small areas of ulcerations of mucus membranes. Macroscopic, microscopic and occult blood tests of stool showed absence of ova/cyst/bacteria and positive occult blood. Hb% was 15gm/dl.

Initially, some āyurvedic medicines were administered orally but didn't get any relief in the symptoms. So, colonoscopy was advised again on 13th July and the findings were: *Hepatic flexure, distal 20cm area of rectum shows lots of vascular pattern, multiple areas of superficial ulcerations present, No*

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friability, No contact bleeding. The interpretations were query mark for infective colitis or ulcerative colitis. A colonic biopsy taken further confirmed the query mark. Histopathologic report on 16th July showed Chronic Active Colitis.

Accordingly, the line of treatment changed. Along with oral medicines, picchavasti[3] conducted for 15 days. The contents of picchavasti were śālmalī,[4] mocarasa,[5] yaṣṭīmadhu,[6] lodhra,[7] nāgkesara[8] and kuṭaja[9] cūrṇa with milk. The basti was given after meal in anuvāsana form i.e.70 to 80 ml.

The symptoms found redressing from the 4th day of picchavasti. Stool examination done after 15th days of picchavasti showed negative for ova/cyst/bacteria and occult blood.

The patient is asymptomatic till date and continuing the oral medicines.

Discussion

Here, the ingredient drugs of picchavasti were altered from the textual reference for convenience. In ulcerative colitis there is inflammatory condition along with rectal bleeding, diarrhea and ulcers. Śālmali is snigdha and picchila hence it protects ulcer from irritations and forms protecting layer over the colonic surface and heals. Mocarasa, lodhra and nāgakesara are kaṣāya in rasa and śīta in vīrya and have stambhaka, grāhi, śothahara properties hence help to stop diarrhea and rectal bleeding. Yaṣṭīmadhu is vraṇaśodhahara so it promotes healing of ulcers. All these cause picchavasti synergistically acts and helps in curing UC. There was no side effect during the course of treatment.

Conclusion

Āyurvedic treatment, especially picchavasti is effective in the management of Ulcerative Colitis. This is safe and cost effective without any side effects. It is easily adoptable in the routine clinical practice.

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NUTRITION AS ANTIOXIDANT TO TREAT FREE RADICALS AND PREVENT DISEASES

(Natural way to prevent and cure the ailments)

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Abstract: Nutrition is defined as the science of food and its relationship to health. The word 'nutrient' is used for specific dietary constituents such as proteins, vitamins and minerals. Different natural nutritive act as antioxidant, delay ageing, gives healthy and happy long life. In this article an attempt is made to highlight about nutrition, free radicals, antioxidants, etc.

Introduction

In the present period due to change in way of life, hectic in the work, the people put up with anxiety, stress, strain, tension and depression. Untimely food, short of different nutritive in the routine food, increased population and pollution pave the way for formation of free radical in the body which ultimately leads to the damage of the cells and tissues leading to different disorders. The natural food rich in vitamins, proteins and carbohydrates in the form of vegetables, fruits, etc. help in nourishing the cell and protect from the tissue and cell damage; enhances immune mechanism, acts as immune modulators and antioxidants; their routine use help to treat and prevent the formation of free radicals.

Classifications of food

1. Based on origin: - a) Animal origin and b) vegetable origin.
2. By chemical composition: - a) Proteins, b) fats, c) carbohydrates, d) vitamins and e) minerals.
3. By predominant function:- a) Body-building foods - milk, meat, poultry, fish, eggs, pulses, groundnuts; b) energy giving foods -cereals, sugars, roots and tubers; c) protective foods - vegetables, fruits and milk.
4. By nutritive values:- Cereals and millets, pulses (legumes), vegetables, nuts and oils, fruits, animal foods, sugar and jaggery, fats and oils, condiments and spices, miscellaneous.

Nutrients

Macronutrients:- These are proteins, fats and carbohydrates which are called 'proximate principles' because they form main bulk of food.

Micronutrients:- These are vitamins and minerals they are called so because they are required in small amounts.

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Proteins:- Proteins are complex organic nitrogenous compound composed of carbon, hydrogen, oxygen, nitrogen and sulphur in varying amounts. They are need to the body for - body building, repair and maintenance of body tissue, maintenances of osmotic pressure, synthesis of substances like antibodies, plasma proteins, hemoglobin, enzymes, hormones and coagulation factors. These are connected with immune mechanism of blood. The cell mediated immune response and the bactericidal activity of the leucocytes has been found to be lowered in severe form of protein energy malnutrition.

Fats

They are high energy foods providing as 9kcal for every gram. Fats in the body support viscera such as heart, kidney and intestine. Essential fatty acids have been reported to reduce serum cholesterol and low density lipoproteins; they play a major role in controlling many physiological functions such as vascular homeostasis, kidney function, etc.

Carbohydrates: - Carbohydrates are the main source of energy, providing 4kcals/g. It is essential for the oxidation of fats and for their synthesis of non essential amino acids.

It absorbs water and thereby increases the bulk of the stool and helps to reduce the tendency to constipation by encouraging bowel movements. Dietary fibers are resistant to digestion in the digestive tract. In large intestine the bacterial action causes emulsification of the fiber thus making the stool soft and passage easier. Dietary fibers are known to be associated with reduced incidence of coronary heart diseases by reducing cholesterol level in circulation

Vitamins

It contributes production of retinal pigments, which are needed for vision, essential for maintaining integrity and normal functioning of glandular and epithelial tissue which lines intestinal, respiratory and urinary tract as well as the skin and eyes. It supports growth especially skeletal growth. It is anti-infective. It protects against some epithelial cancers such as bronchial cancers.

Nutritional problems

1. Low birth weight
2. Protein energy malnutrition
3. Xeropthalmia
4. Nutritional anemia
5. Iodine deficiency disorder
6. Endemic fluorosis
7. Lathyrism

Nutritional factor in selected diseases

1. Cardiovascular diseases
2. Diabetes
3. Obesity
4. Cancer

Free radicals means

An atom or group of atoms with at least one unpaired electron; in the body it is usually an oxygen molecule that has lost an electron and will stabilize itself by stealing an electron from a nearby molecule.

The human body is composed of different types of cells. Cells are composed of different types of molecules. Molecules consist of one or more atoms of one or more elements joined by chemical bonds.

How Free radicals are formed?

Environmental factors such as cigarette smoke, air pollution, radiation and ultraviolet light can also cause free radicals to form. Because free radicals lack an electron, they are unstable and highly reactive. As a result of their instability

they steal electrons from other cells. This in turn destabilizes those cells, turning them into free radicals. This can cause a chain reaction which can occur indefinitely, causing destruction to the body as cellular damage accumulates. Some free radicals arise normally during metabolism. Sometimes the body's immune systems cells purposefully create them to neutralize viruses and bacteria. To prevent free radical damage, the body has a defense system of antioxidants.

Free radicals enter our bodies as we breathe in polluted air and cigarette smoke, and are generated during prolonged stress or illness and through every metabolic reaction involving oxygen. When oxygen molecules become unstable they seek to stabilize by reacting with other chemicals. If left unchecked, this leads to inflammation and arterial wall damage. This sort of damage is the number-one cause of ageing and a significant contributor to diseases in those aged 60 or over.

Antioxidants are molecules which can safely interact with free radicals and terminate the chain reaction before vital molecules are damaged. Although there are several enzyme systems within the body that scavenge free radicals, the principle micronutrient (vitamin) antioxidants are Vitamin E, beta-carotene and Vitamin C.

Antioxidant therapy

The free radical theory of aging implies that antioxidants such as Vitamin A, Vitamin C, Vitamin E and Superoxide dismutase slow the process of aging by preventing free radicals from oxidizing sensitive biological molecules or reducing the formation of free radicals. The antioxidant chemicals found in many foods are frequently cited as the basis of claims for the benefits of a high intake of vegetables and fruits in the diet. Antioxidants are intimately involved in the prevention of cellular damage.

Antioxidants and malady prevention

Heart Disease:- Vitamin E protects against cardiovascular disease by defending against LDL oxidation and artery-clogging plaque formation.

Cancer:- Many studies have correlated high Vitamin C intakes with low rates of cancer, particularly cancers of the mouth, larynx and esophagus.

Eat fruits and vegetables

The antioxidants are believed to help protect the body from free-radical damage. Other chemicals and substances found in natural sources of antioxidants may also be responsible for the beneficial effects. The best way to ensure adequate intake of the antioxidant nutrients is a balanced diet through fruits and vegetables per day.

Vitamin E:- d-alpha tocopherol. A fat soluble vitamin present in nuts, seeds, vegetable and fish oils, whole grains (esp. wheat), fortified cereals and apricots. Current recommended daily allowance is 15 IU per day for men and 12 IU per day for women.

Vitamin E is the most abundant fat-soluble antioxidant in the body. It is one of the most efficient chain-breaking antioxidants available in the body and a primary defender against oxidation and lipid per oxidation (creation of unstable molecules containing more oxygen than is usual).

Vitamin C:- The most abundant water-soluble antioxidant in the body. Acts primarily in cellular fluid of particular note in combating free-radical formation caused by pollution and cigarette smoke. Ascorbic acid is a water soluble vitamin

present in citrus fruits and juices, green peppers, cabbage, spinach and strawberries.

Beta-carotene:- A precursor to vitamin A (retinol) and is present in liver, egg yolk, milk, butter, spinach, carrots, squash, tomato and grains. Beta-carotene is converted to vitamin A.

Antioxidants prevent free radical damage

The vitamin C and E protect the body against the destructive effects of free radicals. Antioxidants neutralize free radicals by donating one of their own electrons, ending the electron - "stealing" reaction. The antioxidant nutrients themselves don't become free radicals by donating an electron because they are stable in either form. They act as scavengers, helping to prevent cell and tissue damage that could lead to cellular damage and free-radical theory.

Help in preventing disease

Antioxidants play a major role in slowing the aging process and preventing heart disease and strokes. Therefore from a public health perspective it is premature to make recommendations regarding antioxidant supplements and disease prevention.

Hard exercise can increase oxygen utilization from 10 to 20 times over the resting state. This greatly increases the generation of free radicals, prompting concern about enhanced damage to muscles and other tissues. Regular physical exercise enhances the antioxidant defense system and protects against exercise induced free radical damage.

Herbs help to protect the body cells from the bad effects of oxidation. Factors like stress, aging and pollution cause high level of free radicals in the body which damage DNA and causes heart-diseases or cancer or stroke. Substances like Vitamin E, Vitamin C or beta carotene (an isomer of carotene that is found in dark green and dark yellow fruits and vegetables) act as anti-oxidant nutrients. Vitamin E and beta-carotene protect cell membranes and vitamin C remove free radicals from inside the cell.

Antioxidants work in several ways

They may reduce the energy of the free radical, stop the free radical from forming in the first place or interrupt an oxidizing chain reaction to minimize the damage caused by free radicals. All living organisms maintain a reducing environment inside their cells; all cells contain complex systems of antioxidants to prevent chemical damage to the cells' components by oxidation.

These antioxidants include glutathione and ascorbic acid and are substrates for enzymes such as peroxides and oxidoreductases. Antioxidants are widely used as ingredients in dietary supplements used for health purposes such as preventing cancer and heart disease.

Antioxidants can be water or fat soluble. The richly pigmented plants prove to be the easiest way to discover and track down where real antioxidant values are to be found. Super foods (a type of food believed to be especially good for human health, for example due to high vitamin, antioxidant often used in smoothies and health drinks for its nutritional and antioxidant properties) to goose berries (amalaki) to spirulina to blue-green algae to marine phytoplankton all contain extraordinarily-rich antioxidant content.

Free radicals what it does in the body?

Antioxidants are known to stop runaway free radicals. Free radicals behave like bad drunks because they create problems in every cell they touch. Free radicals are aggressive oxygen molecules that oxidize and damage tissue. Free radical damage implicates in numerous

symptoms ranging from skin wrinkles all the way to cancer. According to the free radical theory, the more antioxidants you consume, the better, due to the ability of antioxidants to quench and deactivate free radicals.

Not only antioxidants are capable of quieting free radicals, but some antioxidants are having medicinal value also. Vitamins A, C and E are considered as antioxidants. Tocotrienols are more powerful Vitamin E antioxidants than tocopherols.

Richly pigmented foods such as raw fruits, vegetables, and super foods (goji berries, cacao nibs, acai, camu berry, spirulina, blue-green algae, marine phytoplankton, etc.) as well as raw fats and oils (nuts, seeds, olive oil, flax seed oil, hempseed oil, etc.) are all powerful antioxidants

Defense of the immune system

One of the best ways our body deals with attacks on the immune system is with its own natural antioxidants. When a virus or pollutant enters the body these antioxidants work by attacking them to stop them damaging the body. As the name suggests, they do 'anti' or the opposite job to the attackers.

Antioxidants prevent free radicals from damaging cells by donating electrons to the free radicals, thereby stabilizing them. When an antioxidant loses an electron, it remains stable and thus does not itself become a free radical. Therefore, a diet rich in antioxidants could be beneficial to health.

Citrus:- A variety of flavonoids are found in citrus fruits, including grapefruit. Antioxidant activity and an ability to increase intracellular levels of Vitamin C, rutin and hesperidin are beneficial.

Carotenoid:- Any of a class of yellow, orange, red and purple pigments that are widely distributed in nature. Carotenoids are generally fat-soluble unless they are complexed with proteins. In human nutrition, carotenoids, as antioxidants, serve to protect cells from the danger of free radicals that may be produced by the body during metabolism

Discussion

Free radicals in the body form because of environmental factors such as cigarette smoke, air pollution, radiation, improper metabolism, prolonged stress, etc. produces destruction to the body and as they act as scavengers, helping to prevent cell and tissue damage.

The different nutrient in the form of proteins, vitamins and carbohydrate act as antioxidants and does the prevention of cellular damage.

Regular usage of appropriate nutrient in the form of green leafy vegetables, fruits, moderate exercise, proper diet, rest, etc. will help in preventing the formation of free radicals in the body.

Antioxidant helps in preventing heart diseases, cancers and many other diseases.

They enhance defense of the immune system, nourishes the cells and tissues and extends early ageing.

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