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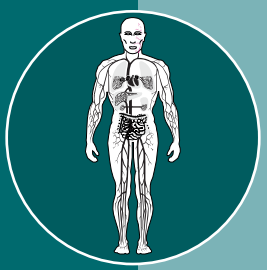

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THE ANATOMICAL PATH OF NASYADRAVYA - AN EXPERIMNETAL STUDY

Malati S. Dhotre* and Kishori Apte**

Abstract: An experimental study was performed in a cadaver as well as in Wistar rats to detect the path of nasyadravya. 8 drops of red stained coconut oil was administered into the nostrils of the cadaver for 7 days consecutively. On the 8th day, the vault of the skull was removed and the base of the brain and cranial fossa were observed. The anterior cranial fossa and pituitary fossa and brain up to pituitary gland were red due to the oil. In animal study, urografin and urografin with sesame oil were administered. All rats were dissected and their brains were observed and compared. It is concluded that the nasyadravya passes up to the cavernous sinus and pituitary gland.

Introduction

Importance of nasya:- Nasyakarma (nasal medication) is a part of pañcakarma. Here the medicated oil/ghee or powder is administered through the nasal cavity.[1] Carakasamhita extols the importance of nasya. It says that in one who practices nasya properly, the sensual organs are strengthened and the graying is delayed;[2] and that the person is unaffected by any disorder above the shoulder and remains healthy in old age.[3] Aṣṭāṅgahṛdayam mentions that nose is the gateway for the head hence nasyakarma is desired for the ailments of neck and head.[4]

Procedure: - Mild svedana (sudation) is given to the nose and face. The patient is positioned in the supine position; the head at the lower level of the body, anterior frontal directed downward, neck extended so that nostrils directed upward. 7 to 8 droplets of medicated oil are dropped in each nostril and the patient is kept in the same position for 10 minutes.

In view of the anatomy of nasal cavity, the possible path of nasyadravya can be considered that - it appears: i.) to be absorbed by mucous membrane of nasal cavity; ii.) to have passed through blood circulation by absorbing tunica adventitia (outer layer of blood vessels) of capillaries; iii.) to be absorbed by the myelin sheath of olfactory nerves; iv.) to have passed to the cranial cavity through the pores of cribriform plate of ethmoid bone; v.) to be passed to the pharynx through naso-pharynx; vi.) to have passed to para-nasal sinuses through their ducts, which open into the meatus of lateral wall of nasal cavity.

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The exact pathway of nasyadravya has not been explained in any text. Keeping this in mind, an experiment was performed on a cadaver.

Suśrutasamhita (Śārīrasthānam) mentions that śṛṅgāṭakamarma is a fatal spot present in the middle of the confluence of veins (inside the head) supplying nourishment to the nose, ears, eyes and tongue.[5] Cavernus sinuses which are situated at the base of the brain and above the roof of pharynx and are to be considered as śṛṅgāṭakamarma. It is related to all cranial nerves which supply to all sensory organs, the carotid artery and its branches also supply to the above nerves. Trauma to this site may lead to death, as śṛṅgāṭakmarma is sadyaprāṇahara (sudden death). But nasyadravya appears to stimulate these structures and increases their strength.

Materials and methods

The study was divided into two parts: a) cadaveric study and b) animal study

Cadaveric study

Preparation of cadaver: - Nasal cavities of cadaver were cleaned by cotton. Wooden block was kept below the shoulder of cadaver, so that its neck gets extended and nostrils directed upwards.

Procedure of nasyakarma: - A pilot experiment was performed first using Eosin and Methylene blue mixture as nasyadravya. It was taken in a 5 ml syringe and 8 drops were instilled in each nostril. After 2 days, the vault of the skull was cut and the brain removed (Fig. Ia). It was found that the cribriform plate in anterior cranial fossa and the olfactory nerves were also blue.

The same experiment was repeated in another cadaver using red stained coconut oil as nasyadravya. The procedure carried was the same but it was repeated for 7 consecutive days. On the 8th day, the vault of the skull was cut and the brain and cranial cavity were observed.

Observation: - The cribriform plate of anterior cranial fossa became red due to oil, so did the olfactory nerves, hypophyseal fossa, pituitary gland, optic nerves and cavernous sinuses. In view of these observations, it is clear that the nasyadravya passes to cranial cavity through pores of cribriform plate and acts on the above mentioned structures.

Animal study

The animal study was divided into three parts: 1) X-ray study of nasyadravya in Wister rats, 2) nasyadravya as sesame oil + Methylene blue stain and 3) nasyadravya as pure sesame oil.

1. X-ray study: - 8 healthy rats, weighing about 200 to 220 gms, were selected and divided equally into 2 groups viz. test and control. Each group contained 2 male and 2 female rats. All the rats were kept NBM from night. In the morning at 11 am they were anaesthetized by injection of Zylogen + Ketamine mixed chemical. After 10 minutes, the test group rats were kept in supine position and 0.1 ml of urografin mixture (a solution prepared by equal amount of urografin and sesame oil) was dropped in each nostril of first 2 rats; 0.2 ml of mixture in each nostril of 3rd rat and 0.5 ml of mixture in each nostril of 4th rat. All the rats were kept in the same (supine) position for 15 minutes and then X-ray of the head was taken. The same procedure was repeated in control group also.

Observation: - The X-ray showed skull bones of control group rats brighter than the test group rats and X-ray of test group rats blurred due to sesame oil. It shows that sesame oil reached the brain.

2. Methylene blue stain with sesame oil: - The rats were prepared in the same way as in the above study i.e. 4 rats in each group, kept NBM

from night and in the morning anaesthetized with injection Zylogen + Ketamine chemical in equal amount. After 10 minutes, all the rats were kept in supine position. An emulsion prepared out of sesame oil and lipid dissolved methylene blue in equal amount was instilled in each nostrils of rats in the test group i.e. 0.1 ml in 1st two rats, 0.2 ml in 3rd rat and 0.5 ml in 4th rat. Pure sesame oil was used in the control group. 0.1 ml sesame oil was instilled in each nostril of 1st 2 rats; 0.2 ml to 3rd rat and 0.5 ml to 4th rat. The rats were kept in the same position (supine) for next 15 minutes. The procedure repeated for consecutive 7 days. On the 8th day, all rats in both groups were dissected; the vault of skull removed and examined.

Observation: - The brain and vault of the rats in the Control group were slightly reddish and shining; whereas, in the test group, the brain appeared blue up to pituitary gland due to Methylene blue.

3. Pure sesame oil: - 12 healthy rats, weighing about 200 - 220 gm were selected and equally divided into two groups i.e. 6 rats (3 male and 3 female) in Control and Test groups.

The rats in the Control group were marked separately - head, tail, body, by yellow colour and kept under observation. The rats in the Test group were kept NBM from night, and in the morning at 11am they were anaesthetized by injection. After 10 minute, they were kept in the supine position and 0.1 ml of pure sesame oil instilled in each nostril of all rats and kept in the same position for next 15 minutes. This was repeated in the evening at 5:30 also. The procedure was repeated twice a day for 7 consecutive days.

On the 8th day, all the rats were sacrificed by cervical extension method. The brains removed and examined. In the control group rats, the brain found reddish due to hemorrhage, whereas in test group, it was whitish and shining due to sesame oil. (Fig. I b&c)

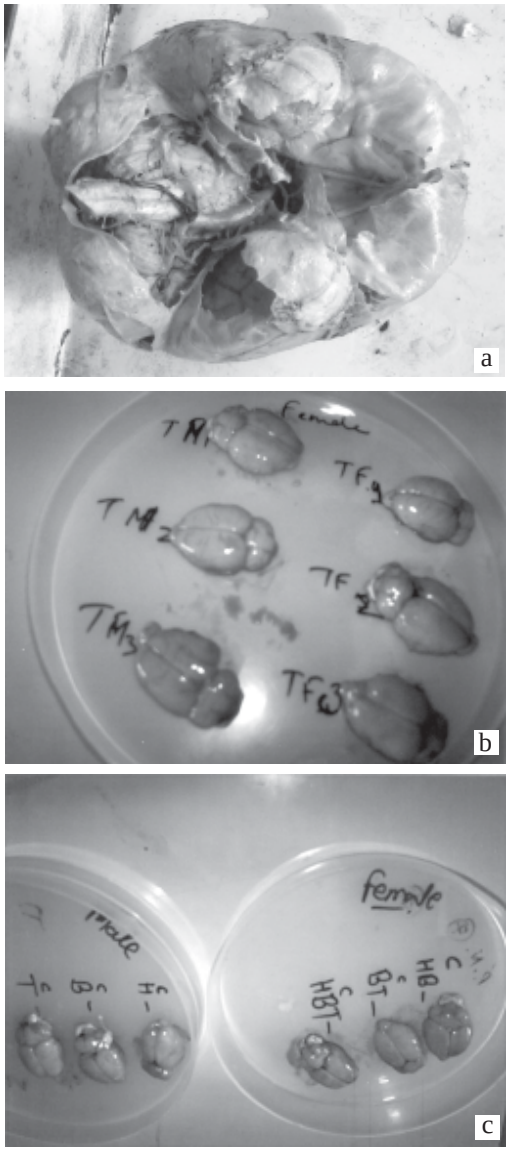

Fig. I. a) Dissected brain after nasyakarma;
b) Brain - Test group rats; c) Control group rats

500 mg brain from each group was measured and homogenised with 250 ml normal saline. Then the homogenate was centrifuged at 300 RPM for 5 minutes and each were separated; then 2ml separated and mixed with 2 ml of HCL and 20 ml of furfural acid. After 10 minutes, all the test tubes were observed and it was found that the test tubes of Test group rats were trubbish pink due to sesame oil + furfural acid. Test tubes of control group rats were clear in appearance. The furfural acid gives pink colour to sesame oil in presence of HCL.[6] The observation was done in UV-VIS spectrophotometer at 400nm and the reading was plotted in standard curve and the quantity of sesame oil was determined in each sample. (Tables 1&2)

TABLE 1
Absorption rate in the test group

Sample	ABS* (in ì l)	CSO* (ì l) for		Total (1400ì l)	% Absorbed
		3.33 mg brain	1 gm brain		
T1	0.031	1.37	411.11	0.71	29.37
T2	0.042	1.78	533.33	0.62	38.10
T3	0.051	2.11	633.33	0.55	45.24
T4	0.031	1.37	411.11	0.71	29.37
T5	0.047	1.96	588.89	0.58	42.06
T6	0.45	1.89	566.67	0.68	40.48

*ABS - Absorption; CSO - Concen. of Sesame Oil

Observation

In the cadaver study, it was found that the cribriform plate of ethamoid bone and hypophysial fossa were red due to stained oil. The base of brain i.e. olfactory nerves, pituitary gland and cavernous sinus appeared red due to red colour of oil.

In the animal study, the X-ray of skull bone of control group rats showed bright, whereas it was blurred in the test group due to sesame oil. In the 2nd study (Methylene blue), it was found that the brain and skull of control group rat were blood stained, whereas they appeared blue in the test group rats. All these show that the nasyadravya reaches up to cavernous sinuses. In the 3rd animal study, the actual quantity of sesame reached into the brain was recorded.

Conclusion

From the cadaver and animal studies, it is concluded that the nasyadravya (nasal medication) reaches up to brain through cribriform plate of ethmoid bone.

TABLE 1
Absorption rate in the Test group after subtracting Control group

Sample	Absorption (ì l)	Abs. of oil in control	Abs of test-control	CSO (ì l) for 3.33mg brain	CSO (ì l) for 1 gm brain	Total (1400ì l)	% Absorbed
T1	0.031	0.007	0.024	1.11	333.33	0.76	23.81
T2	0.042	0.007	0.035	1.52	455.56	0.67	32.54
T3	0.051	0.007	0.044	1.85	555.56	0.60	39.68
T4	0.031	0.007	0.024	1.11	333.33	0.76	23.81
T5	0.047	0.007	0.04	1.70	511.11	0.63	36.51
T6	0.045	0.007	0.038	1.63	488.89	0.65	34.92

*Abs - Absorption; CSO - Concentration of Sesame Oil

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2. नस्यकर्म यथाकालं यो यथोक्तं निषेवते । न तस्य चक्षुर्न घ्राणं न श्रोत्रमुपहन्यते। न स्यु: श्वेता न कपिला: केशा: श्मश्रूणि वा पुन:।। न च केशा: प्रमुच्यन्ते वर्धन्ते च विशेषत: । (च.सू. ५/५७-५८)
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   नासा हि शिरसो द्वारं तेन तद्व्याप्य हन्ति तान् ।।
   (अ.हृ. सू २०/१)
5. घ्राण श्रोत्राक्षि जिह्वासंतर्पणीनां सिराणां मध्ये सिरा-सन्निपातश्रृंगाटकानि, तानि चत्वारि मर्माणि तत्रापि सद्योमरणम् । (सु. शा. ६)
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ETHICAL ISSUES ON SURROGATE CONSENT IN RESEARCH ON MENTAL DEVELOPMENT DISABILITIES - A REVIEW
(Part - II)

B. Chandra Sekhara Rao*

Abstract: The ethical issues of surrogate consent in research on mental development disabilities continues from the previous issue. General safeguards - research on vulnerable population and Disabilities & Indian legislation are discussed here. The review concludes with this issue.

Investigators' Responsibilities on SDM: - In a non-emergency room environment, surrogate consent may be obtained from any of the following potential surrogates who have reasonable knowledge of the subject, in the following descending order of priority:

1. The person's agent designated by an advance health care directive.
2. The conservator or guardian of the person having the authority to make health care decisions.
3. The spouse.
4. The domestic partner as defined in Section 297 of the Family Code
5. An adult son or daughter.
6. A custodial parent.
7. Any adult brother or sister.
8. Any adult grandchild.
9. An available adult relative with the closest degree of kinship.

In non-emergency room research settings, no surrogate consent may be utilized if there is a disagreement whether to consent among the members of the highest available priority class of surrogates, (e.g., where two members of a person in the highest of categories 5-7 disagree and there is no persons in categories 1-4 available.)

In non-emergency room research settings only, the investigator is responsible for ensuring that the surrogate: a) has reasonable knowledge of the subject; b) is familiar with the subject's degree of impairment; c) is willing to serve as the substitute decision-maker; d) understands the risks, potential benefits, procedures and available alternatives to research participation; e) makes decisions based on the subject's known preferences, and where the subject's preferences are unknown, makes decisions based upon the surrogate's judgment of what the subject's preferences would be.

In an emergency room setting, the order of

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priority does not apply, nor does the surrogate have to show reasonable knowledge of the subject. Surrogate consent may be obtained from a surrogate decision maker who is of any of the following:

1. The person's agent designated by an advance health care directive.
2. The conservator or guardian of the person having the authority to make health care decisions.
3. The spouse.
4. The domestic partner as defined in Section 297 of the Family Code.
5. An adult son or daughter.
6. A custodial parent.
7. Any adult brother or sister.

In emergency room research settings, no surrogate consent may be utilized if there is a disagreement whether to consent among any available surrogates.

In non-emergency and emergency-room setting:- The surrogate shall complete the "Self-Certification of Surrogate Decision Makers for Participation in Research" Form (Chart 1) as an attachment to the informed consent document for the research study. The "Self-certification of Surrogate Decision Makers for Participation in Research" Form verifies the willingness of the person to serve as a surrogate, details the relationship of the surrogate to the subject and the surrogate's qualifications demonstrating "reasonable knowledge" of the research subject. (Note: Section 3 of the "Self-certification of Surrogate Decision Makers for Participation in Research" Form is required only for surrogate consent in non-emergency room environment settings).

Surrogates are prohibited from receiving any financial compensation for providing consent. This does not prohibit the surrogate from being reimbursed for expenses the surrogate may incur related to the surrogate's participation in the research.

Surrogate consent to participate in research under California Health & Safety Code section 24178 is not permitted for persons on an inpatient psychiatric ward, inpatients of a mental health facility, or persons on psychiatric hold. Note: This is more restrictive than the standard under previously existing law whereby an incapacitated adult with a conservator or guardian could be enrolled onto a study being conducted in an inpatient psych unit because conservators and guardians were considered legally authorized representatives.

In protocols in which a surrogate's consent is approved by the IRB, assessment of the decision-making capacity of the surrogate should be implemented only when the investigator has reason to believe that the surrogate's decision making capacity may be impaired.[26-29]

Re-consenting subjects: - Consenting is an ongoing process. All applicable criteria that would trigger re-consenting a subject in any study shall apply to subjects whose consent has been provided by a surrogate. In addition:

- A subject who regains the cognitive ability to consent must be re-consented using standard consenting procedures.
- In the event a subject has been initially consented by a surrogate, and a surrogate of higher priority subsequently notifies the investigator of that relationship to the

CHART 1

Self-certification of Surrogate Decision Makers for Potential Subject's Participation in University of California Research

Section 1:

I am willing to serve as a surrogate decision maker for _____
(Potential Subject)

to participate in _____
(Title of research project and IRB #)

research conducted by _____
(Principal Investigator)

Section 2:

Category of Potential Surrogate	Check (√) the category that best describes your relationship to the potential subject(s)	For the categories listed above yours, provide the name(s) of other relatives. (For example, if you are the adult son or daughter of the potential subject, provide the name of adult, if any, who are best described by categories 1-4 only)
1. Agent named in the potential subject's advanced health care directive.		1._____
2. Conservator or guardian of the potential subject, with authority to make health care decisions for the potential subject		2._____
3. Spouse of the potential subject.		3._____
4. Domestic partner of the potential subject		4._____
5. Adult son or daughter of the potential subject		5._____
6. Custodial parent of the potential subject		6._____
7. Adult brother or sister of the potential subject		7._____
8. Adult grandchild of the potential subject		8._____
9. Adult whose relationship to the potential subject does not fall within one of the above listed categories and is best described as: _____ (Example: cousin, aunt, etc.)		9._____

Section 3:

The following section information must be completed only for surrogate consent to participate in research in non-emergency settings:

(Check the statement which best describes the basis of your knowledge of the potential subject)

_____ I live with the potential subject and have done so for _____ years.

_____ I have discussed participation in research with the potential subject and believe that I can carry out his/her preferences.

_____ Other (please describe): _____

Section 4:

Potential Surrogate's Contact Information:

Name: _____ Home Phone: ( ) _____

Address: _____

_____

Work Phone: ( ) _____

Cell Phone: ( ) _____

E-mail: _____

_____ ___/___/___ _____ ___/___/___

Signature of Potential Surrogate Date Signature of Witness Date

subject, the investigator must defer to the higher priority surrogate's decision regarding whether the subject will continue to participate or to withdraw from the study.

- Investigators shall describe to potential surrogates the nature of ongoing decisions during the study regarding the subject's participation, decision to participate in certain procedures, changes to the study, etc., in order to ensure that the surrogate will be willing to undertake these on-going responsibilities.
- In the event that the surrogate dies, the subject must be re-consented subsequently upon any event that would otherwise trigger re-consenting the subject.

Guidance to Investigators Concerning the Surrogate's Self-certification Form:

- Potential surrogates must be advised that if a higher-ranking surrogate is identified at any time, the investigator will defer to the higher-ranking surrogate's decision regarding the subject's participation in the research.
- For non-emergency room environment research only, if the potential surrogate identifies a person of a higher degree of surrogacy, the investigator is responsible to contact such individuals to determine if they want to serve as surrogate.[26-29]

General safeguards - research on vulnerable population

In addition to the specific recommendations stated above, general safeguards should be adopted. These include: the requirement of the scientific validity and importance of an experiment; the requirement on the part of all participants in the research process to minimize risks and to balance possible risks with potential benefits; a general limitation of the level of risk to which a vulnerable person may be exposed; the requirement of assent; and the importance of respecting an individual's right to object to and withdraw from (or be withdrawn from) an experiment. It was also stated that an individual should have the right to object, regardless of the person's mental competence at the time. However, in certain situations a person's objection might not be genuine, in which case an appeal should be made to a judicial or quasi-judicial authority, which could then over-rule an objection in exceptional circumstances, and must provide a written decision to that effect.

Any objection by the subject, even if he or she is legally incompetent, should be respected and should supersede the decision of a SDM.[12] The UK Law Commission Paper #128 has stated that it is not reasonable for a researcher to force an incapacitated person to act in accordance with a decision to which the incapacitated person objects, unless such action is essential to prevent an immediate risk of serious harm to that person or others. These principles should be applied when considering whether to overrule the objection of a subject.

When developmentally disabled persons are research subjects, it is recommended that:

- the assessment of competency includes the assessment of the ability of the developmentally disabled person to express his refusal. Severely and profoundly retarded persons may have difficulty communicating their refusal. If this is the case, a record should be made to alert researchers and SDMs that extra care should

be taken in monitoring the experiment.

- if a SDM has been appointed for the person, the SDM should monitor the progress of the experiment and be sensitive to expressions of disapproval by the person. A researcher may not know the individual well enough to recognize signs of objection. The SDM must recognize that in addition to providing consent of behalf of the individual he or she must also honour an objection on behalf of the developmentally disabled person[32,33]

Disabilities and Indian legislation

Legislation for persons with disability could be required for two purposes: firstly to remove the discriminatory regime of the existing legal order and secondly to facilitate the creation of a more disability friendly world.[34]

Though there are no clear-cut guidelines available in Indian legislation with regard to the surrogate consent to conduct research in mental developmental disabilities. Pursuant to constant lobbying for a comprehensive law by disability activists, one can saw the enactment of three legislations for the rehabilitation and welfare of people with disabilities in India since last decade of the 20th century.

The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act was passed in 1995. This is an important legislation that provides for both preventive and promotional aspects of rehabilitation such as education, employment and vocational training, reservation, research and human resource development, creation of barrier-free environment, inclusion and independent living. The Rehabilitation Council of India Act 1992 led to the establishment of the Rehabilitation Council of India (RCI). The RCI is responsible for standardizing and monitoring training courses for rehabilitation professionals, granting recognition to institutions running courses, and maintaining a Central Rehabilitation Register of rehabilitation professionals. The RCI Act was amended in 2000 to give the RCI the additional responsibility of promoting research in rehabilitation and special education.

The National Trust Act 1999 provides for the constitution of a national body for the welfare of people with autism, cerebral palsy, mental retardation, and multiple disabilities. The Act mandates promotion of measures for the care and protection of persons with these disabilities in the event of the death of their parents, procedures for appointment of guardians and trustees for persons in need of such protection, and support to registered organizations to provide need-based services in times of crisis to the families of the disabled.

The three legislations are comprehensive in spirit and together deal with all aspects pertaining to rehabilitation, from prevention, training, employment, long-term settlement, human resource development and research and documentation.[35]

Conclusion

Losing the ability to exercise one's power of choice can be an unfortunate consequence of illness. Conditions such as mental retardation, pervasive developmental disorders, learning disorders, motor skills disorders, and communication disorders, can be especially devastating. Because current treatments for many of these conditions are only modestly effective, there is a clear need for further research. Yet the very factor that makes these illnesses so devastating creates significant

ethical concerns and poses potential limits to research, because loss of decisional capacity among numerous persons with these conditions precludes obtaining their informed consent. While the fact must be acknowledged and dealt with by researchers who work with developmental disability individuals, the outcomes of their research, when done properly and systematically, will result in a better understanding of a variety of behavioral and developmental issues. Research with developmental disability individuals must, then, continue, with the goal of applying acceptable standards that will result in scientific advancement rather than scientific stagnation. Hence, it is imperative that the scientific community, patients and their advocates, and policy makers at all levels establish a constructive dialogue to clarify ethical and legal standards in the area of surrogate consent for research.

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BIOAVAILABILITY OF ZINC IN LAGHUMĀLINĪVASANTARASA

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Abstract: Laghumālinīvasantarasa is a formulation explained in the chapter Viṣamajvara Cikitsa of Yogaratnākara. The most important ingredient of the formulation is rasaka. Though most of the books interpret rasaka as a carbonate of zinc, the market samples have got only traces of zinc. Calcium was the main content with very small amount of zinc in the selected raw material. After preparation, the bioavailability study was done in rabbits to assess the absorption of zinc from the formulation. Even though zinc is present in a very small amount only, the absorption from the formulation was significant and the relative bioavailability was about eight times when compared to a zinc supplement.

Background

When a drug enters the body, the body begins immediately to work on the drug: absorption, distribution, metabolism (biotransformation) and elimination. These are the processes of pharmacokinetics. The mechanisms of drug action are the processes of pharmacodynamics. The time course of therapeutic drug action in the body can be understood in the terms of pharmacokinetics and pharmacodynamics.[1] Bioavailability is the rate and extent of absorption of a drug from a dosage form. It is determined by its concentration - time curve in blood or by its excretion in urine. It is the measure of the fraction of administered dose of a drug that reaches the systemic circulation in unchanged form.[2]

Particle size, solubility and wettability are three important factors that interfere with the bioavailability. Most of the herbo-mineral preparations like Laghumālinīvasantarasa are water-insoluble. If the solubility of a drug is low then the bioavailability is increased by decreasing the particle size and increasing wettability. When the particle size is decreased during the preparation of a formulation, in the case of water insoluble substances, the wettability will be mostly low. This is because the attraction in between the particles of the formulation will be greater than the attraction between the liquid medium and the particles of formulation. A method of increasing the wettability of a medicine is, to incorporate a hydrophilic material. Grinding with a hydrophilic substance has been proved to increase the wettability.[3]

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Laghumālinīvasantarasa is a formulation explained in Yogaratnākara. The chief content of the formulation is rasaka. The other ingredients are pepper, butter and lemon juice. It is recommended even in infants and pregnant women. The method of preparation is also very easy. The main indications of the formulation are diseases of rakta and pitta predominance, bleeding piles, bleeding diarrhoea, menorrhagia and recurrent fever. The anupānas for this formulation are pippali and honey.[4]

Rasaka is considered as carbonate of zinc called Smithsonite and this mineral is not easily available in India. Different materials are used in different parts of India as rasaka. But many vaidyas, who are using locally available samples of rasaka are claiming good clinical efficacy. The Ayurvedic Formulary of India recommends the use of Yaśadabhasma in place of rasaka[5] as zinc is the major constituent of Smithsonite and because of the non availability of Smithsonite. In Smithsonite, the carbonate mineral of zinc is often partly replaced by iron, calcium, manganese, cadmium, cobalt or copper.[6] These trace elements may also have role in the action of the drug, which is not present in Yaśada-bhasma.

Humans are able to regulate the uptake of zinc such that there is relatively little variation in body-zinc in proportion to the variation in dietary-zinc. If zinc intake is low, proportionally more dietary zinc is absorbed and vice versa.[7] Only a small percentage (5 to 10%) of the zinc present in the diet is usually absorbed. On zinc intake of about 10mg/day by healthy adult humans, about 90% is lost in faeces, about 0.5mg is excreted in urine and 0.5mg retained in body. Studies with zinc-65 in humans show the presence of the isotope in plasma within 15 minutes of oral administration, peak levels being reached within two to four hours.[8] So the local samples of rasaka containing traces of zinc may be sufficient to do the role of the zinc in the formulation. If the locally used raw material can be used in place of Yaśadabhasma, then the formulation can be brought to the public in a much low cost, since the method of preparation of the medicine is very easy. Hence from the available raw materials, the one which is more widely used and similar to the original one was identified and used as rasaka in the study. In this study, the bioavailability of zinc from Laghu-mālinīvasantarasa, prepared with the locally available rasaka sample, was compared to that of an established zinc supplement purchased from the market.

Methodology

Rasaka was collected from different parts of Kerala and also from Chennai and Maharashtra. The rasaka obtained from Kerala and Chennai was that of a dirty white colour, whereas that collected from Maharashtra was that of a brick red colour. The white variety is used for the preparation of siddha medicines and is called Pāltutham in Kerala. The red variety is comparatively softer and is more like a mud type consistency. The white variety is much hard. To identify the chemical constituents, both the varieties were subjected to chemical analysis, X-ray diffraction and X-ray fluorescence.

The aim of the study was to find out whether the absorption of zinc from Laghumālinī-vasantarasa is significant. The study was a non-randomized interventional. 12 rabbits weighing 1.5 - 2 kg of either sex were randomly selected. The rabbits were maintained on pellet diet (Kerala feeds, Govt. of Kerala) and water *ad libitum*. All the rabbits were kept in cages with

wide square mesh at the bottom to avoid coprophagy and maintained in a well ventilated animal house with 12 hr light and dark cycle.

The animals were fasted overnight with water *ad libitum.* They were divided into two groups (six in each) - Group I & II. Two animals from each group were kept as Control group. Group I was administered with a zinc supplement purchased from the market; and Group II with Laghumālinīvasantarasa mixed with honey and pippali. Both this medicines were diluted with distilled water and administered orally. In Control group, equal amount of distilled water was given.

The experimental variables were the Laghumālinīvasantarasa and zinc supplement. The plasma concentration of zinc in rabbit blood at different interval was the dependant variable. The other factors affecting the variable under consideration were monitored by keeping a control group. The control group was exposed to the same environmental conditions and situations as that of the study groups. Assessment of plasma zinc concentration of both the groups was done before drug administration and at different intervals after the drug administration.

The animal dose corresponding to 1 g human dose for both the formulations was calculated. The dose in rabbits was calculated as 4.67 mg/ 100 g body weight. The required dose of Laghumālinīvasantarasa and pippali was mixed with honey to make a paste and diluted with 10 ml of distilled water and administered. The zinc supplement was also mixed with 10 ml of distilled water and administered. The animals of the control group were given 10 ml of distilled water. The weight of the animals and dose of the medicine administered are given in Table 1.

The medicine was administered in a 10 ml syringe using an infant feeding tube. The blood samples were collected from the marginal ear vein of the rabbits at 0 hour, 10 min, 30 min, 1 hour, 1.30 hour, 2 hour, 3 hour, 4 hour, 5 hour, 6 hour and 24 hour. 2 ml of blood was collected from each sample in EDTA pre-coated vials and centrifuged and the plasma was collected. The estimation of zinc was done with Atomic Absorption Spectroscopy. The analysis was done in the Department of Nutrition, College of Veterinary and Animal Sciences, Mannuthy.

Observations

On analysis of the samples of rasaka, it was found that the white variety was a carbonate mineral and the red variety of silicate mineral. The main constituent i.e. calcium oxide in the white variety was 48.806% and all other constituents were less than 5%. In the case of red variety, the main constituents were silicon dioxide (55.45%) and aluminium oxide (27.03%). In both the samples, all these trace elements in Smithsonite except cadmium were present. Zinc was present in both the samples but the amount was only in traces. The white variety is used widely in South India and it has a small portion of zinc and a large percentage of calcium

TABLE 1
Dose of medicine and weight of animals

Group	Wt. (kg)	Dose (mg)
I. Group 1	1.6	74.7
(Zinc supplement)	1.5	70.1
	1.75	81.7
	1.55	72.385
II. Group 2	1.55	72.38
(Laghumālinīvasantarasa)	1.75	81.72
	2.0	93.4
	1.6	74.7

(48.806%). The Laghumālinīvasantarasa prepared using white rasaka sample was very fine due to the reaction between the carbonate mineral and acids in the lemon, and was having properties of bhasmas, like floating in surface of water (vāritaratva). The solubility and wettability of the formulation was low. When mixed well with a hydrophilic substance like honey, which is used as anupāna, it forms a coating over the fine particles of the drug and increases wettability.

The level of zinc in the animal blood plasma at different intervals and the mean plasma zinc levels in the three groups are shown in the Tables 2 & 3 respectively.

The plasma zinc levels at different intervals due to absorption of zinc from the formulation was

TABLE 2
Plasma zinc levels in three groups at different intervals

Group	Animal	Plasma zinc levels at different intervals (ppm)										
		0 h	10 min	30 min	1 h	1.30 h	2 h	3 h	4 h	5 h	6 h	24 h
I. Group 1												
	1	2.75	4.95	5.5	9.9	7.37	6.8	6.4	5.5	5.1	4.8	2.75
	2	2.6	4.48	5.34	9.6	7.21	6.64	6.32	5.32	4.92	4.72	3.1
	3	2.24	4.26	5.12	9.31	6.9	6.45	6.12	4.91	4.67	4.21	2.35
	4	3.1	5.12	5.93	10.1	7.89	7.1	6.64	5.76	5.23	4.97	2.9
II. Group 2												
	1	3.63	6.27	7.81	8.69	9.79	5.28	4.73	4.62	4.2	3.3	2.9
	2	3.5	6.1	7.5	8.32	9.63	5.1	4.4	4.1	3.9	3.1	3.2
	3	3.58	6.8	7.9	8.8	10	6.2	5.2	4.64	4.2	3. 53	3.45
	4	2.5	5.9	6.9	8.1	9.14	5.2	4.56	4.14	3.89	3.1	2.9
III. Control												
	1	2.6	2.9	2.9	2.97	2.6	2.6	2.6	2.5	2.5	2.5	2.4
	2	2.4	2.45	2.9	2.87	2.67	2.4	2. 4	2.2	2.12	2.1	1.96
	3	3.2	3.3	3.3	3.34	3.24	3.29	3.21	3.2	3.2	3.14	2.8
	4	2.9	3.1	3.52	3.34	3.23	3.23	3.12	2.93	2.9	2.9	2.8

TABLE 3
Mean plasma zinc levels in three groups at different intervals

Group	Intervals (ppm)										
	0 h	10 min	30 min	1 h	1.30 h	2 h	3 h	4 h	5 h	6 h	24 h
1. Group 1	2.67 ± 0.36	4.70 ± 0.40	5.47 ± 0.34	9.73 ± 0.35	7.34 ± 0.41	6.75 ± 0.28	6.33 ± 0.18	5.37 ± 0.36	4.98 ± 0.24	4.68 ± 0.33	2.78 ± 0.32
2. Group 2	3.3 ± 0.54	6.27 ± 0.39	7.53 ± 0.45	8.48 ± 0.32	9.64 ± 0.37	5.45 ± 0.51	4.72 ± 0.35	4.38 ± 0.30	4.05 ± 0.18	3.25 ± 0.19	3.11 ± 0.27
3. Control	2.78 ± 0.35	2.94 ± 0.36	3.16 ± 0.31	3.13 ± 0.25	2.94 ± 0.35	2.88 ± 0.45	2.83 ± 0.39	2.71 ± 0.44	2.68 ± 0.47	2.66 ± 0.46	2.49 ± 0.40

determined by subtracting the mean plasma zinc levels of the control group at corresponding intervals from the mean plasma zinc levels of the animals of groups I and II (Table 4).

Discussion

The results were analyzed by one-way analysis of variance (ANOVA) followed by Tukey-Kramer multiple comparison test using Graph Pad Instat software (GraphPad Software Inc., CA, USA). The pharmacokinetic parameters were determined using Win Lin software (Cole-Parmer Instrument Co., Chicago, IL, USA). The comparative result between three groups is shown in Table 5.

TABLE 5
Comparison between three groups

Time	Group 1 Vs Control	Group 2 Vs Control	Group 1 Vs Group 2
0 hr	P>0.05 ns	P>0.05 ns	P>0.05 ns
10 min	P<0.001	P<0.001	P<0.001
30 min	P<0.001	P<0.001	P<0.001
1 hr	P<0.001	P<0.001	P<0.001
1 hr 30 min.	P<0.001	P<0.001	P<0.001
2 hr	P<0.001	P<0.001	P<0.01
3 hr	P<0.001	P<0.001	P<0.001
4 hr	P<0.001	P<0.001	P<0.05
5 hr	P<0.001	P<0.001	P<0.01
6 hr	P<0.001	P>0.05 ns	P<0.001
24 hr	P>0.05 ns	P>0.05 ns	P>0.05 ns

When the plasma zinc level was assessed before administration of the medicine there was no significant difference in the three groups. From the 10 minute sample there was significant difference in the plasma zinc level in blood. In group I, there was significant difference from the control till the sixth hour after drug administration. But in group II, there was significant difference only till the fifth hour after drug administration. At twenty four hour after drug administration there was no significant difference between the groups. The absorption of zinc was more in group II at ten minutes, thirty minutes and one hour thirty minutes compared to group I. In all the other intervals the absorption was more in group 1. The maximum concentration of zinc that reached the blood (Cmax) in group I was 6.59 ppm whereas that in group II was 6.7 ppm. The time at which the maximum concentration of zinc reaches the circulation (Tmax) is 1 hour in group I and 1 hour 30 minutes in group II. A graph (Fig. 1) was plotted with all these values, the time interval in the X axis and the concentration in the Y axis. The area of the graph was calculated which represents the extent of zinc absorption. In Group 1 it was 40.09615 ppm h, group II was 26.62855 ppm h. The dose of zinc in 1 gram of both the formulations was different. In Laghumālinī-vasantarasa it was 560µg whereas in the supplement it was 7100µg i.e. 71 mg. From this, the relative bioavailability of Laghumālinī-

TABLE 4
Absorption of zinc at different intervals (ppm)

Group	Intervals (ppm)										
	0 h	10 min	30 min	1 h	1.30 h	2 h	3 h	4 h	5 h	6 h	24 h
1. Group 1	0	1.76	2.31	6.59	4.4	3.87	3.54	2.66	2.3	2.02	0.29
2. Group 2	0	3.33	4.37	5.35	6.7	2.57	1.89	1.67	1.37	0.6	0.6

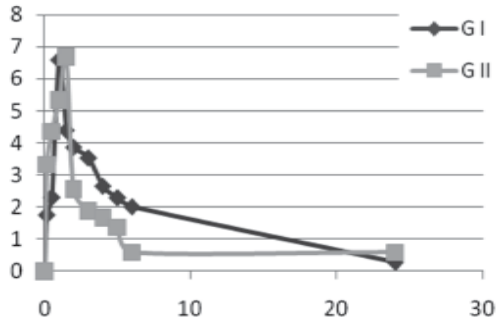

Fig. I.
Extent of zinc absorption

vasantarasa was calculated as 8.42. The bioavailability of zinc in Laghumālinīvasantarasa is about 8 times than that of the zinc supplement.

Even though the concentration of zinc is much less in Laghumālinīvasantarasa compared to the supplement, the extent of absorption is much more. This is due the presence of marica and addition of pippali during administration. Both these contain piperine which is a proved bioavailability enhancer. This helped in the increasing the bioavailability of zinc in the formulation.

Conclusion

The bioavailability of zinc in Laghumālinīvasantarasa is around eight times compared to a zinc supplement. The absorption of zinc from the formulation was significant even though the raw material used as rasaka was containing only traces of zinc.

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HERBOMINERAL DRUGS AND PAÑCAKARMA THERAPY IN THE MANAGEMENT OF PAKṢAVADHA (HEMIPLEGIA) - A COMPARATIVE CLINICAL EVALUATION

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Abstract: Pakṣāghata is one of the major neurological disorders usually developing as a sequel of stroke. It is manifested as paralysis/weakness of one side of the body. It is a nānātmajavyādhi occurring mainly due to the vitiation of vāta. A clinical trial was conducted on 20 cases of pakṣavadha. The patients were subjected to patrapiṇḍasveda with Kṣīrabalātaila for 14 days followed by the virecanakarma with eraṇḍataila; and administered with Dhanadanayanādi kaṣāya along with Kṣīrabalātaila (101) twice a day for a period of 45 days. The treatment was very effective.

Introduction

Āyurveda considers pakṣavadha as one among 80 types of nānātmaja vātavyādhi. The line of treatment for vātavyādhi is applicable for this disease also. In pakṣavadha, the area of concern is mobility, which gets affected. As vātadoṣa is āśukāri and sūkṣma, the pūrvarūpas related to vātavyādhi are very unstable, swifter and difficult to assess in the prodromal stage. Factors like prakṛti, dūṣya, deśa, kāla, bala, satva and vaya of the patient are also influencing factors.

The lakṣaṇas of pakṣavadha mentioned in the āyurvedic classics are as follows: i) dakṣiṇa/vāmapakṣa ceṣṭānivṛtti, ii) affliction of jñānendriya and karmendriya, iii) vākstambha, iv) acetana/vicetana, v) sirāsnāyuśoṣa, vi) sandhibandha vimokṣa, vii) hastapāda saṅkoca and viii) ruja.

Ceṣṭānivṛtti: - Caraka has used the word 'ceṣṭāhāni' whereas Suśruta and Vāgbhaṭa coined the term 'ardhakāya akarmaṇya', which means loss of movements of half side of the body. Ḍalhaṇa, commenting on the word akarmaṇya, describes 'īṣat karmakṣayam'. Aruṇadutta explains it as 'kriyāyām aśaktau' whereas Vijayarakṣita as 'īṣat ceṣṭā akṣamah'. It means partial loss of function. Bhāvamiśra says 'karma aśaktah' which means inability to perform the required activity.

Affliction of jñānendriya and karmendriya:- Siras is considered as uttamāṅga and it is the adhiṣṭhāna of jñānendriya and karmendriya. The location of prāṇavāyu is said to be in siras. While explaining about śiromarmābhighātalakṣaṇa, ardita, ceṣṭāhāni, mūkatva, gadgada and karmahāni are explained. The functions of hasta and pāda are grahaṇa, dhāraṇa and gamana. So, impairment in these functions is seen in pakṣavadha. The coordinated movements of

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fingers, gripping of some objects, holding minute objects, writing ability, etc may be lost. One of the important functions of vāta is 'kṣeptā bahirmalānām'. The symptom like aniyantrita malapravṛtti is not explained in pakṣavadha, but in some cases, such symptom can be seen.

Vākstambha: - Among the five karmendriya, vāk is also one. It gets affected in pakṣāghāta and result in vākstambha.

Acetana/vicetana: - Acetana is the word used by Suśruta while Vāgbhaṭa used vicetana. Ḍalhaṇa commented acetana as alpa cetana. Gayādāsa says that 'na cetanam acetanam'. Vicetana is explained as 'īṣat sparśādi jñāna yuktam' means less sensation.

Sira-snāyuśoṣa: - The word śoṣa means emaciation. Śoṣa is mainly due to the increase in rūkṣaguṇa of vitiated vāyu which causes decrease in snigdhaguṇa and texture of sira and snāyu.

Sandhibandhavimokṣa: - It can be considered as: i) loss of co-ordination and ii) sandhiviśḷeṣa. Due to hastapādasaṅkoca and stabdhata, the patient may not be in a position to use his limbs according to his will; means there is in-cordinance between asthi, sandhi, snāyu and kaṇḍara. Sandhiviśḷeṣa or sandhicyuti is observed either because of continuous disuse or improper forceful passive movements during exercise.

Hastapādasaṅkoca: - This symptom is mentioned in Caraka only. Ākuñcana and prasāraṇa are the normal functions of snāyu. Saṅkoca is seen on the affected side of the body. This is due to the effect of vāyu on tvak, snāyu, sira and dhamani. It is usually seen in the joints of the extremities. Saṅkoca occurs due to increased rūkṣaguṇa of vitiated vāyu that results in decrease of the snehaguṇa present in sira, snāyu and in sandhi of hasta and pāda.

Ruja: - It may not be seen in early symptoms but may occur in later stages. Persisting kriyāhāni increases the saṅkoca which may cause the ruja.

Prognosis (sādhyāsādhyata):- Pakṣavadha is considered as a mahagada or duścikitsya. Snehana, svedana, mṛduvirecana, vasti, nasya, māstiṣkya are the treatments to be adopted in sequence.

Materials and methods

The clinical trial was conducted at the Advanced Centre for Ayurveda in Mental Health and Neurosciences, NIMHANS, Bangalore during 2006 - 2008. A total of 20 cases were registered from the O.P.D of the Unit on the basis of 'diagnosis criteria' laid down in the protocol designed by the C.C.R.A.S., New Delhi.

Study design: - A single blind, single group study in the OPD/IPD level for a period of 45 days.

Inclusion criteria

Patients between 20-70 years of age; of either sex, having duration of illness up to 2 years; of unilateral paralysis, V.D.R.L negative; no acute cardio-vascular complaints; normal general condition; and with minimum 30% and above neurological deficit as per assessment criteria.

Exclusion criteria

Patients below 20 and above 70 years of age; having duration of illness more than 2 years; suffering from bilateral paralysis, V.D.R.L positive, tuberculosis, intra cranial space occupying lesions, IDDM, psychiatric diseases, acute cardio-vascular diseases, associated with other severe systemic diseases; having h/o liver diseases in recent past, h/o renal diseases.

Schedule of the therapy

a) Śodhanacikitsa: - Patrapiṇḍasveda was

preceded with Kṣīrabalātaila abhyaṅga for 14 days followed by virecana with eraṇḍatailam

b) Śamanacikitsa: - Dhanadanayanādi kaṣāya (60 ml) along with Kṣīrabalātaila 101 (10 to 20 drops) twice daily before food.

Pathyāpathya: - Advised to avoid excessive sour, spicy and oily foods.

Assessment criteria

Relevant details of history and physical examination were recorded and assessed as per the 'protocol' for the study designed by the C.C.R.A.S. New Delhi. (Table 1)

Interpretation of results:- a) Good response - 75% and above relief in signs and symptoms and improvement in lab-parameters; b) Fair response - 50% relief; c) Poor response - 25% and above relief or insignificant improvement in lab-parameters; d) No response - No change in signs and symptoms.

Observations and results

Of 20 patients, 13 were males and 7 females; majority was field workers between the age group of 41-70. Distribution of patients according age, occupation, sex, duration of illness, etc. is shown in Table 2.

The study showed significant results in terms of i) power with respect to movement of upper limb, shoulder, elbow, wrist, meta carpo phalanges and improvement in inter phalanges joints; ii) power with respect to movement of lower limb, hip, knee, ankle, meta tarsal and improvement of phalanges. Statistical analysis revealed significant change (P 0.001) in almost all the sign and symptoms viz. ceṣṭānivṛtti, ruja, vākstambha, etc. The result of various assessment factors are shown in (Table 3).

TABLE 1
Gradation of different parameters

Parameters	Score
i. Motor system	
a. Bulk of the muscles	
- No atrophy	0
- Mild atrophy*	1
- Moderate atrophy	2
- Severe atrophy	3
b Tone of the muscles	
- Normal tone	0
- Mild hypertonicity	1
- Moderate hypertonicity	2
- Severe hypertonicity	3
c. Strength of the muscles	
- No movement	0
- Flicker of contraction	1
- Active movement with gravity eliminated	2
- Against gravity	3
- Against moderate resistance	4
- Normal	5
d. Hand strength	
- 0 mm of Hg	7
- Up to 10 mm of Hg	6
- Up to 20 mm of Hg	5
- 21 to 30 mm of Hg	4
- 31 to 40 mm of Hg	3
- 41 to 50 mm of Hg	2
- 51 to 60 mm of Hg	1
- More than 60 mm of Hg	0
e. Ability to hold and lift weight	
- Cannot lift	5
- Below 100 gms	4
- 101 to 500 gms	3
- 501gms to 1 kg	2
- 1 to 2 kgs	1
- Above 2 kgs	0

*Difference of 1-2 cm. (when c/w unaffected side of the limb) - mild atrophy; 2-3cm - moderate; >3 cm - severe atrophy

Symptomatic assessment (āyurvedic parameters): Score pattern: Grade 0 - Nil; Grade 1 - Mild; Grade 2 - Moderate; Grade 3 - Severe

Cont...

f. Posture/gait

- Cannot lie down on lateral positions (left or right)	28
- Can lie down on lateral positions	26
- Can sit on the bed with support	24
- Can sit on the bed without support	22
- Can attain the sitting posture with support	19
- Can attain the sitting posture without support	16
- Can get down from the bed and stand with support	13
- Can get down from the bed and stand without support	10
- Can walk with the support of person	9
- Can walk with the help of a stick	8
- Can walk without the support but gait is hemiplegic (Severe limping)	7
- Can attain squatting posture	6
- Can regain from squatting posture	5
- Can climb upstairs with the help of a banister	4
- Can climb upstairs without the help of banister	3
- Hemiplegic gait with minimal limping	2
- Normal gait but cannot run	1
- Normal gait but can run	0

g. Walking speed (80 meters)

- Up to 20 seconds	0
- 21 to 30 seconds	1
- 31 to 40 seconds	2
- 41 to 50 seconds	3
- 51 to 60 seconds	4
- Above 60 seconds	5

ii. Sensory system

a. Tactile sensibility
(This includes light touch and pressure, tactile localization and discrimination)

- completely lost	0
- 75%	1
- 50-75%	2
- 25%	3
- <25%	4
- Normal	5

b. Position sense
(The appreciation of passive movements)

- Complete loss	0
- Appreciation of course movement	1
- Appreciation of fine movement but not direction	2
- Appreciation of direction of fine movement but slower reliable than normal	3
- Normal	4

c. Recognition of the size, shape, weight and form of object

- Preserved	0
- Not preserved	2

d. Appreciation of vibration

- Preserved	0
- Not preserved	2

e. Pain sensation

- Preserved	0
- Not preserved	2

f. Temperature sense

- Preserved	0
- Not preserved	2

Discussion

A proper understanding of samprāpti (etio-pathogenesis) is vital for undertaking treatment for any disease. Objective of cikitsa is achieving by samprāptivighaṭana. Any physician capable of identifying the samprāptighaṭakas properly can provide better treatment.

Samprāpti of pakṣāghāta:- Affliction of vātadoṣa, either on vāma or dakṣiṇa pārśva, leads to loss of function on the affected side with or without vāksaṅga. The samprāptighaṭaka in pakṣavadha are shown in Table 4.

Drug review

Auṣadhi is considered as one of the four-fold constituents of cikitsa. It not only interferes with disease causative factors but also helps in restoration of svāsthya. As per WHO norms, a drug is a substance or product that is used or

TABLE 2
Demographic profile of patients

Description	No. of patients
1. Age	
- 20-30	2
- 31-40	0
- 41-50	6
- 51-60	6
- 61-70	6
2. Occupation	
- Business	3
- Student	1
- Field work	10
- Skilled	3
- House wife	3
3. Sex	
- Female	7
- Male	13
4. Duration of illness	
- <30	2
- 30-365	10
- 365-1095	7
- >1095	1
5. Food habit	
- Vegetarian	5
- Mixed	15
6. Mental stress	
- Yes	14
- No	6
7. Addictions	
- Smoking	5
- Alcohol	1
- Both	1
- Nil	13
8. Prakṛti	
- Vāta-pitta	11
- Pitta-kapha	8
- Vāta-kapha	7
9. Affected side	
- Right	14
- Left	6

intended to be used or to modify or explore physiological system or pathological status for the benefit of the recipient. The compositions and their properties of the trial medicines i.e. Kṣīrabalātaila and Dhanadanayanādi kaṣāya are analyzed in Table 5.

Patrapiṇḍasvedam

It is a variety of piṇḍasveda. It fulfils the effect of snehana and svedana together. It is indicated in all types of vātavikāra. Leaves of eraṇḍa, śigru, nirguṇḍi, pḷakṣa, āmra, ciñca, arka and rāsna are fried in neem oil along with nārikelam and śatapuṣpa. Then a poṭali is prepared and heated on the hot pan either with Kṣīrabalātaila or Nimbataila and applied on the affected part.

Mechanism of action of the trial

Pakṣāghāta is a vātapradhāna vyādhi. Sneha-svedas are given prime importance in the treatment of pakṣāghāta as they pacify vāta and helps in liquefying the vitiated doṣas which are eliminated through snigdha virecana. Vāgbhaṭa indicates taila as paramauṣadha for pacifying vāta. Hence tailābhyaṅga is essential as pūrvakarma before undertaking virecana in pakṣāghāta.

Tilataila is considered as the best among tailavarga. It is having snigdha, tīkṣṇa, sūkṣma and vyavāyi guṇa. These qualities help in pacifying vāta and also remove sroto avarodha. Tilataila is specifically indicated in the treatment apanavātavikāra. As pakvāśaya is adhiṣṭhāna sthāna for pakṣavadha, bāhyābhyantara snehana is effective. Kṣīrabalātaila has tilataila base and is indicated in pakṣāghāta and other vātavyādhis.

Snigdhavirecana is helpful in pakṣavadha. After vamana, virecana is considered as the second best treatment for kapha. So in kaphānu-bandhata one can opt for virecana. Caraka has

TABLE 3
Effect of the treatment on various sign and symptoms

Parameters	Mean			SD +	SE +	t	p
	BT	AT	Diff.				
A. General factors							
1. Overall signs & symptoms	12.35	4.35	8	1.97	0.44	18.12	<.001
2 Tone of muscles							
- Upper	1.25	0.35	0.9	0.44	0.10	8.99	<.001
- Lower	1.15	0.3	0.85	0.48	0.10	7.76	<.001
3. Strength of affected muscles							
- Upper	29.85	51.2	21.35	6.99	1.56	13.63	<.001
- Lower	33.2	55.65	22.45	10.40	2.32	9.64	<.001
4. Strength of hand	4.6	2.4	2.2	0.76	0.17	12.08	<.001
5. Abilityto hold & lift wight	3.65	2.2	1.45	0.60	0.13	10.7	<.001
6. Posture/gait	14.7	7.45	7.25	3.04	0.68	10.65	<.001
B. Āyurvedic parameters							
1. Ceṣṭānivṛtti	2.65	1.4	1.25	0.44	0.09	12.57	<.001
2. Ruja	1.5	0.35	1.15	0.67	0.15	7.66	<.001
3. Vākstambha	1.6	1.05	0.55	0.51	0.11	4.81	<.001
4. Pādahastasaṅkoca	1.35	0.6	0.75	0.550	0.12	6.09	<.001
5. Toda/śūla	1.45	0.35	1.1	0.64	0.14	7.67	<.001
6. Dāha	0.65	0.05	0.6	0.75	0.16	3.55	<.01
7. Deha-mānasa-santāpa	0.9	0.25	0.65	0.58	0.13	4.94	<.001
8. Śaithilya	0.6	0	0.6	0.75	0.16	3.55	<.01
9. Śotha	0.55	0.1	0.45	0.60	0.13	3.32	<.01
10. Gurutva	1.45	0.4	1.05	0.51	0.11	9.19	<.001

TABLE 4
Samprāptighaṭakas in pakṣāghāta

1.	Pradhānadoṣa	-	Vāta (Prakāra - prāṇa, vyāna and udāna)
2.	Anubandhadoṣa	-	Pitta and kapha
3.	Dūṣya - dhātu	-	Rasa, rakta and māmsa
4.	Upadhātu	-	Sira and snāyu
5.	Mala	-	Purīṣa and mūtra
6.	Agni	-	Jaṭharāgni and dhātvāgni (rasa, rakta and māmsa)
7.	Āma	-	Jaṭharāgni/dhātvāgni janya (rasa, rakta and māmsa)
8.	Śrotas	-	Rasavaha, raktavaha and māmsavaha
9.	Srotoduṣṭi	-	Atipravṛtti, saṅgha, śirāgranthi, vimārgagamana (any one, a few, or all - depends upon the cause)
10.	Udbhavasthāna	-	Pakvāśaya
11.	Sthānasamśraya	-	Siras
12.	Adhiṣṭhāna	-	Ardhaśarīra
13.	Sañcārasthāna	-	Dakṣiṇa/vāma sira, dhamani, snāyu

TABLE 5
Properties and contents of the trial drugs

Dravya	Rasa	Guṇa	Vīrya	Vipāka	Karma	Doṣaghnata
1. Kṣīrabalataila						
- Balāmūla	Madhura	Snigda, guru	Śīta	Kaṭu	Balya	Vāta-pitta śāmaka
- Jala	Madhura	Laghu	Śīta	Madhura	Jīvanīya	Tridoṣahara
- Tilataila	Madhura, kaṣāya, tikta	Guru, snigdha, picchila, laghu	Uṣṇa	Madhura	Bṛhmaṇa, vṛṣya-prīṇana, tvakprasādana	Kapha-vātaghna
2. Dhanadanayanādi kaṣāya						
- Dhanadanayana (kuberākṣa)	Tikta, kaṣāya	Laghu, rūkṣa	Uṣṇa	Kaṭu	Śothahara Vedanāsthāpana	Tridoṣaśāmaka
- Śuṇṭhi	Kaṭu	Laghu, snigda	Śīta	Madhura	Grāhi	Vāta-kaphahara
- Śigru	Kaṭu, tikta	Laghu, rūkṣa, tīkṣṇa	Uṣṇa	Kaṭu	Nāḍī uttejaka, śothahara	Kapha-vāta śamana
- Rāsna	Tikta	Guru	Uṣṇa	Kaṭu	Vedanāsthāpana	Vāta-kaphaghna
- Ugragandha	Tikta, kaṭu	Laghu, tīkṣṇa	Uṣṇa	Kaṭu	Medhya	Vāta-kapha śāmaka
- Varaṇa	Tikta, kaṣāya	Laghu, rūkṣa	Uṣṇa	Kaṭu	Dīpana, anulomana, bhedana	Kapha-vāta śāmaka
- Laśuṇa	Amḷavarjita pañca-rasa	Snigdha, tīkṣṇa, guru, sāra	Uṣṇa	Kaṭu	Śothahara, vedanāsthāpana	Kapha-vāta śāmaka
- Kṛṣṇā	Kaṭu	Tīkṣṇa, laghu	Anuṣṇa	Madhura	Dīpana	Tridoṣahara
- Citraka	Kaṭu	Laghu, rūkṣa, tīkṣṇa	Uṣṇa	Kaṭu	Dīpanīya	Vāta-kapha śāmaka
- Eraṇḍamūla	Madhura, kaṣāya	Tīkṣṇa, guru	Uṣṇa	Madhura	Bhedanīya	Tridoṣahara
- Surataru	Tikta, kaṭu	Laghu, snigdha	Uṣṇa	Kaṭu	Vedanāsthāpana	Vāta-kapha śāmaka
- Ghana	Tikta, kaṭu, madhura	Laghu, rūkṣa	Śīta	Kaṭu	Vedanāsthāpana	Tridoṣahara
- Pathyā	Pañcarasa alavaṇa	Laghu, rūkṣa	Uṣṇa	Madhura	Śothahara, vedanāsthāpana	Kapha-vāta śāmaka
- Barbara	Kaṭu, tikta	Laghu, rūkṣa, tīkṣṇa	Uṣṇa	Kaṭu	Śothahara, vedanāsthāpana	Kapha-vāta śāmaka

enlisted pakṣāghāta as a virecanārha vyādhi. In the treatment of āvaraṇajanyavyādhi, mṛdu-śodhana is advised and virecana is ideal for this. According to Suśruta, pittadharakala is equal to majjadharakala. Virecana is beneficial in majjadharakala, so also in diseases of pittadhara kala. Since pakṣavadha is a pakvāśayotha vyādhi, virecana is beneficial. Sira and khaṇḍara are made up of rakta and vikṛti of sira and khaṇḍara occurs in pakṣāghāta. Virecana acts on pitta and rakta and corrects the vikṛti of rakta. Due to snehana and svedana, dravīkaraṇa and utkḷeśa of sāmadoṣa take place. It needs to be eliminated from the body. Virecana is beneficial in achieving this objective. As per Suśruta, after virecana anuvāsanavasti, other measures like āsthāpanavasti, māstiṣkya, śirovasti are to be observed for continuous period of three to four months for achieving good relief.

All the ingredients of Dhanadanayanādi kaṣāya are having vāta-kaphahara properties. The effect of Kṣīrabalātaila is vāta-pittahara. The combination of these two medicines has helped to pacify all the three doṣas. In this way, the objective of samprāptivighaṭana was achieved.

Conclusion

The combination of Dhanadanayanādi kaṣāya with Ksīrabalātaila 101 and Patrapiṇḍasveda and virecana are very effective in pakṣavadha.

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MANAGEMENT OF LEUKEMIA BY ĀYURVEDA - CASE STUDIES

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Abstract: In cancer, certain cells in the body become abnormal. The body keeps producing large numbers of these abnormal cells. Leukemia is a type of cancer of the blood or bone marrow characterized by an abnormal increase of immature white blood cells called 'blasts'. In acute leukemia, the bone marrow cells are unable to mature properly. It is hard to limit the side effects of leukemic therapy so that only leukemia cells are destroyed. Leukemia treatment not only damages healthy cells and tissues but also causes side effects. Presently, the cytotoxic immuno-suppressant and glucocorticoids drugs are the main stay in this condition. However, they are costly and have serious adverse effects and limitations for a long-term therapy. Hence, there is a need for drugs having good efficacy with low toxic profile and low-cost.

Introduction

There has been an increase in the incidence of cancer. This is attributed to urbanization, industrialization, lifestyle changes, population growth and increased life span (in turn leading to an increase in the elderly population).[1] It affects people of all ages. In leukemia immature cells rapidly accumulate in the bone marrow cavity replacing most of normal haemopoetic cells, resulting in signs and symptoms of disease. There are four main types of leukemia viz. Acute lymphocytic leukemia, Chronic lymphocytic leukemia, Acute myelocytic leukemia and Chronic myelocytic leukemia. The disease has been linked to exposure to large amounts of high energy radiation (from nuclear bombs), occupational exposure to the chemical and viral infections, and chemicals from cigarettes.[2] Diagnosis is usually based on repeated complete blood counts and a bone marrow examination following observations of the symptoms, however, in rare cases, blood tests may not show if a patient has leukemia. Most forms of leukemia are treated with pharmaceutical medication, typically combined into a multi-drug chemotherapy regimen. Some are also treated with radiation therapy. In some cases, a bone marrow transplant is useful but these therapies are highly expensive and give more side effects.[3] Although some scholars identify present day leukemia with pāṇḍu, no direct reference to leukemia or its sub classifications are seen in āyurvedic literature. In this disease aggravation of all the three doṣas is considered to be the causative factor while pitta is predominantly affected. Pitta and rakta are homogenous as both of them are originated from agni (tejas). Normally aggravation of pitta results

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in growth (increase of rakta) but the aggravation of pitta brings about the diminution of specific portion of rasa responsible for nourishment of rakta as a result of which there is no production of nutrient factor to nourish the rakta.[4] Certain symptoms[5] of pāṇḍu like suppression of power of digestion, weakness, fatigue, giddiness, pain in body, fever, dyspnoea, loss of body luster, resemble to the disease leukemia. The rationale behind for using āyurvedic medicines is to restore homeostasis and reverse the proliferation of neoplastic cells in the bone marrow.

Materials and methods

Four cases of acute/chronic leukemia, diagnosed at the Department of Medicine, Hematology Unit, S.S. Hospital, Banaras Hindu University, Varanasi, managed with āyurvedic formulations are briefed here (Tables 1-4). Complete blood count, generalised blood picture and bone marrow aspiration cytology were the diagnostic method adopted.

Discussion

Leukemia is a type of cancer in which the body produces large numbers of abnormal (usually white) blood cells. About 28,500 new cases of leukemia are diagnosed each year.[2] Āyurvedic treatment of leukemia is aimed at treating the basic pathology of the disease, controlling the symptoms and improving survival.

Medicines beneficial in this condition acts in following ways:

- Reducing the aggravated pitta: - These include medicines like Rajatabhasma, Punarnavāmaṇḍūram, Tāmrabhasma and Tṛṇakāntamaṇi piṣṭi. These drugs reduce the aggravated pitta, bring down the rakta in its normal state[13] and further check the bleeding disorder which is the main complication of leukemia. These drugs also help in prevention of overproduction of immature cells.
- Nourishing the ratkadhātu: - These include medicines like Tāmrabhasma, Maṇḍūra,

TABLE 1 (Case No. 1)

Patient	:	40 years male, from Chandauli (U.P.)
Hospital No.	:	35027/05, MKC (Bed No.13)
Diagnosis	:	Chronic myeloid leukemia (CML- M3) - Nov.2005
Physical examination	:	Pallor, icterus, cyanosis, clubbing, pedal odema, lymph node palpable bilaterally, enlarged, non tender, discrete, movable these were cervical, axillary and inguinal group of lymph nodes. Spleenomegaly 10 cm from costal margin in mid clavicular line, Hepatomegaly 2 cm from costal margin in mid clavicular line.
Treatment	:	1. Samīrpannagarasa - 150 mg Tṛṇakāntamaṇi piṣṭi - 500 mg Tāmrabhasma - 80 mg Punarnavāmaṇḍūram - 1 gm } In two divided doses with madhu and tāmbūlapatra svarasa

-/-

2. Kaṣāya (decoction), prepared out of neem bark (*Azadirhacta indica*), apamārga pañcāṅg (*Achyranthes aspera* - whole plant), tuḷasi (*Ocimum sanctum*), śigru (*Moringa oleifera*), tāmbūlapatra (*Piper betel*), sadāpuṣpī (*Catharanthus roseus*) and guḍūci (*Tinospora cordifolia)* - all in equal amount, 100 ml in 2 divided doses per day.

Investigation

Parameters	04-11-05	15-11-05	15-12-05	17-02-06	20-05-06	10-02-06	15-06-075
1. TLC	180600	16200	22900	18000	12000	16200	19000
2. DLC	P96, L4	P90, L10	P92, L8	P88, L12	P81, L19	P84, L16	P83, L17
3. Hb% (gm)	6.0	6.2	7.2	8.1	7.0	7.7	7.6
4. PL	0.27	0.48	1.4	1.32	1.4	1.56	1.47
5. B/M Examination M:E Ratio	28:1			12:1			

TABLE 2 (Case No. 2)

Patient : 65 years old male from Deoria (U.P.)

Hospital No. : 1032/06 (Bed No.14)

Diagnosis : Chronic lymphoid leukemia (CLL- IV) - February, 2006

Physical examination : Pallor, icterus, cyanosis, clubbing, pedal odema, lymph node palpable bilaterally enlarged, non tender, discrete though some are matted, movable these were cervical, axillary and inguinal group of lymph nodes. Spleenomegaly 8 cm from costal margin in mid clavicular line, Hepatomegaly 5 cm from costal margin in mid clavicular line.

Treatment : 1. Samīrpannagarasa - 150 mg
Rajatabhasma - 200 mg
Bṛhat Loknātha rasa - 200 mg
Punarnavāmaṇḍūram - 1 gm
In two divided dose with madhu and tambulapatra svarasa

2. Kaṣāya (decoction), prepared out of neem bark (*Azadirhacta indica*), apamārga pañcāṅg (*Achyranthes aspera* - whole plant), tuḷasi (*Ocimum sanctum*), śigru (*Moringa oleifera*), tāmbūlapatra (*Piper betel*), sadāpuṣpī (*Catharanthus roseus*) - all in equal amount, 100 ml in 2 divided doses per day.

Investigation

Parameters	21-02-06	26-02-06	06-03-06	03-04-06	12-07-06	10-05-07	22-10-07
1. TLC	257000	139500	82900	24000	21000	23800	22000
2. DLC	P2, L98	P5, L95	P8, L92	P12, 88	P10, L90	P13, L87	P13, L87
3. Hb% (gm)	4.0	6.8	6.3	7.1	7.7	8.0	8.0
4. PL	0.50	0.56	1.2	1.6	1.2	1.44	1.52
5. B/M asp. L:E Ratio	22:1			10:1			

TABLE 3 (Case No. 3)

Patient	:	24 years old female from Varanasi (U.P.)
Hospital No.	:	22051/07
Diagnosis	:	Chronic myeloid leukemia (CML- M4) - June, 2007
Physical examination	:	Pallor, icterus, cyanosis, clubbing, pedal odema, lymph node palpable bilaterally enlarged, non tender, sternal tenderness present. Spleenomegaly 6 cm from costal margin in mid clavicular line
Treatment	:	1. Samīrpannagarasa - 150 mg Rajatabhasma - 200 mg Tāmrabhasma - 150 mg Punarnavāmaṇḍūram - 1 gm In two divided doses with madhu and tāmbūlapatra svarasa 2. Kaṣāya (decoction), prepared out of neem bark (*Azadirhacta indica*), apāmārga pañcāṅg (*Achyranthes aspera* - whole plant), tuḷasi (*Ocimum sanctum*), śigru (*Moringa oleifera*), tāmbūlapatra (*Piper betel*), sadāpuṣpī (*Catharanthus roseus*) and guḍūci (*Tinospora cordifolia*) - all in equal amount, 100 ml in 2 divided doses per day.

Investigation

Parameters	12-05-07	20-05-07	21-06-07	10-10-07	17-01-07
1. TLC	132000	73000	26000	25300	27000
2. DLC	P98,L2	P95,L5	P92,L8	P86,L14	P86,L14
3. Hb%(Gm)	6.0	6.8	5.6	7.2	7.6
4. PL	0.50	0.56	1.2	1.6	1.49
5. B/M asp. M:E Ratio	28:1		13:1		

TABLE 4 (Case No. 4)

Patient	:	42 years old female from Varanasi (U.P.)
Hospital No.	:	19123/08
Diagnosis	:	Acute lymphoid leukemia (ALL-M0) - May, 2008
Physical examination	:	Pallor, icterus, cyanosis, clubbing, pedal odema, lymph node palpable bilaterally enlarged, non tender, movable these are cervical, axillary and inguinal group of lymph nodes. Spleenomegaly 10 cm from costal margin in mid clavicular line, mild Hepatomegaly from costal margin in mid clavicular line
Treatment	:	1. Samīrpannagarasa - 150 mg Rajatabhasma - 200 mg Tāmrabhasma - 80 mg Punarnavāmaṇḍūram - 1 gm In two divided doses with madhu and tāmbūlapatra svarasa

-/-

2. Kaṣāya (decoction), prepared out of neem bark (*Azadirhacta indica*), apāmārga pañcāṅg (*Achyranthes aspera* - whole plant), tuḷasi (*Ocimum sanctum*), śigru (*Moringa oleifera*), tāmbūlapatra (*Piper betel*), sadāpuṣpī (*Catharanthus roseus*) and guḍūci (*Tinospora cordifolia*) - all in equal amount, 100 ml in 2 divided doses per day.

Investigation

Parameters	18-05-08	27-05-08	06-06-08	03-07-08	12-10-08	02-03-09
1. TLC	257000	139500	82900	24000	21000	22700
2. DLC	P2,L98	P5,L95	P8,L92	P10, L90	P10,L90	P11,L89
3. Hb%(Gm)	6.5	6.2	6.3	7.1	8.2	7.2
4. PL	0.42	0.56	1.2	1.6	1.53	1.23
5. B/M asp. L:E Ratio	60:1			22:1		

Samīrpannagarasa which nourishes the rakta dhātu hence help in maturation of cells. Tikta and tīkṣṇa guṇa of these drugs act on srotas (channels) immediately and pierce the smallest cells of the vessels and remove the obstruction caused by āma.[9] These guṇas also activate the jaṭharāgni and dhātvāgni and maintain their status.[8]

- Improving the immunity:- Drugs like neem bark, apamārga[13], tuḷasi, śigru, tāmbūlapatra, sadāpuṣpī and guḍūci[12] have properties to improve the immune status of the body.
- Breaking down the pathogenesis: - Drugs like sadapuṣpī[6], neem bark, apamārga pañcāṅg[6,7] are proved to be anti cancerous and used for vyādhipratyanīkacikitsa i.e. they work directly on breaking down the pathogenesis of disease.

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EFFICACY OF ĀYURVEDIC FORMULATION IN THE MANAGEMENT OF POST-MENOPAUSAL SYNDROME

K. Bharathi,* C. M. Jain and B. Pushpalatha**

Abstract: Rajonivṛtti lakṣaṇa (post-menopausal syndrome) is one of the common gynecologic problems. Hormone replacement therapy is the established treatment for this condition, but it has reported that hormone replacement therapy is associated with an increased risk of breast cancer, myocardial infarction and cardio vascular disease. In āyurveda, rasāyana therapy is indicated for jarākālīnavyādhi. Vidāri, aśvagandha and āmalaki are well known rasāyana drugs. A study was conducted on 90 cases to assess the efficacy of these drugs in the management of post-menopausal syndrome. The efficacy of the trial drug, on overall parameters, was highly significant (P<0.001).

Introduction

In India the mean age of menopause is 49.4 years and the incidence of menopause increases rapidly after 41 years. By the age of 48-49, two thirds of women are in menopause. The number is increasing with the increase in life expectancy and so is the increase in reported problems.

Menopause is defined as the permanent cessation of menstruation for one year and is physiologically correlated with the decline in estrogen secretion resulting from the loss of follicular function/depletion of follicles. The word menopause is derived from the Greek terms 'men' (month) and 'pauo' (stop), means cessation of menstruation. The cause of menopause is 'burning out' of the ovaries, due to the depletion of follicles. The loss of the estrogens causes marked physiological changes in the function of the female body. The changes are hot flushes characterized by extreme flushing of the skin, night sweats, psychic sensations of dyspnea, irritability, fatigue, anxiety and insomnia. Occasionally various psychotic states, decreased strength and calcification of bones throughout the body, muscle and joints pain with increased vulnerability to cardiovascular diseases will also be present.

Deficiency of ovarian hormones leads to short term discomforts to chronic health problems. Hormone replacement therapy is the allopathic treatment for this condition, but the recent report from the women's health initiative study, the first large scale randomized controlled trial in women aged 50-79 years, shows that (the positive finding) the risk of breast cancer

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beginning to decline when hormone replacement therapy is stopped and the risk after five years is at the same level as in any other women who have not taken hormone replacement therapy. The study opines that the hormone replacement therapy is associated with an increased risk of breast cancer, myocardial infarction, cerebrovascular disease and thromboembolic disease.

In āyurvedic classics, the age described for menopause (rajonivṛtti) is 50 years. The causative factor of rajonivṛtti is said to be rajodhātukṣaya. In old age, dhātukṣaya takes place due to vāta predominance and rajokṣaya further aggravates vāta in the body. Hence, the symptoms manifest during post-menopausal stage are due to the rajodhātukṣaya and vātaprakopa. Rajodhātu is responsible for the maintenance of the anatomy and physiology of the reproductive tract. Hence deficiency of rajas leads to the atrophy of genital organs.

Rationality of selection of trial drugs: - Rasāyana therapy is indicated for jarākālīnavyādhi. The aim in the treatment of this disorder is to pacify vāta as well replenish rajodhātu. In classics, many of the rasāyana formulations are described to prevent onset of old age and cure different diseases. Among these, single drugs like vidāri (*Pueraria tuberosa*), aśvagandha (*Withania somnifera*) and āmalaki (*Phyllanthus emblica*) are well known. Vidāri is rich in phytoestrogens, and clinically and pharmacologically, a well proved drug in post-menopausal syndrome. Aśvagandha is proved effective in insomnia, anxiety, depression etc.; and āmalaki prevents the collagen breakdown and further prevent the post-menopausal osteoporosis. Hence, combination of these three drugs can be an ideal regimen for the management of post-menopausal syndrome. Clinical studies on vidārikanda have reported that the drug is highly effective in menopausal syndrome, dysmenorrhora and dysfunctional uterine bleeding (Chandhoke, N. *et al*, 1981).

Materials and methods

90 cases of post-menopausal syndromes were selected from the OPD of Dr A Lakshmipathi Research Centre for Ayurveda, Voluntary Health Services, Chennai, Tamil Nadu, for a single, open trial (2005-2009) as per inclusion criteria. The duration of the study was 3 months. Follow up was done at the end of 1st, 2nd and 3rd month.

Drug schedule: - Āmalaki, vidārikanda and aśvagandhacūrṇa - each 2 grams, thrice a day with milk.

Inclusion criteria

- Age between 45-60 years
- Cessation of menstruation for consecutive 12 months during climacteric
- Cases of surgically induced menopause.
- Appearance of post-menopausal symptoms with above two conditions

Exclusion criteria

- Age below 45 and above 60 years
- Organic lesions like carcinoma, fibroids of the reproductive system.
- Any severe systemic illness
- Established cases of mental illness
- Unexplained post-menopausal bleeding per vagina

Assessment criteria

Clinical assessment was done before the drug administration and at the end of 1st, 2nd and 3rd month according to the following criteria on the subjective (Table 1) and objective parameters. The laboratory investigations were recorded

TABLE 1
Gradation of subjective parameters

Parameters	Gradation
1. Hot flushes	
Severe - Regular day-night attacks	10
Mod. - Regular night / occasional day	05
Mild - Occasional night attacks	02
2. Night sweating	
Severe - Profuse, regular daily attacks	10
Mod. - Medium, regular daily attacks	05
Mild - Occasional attacks (hot flushes)	02
3. Insomnia	
Severe - Complete lack of sleep	10
Mod. - Disturbed sleep	05
Mild - Occasional sleep disturbance	02
4. Muscle / Joints pain	
Severe - Regular attacks of leg cramps / pain in 2 or more joints	10
Mod. - Frequent complaint of leg cramps and joint pain	05
Mild - Occasional attacks of leg cramps / joint pain	02
5. Anxiety	
Severe - Always anxious	10
Mod. - Frequent episodes of anxiety	05
Mild - Occasional episodes of anxiety	02
6. Mood fluctuation	
Severe - Always fluctuating mood	10
Mod. - Frequent change of mood	05
Mild - Occasional mood fluctuation	02
7. Irritability	
Severe - Always in a irritating mood	05
Mod. - Gets irritated on small reasons	02
Mild - Gets irritated on strong reasons	01
8. Dryness / burning sensation in vagina	
Severe - Continuous burning sensation	10
Mod. - On and off burning sensation	05
Mild - Occasional dryness	02
9. Altered sexual desire	
Severe - Complete lack of libido	05
Mod. - Medium frequency of desire	02
Mild - Occasional desire	01
10. Fatigue	
Severe - Feeling of fatigue always	10
Mod. - Frequent feeling of fatigue	05
Mild - Occasional feeling of fatigue	02
11. Stress incontinence	
Severe - Incontinence of urine during sleep	10
Mod. - Incontinence on increase of intra abdominal pressure	05
Mild - Incontinence on acute raise of intra abdominal pressure	02

before and after the treatment.

- Good response - Complete relief from the presenting clinical features or >75% relief.
- Fair response - Relief between 51-74%
- Poor response - More than 25% but <50% relief
- No response - <25% of relief or no relief

Objective/lab parameters:- Blood examination - Total red blood cell count, differential count, hemoglobin%, Erythrocytic sedimentation rate (1st hour), Pocket cell volume, Blood sugar (post prandial), Lipid profile, Blood urea, Serum creatinine, Uric acid, Total proteins, Albumin, Globulin, A/G ratio, Serum Glutamic Pyruvate Transaminase, Serum Glutamic Oxaloacetic Transaminase, Clotting profile, Level of Leutinizing hormone and Follicular stimulating hormone.

Statistical analysis: - The values obtained as pre and post assessment of clinical and laboratory parameters were tabulated and analyzed by student's 't' test.

Observation

Among the 90 cases, majority were in 40-45 years of age group (Table 2). All the women were with dvandvaprakṛti, of which, majority were vata-pitta prakṛti. Age of menarche was 13

TABLE 2
Distribution of patient according to age

Description	No. of cases	%
Age (years)		
- 45	50	50.00
45-50	22	24.44
50-55	15	16.67
55-60	08	08.89
Total 90	100.00	

years in about 46% of women. Age of menopause observed between 45-50 years in around 40% of women.

Hot flushes and night sweats were seen in almost all cases before treatment and about 45% got complete relief from these symptoms after treatment and severity came down in 40% cases. This was due to the phytoestrogenic activity of vidārikanda and vātaśāmaka properties of the drugs. Insomnia was seen in 70% of patients before treatment and after treatment around 46% got complete relief from this. This is due to the sleep inducing and anti-stress properties of aśvagandha. Muscle and joints pain was seen in 72% of women with severe to moderate intensity. Complete relief from muscle and joints pain is seen in 41% women, due to vātaśāmaka, anti-arthritic property of aśvagandha and bone rebuilding activities of āmalaki and anti-inflammatory, anti-rheumatic properties of vidārikanda.

The symptom of anxiety was seen in 80% of women before treatment. 51.12% of women after treatment got complete relief. Psycho-neurological symptom, mood fluctuation was seen in around 66% patients, after treatment this was reduced to 28%. Relief from all the neuro-psychological symptoms is may be due to adaptogenic, psychotropic, sedative, central nervous system depressant activities of aśvagandha. Loss of libido in post menopausal women is also common due to decreased levels of oestrogen hormone. This symptom was seen in around 50% of women before treatment and after the treatment 20% women were only complained this symptom.

Out of the 90 patients, 19 (21.11%) showed good response, 36 (40.00%) fair response, 16 (17.78%) poor response and 19 (21.11%) did not show any response. Total 61.11% people benefited with this treatment. The overall result was statistically highly significant (P<0.001) (Table 3).

TABLE 3
Overall effect of trial drug

Particulars	BT	AT	Difference
1. Mean	53.73	25.21	31.06
2. S.D	±10.31	±14.30	±12.73
3. S.E	1.09	1.51	1.35
4. 't'			23.00
5. P			<0.001

Discussion

Two important blood hormone levels of menopause viz. follicular stimulating hormone and leutinizing hormone were assessed before and after the treatment. Major changes in the levels of Follicular stimulating hormone and Leutinizing hormone before and after treatment were not observed with this treatment. The changes in the levels of both hormones were within normal limits. But on statistical analysis changes in both the hormones were found to be significant (P<0.001). The trial drug might not change the endogenous reproductive hormone levels. This increase may be due to increase of secretion of these hormones during late post menopausal phase.

The trial drug was found to be safe to the liver and kidney. Renal function markers did not show

TABLE 4
Statistical analysis of effect of trial drug on important lab parameters (n=90)

Parameters	Mean			SD	SE	t	p
	BT	AT	Diff.				
FSH #	65.79	68.14	3.20	±1.34	0.14	22.85	<0.001
LH @	34.62	35.87	1.92	±1.53	0.16	12	<0.001
Serum creatinine	0.86	0.89	0.07	±1.61	0.17	0.41	>0.5*
Bleeding time	02.73	02.60	0.08	±1.30	0.13	0.61	>0.5*
Clotting time	05.51	05.57	0.14	±0.84	0.08	1.75	>0.1*
Serum cholesterol	43.83	44.31	8.55	±3.68	0.39	21.92	<0.001
Hemoglobin	11.28	11.21	0.22	±0.26	0.02	11	<0.001

Follicular stimulating hormone, @ Leutinizing hormone *Non significant

any abnormal effects before and after the treatment. The trial drugs do not interfere with bleeding time and clotting time (P>0.1 - >0.5). It had shown positive effect on serum cholesterol and this change is found statistically significant (P<0.001) (Table 4).

Relief from symptoms like hot flushes, night sweats, fatigue and insomnia was seen from 15th day onwards. Symptoms like anxiety, mood fluctuation, irritability and altered sexual desire started improving after one month. Stress incontinence, muscle/joint pain improvement was not well marked in most of the women. But on statistical analysis of individual parameters, relief in all the subjective parameters was found to be highly significant (P<0.001).

There was a change in the levels of follicular stimulating hormone and luteinizing hormones, before and after treatment but these changes were within normal physiological limits. On statistical analysis, changes in both the hormones are found significant (P<0.001). This increase of hormones may be due to naturally enhanced secretion of endogenous reproductive hormones during late post menopausal phase.

Conclusions

The advantages of āyurvedic treatment over the hormone replacement therapy were: a) no irregular bleeding P/v was observed and b) no significant changes in blood pressure and endogenous reproductive hormonal patterns were seen. The efficacy of the herbal compound in post-menopausal syndrome was highly significant.

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EFFICACY OF NIMBĀDITAILANASYA IN THE MANAGEMENT OF MUKHADŪṢIKHA - A PILOT STUDY

R. V. Shettar and Gowripriya R

Abstract: Mukhadūṣika (*Acne vulgaris*) is mentioned as one of the kṣudraroga, in which mainly kapha, vāta and rakta are involved producing śālmalīkaṇṭakasadṛśapiḍakas (that which resembles the thorns of śālmalī tree) over face. *Acne vulgaris* is a self-limited disorder primarily of teenagers and young adults. It is not limited to adolescence; 12% of women and 5% of men at age 25 years have acne. A study was conducted on 8 mukhadūṣika patients. According to sthānasamśraya and vyaktata of the disease, Nimbāditailanasya was done for 7 days. The treatment found effective in mukhadūṣika, especially in reducing the size of piḍaka, ruja and the scars.

Introduction

Skin provides individual identification and awareness of personal identity and self-image. Any minor ailment of the skin may give an unattractive look to a permanent disfigurement which may result in inferiority complex. Mukhadūṣika is one of the skin diseases described in āyurveda under the Kṣudrarogas. It is painful; solid but soft with adipose tissue inside; resembles the thorns of śālmalī tree (śālmalīkaṇṭakasadṛśa) on the face. The equivalent modern terminology is *Acne vulgaris*. *Acne vulgaris* is a self-limited disorder primarily of teenagers and young adults, although perhaps 10-20% of adults may continue to experience some form of the disorder. It is not limited to adolescence, 12% of women and 5% of men at age 25 years have acne, by the age of 45yrs, 5% men and women still have acne.[1] The attitude of most people as well as physician to this condition is that as a normal physiological process you have to wait to grow with it. Though its manifestation is routine, those which becomes severe and disfigure the face due to scars are the cause of concern.

Āyurveda advocates various modalities like nasya, vamana and raktamokṣa along with many lepas in the management of mukhadūṣika. Among them nasya is said to be the best for ūrdhvajatrugatarogas. According to Suśruta, mukhadūṣika is kapha-vāta pradhāna with rakta as the dūṣya[2] and according to Vāgbhaṭa, meda as the dūṣya.[3] Keeping all this in view, nasyakarma with Nimbāditaila was chosen for the removal of the doṣas.

Material and methods

Selection of patients: - Patients suffering from mukhadūṣika were selected from the OPD & IPD of D.G.M.A.M.C.&H, Gadag, according to the inclusion and exclusion criteria.

Inclusion criteria: - Cases with clinical signs and

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symptoms of mukhadūṣika, both sexes, between the age group of 10-50 years, who are fit for nasyakarma.

Exclusion criteria: - Pregnant women, lactating mothers, cases of severe metabolic disorders like hypertension, diabetes and systemic disorders were excluded.

Drug: - Nimbādi taila of Kottakkal Arya Vaidya Sala was used for nasya. The ingredients of the formulation are shown in Table 1.

TABLE 1
Ingredients of Nimbādi taila

Sanskrit/Scientific name	Proportion
1. Nimbapatra (*Azadirachta indica*)	20 g
2. Paṭola (*Trichosanthes cucumerina*)	20 g
3. Rajani (*Curcuma longa*)	0.313 g
4. Kuṣṭha (*Saussurea costus*)	0.313 g
5. Kerakṣīra (Coconut milk)	5 ml
6. Tailam	5 ml
7. Keratailam	5 ml

Diagnosis criteria: - Diagnosis was mainly based on the clinical presentation of the patients, according to signs and symptoms which are described under subjective and objective parameters (Table 2).

Posology: - Nasyakarma with Nimbādi taila - 8 drops in each nostril - for a period of 7 days. The follow up was done for 20 days.

Assessment of results:- All the results were analyzed statistically for signification using paired 't' test. Gradation of the objective and subjective parameters is shown in Table 2.

Subjective parameters: - a) śālmalīkaṇṭaka-sadṛśapiḍaka, b) ruja, c) ghana, d) medogarbha mukha (oily face)

Objective parameters: - IGAS (Investigators global Assessment Scale)[4]

Observations

Maximum patients were in the age group of 15-25 years; 75% were females; 87.5% were

TABLE 2
Grading of objective and subjective parameters

Sign & symptoms	Score
I. Objective parameters - IGAS	
- Clear residue hyper pigmentation and erythema may be present	0
- Almost clear - a few scattered comedones and a few small papules	1
- Mild - easily recognizable less than the face is involved. Some comedones, papules and pustules	2
- Moderate - more than half of the face is involved. Many comedones, papules and pastules	3
- Severe - entire face is involved. Covered with comedones numerous papules and pastules	4
II. Objective parameters	
1. Size of piḍakas	
- 0-0.9mm	1
- 1-1.9mm	2
- 2-2.9mm	3
- 3-3.9mm	4
- 4-4.9mm	5
- =>5mm	6
2. Ruja	
- No pain	0
- Mild pain	1
- Moderate pain	2
- Severe pain	3
3. Ghana piḍakas	
- Mild	0
- Moderate	1
- Severe	2
4. Medogarbhapiḍakas	
- Mild	0
- Moderate	1
- Severe	2

unmarried/students, 75% belongs to upper-middle class; 25% had alpanidra. Majority (62.5%) of patients had gradual onset of the disease; 50% had habit of intake of madhurarasa, 37.5% amḷarasa; 50% had habit of intake of snigdha āhāra, 37.5% had dadhi (curd) in their regular diet. Cinta (stress) was the major mānasikanidāna reported by 62.5% of patients and 50% had śoka (depression) as the nidāna. Nearly, 50% of patients had ruja (pain), 50% had ghanapiḍaka and 75% had medogarbha mukha (oily face).

Results

The mean effect of the treatment on all the subjective and objective parameters was statistically significant ($p<0.05$). The details of the result are shown in Table 3.

Discussion

Yogoratnākara has mentioned that by doing abhyaṅga, the complexion of skin increases within seven days.[5] The ingredients of Nimbādi taila have vātahara and raktaprasādaka properties. Nimba, paṭola, rajani and kuṣṭha are having varṇya, raktaśodaka and kuṣṭhagna properties also. Sthānika abhyaṅga was done with Nimbādi taila and svedana was done until svedapradurbhāva lakṣaṇa are seen. Abhyaṅga and svedana improved the circulation of blood and lymph. Thus the vasodilatory action on superficial surface of the face helped in drug absorption and removal of the toxins out.

When nasyadravya is instilled into the nostril, the drug reaches śṛṅgāṭakamarma. According to Indu, śṛṅgāṭakamarma, which is present in siroso-antara-madhya, is in contact with siras - nāsa, akṣi, karṇa and gaḷa. So the instilled drug remains in the upper part of nasal cavity and stimulates the olfactory neuron and thus the vitiated doṣas are expelled out.

Conclusion

The disease is named mukhadūṣika as the affected part is mukha, the face. The incidence rate of the disease is more in the age group of 16-24 years hence it is called as yuvānapiḍaka also. The incidence rate is more in females as the early hormonal changes are seen in females. The quality of life scales have assessed that the impact of acne is as similar as epilepsy or asthma and redefined it as chronic disease instead of simple and self limiting. In the study many of the patients had mānasika lakṣaṇas like

TABLE 3
Effect of the therapy on subjective and objective parameters (n=8)

Parameters	Mean		Diff.	SD	SE	't'	p
	BT	BT					
I. Subjective parameters:							
- Piḍaka	4.500	2.125	2.375	0.744	0.263	9.03	0.000
- Ruja	0.875	0.250	0.625	0.744	0.263	2.38	0.049
- Ghanapiḍaka	0.750	0.250	0.500	0.535	0.189	2.65	0.033
- Medogarbhapiḍaka	1.125	0.375	0.750	0.463	0.164	4.58	0.003
II. Objective parameters:							
- IGAS	2.625	0.750	1.875	0.641	0.227	8.28	0.000

krodha, āyāsa, śoka, which aggravates vātadoṣa. Sunlight is the main cause for mukhadūṣika. Nasya with Nimbādi taila found very effective. Reccurrence was seen in relieved patients who did not follow the post operative regimens.

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RASĀYANA EFFECT OF RUDANTI (*CAPPARIS MOONII* WIGHT) W.S.R. TO PULMONARY TUBERCULOSIS - A CLINICAL STUDY

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Abstract: Tuberculosis is a major cause of morbidity and mortality in developing countries. Effective immunotherapy for the management of tuberculosis is yet under trial. An effort was made to evaluate the efficacy of adjuvant therapy of āyurveda in improving the immune response in the management of rājayakṣmā with special reference to pulmonary tuberculosis. For this purpose, the drug rudanti was selected as referred to in the Rājanighaṇṭu and Śārṅgadharasamhita that rasāyana can be used to treat kṣaya and śvāsa. The single blind clinical study showed significant improvement in subjective and objective criteria and that the fruit of rudanti has rasāyana (immuno-modulatory) effect in pulmonary tuberculosis.

Introduction

Tuberculosis is a major cause of morbidity and mortality especially in developing countries. The 1990s have witnessed the resurgence of this ancient enemy. With the advent of HIV, Tuberculosis has become a serious health hazard world over. Āyurveda describes the management of rājayakṣmā in detail. But in today's perspective, even though treating rājayakṣmā with āyurvedic drugs only is quite difficult, they offer significant measures to improve the immunity and general condition of the patient and also to reduce the adverse effects of chemotherapy.

Several observations suggest that genetic factors play a key role in innate non-immune resistance to infection with Mycobacterium tuberculosis and the development of disease. The existence of this resistance, which is polygenic in nature, is suggested by differing degrees of susceptibility to tuberculosis in different populations. Tubercular immunology is a competitive area of research and the available data is still controversial and often based on interpretations of results obtained from experimental studies. The events associated with the induction and maintenance of M. tuberculosis-specific immune responses is complex and there are still many questions to be answered.

Taking all these points into consideration, an effort was made to evaluate the efficacy of adjuvant therapy of āyurveda to improve the immune response in the management of rājayakṣmā with special reference to pulmonary tuberculosis. Rudanti (*Capparis moonii* Wight) is a rasāyana drug and has referred to in

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Rājanighaṇṭu and Śārṅgadharasamhita in the management of kṣaya and śvāsa.

Aims and objectives: - a) Pharmacognostic and preliminary phytochemical analysis of rudanti phala; b) to evaluate the efficacy of immunomodulatory (rasāyana) effect of rudanti phala in pulmonary tuberculosis (rājayakṣmā).

Materials and methods

The preliminary phytochemical and pharmacognostical study was carried out in the Dravyaguna Laboratory of Sri JGCHS Ayurvedic Medical College, Ghataprabha and SDM Centre for Research in Ayurveda and Allied Sciences, Udupi, Karnataka. The study showed that the trial drug is rich in alkaloids, steroids, carbohydrates, flavanoids, saponins, tannins, carboxylic acid, proteins and amino acids.[1] Estimation showed that it contains 37.15% carbohydrate, 8.5% protein and 19.13% crude fiber.

Rudantiphala, collected from the Belgaum market, was authenticated from RMRC (ICMR), Belgaum. The cūrṇa was prepared as referred to in the text.

Selection of patients: - 60 patients (both male and female) suffering from pulmonary tuberculosis were selected from Sri JGCHS Ayurvedic Medical College & Hospital, Ghataprabha, Belgaum, Karnataka.

Inclusion criteria: - a) Diagnosed cases of pulmonary tuberculosis of either sex; b) between 15-60 years of age; and c) newly diagnosed or chronic cases scheduled on anti-tubercular drugs.

Exclusion criteria: - a) Patients below 15 and above 60 years of age; b) with any other acute lung diseases; c) with any other tubercular complications; d) with any systemic disorder which interfere with the present treatment.

Diagnostic criteria:- a) Subjective - kāsa, jvara, pārśvaśūla, svarabheda, atisāra, aruci, śvāsa, śoṇitadarśana and durbalata; b) Objective - CBC, ESR, Chest X-ray, Serum IgG level and weight of the patient.

Treatment

The patients were equally divided into two groups i.e. 30 patients in each group. Group A was prescribed the standard AKT regimen as per schedule and group B was prescribed both the standard AKT regimen as per schedule and Rudantiphala cūrṇa - 5 gm BD with milk after food. The duration of the treatment was 45 days.

The patients were observed for 45 days along with treatment. Assessment of relief in the signs and symptoms and changes in the objective parameters were recorded after every 15 days of treatment in three follow-ups.

Follow up: - Patients were reviewed after every 15 days up to 45 days. In each follow up the subjective parameters and weight of the patient were recorded.

Statistical analysis:- All information based on various parameters were collected and statistical analysis were carried out in terms of mean, standard deviation, standard error, paired 't' test, unpaired 't' test.

Observation

41 patients were male belonging to 45-60 years of age group; and from lower/middle socio-economic status. Most of them were from rural area; agriculture as the main occupation; with positive history of smoking and alcoholism. They were vāta-pittaprakṛti with madhyama koṣṭha and mandāgni. 16 patients had positive history of PT in self or family members, whereas 44 patients had no significant previous history. No patient complained of atisāra (loose motion).

Sri JGCHS Ayurvedic Medical College & Hospital, Ghataprabha, Belgaum, where the study carried out, is one of the oldest TB Sanatoriums in Karnataka state. It comes under rural area. More population in this area related with agriculture. So, the main causative factors could be: a) sāhas (hard work beyond capacity), b) vegadhāraṇa (suppression of natural urges), c) viṣamāśana (improper diet regimen) and d) kṣaya (low immunity power due to not following dinacarya and ṛtucarya).

Result

Both group A (AKT regimen) and B (AKT regiment and Rudantiphalacūrṇa) showed statistically highly significant (P<0.001) result on the subjective and objective parameters. However, group B showed better result compared to Group A. The results on various parameters in Group A&B are shown in Tables 1-3.

Discussion

Rudantiphala is tikta and kaṣāya in rasa, laghu-tīkṣṇa in guṇa, kaṭu vipāka and uṣṇa in vīrya. It has kṣayaghna, kaphaghna, kṛmighna, śvāsaghna, pramehaghna and rasāyana properties. The drug acts as kaphahara and srotaśśodhaka because of its rasapañcaka property; thus reduced kaphaduṣṭi and removed srotosaṅga. Once the srotases are cleared, all dhātus get nutrition from the rasadhātu. As dhātupoṣaṇa starts, the ojas is improved and the general health condition of the patient also improved.

The improvement in the weight of the patients and reduction in ESR and Serum IgG level was due to the rasāyana effect of the trail drug. The rasapañcaka of the drug is not in a support of rasāyanakarma, but the immunomodulatory property (rasāyanaguṇa) is its prabhāva.

TABLE 1

Effect of the treatment on subjective and objective parameters in Group A

Parameters	Mean		Relief %	SD	SE	't'	P
	BT	AT					
1. Subjective parameters							
- Jvara	0.86	0.23	73.25	0.71	0.63	4.834	<0.001
- Śvāsa	1.90	1.16	38.94	0.53	0.09	7.291	<0.001
- Kāsa with ṣṭhīvana	2.03	1.26	37.93	0.50	0.09	8.326	<0.001
- Aruci	2.00	1.03	48.50	0.19	0.03	27.6	<0.001
- Pārśvaśūla	0.86	0.46	46.51	0.56	0.10	3.921	<0.001
- Śoṇitadarśana	0.13	0.00	100.0	0.34	0.06	2.116	<0.05
- Atisāra	0.00	0.00	00.00	0.00	0.00	0.00	0.00
- Daurbalya	2.13	1.23	42.25	0.30	0.05	16.36	<0.001
- Svarabheda	0.10	0.03	70.00	0.25	0.04	1.43	>0.05
2. Objective parameters							
- Weight	44.80	45.93	2.52	1.041	0.19	5.964	<0.001
- Hb %	10.28	10.34	0.58	0.470	0.08	0.35	>0.10
- ESR	29.03	28.63	1.37	5.52	1.01	9.171	<0.001
- Sr IgG level	1176.06	1126.60	4.20	93.02	17.0	2.884	<0.01
- AFB	0.60	0.066	89.0	0.860	0.15	3.392	<0.001
- M T	0.3333	0.0000	100.0	0.479	0.08	3.803	<0.001

TABLE 2

Effect of the treatment on subjective and objective parameters in Group B

Parameters	Mean		Relief %	SD	SE	't'	P
	BT	AT					
1. Subjective parameters							
- Jvara	1.03	0.06	94.17	0.61	0.11	8.648	<0.001
- Śvāsa	2.00	1.13	43.50	0.62	0.11	7.878	<0.001
- Kāsa with ṣṭhīvana	2.00	1.36	32.00	0.48	0.08	7.275	<0.001
- Aruci	1.93	1.00	48.18	0.44	0.08	11.378	<0.001
- Pārśvaśūla	0.56	0.16	71.42	0.49	0.09	4.395	<0.001
- Śoṇitadarśana	0.03	0.00	100.0	0.18	0.03	1.00	>0.05
- Atisāra	0.00	0.00	00.00	0.00	0.00	0.00	0.00
- Daurbalya	2.10	1.13	46.19	0.31	0.05	16.65	<0.001
- Svarabheda	0.00	0.00	00.00	0.00	0.00	0.00	0.00
2. Objective parameters							
- Weight	48.50	50.36	3.83	1.191	0.21	8.402	<0.001
- Hb %	10.51	10.68	1.61	0.1658	0.030	5.719	<0.001
- ESR	37.16	24.36	34.44	11.32	2.07	5.58	<0.001
- Sr. IgG level	1395.80	1141.03	18.25	351.87	64.32	3.96	<0.001
- AFB	0.3666	0.0000	100.0	0.764	0.13	2.622	<0.01
- MT	0.3333	0.0000	100.0	0.430	0.07	2.967	<0.01

TABLE 3

Comparative result of subjective and objective parameters between Group A&B with unpaired 't test

Parameters	Mean		SE	Unpaired 't'	P
	Group A	Group B			
1. Subjective parameters					
- Jvara	0.5450	0.545	0.170	0.004	>0.90
- Śvāsa	1.56	1.53	0.148	0.235	>0.80
- Kāsa with ṣṭhīvana	1.68	1.64	0.126	0.276	>0.70
- Aruci	1.46	1.51	0.087	0.569	<0.60
- Pārśvaśūla	0.36	0.66	0.137	2.197	<0.05
- Śoṇitadarśana	0.01	0.06	0.070	0.714	<0.50
- Atisāra	0.00	0.00	0.00	0.00	0.00
- Daurbalya	1.61	1.68	0.079	0.820	>0.40
- Svarabheda	0.00	0.06	0.046	1.406	<0.20
2. Objective parameters					
- Weight	45.36	49.43	0.287	14.171	<0.001
- Hb %	10.31	10.59	0.089	3.146	<0.001
- ESR	28.83	30.76	2.288	0.843	>0.40
- Sr. IgG level	1151.33	1268.41	66.11	1.770	<0.10
- AFB	0.333	0.183	0.21	0.712	<0.50
- MT	0.166	0.116	0.116	0.428	<0.70

Conclusion

Several studies suggest that proteins and amino acids are responsible for immuno-modulation. Rudantiphala is rich in carbohydrate, natural steroids, proteins and amino acids, hence promotes the weight. Promising clinical efficacy was found from the study that rudanti is effective in both subjective and objective parameters of rājayakṣmā without any clinical side effects. Rudantiphala has rasāyana (immuno-modulatory) effect in pulmonary tuberculosis.

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KAṬĪVASTI AND KĀLAVASTI IN THE MANAGEMENT OF KAṬĪŚŪLA W.S.R. TO L-PIVD - A CLINICAL STUDY

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Abstract: - Prolapsed inter-vertebral Disc (PIVD) is a problem mainly caused by trauma with degenerative predisposition and is characterised by low backache and neurological deficit. The symptoms are often severe and prolonged, and the prevailing methods of treatment are not adequately effective. A clinical study was carried out on 27 patients and the effect of kaṭīvasti along with Balādi nirūhavasti as a kālavasti (16 days course) in the management of kaṭīśūla was found to be statistically significant.

Introduction

Physical loading of back[1] is one of the main reasons for the prolapse of lumbar inter vertebral disc and it is the main cause of back-pain in over 99% of cases. Inter vertebral discs are specialised connective tissue, inter-posed between adjacent vertebrae, give spine its mobility by acting as a pivot point and absorbs compressive axial load of the body. Advancing age causing mineralization of disc thus decreasing the diffusion of nutrients to the disc and flexion strain with the spine causing rupture of tough annulus or tear in posterior longitudinal ligament leads to dull pain in lumbar region sometimes radiating to lower limb, altered gait, tenderness, restricted spinal movements in all planes, motor and sensory impairment.

Śūla (pain) in any part of the body is caused by vitiated vāta[2] and its predominant site is pakvāśaya.[3] Vasti is the most effective treatment for vātaja disorders.[4] Along with vasti (internal), the external measure of kaṭīvasti in the form of local snehana (oleation) and svedana (sudation) over the affected area is effective in relieving the symptoms. Hence, following the yuktivyapāśraya cikitsa, it was planned to study the efficacy of these modalities in the treatment of kaṭīśūla w.s.r. to L-PIVD.

Material and methods

Inclusion criteria: - Patients in the age group of 20-60 years, irrespective of sex and religion; diagnosed for L-PIVD based on MRI/CT scan; presenting typical clinical findings suggestive of L-PIVD of <1 year duration; having prolapse at any level of lumbar region i.e. L_1-L_2 / L_2-L_3 etc. were selected from the IPD and OPD of R.G.G.P.G. Ayurveda College and Hospital.

Exclusion criteria:- Patients below 20 and above 60 years of age; of L-PIVD >1 year duration; traumatic vertebral disorders, lumbar canal

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stenosis, infections of spine, neoplastic disorders, spondylolisthesis, spondylosis, ankylosing spondylosis, uterine prolapse, fibroid, PID, IHD, diabetes mellitus, hypertension, endocrinal disorders, piles, rectal ulcers, intestinal obstruction and pregnant and lactating women.

Treatment protocol

Kaṭīvasti along with Balādi kālavasti were done for 16 days. Mūrcchita tilataila as referred to in Bhaiṣajyaratnāvali[5] (5/1268) was administered as kaṭīvasti for 30-45 minutes followed by gentle massage and nāḍīsvedana over the lumbosacral region.

1) Balādi nirūhavasti, comprising of mākṣika, saindhava, sneha (mūrcchita tilataila), madanaphala (as kalka) and balāmūla (as kaṣāya) with kṣīra as prakṣepa churned sequentially into a homogenous mixture amounting to 480ml (approx.), in empty stomach alternating with 2) anuvāsanavasti of mūrcchita tilataila of 60 ml (approx.) with a pinch of saindhava and śatāhva after a light meal, following 3) kālavasti (for 16 days) were administered.

The patients were educated regarding restriction of forward bending and weight lifting, and encouraged for back strengthening exercises.

Assessment criteria: - Gradation of different parameters was done as shown in the Table 1 (Visual Analogue Scale - 0 for no pain and 10 for worst pain). The relief were assessed as: a) Marked - 76-100% relief in sign/symptoms, b) Moderate - 51-75% relief, Mild - 26-50% relief, No/insignificant - 0-25% of relief in sign/ symptoms. Students paired 't' test was applied

TABLE 1
Gradation of different parameters

Sign & symptoms	Grade/Score
1. Pain	
- No pain at rest	0
- No pain while working/walking.	
- No disturbance of sleep due to pain	
Mild pain	1
- No pain at rest	
- Mild and tolerable while working/walking	
- No disturbance of sleep due to pain	
Moderate pain	2
- Mild pain at rest	
- Moderate & tolerable while working/walkin	
- No disturbance of sleep due to pain	
Severe pain	3
- Moderate/severe pain at rest	
- Severe & intolerable while working/walking	
- Disturbance of sleep due to pain.	
2. Tenderness	
- No tenderness	0
- Mild tenderness without any response	I
- Wincing of face due to tenderness	II
- Resists touch due to tenderness	III
3. Straight leg raising test	
Left	
- Full free (90°)	0
- 60° to 90°	I
- 30° to 60°	II
- 0° to 30°	III
Right	
- Full free (90°)	0
- 60° to 90°	I
- 30° to 60°	II
- 0° to 30°	III
4. Forward flexion	
- Touch his/her toes	0
- Reach within 10 cm from floor	I
- Reach mid tibia	II
- Upto knees	III
- No bending at all	IV

Cont...

5. Lateral flexion	
- Mid tibia (L&R)	0
- Knees (L&R)	I
- Mid thigh (L&R)	II
- No bending at all	III
6. Reflexes	
- Exaggerated	1
- Normal	2
- Reduced	3
- Absent	4
7. Sensations w.s.r to dermatomes	
- Increased	1
- Normal	2
- Reduced	3
- Absent	4
8. Motor power	
- Movement against gravity and full resistance possible	1
- Movement against gravity and moderate resistance possible	
- Movement possible against gravity on both legs	3
- Movement possible with elimination of gravity on both legs	4
- Flicker of movement	5
- No movement at all	6

for individual symptom and the level was interpreted as - a) Insignificant - $p > 0.05$, b) Significant - $p < 0.05$ and c) Highly Significant - $p < 0.001$

Result and discussion

Pain, tenderness, restricted forward and lateral flexion and decreased angle during SLR test were presented in all subjects. The results were significant in degree of severity of pain (as per the Visual Analogue Scale), tenderness, forward flexion and SLR (right & left). There were significant results in lateral flexion and sensation also. Only 6 patients presented diminished motor power and the effect of the therapy on motor power was insignificant. Regarding the change in deep tendon reflexes, both knee jerk and ankle jerk did not show any significant change. (Tables 2 & 3)

Probable mode of action: - Doṣapratyanīka cikitsa of vasti, kaṭīvasti with bala having balya and vātahara properties;[6] jīvanīya property of kṣīra;[7] snehana with mūrcchita tilataila that contains mañjiṣṭha as a major component having śothaghna (anti inflammatory) and

TABLE 2
Effect of the therapy in different sign & symptoms

Sign & symptoms	No. of patients	Mean Score		% of relief	t	p
		BT	AT			
1. VAS	27	8.74	3.67	58.05	12.28	<0.001
2. Severity of pain	27	2.44	1.04	57.38	8.67	<0.001
3. Tenderness	27	2.33	0.82	64.81	9.83	<0.001
4. Forward flexion	27	2.56	1.11	56.64	8.42	<0.001
5. Lateral flexion	27	1.44	1.07	25.69	3.91	<0.05
6. SLR right	27	2.19	1.00	54.34	9.04	<0.001
7. SLR left	27	2.15	1.00	53.49	9.92	<0.001
8. Motor power	6	2.50	1.50	40	2.24	>0.05
9. Knee jerk	08	2.90	2.80	3.45	1.00	>0.05
10. Ankle jerk	16	3.71	3.53	4.85	1.85	>0.05
11. Sensation	08	3.12	2.38	23.72	4.58	<0.05

TABLE 3
Overall effect of the therapy

Description	No. of patients	%
Marked Improvement	08	29.63
Moderate Improvement	05	18.52
Mild Improvement	11	40.74
No improvement/insignificant	03	11.11

sandhānīya (binding) properties;[8] and svedana that reduces stiffness by increasing extensibility of collagen tissue and by gate control theory provides local pain relief. Madanaphala having lekhana, śothaghna, kaphaśāmaka[9] properties alleviates śrotosaṅgha (obstruction of micro channels) and ensures proper blood and nutrient supply to the tissues.

Conclusion

Kaṭīvasti (externally) and vasti (internally) by targeting the site of vātaprakopa i.e. pakvāśaya and kaṭīpradeśa produce promising results in kaṭīśūla. Preventive aspect and patient's education regarding restriction of forward bending and weight lifting, lying down on supine position with knee and hip slightly flexed, exercises for strengthening the back muscles provides complementary effect to therapy.

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EFFECT OF CANDRAPRABHĀVAṬI AND PUṢYĀNUGACŪRṆA IN ŚVETAPRADARA

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Abstract: Śvetapradara (leucorrhoea) is one of the most common gynecological disorders. The disease is characterized by non purulent whitish or yellowish discharge from the genital tract with or without vaginal itching. Various factors like fungal, parasite, bacterial, and sexually transmitted diseases are responsible for the causation of this disease. Unhygienic condition of the genital tract and low immunity are also important factors. A study was conducted among the OPD patients to see the efficacy of Candraprabhāvaṭi and Puṣyānugacūrṇa in the management of śvetapradara. The result was encouraging.

Introduction

Śvetapradara is one of the most common gynecological disorders characterized by whitish discharge from the genitals. According to āyurveda due to improper diet and regimes, kapha gets aggravated and reaches the genital tract and vitiates rasadhātu of the reproductive system causing discharge of the white coloured foul smelling fluid. A detailed description of vaginal discharge is available in āyurvedic texts under the title Yonivyāpad. Terms like śvetasrāva or yonīsrāva are used while describing different types of pradara. On the other hand, Yogaratnākaram and Bhāvaprakāśam have described the symptoms in somaroga, which is a condition of vaginal discharge. Yogaratnākaram mentions the word śvetapradara while describing the treatment of somaroga.

Physiological factors like ill-health, undernutrition, psychological and dysfunctional and the pathological factors like vaginitis, cervicitis and pelvic inflammation are responsible for causation of leucorrhoea. The main symptom of leucorrhoea is white vaginal discharge and the associated symptoms are pain in the lumbar region, constipation, headache, fatigue, vaginal itching and weakness. The patient is disturbed with soreness of the vulva with slight pruritus and excoriation leading to a feeling of weakness. The discharge may be physiological excessive secretion of cervical mucus or sometime excessive vaginal transudate due to a low grade or sub-clinical infection with non-specific pathogens.

Material and methods

Selections of patient- 25 patients having the basic features of śvetapradara were selected for the study.

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Exclusion criteria:- Cases of systemic disease such as acute or chronic respiratory disease, thyrotoxicosis, cardiovascular diseases, kidney diseases, diabetes, anemia, tuberculosis, or any other prolonged organic illness.

Diagnosis: - The cases were diagnosed on the basis of clinical symptoms and physical examination.

Drug and duration: - Candraprabhāvaṭi 500 mg and Puṣyānugacūrṇa 2 gm - twice daily with rice water for a period of 21 days.

Diet: - Patients were advised to take protein rich diet and nutritious food and asked to avoid spicy, fried and oily food. They were also advised to maintain proper hygiene of genital region.

Assessment criteria: - 1) Good response (70% improvement of sign and symptoms); 2) fair response (50% improvement); 3) poor response (25% improvement) and 4) No response (no change in sign and symptoms).

Observation

Higher incidence of the disease found in the age group of 26 to 30 (32%). Majority of the cases (40%) was suffering from the disease for a long duration. This suggests that most of the patient suffers from the disease for a longer duration compromising to their general health. 56% patients were married while 44% were unmarried. This shows that both married and unmarried women suffer from the disease alike. A major group of patients of śvetapradara complains of weakness as one of the associated symptom. Backache is also associated with half of the patients, whereas itching of vulva is seen in one fourth of the patients. Distribution of patients according to age, chronicity of disease, marital status and associated symptoms are shown in the Table 1.

TABLE 1

Distribution of patients according to age, associated symptoms, chronicity and marital status (n=25)

Descriptions	No. of patient
1. Age	
- 15-20	3
- 21-25	7
- 26-30	8
- 31-35	3
- 36-40	3
- 41-45	1
2. Chronicity of disease (in month)	
- 3-6	3
- 6-9	5
- 9-12	7
- More than12 months	10
3. Marital status	
- Unmarried	11
- Married	14
- Widow	0
- Divorcee	0
4. Associated symptoms	
- White discharge per vagina	25
- Backache	12
- Weakness	18
- Itching on vulva	6
- Constipation	5
- Pain abdomen	2
- Burning feet syndrome	3
- Giddiness	8

Result

The overall result of the treatment was encouraging. Out of 25 patients, good response was observed in 16 cases, fair response in 4, poor response in 3 and no response in 2 cases. (Table 2)

Discussion

Most of the patients were from the reproductive age group and suffering from the disease for a long duration (i.e. more than a year). Major group of patients complained of associated symptoms i.e. general weakness followed by backache.

TABLE 2
Treatment result

Descriptions	No. of patient	%
1. Good response (70% improvement)	16	64
2. Fair response (50% improvement)	4	16
3. Poor response (25% improvement)	3	12
4. No response (No improvement)	2	8

Śvetapradara occurs due to increase of vitiated of kapha and thereby vitiation of rasadhātu of the genital organ. The drugs Candraprabhāvaṭi and Puṣyānugacūrṇa, composed of herbs mainly having laghu and rūkṣa property with kaṣāya and tiktarasa predominance, decrease the vitiated kapha. With the improvement of kapha, gradually the rasadhātu gains its normal state along with improvement of nutrition. Moreover, due to natural quality of rūkṣaguṇa, vaginal secretion also decreases.

Conclusion

Candraprabhāvaṭi and Puṣyānugacūrṇa is effective in the treatment of śvetapradara.

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PAÑCAKARMA PRACTICE BASED ON PAÑCAMAHĀBHŪTA SIDDHĀNTA

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Abstract: Pañcamahābhūtasiddhānta is one of the basic principles of āyurveda, which can be applied in almost all the modalities of treatment. Pañcakarma is an integral part of treatment in āyurveda. Though majority of the pañcakarma are śodhanakarma, almost all the effects of ṣaḍvidha upakrama can be achieved by it. Each pañcakarma treatments can be prescribed specifically based on the derangement of the pañcamahābhūta in order to bring the homeostasis which is desired to cure the disease as well as maintain the health.

Introduction

Sṛṣṭi is evolved as a result of a blend of Aṣṭaprakṛti and ṣoḍaśavikāra.[1a] Aṣṭaprakṛti comprises of pañcamahābhūta which is the reason for considering the basic principle 'Yat brahmāṇḍe tat piṇḍe'.[1b] Depending on the predominance of particular pañcamahābhūta, the ṣaḍ ṛtu (six seasons) are broadly classified into ādānakāla and visargakāla. Any disparity occur in the body is directly related to transform in pañcamahābhūta. So ṛtucarya (recommended rituals in each season) is advised by all the ācāryas in order to maintain homeostasis of pañcamahābhūta in body with relation to different ṛtu (season). For instance, excessive dry and hot climate in grīṣma ṛtu is due to the predominance of agni and vāyu mahābhūta which directly influences the body and produces dryness in the body.[1c] So, sarvāṅga abhyaṅga (whole body massage) is preferred in this season in order to tackle the dryness. By this ritual pṛthvi and jala constituents of the body are augmented and restored to create homeostasis of the pañcamahābhūta.

Moreover āyurveda considers ṣaḍdhātuka puruṣa as cikitsāpuruṣa,[1d] who is constituted of pañcamahābhūta and ātma (soul). As ātma is nirvikāra (devoid of emotions),[1e,f] the treatment of any condition supposed to be aimed towards maintaining the homeostasis of the pañcamahābhūta. Thus it can be inferred that pañcamahābhūtasiddhanta can well be applied in maintaining health as well as curing diseases. Pañcakarma being one of the integral treatments of āyurveda can also be practiced by adopting the same principle to achieve success in treatment up to maximum extent.

Ṣaḍ-upakrama and pañcamahābhūta

Ṣaḍvidha upakrama (six treatment protocols) are

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the basic treatment principles in the management of different conditions. These treatment principles are broadly classified as apatarpaṇacikitsa (depletion therapy) and santarpaṇacikitsa (nourishing therapy).[2a] Apatarpaṇacikitsa provokes vāyu, agni and ākāśa mahābhūta content and alleviates pṛthvi and jala mahābhūta content of the body where as santarpaṇacikitsa acts vice versa. Both the treatment principles are aimed towards maintaining homeostasis of pañcamahābhūta.

Pañcakarma is an integral part of the āyurveda which has the potential of multi dimensional action.

Application in pañcakarma

Majority of pañcakarma are śodhanakarma (cleansing therapy) where, pṛthvi, jala contents are expelled from the body and cleansing the channels in turn establishing the vāyu and ākāśa mahābhūta contents in the body. In some other conditions, vāyu and ākāśa contents produce disorder in aggravated status. Such condition can be managed by increasing pṛthvi and jala content of the body. But if the physician is sure about each mahābhūta and its status in the body the treatment will be impeccable. Assessment of different factors like doṣa, auṣadha, deśa, kāla, sātmya, agni, satva, vaya and bala are mandatory prior prescribing pañcakarma in order to accomplish the desired effect of therapy.[1g] Each factor has to be assessed based on the preponderance of particular mahābhūta and then pañcakarmacikitsa can be executed. The selection of the procedures and drugs can be made specifically by considering the configuration of each mahābhūta. It is advised that vamana, virecana and vasti are the prime modality of treatment in the management of kaphaja, pittaja and vātaja disorders respectively.[3] Even minor changes done either in procedure or the selection of drug based on pañcamahābhūta concepts will yield good relief from conditions.

Pañcamahābhūta and doṣa

Āyurveda advises different doctrine of treatment in diverse conditions of the doṣa. Doṣa should be augmented when in alpāvastha (decreased state); should be expelled out in vṛddhāvastha (increased state) and when the doṣa are in samāvastha (equilibrium state) it should be maintained.[4] This principle is similar to that of pañcamahābhūtasiddhānta, which is also aimed towards safeguarding homeostasis. Śodhana is prime modality of treatment in bahudoṣāvastha.[1h] Pañcakarma therapy is administered for removing the disease from the root itself by expelling the morbid doṣa. The same principle can be adopted by considering the status of pañcamahābhūta.

Assessment of doṣa plays an important role in the diagnosis of disease as well as in treating it with pañcakarma therapy. Tridoṣasiddhānta is the concise form of the pañcamahābhūta theory. Vāyu and ākāśa mahābhūta are symbolized by vātadoṣa; agni mahābhūta is represented by pittadoṣa; pṛthvi and jala mahābhūta are represented by kaphadoṣa. Respective disorders are produced when a particular content of mahābhūta amplifies. For instance, if a person suffering from agnimāndhya indulges in the excessive guru āhara sevana (intake of heavy food), he may land up in the disorders like ajīrṇa, viṣūcika, alaśāka, etc. In other words, it can be understood that the homeostasis of the pañcamahābhūta is lost as the pṛthvimahābhūta content in the body are augmented when agnimahābhūta content is less in the body.

The above-said condition can be managed by either increasing agnimahābhūta or by removing the excessive pṛthvimahābhūta contents.

Administration of dīpana-pācana dravya (digestive and carminative drugs) is one of the śamana (palliative) therapies which will increases the agnimahābhūta contents in the body and digests the excessive pṛthvimahābhūta contents. Vamanakarma (emesis) is the choice of śodhana therapy when the pṛthvimahābhūta contents are excessively collected in the body which neither can be digested nor can be treated with palliative therapy. Thus by all these treatments homeostasis of the pañcamahābhūta are achieved in different stages of the disease.

Excessive pṛthvimahābhūta and jalamahābhūta contents are removed by adopting vamanakarma (therapeutic emesis) in case of navajvara wherein, patient presents with agnimāndya (indigestion) and hṛllāsa (nausea).[2b] In virecanakarma excessive agnimahābhūta contents are removed as in the condition like kāmala.[1i] Vastikarma is said to be the treatment of choice in the management of disorders in which excessive accumulation of vāyumahābhūta is responsible for the disease. Excessive ākāśamahābhūta evenly responsible for causing the disease as khavaiguṇya is the prerequisite for the sthānasamśraya avastha of any disease.

Treatments of most of diseases are doṣapratyanīkacikitsa; exceptions are few like pratimārgaharaṇacikitsa in the management of raktapitta.[1j] Pañcamahābhūtasiddhānta may not be applicable to the fullest extent in this disease as pratimārgaharaṇacikitsa is vyādhipratyanīkacikitsa.

Treatment of dhātupradoṣajavikāra also can be well understood by taking āśraya and aśrayībhava into consideration. Asthi is predominant of vāyu and ākāśa; rasa is predominant of pṛthvi and jalamahābhūta; rakta is predominant of agni and jalamahābhūta; māmsa and meda are predominant of pṛthvimahābhūta; majja is the jala and pṛthvi predominant dhātu. Śukra is a pṛthvi and jala mahābhūta predominant dhātu so it is saumya. Considering these aspects, pañcakarma treatments can be adopted in disorders of the respective dhātu by manipulating the configuration of pañcamahābhūta in order to maintain homeostasis.

Pañcamahābhūta and auṣadha

Auṣadha is the integral component in the treatment of any disorders. Though all the auṣadha dravyas (medicines) are vīryapradhāna, a drug will act either owing to its rasa, guṇa, vīrya, vipāka or prabhāva. In case of āmavāta, pṛthvi and jala mahābhūta components are increased in the form of āma and accumulated in the joints. Svedanakarma, which has dominance of agni and vāyu mahābhūta, has to be selected as initial measure to alleviate pṛthvi and jala mahābhūta contents. Either upanāhasveda (poultice) or vālukāsveda (sand sudation) can be selected, as both these svedanakarma possess rūkṣa (dry) property. Upanāhasveda with atasi (*Linum usitatissimum)* can be superlative selection as it has rūkṣa (rough) guṇa, kaṭu (acrid) rasa and uṣṇavīrya (hot potency). These modalities do śoṣaṇa (depletion) of pṛthvi and jala mahābhūta and thus āma in the joints dries up.

Taila (oil), ghṛta (ghee) and madhu (honey) are selected in the disorders of vāta, pitta and kapha respectively.[3] Taila has snigdha (oily), uṣṇa (hot) and guru guṇa (heavy property) which is contradictory to the property of vāyu and ākāśa mahābhūta. So taila is preferred in the disorders of the vātadoṣa. Ghṛta is selected in the disorders where, predominance of agni mahābhūta is evident and madhu is selected in the disorders where derangement of pṛthvi and jala is present. They act by viṛtue of their respective property and restore the equilibrium in the body.

The drugs used for vamanakarma, possess vāyu and agni predominance which does chedana (destruction) of the pṛthvi contents. Due to the laghu (lightness) property of the vāyu, the contents are expelled through the upper orifice.[1k] Virecana is performed by using the pṛthvi and jala mahābhūta predominant drugs in order to remove the doṣa through descending route.[1k]

Pañcamahābhūta and agni

Jaṭharāgni, bhūtagni and dhātvāgni are responsible for digestion, metabolism and assimilation of the food particles. In order to decide the snehamātra (doṣage for oleation therapy), vamana/virecana dravya mātra (doṣage of the medicaments), evaluation of the agni as well as the koṣṭha are important. Pañcakarma should not be performed in persons with mandāgni (low digestive fire). Before considering śodhana, agnimahābhūta content in the body must be amplified by means of dīpana. The basic idea is to prepare the body to withstand the intensive treatment.

Pañcamahābhūta and deśa, kāla, etc.

Deśa (locality) is an important factor as the deśa (where the patient hails), influences in the treatment outcome. Jāṅgaḷapradeśa is the vāyu and ākāśa pradhana vicinity whereas ānūpa is pṛthvi and jala predominant locale. So, most of the disorders occur in the respective vicinity are corresponding to that of the predominance of pañcamahābhūta. Accordingly, laṅghana-cikitsa or bṛhmaṇacikitsa are considered for the treatment by taking deśa into account.

Caya (accumulation), prakopa (provoked state) and praśamana (mitigation) of doṣa are constantly occurring in the body on daily basis as well as seasonally. Indirectly it is the cacophony of pañcamahābhūta in the environment which is influencing internal milieu. Therefore seasonal purification is advised with the lone aim to maintain the homeostasis.

Tīkṣṇavamana and virecana auṣadhi are advised in śītakāla (cold climate) whereas mṛdu auṣadhi are ordered in uṣṇakāla (hot climate). Even tīkṣṇa and mṛdu vasti are signified in śīta as well as uṣṇakāla respectively. This infers appraisal of kāla is evenly important as the evaluation of the doṣa so as to uphold the equilibrium of the mahābhūta constituencies of both external environment and internal milieu.

Assessment of satva is essential prior considering any treatment and pañcakarma is not the exception. Satvaguṇa is the ideal mind set. In a person possessing rajoguṇapradhānata, predominance of either agnimahābhūta or vāyumahābhūta may be there. In the preponderance of agni, krodha will be the presenting symptom and in the dominance of vāyumahābhūta, bhaya or viṣāda may be observed as a symptom. On the contrary, in the dominance of the pṛthvi and jala mahābhūta, tamapradhānata is seen. Sāntvana in bhaya, harṣaṇa in krodha and jāgaraṇa in atinidra are advised as the management. These are the indirect techniques of adoption of the pañcamahābhūtasiddhānta. Removal of the manodoṣa is the pre-requisite to the pañcakarma therapy. Proper counselling and mental preparation prior considering the pañcakarma as well as during the treatment may yield desired results. More over, vamana is preferred in avasāda, virecana in pittaja unamāda and vasti of snehanacikitsa (oleation therapy) is indicated in cittodvega considering the pañcamahābhūtasiddhānta itself.

Tīkṣṇaśodhana is contraindicated during bālāvastha (paediatric age group) as this age group has the preponderance of pṛthvi and jala mahābhūta which nuṛture the body. On the contrary, during elderly age bṛmhaṇa and

rasāyana treatment like yāpanavasti are indicated where, predominant ākāśa and vāyu mahābhūta are tackled by the pṛthvi and jala pradhānacikitsa.

Discussion

The treatment principle is broadly classified into laṅghana, laṅghanapācana and doṣāvasecana which have to be adopted in the alpa, madhyama and prabhūta avastha of the doṣa or pañcamahābhūta respectively. Ultimately the whole ideology stands on either laṅghana or bṛhmaṇa therapy. Derangement of particular pañcamahābhūta configuration is considered and different treatment principles are adapted. Similarly, the sāmānyaviśeṣasiddhānta and other principles applied in kāyacikitsa are aimed towards maintenance of homeostasis of the pañcamahābhūta in the body.

Śodhana line of treatment is essential in condition where, predominance of pṛthvi, jala and agni mahābhūta are evident. Śamanacikitsa can be adapted where, vāyumahābhūta predominance occurs and bṛhmaṇacikitsa is preferred whenever ākāśamahābhūta is dominant. This rule holds good for all pañcakarma therapies. In conditions like dhātukṣayajanya vātavyādhi where ākāśamahābhūta is in excess, bṛmhaṇavasti should be selected. Whereas in āvaraṇajanyavātavyādhi, śodhana therapy (especially vamana/virecana), or śodhanavasti should be the choice of pañcakarma, based on the derangement of the pañcamahābhūta.

Conclusion

Pañcamahābhūtasiddhānta is the basic principle, which is mother of all the siddhāntas of āyurveda. This principle can easily be understood and applied in pañcakarma to the maximum extent for desired results. Āyurveda has given a brief account of pañcamahābhūta in the form of tridoṣa for the easy understanding of condition. Intelligent physician need to elaborate the mahābhūta derangement in order to treat the condition accurately.

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KŪSMĀṆḌA (*BENINCASA HISPIDA*) FRUIT - A BRIEF PHARMACOGNOSTIC STUDY

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Abstract: Kūśmāṇḍa is one of the commonly used vegetables in India. It is also extensively used in many āyurvedic formulations indicated in diseases like asthma, cough, haemoptysis, fever and epilepsy and is cooling, styptic, diuretic, appetizer and tonic. Kūśmāṇḍa (*Benincasa hispida* Thunb.) belongs to the family Cucurbitaceae. A pharmacognostic study of *Benincasa hispida* fruit was carried out including macroscopy, microscopy, preliminary phytochemical screening and physico-chemical evaluation.

Introduction

Pharmacognosy is a simple and reliable tool by which complete information of the crude drug can be studied.[1] *Benincasa hispida*, commonly known as petha in Hindi, is a medicinal plant as well as a vegetable.[2,3] Its common names are White Guard melon, Ash pumpkin and White Guard. Rājanighaṇṭu,[4] an ancient book on therapeutics, gives a long account of its virtues. Old ripe fruits were selected in preparing medicine. It is cultivated for its large sized edible fruit.

A large climbing or trailing herb with stout, angular, hispid stems, cultivated throughout India up to an altitude of 1,200 m. Leaves large and long-petioled, 5-7 lobed, reniform-round, deeply cordate, upper surface sparsely pilose and scabrous, lower rigidily hispid, margin sinute, dentate or crenulate; tendril slender and short. Flowers solitary, axillary, large, yellow and monoeocious. Fruits fleshy, succulent, 25-60 cm long and 10-25 cm broad, densely hairy when young, thickly deposited with white easily removable waxy bloom when mature, flesh white and spongy. Seeds white, yellowish white or pale brown, ovoid and compressed distinctly marginate.[3]

Kūśmāṇḍa is reported to contain copper, 0.07 mg/100g; iodine, 0.38 ppm; and fluorine, 3.5 ppm of dry edible matter. A number of free amino acids including ã-aminobutyric acid (GABA) and serine, and a serine-type of proteinase have been isolated from the fruit. Glucose; rhamnose, mannitol, n-triacontanol, lupeol and â-sitosterol are present.[5] It has higher fiber content than tomato. The seeds consist of 53.3% shell and the remainder kernel. The kernals are rich in fatty oil.[5] It is recommended for various ailments like epilepsy, constipation, piles, dyspepsia, syphilis and diabetes.[2] The ash of fruit rind is applied on

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painful swellings. The seed and their oil are considered antihelmintic and prescribed in case of roundworm and tapeworm infestations.[2]

Material and method

Kūśmāṇḍa fruit was collected from Yellur village, Belgaum district, Karnataka and authenticated. The fruit pulp was taken, cut into small pieces and dried properly. Aqueous and alcoholic extractions were carried out using soxhelet apparatus. Fruit juice was prepared by using juice extractor.

Macroscopic study

The samples were subjected to the macroscopic study[6] and organoleptic characters like colour, odour, taste, touch were observed for fruit powder, juice and extractives.

Microscopy

Fruit:- The microscopy of matured fruit shows cuticularised epicarp consisting of single layered, squarish or slightly tangentially elongated cells of epidermis, outer tangential walls of epidermis thickened and cuticularised; a few epidermal cells divide periclinally and become 2 or 3 layered; mesocarp has a heterogenous structure consisting of multilayered hypodermis composed of tangentially elongated, thin-walled, parenchymatous cells; immediately within this is a zone of thick-walled, multilayered, lignified sclereids with the outer one to three layers thicker than the inner 2 to 6 or more layers; beneath this zone, thin walled tangentially elongated, parenchymatous cells present, their size gradually increasing from those at periphery to those inside of mesocarp, the latter becoming circular having conspicuous intercellular spaces; vascular bundles poorly developed, bi-collateral, found scattered throughout mesocarp.[7] (Fig I)

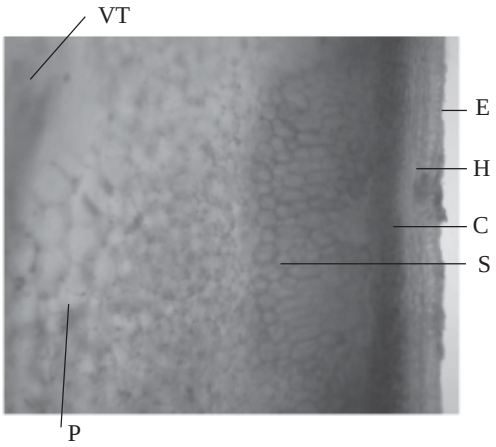

Fig. I. Microscopy of fruit
VT - Vascular tissue; **E** - Epidermis; **H** - Hypodermis; **C** - Chollenchyma; **S** - Scerenchyma; **P** - Parenchyma

Powder: - Yellowish-brown; shows numerous fragments of thin-walled, tangentially elongated and circular parenchymatous cells; numerous sclereids in groups and singles and a few fragments of xylem vessels having spiral thickenings.[7]

The organoleptic characters of fruit, physico-chemical[6] and preliminary phytochemical screening[8] are shown in Tables 1-3.

Discussion

Morphological and anatomical studies of the kūśmāṇḍa fruit juice and powder will enable to identify the crude drug. Extraction process showed more active ingredients extracted in the water, compared to alcohol extraction. It indicates water soluble components are more in the kūśmāṇḍa fruit.

Conclusion

The information obtained from preliminary phytochemical screening will be useful in finding out the authenticity of the drug.

TABLE 1
The median paralysis and lethal concentrations of herbal extracts against *Ascaridia galli* worm

Parameters	Powder	Juice	Aqueous extract	Alcohol extract
1. Colour	Yellowish-brown	Whitish	Reddish-brown	Yellow
2. Smell	Sweet and fragrant	Characteristic odour	Sweet and fragrant	Sweet and fragrant
3. Taste	Sweet	Sweet, astringent, sour	Sweet	Sweet
4. Touch	Fine powder	Sticky or viscous	Sticky and thick	Sticky and thick

TABLE 2
Physico-chemical study

Parameters	API std	Value (%)
1 Foreign matter	Not more than 1	Nil
2 Total ash	Not more than 12	7.06
3 Acid-insoluble ash	Not more than 1	0.94
4 Water-insoluble ash	-	2.22
5 Sulphated ash	-	8.79
6 Total % of moisture	-	13.88
7 Water-soluble extract	Not less than 24	56.42
8 Alcohol-soluble extract	Not less than 10	34.35

TABLE 3
Preliminary phytochemical screening

Parameters	Juice	AQ	AL
Reducing test (Benedict's test)	+	+	+
Monosaccharides (Barfoeds test)	+	+	+
Pentose sugars (Bials orchinal test)	-	-	-
Hexosugars (Selwinoffs test)	+	+	-
Steroids (Salkowski reagent)	+	+	-
Alkaloids (Wagner's reagent)	+	+	+
Tannins (5% FeCl3)	-	-	-
Proteins (Biuret test)	+	-	+
Starch (Tannic acid for starch)	+	+	-

AQ - Aqueous Extract; AL - Alcohol Extract
+ Present; - Absent

Phytochemically the fruit juice was found to contain alkaloids, proteins, starch, and steroids. Ash value, extractive values can be used as reliable aid for detecting adulteration.

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