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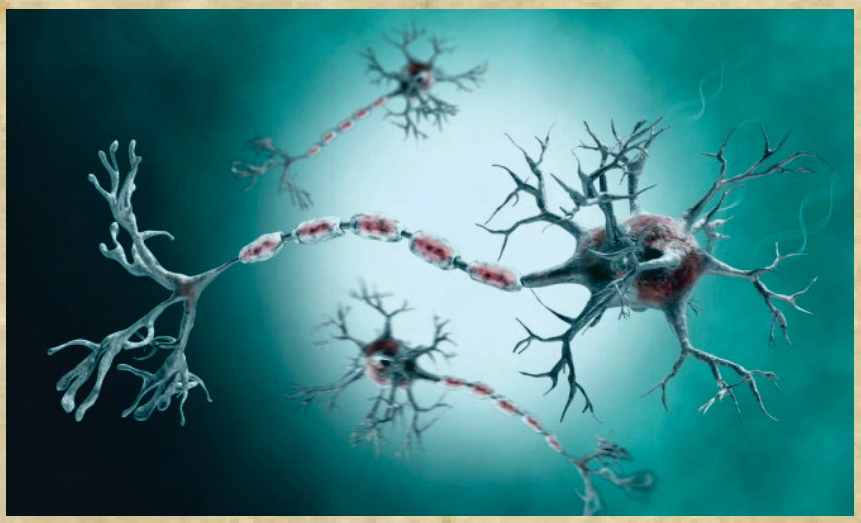

लाभानां श्रेय आरोग्यम्

Of all the gifts,
the most precious is health

Vaidyaratnam P.S. Varier's
Arya Vaidya Sala, Kottakkal, Kerala

Aryavaidyan, the quarterly journal of Arya Vaidya Sala, Kottakkal, is intended to encourage scientific writing and intellectual interactions among scholars, academicians, practitioners and students of ayurveda and allied subjects.

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VAIDYARATNAM P.S.VARIER'S
ARYA VAIDYA SALA, KOTTAKKAL

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सततध्ययनं, वादः परतन्त्रावलोकनम् ।
तद्विद्याचार्यसेवा च बुद्धिमेधाकरो गणः ।।

Constant study, mutual discussion,
learning other disciplines and
serving the preceptor - these factors
endow one with intelligence and memory

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LITERARY REVIEW

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Śabdapramāṇa in āyurveda

Murali K.

ABSTRACT: Pramāṇas as means of valid knowledge are integral part of any śāstra. Āyuveda conceives śabda as the most important pramāṇa. The term often used in texts is āptopadeśa. Learning and application of āyurveda both in terms of siddhānta and prayoga, cannot be initiated without āptopadeśa. This paper reviews the definition, application, significance and current relevance of śabda in āyurveda. Author has also tried to incorporate the conceptions from other knowledge systems though the study is not exhaustive. Discussion on śābda-bodha has not been included due to its enormity.

Key words: Pramāṇa, Śabda

Introduction

Śabdapramāṇacinteyam
bahuśāstravilokanāt |
kriyateऽlpamatitveऽpi
prīyatām tātarāghavaḥ ||

Acquiring prama or yathārttha-jñāna (valid knowledge) is considered as the aim of all darśanas. Cause of sorrow is ajñāna (ignorance) or mithyājñāna (false information). This fact is applicable even in day to day life. Misinformation and ignorance can lead to misery. Practice of āyurveda is no exemption.

Prameya-pramāṇa-pramiti and pramātā are relevant in the context. Prameya in vaidyaka can be summerised into two i.e. śarīra (body) and dravya (any material used as food and medicine).

Śarīra which is pāñcabhautika in structure consists of doṣa, dhātu and mala. Doṣas govern the total body and mind. Dhātus are more structurally well defined due to their limited location. These bodily structures undergo changes (dhātu-pariṇāma) due to pāka of concerned agnis (dhātvagni). Malas are formed from anna-pariṇāma (digestion of food) and dhātu-pariṇāma. Even though eliminated periodically from body, they also perform some important functions. Also, there are upadhātus which are derived from dhātus. But they do not undergo any pāka (transformation). Apart from these, there are avayavas (organs) which are made up of doṣa, dhātu and mala. Understanding body through these constituents is essential for the assessment of health and illhealth. These are actually two distinct conditions of the body.

Health and disease are identified and measured by assessing the functions of doṣa, dhātu and mala. Changes in structure of the organs may be of help in some instances. So profound knowledge of body is a must to identify and estimate health and illness. Disease is a morbid conglomeration of doṣa, dhātu and mala. Its variations are considered as individual diseases. 'Diagnosis' is needed in health also as in the case of identification of prakṛti, sāra, samhanana, etc.

Dravyas are also pāñcabhautika. Body is a dravya. But for the sake of explanation, āyurveda generally considers any material that is consumed to maintain health and relieve disease, as dravya. Here also pañcabhūtas are inadequate to explain dravya. They are processed outside and inside the body. The number of dravyas is also innumerable. So there has to be a systematic approach to evaluate them. The scope of the theory of pañcabhūta cannot be extended to this aspect. To overcome this, dravya-guṇa-siddhānta was evolved. The main principles in this siddhānta are dravya, rasa, guṇa, vīrya, vipāka and prabhāva. Dravya as a medicinal plant or food material is to be understood with its nomenclature and distinct morphological features.

Pramiti is the jñāna acquired through pramāṇas. Without this no cikitsa is possible. In āyurveda, pramātā is vaidya. She/he should be very knowledgeable, skillful, intelligent and inquisitive. Examining śarīra and dravya is an essential prerequisite for any procedure. This is termed as parīkṣa. Pramāṇas are the tools of parīkṣa. Kriya or karma in āyurveda means cikitsa. Karma has to be preceded by jñāna always.[1] So vaidya as a pramātā must be well versed in the application of pramāṇas. Each pramāṇa has got its own scope and limitations. The prama attained by each pramāṇa may be varied. Or else to perceive particular information specific pramāṇa may be required. It is not always possible to validate the outcome of a pramāṇa with another.

Āyurveda has recognised pratyakṣa, anumāna and śābda as the main pramāṇas. Upamāna and aitihya have also been mentioned by Caraka in certain contexts. Yukti as a pramāṇa has been acclaimed as a significant contribution of Caraka to Indian philosophy. All the theories of āyurveda have been derived from and can be validated with these means of knowledge. Among these, śabda is considered as the primary one.

Mithyājñāna

The consequence of mithyājñāna has been mentioned in many darśanas. In an applied science like āyurveda, it is quite malicious. So rogaparīkṣa and rogīparīkṣa have been conceived distinctly. Auṣadha parīkṣa is also a prerequisite for treatment. Every procedure should be done with clear understanding. Learning has been emphasised by Caraka before anything being done. Kerala physicians have actually considered conducting therapeutic procedure as the reinforcement of knowledge in śāstra. It was usual to recite the related śloka while performing a kriya. Suśruta has cautioned that misunderstood roga can confuse vaidya.[2] A disease should be assessed and explained well. That understanding may also be communicable. Same is the case of medicine and medicinal plants. They must be understood by name (nomenclature) rūpa (morphology) and karma (therapeutic action).[1a] Errors in analysing gravity of the illness can also cause severe problems. Misdiagnosing guruvyādhi as laghuvyādhi and *vice versa* would affect the formulation of treatment both in śamana and śodhana lines.[3] Examples can be cited even in Śalyatantra regarding the distinction between āma and pakva stages of śopha. Doing chedana in āma and avoiding it in pakva has been deemed hazardous.[3a] Similar is the case with distinguishing between riṣṭa and riṣṭābhāsa.[3b]

To sum up, physician has to be well versed in pramāṇas and their application in different areas.

Śabdapramāṇa

Śābda as a pramāṇa has been accepted by most schools of Indian philosophy. Āstika schools divided śābda into vaidika and laukika.[4] Vaidika is related to vedas. Laukika is āptavacana. The knowledge is of course transferred through spoken words. Anything spoken, which is meaningful and relevant is śābda. According to Tarkasaṅgraha three essential features of āptavacana are ākāmkṣā (mutual expectancy), yogyatā (compactibility) and sannidhi (proximity). Both ākāmkṣa and yogyata represents the relevance and meaningfulness. So it has been translated as verbal testimony. Authenticity is the characteristic of the pramāṇa. Any knowledge is authentic, only if it can be applied.

The synonym upadeśa is self-explanatory. It is the advice to śiṣya by the guru. It is prompted by the affection towards śiṣya (pratipatyanukūla-vyāpāra). The student-teacher relationship has been highlighted here. This is well evident in the conversations between Ātreya and Agniveśa. Carakasamhita has presented the content as deliberations between guru and śiṣya. Śiṣya is very polite and inquisitive. This arouses pratipatti (affection) in guru who is wise and compassionate. The word 'ha' (iti ha smāhur-ātreyādayo maharṣayaḥ) in the opening colophon of each chapter of Aṣṭāṅgahṛdayam has been interpreted as 'with compassion'.

Occasions of discussions of group of ācāryas with Ātreya presiding can also be read in Carakasamhita.[1b] Considering all the different views, Ātreya spells out the conclusions which can be taken as an example for upadeśa. This represents the pratipatti (commitment) towards śāstra.

Synonym, āgama is very relevant as far as āyurveda is considered. It has been felt that āyurvedācāryas are more inclined to use this term instead of 'śābda'. The root 'gam' also connotes 'jñāna' (knowledge). Upasarga 'aa' is added to it. This refers to the information gained from all areas (both geography and other related disciplines are implied in the context). The Upaniṣad saying " ā no bhadrāḥ kratavo yantu viśvataḥ" is reminded here. The common meaning of 'gam' dhātu is also relevant here. 'Ā' upasarga modifies the meaning as coming or arrival. Hence āgama represents the knowledge reached to the current ages after corrections, additions and modifications. This indicates the scientific process through which the knowledge system has evolved. Ḍalhaṇa's definition of āgama is indicative of this aspect.[2a]

Āptopadeśa, āptavākya and āptavacana are synonymous to śadba. These are also frequently used in āyurveda. The latter part of these terms (upadeśa, vākya and vacana) does not require any elaboration. But āpta has to be defined. The definition of āpta in Carakasamhita,[1c] perhaps, is the most descriptive one than those in any other systems of philosophy.

The nāstika schools, though reject the authority of Vedas, cannot negate the teachings of their own ācāryas. In that way, they also have considered śābda as a pramāṇa.

Definition of āpta

Āptas are devoid of rajas and tamas. These two guṇas are recognised as manodoṣas in āyurveda because excessive aggravation of these will lead to mental diseases. Though the presence of rajas and tamas can be elicited in normal activity of the mind, aggravation of any of these can make one biased in thoughts. Tapa includes the methods of concentration which will enhance clarity of perception and critical thinking. This leads to scholasticism. Āpta's thought can reach all the three phases of times ie. past, present and future. There is no interruption to their thought process. Two other synonyms that have been suggested by Caraka are śiṣṭa and vibuddha. The former term means, those who advises what is to be done or not; or even when to begin and stop (action).[1d] Vibuddha points to those having specific knowledge on a particular subject. Their words can be accepted without doubt. Caraka has further added that there is little chance of them saying anything wrong. In another context, Caraka has described āptas as those who have undoubted sharp memory and wisdom (Avitarkitasmṛtivibhāgajño...). They do not have rāga or dveṣa, both of which can cause bias. Definition in Nyāyaśāstra[5] is also relevant in āyurveda. Āpta is one, who is able to interpret the diction to the context. This should capacitate the learner for the preferred action. This relates an āpta to a teacher. A text has to be taught with proper elaboration. This learning should equip the student to be efficient in the karma.

Āptas have realised the truth behind every phenomenon. Also they are interested to share the knowledge they have acquired. They not only preach but put into practice what they have understood.

There are different views on the psychological affects like rāga, dveṣa, etc. related to āpta. Caraka's definition rules out affects affecting such persons. Caraka has also described anāptas.[1e] Some other ācāryas have opined that āpta can also be affected by mental aberrations. But that would not affect the authenticity of his/her teaching; i.e. āpta would not pollute the knowledge even if affected by rāga, kāma, krodha, etc.[6] Caraka has remarked that an āpta praising oneself is never honoured by others.[1f]

Āptas are classified as paramāpta and laukikāpta.[1g] Parama means supreme. These āptas might have lived centuries before and they are now considered as

mythological personalities. The period of laukika āptas can be traced or they even live among us. The upadeśa of paramāptas may not be in written form. But those of laukika āptas are available to us as different treatises. So in āyurveda Brahma, Ātreya, etc. are paramāptas. Caraka, Suśruta and Vāgbhaṭa are laukika āptas.

The notion that āpta means ṛṣi is not correct. Whoever satisfies the definition can be an āpta. Vātsyāyana specifies this. Even a mḷeccha (Foreigner, uncivilised person) is an āpta, if he/she is a provider of a useful piece of knowledge.[5a] This is significant in āyurveda especially in dravya-vijñāna. Those who are in touch with nature are more aware of the plants and their properties. Caraka has stressed the need to acquire information in this regard from vanecaras (dwellers of forest) and ajapālas (shepherds).[1h]

Types of āptopadeśa

Āptopadeśa that can be validated either directly or by indirectly.[5b] The former is through pratyakṣa and this type is termed as dṛṣṭārtha. Interestingly here Nyāyasūtra refers to āyurveda as an example.[5c] The effectiveness of treatment can be a validation for the śābdapramāṇa of āyurveda. But some of the information made available by āptopadeśa can be verified only through anumāna. This kind of śābda is called adṛṣṭārtha. Doṣic nature of diseases can be an example.

Relation with other pramāṇas

No pramāṇa can be applied alone. Or rather there is a scope for the use of more than one pramāṇa for a single prama. More the number of pramāṇas applied, stronger the prama. Relation of āptopadeśa with pratyakṣa and anumāna has already been discussed in the classification of āptopadeśa. Thus these pramāṇas can be used to validate śadba. To substantiate the authenticity of his text Aṣṭāṅgahṛdayam, Vāgbhaṭa has written in the conclusion that the content has been derived from āgama and can be validated by pratyakṣa.[3c] Ḍalhaṇa's definition mentioned earlier also supports this view. Āpta relies upon pramāṇas like pratyakṣa and anumāna for acquiring knowledge. Also the application of āgama is through pratyakṣa and anumāna as in the practice of āyurveda.

Aitihya is a pramāṇa that has been recognised by paurāṇikas. Here the source of information is anonymous. This perhaps is due to its historicity. Caraka has considered aitihya synonymous to āptopadeśa.[1i] Since this is in the context of vāda-mārga, Dr. Agnives does not consider it seriously and adds that the comment could be just contextual.[7] But as mentioned elsewhere in the text, the information from parama-āptas has been termed as aitihya. This is because the anonymity of the source of information. Even nowadays, among the physicians, there are many practically useful pieces of information which are being transferred to newer generations orally by tradition. These are not documented and the exact source is also not known. In this context it is interesting to note Govinda Sen referring to 'some vaidyas' suggesting lakṣmaṇāmūla [Ipomoea marginata (Desr.) Verdc.] to be added to Phalasarpis (a medicated ghee indicated mainly in female infertility).[8] In some occasions the authority is attributed to vṛddhavaidyas (senior experienced physicians).[1j] In Kerala there are many practices followed traditionally for which source of information is not known exactly. So, there is no contradiction in considering aitihya as a part of āptopadeśa.

Significance of āptopadeśa

For the reasons detailed so far, it is evident that for āyurveda, āgama is indeed the main strength. Thousands of texts available in different areas of āyurveda in various languages are also documentations of āptopadeśa. The knowledge that has been imparted by teachers in educational institutions is also āptopadeśa. Without this śābdapramāṇa one cannot be initiated in any discipline. There is nothing to doubt on the

documented information in the authentic texts. They carry the experiences generated by the experiments of masters of the subject. Suśruta has particularly remarked that further reasoning on the documented facts is not essential. The effect of Ambaṣṭādi gaṇa will not change from its documented therapeutic properties (antidiarrhoel) even if you argue in opposite with several reasons.[2b] So he has stressed the need of āgama to be taken for granted.

Some of the effects of drugs in isolation or combinations cannot be explained just with pharmacodynamic principles. Their observed effects have been documented in texts. Scope of further reasoning is limited in this aspect.[9]

The major siddhāntas of āyurveda, pertaining to pañcabhūta, tridoṣa and dravyaguṇa developed by ācāryas are found to be valid in application. These form a part of śabdapramāṇa. It is possible to evolve additional postulations consistent with these theories.

It is not possible to have a validation of all the doctrines and practice of āyuveda for accepting them. So, it is better to learn them and practice those, which will lead to better understanding of its theoretical foundations. Perseverance in studies is needed for deeper understanding in applied knowledge systems like āyurveda. Inability to perceive the meaning of the text cannot be the reason for rejecting the knowledge (Vyākhyānato viśeṣapratipattiḥ na hi sandehalakṣaṇam). Here commentaries would be of much help.

Dṛshṭakarmata is one of the essential qualities of a vaidya.[3d] This is observing the treatment, especially procedures like pañcakarma under the supervision of guru. Śiṣya may do it guided by guru. This first-hand knowledge is also āptopadeśa.

Tadvidyasambhāṣa[1k] is the interaction among vaidyas on scientific matters. Sandhāyasambhāṣa is friendly discussion among more than two vaidyas together. Vigṛhyasambhāṣa is the formal debate between two vaidyas. In this, the argument is done before a learned assembly. The contestant failing to prove his/her hypothesis is considered to have failed. In both types of sambhāṣa, recital and interpretation of texts or textual parts are essential. So along the other pramāṇas, ātopadeśa also has a major role in tadvidyasambhāṣa.

Rasavaiśeṣaika, a text on pharmaco-dynamic principles has highlighted āptopadeśa as the most important pramāṇa in clinical practice. Action of dravya can be assumed from its rasa, guṇa, vīrya, vipāka, etc. But on many occasions, innumerable combinations of these principles would hinder easy assessment.[10] So it is better to follow what is documented in texts, especially in cikitsa.[10a]

Contradictions among āptas

What if there are contradictions among ācāryas? Some aspects of this problem has been discussed in the context of Tantrayukti, in this text.

While learning the texts of different ācāryas, some factors are to be considered to avoid conflicts in understanding. Context of ācārya's upadeśa has to be considered when a deviation of opinion is found. Even the meaning of a word changes according to the context. Types of vipāka are two according to Suśruta while it is three for Vāgbhaṭa. This is because; former view is based on the pace of digestion. Vāgbhaṭa has considered vipāka as the change of rasa due to jaṭharāgni. Difference in criterion caused the difference in number. Deśa (geographical area) and kāla (time period) may cause difference in views. Vāgbhaṭa's nativity is Sindhu region (Indus valley; current Sind province in Pakistan). He represents the school of thought prevalent there. Suśrutasamhita belongs to Gangetic planes. Development of āyurveda during different centuries has been reflected in treatises written in the respective period. Some of the divergent opinions are due to authors own innovative views. His experiences might also have contributed to the same. So these factors prakṛta (context), deśa (regional

identity of the author), kāla (period his life), abhiprāya (approach) and upāya (application) may be considered while interpreting a text or āptopadeśa.[11]

Inhibiting and felicitating factors

It is interesting to discuss whether there are any hindrances in the perception of āptopadeśa. For pratyakṣa there are eight types of obstacles as mentioned in Carakasamhita. In the case of anumāna, hetvābhāsas can hamper with the acquirement of knowledge. Similar factors have not been mentioned in texts in the context of śābda. But some of the possibilities are discussed here.

Aśraddha (non-attendance) can object the perception of upadeśa (ṣrddhāvān labhate jñānam - Bhagavad gīta). Lack of aptitude (jijñāsa) can be another hindrance. Samśaya (doubt) is a prerequisite for jijñāsa. If the subject is lacking adequate understanding that also may be a block. Buddhiviśeṣa (intellectual skill) surely is a factor that influences the understanding from śābda. The excellence of Agniveśa among the six students of Ātreya is well known.[1m] The prajña-guṇas mentioned in Arthaśāstra are also relevant. They are śuśrūṣa (readiness to attend), śravaṇa (proper hearing), grahaṇa (understanding), dhāraṇa (keeping in mind), vijñāna (specified knowledge), tarka (critical thinking), apoha (wisdom) and tatvābhiniveśa (adhering to what is understood) has been referred to as the qualities of a king according to Cāṇakya.[11] These will felicitate the perception of āptopadeśa.

Tantrayuktis

Tantrayuktis are methods to interpret a scientific treatise. Tantra means treatise. Yukti is application. These techniques when applied in textual analysis will yield exact and implied meaning.[12] Some of the tratrayuktis coincide well with āptopadeśa. Best example is upadeśa tantrayukti. Suśruta has even defined it as āptavacana.[2c] Apadeśa is explanation with reason.[12a] Ekānta tantrayukti is a direction with no other option.[12b]Anekānta is the opposite. Here the suggestion is more or less flexible. Vyākhyāna[12c] is narrating the terms. Nirvacana[12d] is defining a concept. Nidarśana[12e] is explaining with examples.

Tantrayuktis like vidhāna and nirṇaya are related to resolving the contradictions among ācāryas. Vidhāna is correlating different views. It never negates any of the views, but enquires the approaches behind them. Nirṇaya is conclusion still not rejecting other suggestions. Here the author presents all the views and strongly puts forth one's own arguments.

Application of āyurveda is more or less situational. But theories are generalised (sāmānya). Application is particularisation (viśeṣa). This should not be confused with sāmānya- viśeṣa theory of āyurveda. So the latter may lead to differences in approach. Some of the divergent views are supplementary to each other as in the case of dhātu-pariṇāma-vāda. Some provoke the learner to think more.

One's opinion can often get biased in spite of one's interest in a subject. This has been stated even as a universal truth by poet Kāḷidāsa.[13] To overcome this obstacle, scholars of same subject should join together to interact openmindly. We have got examples of such gatherings in āyurvedic texts. Through discussions, doubts can be cleared. Newer concepts, interpretations, innovations may be evolved. Ambiguities in applied aspect may be cleared. Some treatment procedures like vasti are suggested to be done together with several physicians.[3e] Kaśyapa has even referred 'pariṣad' (assembly of vaidyas) in support of some practical approaches.[14] The opinion of the collegiums can be considered as āptavacana.

Scientific journals carry validated findings of research which are peer reviewed. Seminars are collegiums where scholars of same or related subjects meet together. This signifies pariṣad or vaidyasamūha.[1n]

Āptopadeśa is not a pramāṇa of the past. Even in current education there are texts to be studied, lectures to be listed and learned. All these represent āptopadeśa.

Research begins and concludes in āptopadeśa. A hypothesis is derived from documented evidences (śabda). Methodology is based on other pramāṇas. The findings actually are an addition to āptopadeśa.

Conclusion

Āptopadeśa is perhaps the strongest among the pramāṇas of āyurveda. It is relevant especially in tadvidyasambhāṣa. But it is never considered as rigid as some schools approach towards the vedas. In an applied knowledge system like āyurveda, the inputs from āptopadeśa can be/should be validated with other pramāṇas. Newer researches are towards this end.

This pramāṇa is not for understanding the theoretical foundations of āyurveda alone. Clinical and pharmacological practices are also based on āptavacana. Interpretation of the text in teaching and scientific deliberations (both in ancient sambhāṣa and current seminars) are reflections of āptopadeśa. Deeper understanding of this pramāṇa will empower vaidya in the theory and practice of āyurveda.

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1a. Ibidem., Sutrasthanam 1/125

1b. Ibidem., Sutrasthanam 16

1c. Ibidem., Sutrasthanam 11/18-19

1d. Ibidem., Sutrasthanam 11/18-19

1e. Ibidem., Vimanasthanam 4/4

1f. Ibidem., Vimanasthanam 8/13

1g. Ibidem., Vimanasthanam 8

1h. Ibidem., Sutrasthanam 1/120

1i. Ibidem., Vimanasthanam 8/41

1j. Ibidem., Cikitsasthanam 11/35-43

1k. Ibidem., Vimanasthanam 8/16-82

1l. Ibidem., Sutrasthanam 26/37

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CASE STUDY

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Mucinous gastric carcinoma with liver metastasis managed with āyurveda poly herbal combinations - a case study

Ramesh P. R., Madhu K. M. and Mahesh K.

ABSTRACT: Mucinous gastric carcinoma (MGC) is a rare histological subtype of undifferentiated gastric carcinoma, accounting for 2.6-6.6% of all gastric cancer cases. Mucinous carcinoma with liver metastasis portrays unfavourable prognosis, which compels the patients to abstain from conventional therapy. We would like to report a case of mucinous gastric carcinoma with liver metastasis, which responded very positively to āyurveda poly herbal combinations. A 66 year old man presented with mucinous gastric carcinoma with liver metastasis. The patient reported to his primary care physician with acute abdominal pain and investigations revealed perforation peritonitis. He was managed with perforation closure surgery. An incision biopsy of the prepyloric region of the stomach was suggestive of mucinous carcinoma. Abdominal computed tomography showed circumferential bowel thickening in the pyloric region of stomach with surrounding omental and mesenteric thickening and small perigastric lymph nodes-s/o stomach mass and segment 8 of the right lobe of liver showed a solitary peripherally enhancing cystic area-probably metastasis. He was advised chemotherapy which he refused and opted for āyurveda management. Oral medications were prescribed with regular follow up and monitoring. He was asymptomatic during the course. After 14 months an abdominal CT scan was repeated. No definite stomach mass/thickening was visualized in the study. It showed a peripherally enhancing cystic lesion measuring 21mm in segment 8 of liver. This shows that āyurveda poly herbal combinations may help in improving the quality and quantity of life by slowing down the metabolic activity of the disease.

Key words: Mucinous gastric carcinoma, Ayurveda poly herbal combinations.

Introduction

Mucinous gastric carcinoma (MGC) is a rare histological subtype of undifferentiated gastric carcinoma, accounting for 2.6-6.6% of all gastric cancer cases.[1] The available literature on MGC is currently limited, mostly due to its rarity. Several previous studies have suggested that the prognosis of MGC patients is poor.[1]

In āyurveda many single herbs as well as poly herbal combinations are mentioned to be utilized in a judicious manner for the management of cancer. The medicines used in this study has shown its efficacy in improving the quality of life in patients suffering from various types of cancer. The ingredients of these combinations were studied by scientists of different organizations using modern tools and has established their role in the management of cancer.

Case Presentation

We describe the case of a 66 year old man who presented at the out-patient department with mucinous gastric carcinoma with liver metastasis. He was asymptomatic and fully active, able to carry on all usual activities without any restriction and without the aid of analgesics. Owing to the disseminated malignant disease he declined any conventional therapy which was advised to him. He opted for āyurveda management.

The patient had presented to his primary care physician with acute pain in abdomen and the investigations revealed perforation peritonitis. There was a 2 x 1cm perforation at the pylorus of stomach for which perforation closure and omental patch repair was performed. He was treated with antibiotics, analgesics and IV fluids with which his condition

improved. Incision biopsy of the gastric tissue revealed loosely areolar fibrous tissue covered over by necrotic debris below, glandular cyst and occasional signet ring cells which was suggestive of mucinous carcinoma. He was referred to a higher centre for management. Computed tomography (CT) sections of the abdomen showed circumferential bowel thickening having an approximate length of 26 mm and thickness of 12mm in the pyloric region of stomach, surrounding omental and mesenteric thickening with fat stranding noted, small perigastric lymph nodes were noted, the largest measuring 8 mm in short axis and the segment 8 of right lobe of liver showed a solitary peripherally enhancing cystic lesion measuring 21 mm which was suggestive of metastasis. He was advised chemotherapy for which he was not willing.

Upon evaluation at our center, he did not present any symptoms. His ECOG(Eastern Cooperative Oncology Group) performance status was recorded as zero. He did not report any change in his appetite or weight. His sleep was sound, micturition was normal, preferred non-vegetarian diet, and there was no change in his bowel habits. He was a tailor running own tailoring shop and was married with three children. He had the habit of smoking cigarettes which he quit one month before. His past medical history was insignificant for Gastroesophageal reflux disease (GERD), Type II diabetes mellitus and hypertension. There was a history of non bleeding hemorrhoids. His brother died of cancer which shows a relevant family history of cancer.

On examination, his weight was 68 kg, the blood pressure was 120/80 mm Hg, the pulse was 72 beats per minute and the temperature was 97.2 degrees Fahrenheit. His haemoglobin level was 14 grams per deciliter (g/dL), Total WBC count was 11,400 cells per cmm. and his platelet count was 7.1 lakhs cells per cmm.

He was prescribed with oral medications and advised regular follow up every four weeks. He was advised non-oily, non-irritant and non-spicy vegetarian diet. The diet timings were also modified to enable proper digestion and assimilation. Daśamūlam pān$\bar{\text{i}}$yam was also included in the diet. The following medications were prescribed during his first consultation.

1. Nimbāmṛtādipañcatiktam kvātham tablet 2 nos. twice daily on empty stomach.

2. Rasasindūram capsule 1 no. twice daily after food.

3. Sahadevi extract 1gm twice daily on empty stomach.

4. Sanj$\bar{\text{i}}$van$\bar{\text{i}}$ tailam for external application over the low back.

He was regular in his follow-up consultations. His complete blood count and plasma levels were regularly monitored. He was asymptomatic during the course. A repeated CT scan abdomen was performed after a period of fourteen months. No definite stomach mass/thickening was visualized in the study. It showed a peripherally enhancing cystic lesion measuring 21mm in segment 8 of the right lobe of liver.

Discussion

Conventional cancer treatments include surgical removal of the tumour, adjuvant radio and chemotherapy that may cause repercussions and affect the quality of life. In addition, the toxicity of chemotherapeutic drugs sometimes restricts their effectiveness. Biological medicine is into use nowadays in certain variety of cancers, however the cost of these drugs is very high and their efficacy is limited to certain varieties of cancer.[2] There is a need for new, efficient and cost effective anti cancer drugs with reduced repercussions, and the plants are a promising source for such entities. Owing to the importance of tackling cancer and the variety of potential molecules offered by plants, over 60% of anti-cancer drugs are directly or indirectly derived from the plant kingdom.[2] The well known anti-cancer drug Paclitaxel (Taxol), derived from the extracts of the bark of *Taxus brevifolia* Nutt. is an example.[2] The cytotoxic activity of this taxane dipertene was

first reported by Wani et al. in 1971.[2] There are now four major structural classes of plant-derived compounds used in western medicine as a single chemical entity compounds, namely, the vinca alkaloids (vinblastine, vincristine, vinorelbine), the epipodophyllotoxin lignans (etoposide, teniposide, etoposide phosphate), the taxane diterpenoids (paclitaxel, docetaxel), and the camptothecin quinoline alkaloid derivatives (toptotecan, irinotecan).[3]

Chemoprevention constitutes a different perspective in cancer treatment. Chemoprevention is defined as the use of natural, synthetic or biological agents to reverse, suppress or prevent either the initial phases of carcinogenesis or the progression of premalignant cells to invasive disease.[4] Curcumin, the deep yellow polyphenol that accumulates in the rhizome of haridrā (*Curcuma longa* L.) is the most prominent chemo preventive agent studied. Both *in vitro* and *in vivo* assays have shown inhibition of cell growth in many types of cancerous cells.

Anticancer therapy in āyurveda includes poly herbomineral preparations, recommendations for a healthy diet and modifications in life style. As mentioned earlier, combinations of medicines prescribed to him were observed to be effective in the management of stomach cancer. Nimbāmṛtādi-pañcatiktam kvātham is a polyherbal formulation which includes a combination of five herbs, i.e. nimba (*Azadirachta indica* A. Juss), amṛta [*Tinospora cordifolia* (willd.) Miers.], vṛṣa [*Justicia beddomei* (C.B.Clarkee) Bennet] paṭola (*Trichosanthes lobata* Roxb.) and nidigdhika (*Solanum virginianum* L.). All the five herbs in the formulations are known for their immense application in the treatment of various diseases in the traditional āyurvedic literature. Anticancerous property of nimba,[5] amṛta[5] and vṛṣa[6] are proven as single drug formulations. *Tinospora cordifolia* has chemopreventive and anti cancerous property and as an adjuvant in cancer chemotherapy.[7] Sahadevi extract consists of extract of dried plants of *Vernonia cinerea*. Alkaloids are a major component present in the plant and are said to have anti tumour, antioxidant and immunomodulatory effect.[8] Anti tumour activity is significantly seen in ethanolic and chloroform extracts of aerial parts of *Vernonia cenerea* (L.) Less. against Daltons ascetic lymphoma.[9] Rasasindūram is an organo-metallic derivative of mercury indicated singly or in combination with other formulation in a wide variety of disorders including chronic and recurrent infections, autoimmune rheumatologic disorders, benign and malignant neoplasms.[10]

Conclusion

Āyurveda poly herbal combinations may help in improving the quality and quantity of life by slowing down the metabolic activity of the disease as reported in this case of mucinous gastric carcinoma with liver metastasis. The āyurveda treatment is cost-effective when compared to any conventional therapy. Hence, this individualized approach deserves further validation to confirm its effectiveness in patients with far advanced cancers.

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OBSERVATIONAL STUDY

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Vision - Does sex hormones matter?

Mitra Das M. and Jithesh M. K.

ABSTRACT: Vision is defined as the ability to see. It is generally believed that physiology of vision is limited to eye and the higher centres associated with perception of light. But this has been proved wrong by recent studies that have found an association between sex hormones and ocular tissues. Sex hormones (estrogen, progestrone and androgen) influence eye and its appendages like lacrimal glands, ocular surface, crystalline lens and retino choroid complexes. As a result of the influence of sex hormones, various physiological conditions like age, menstrual cycle, pregnancy, menopause/andropause affects vision. Using animal and human studies, sex hormone receptor have been found in various tissues of the eye like cornea, lacrimal gland, meibomian gland, conjunctiva, lens, iris, ciliary body and retina. Thus these structures respond to a direct regulation by these hormones. Sex hormones influence the eye through these receptors. Estrogen may have direct effect upon eye as indicated by increased incidence of many ocular pathologies like age related cataract, dry eye, age related macular degeneration, glaucoma and macular hole as these diseases are higher in menopausal women than age matched men. From the view point of āyurveda, the link between sex hormones and vision has already described by various ācāryas. In śukrakṣaya this link is evident from the fact that śukrakṣaya can lead to timiradarśana. In majjakṣaya (which inturn leads to śukrakṣaya) too, tamodarśana is mentioned. This paper is an attempt to summarize various studies that establish the association between sex hormones and vision and also view it from āyurvedic perspective.

Key words: Sex hormones, Eye, Vision, Āyurveda, Netraroga, Vājīkaraṇa

Introduction

Vision is the ability to see. When light falls on the retina, nerve impulses are generated which are then transmitted to the visual areas of cerebral cortex of brain. Hence, it is generally believed that physiology of vision is limited to eye and the higher centres associated with perception of light. But in the recent years various researches have been conducted to study the relation between sex hormones and vision. The published results from these researches have highlighted the role of sex hormones in the normal functioning of eye and its related structures. Hormonal changes can adversely affect eye and increase the risk of its being afflicted by various diseases. Sex hormones come under the purview of śukradhātu. Śukradhātukṣaya can lead to timiradarśana. Thus we can infer that ācāryas have already explained the link between sex hormones and vision in the ancient classics .

Sex hormones and vision

Hormones are defined as substances secreted by specialized cells and transported to a distant site to exert its action upon specific tissues. Hormones regulate various biological activities like growth, development, reproduction, etc. Hormones are further classified into peptide hormones and steroid hormones. Sex hormones are a type of steroid hormones. Sex hormones are lipid-soluble and are able to pass through the cell membrane to enter a cell. Estrogens, androgens and progestrone are the main sex hormones. Any pathology that affects the levels of sex hormones can affect the ocular tissues.[1] In premenopausal women, large amounts of estrogens are synthesized in the ovaries, but these hormones are also produced in many other tissues. But in post menopausal women the extra-ovarian synthesis of estrogen is the only source of this hormone. So the problems with vision become more common in post menopausal women due to the influence of decresed

sex hormones. Androgens control the development and functioning of meibomian gland which is a sebaceous gland. Androgen, infact, has a significant influence on all the the lipid metabolic pathways.

Research findings

Many studies have been conducted to establish the link between sex hormones and vision. It has been found that sex hormones influence the eye and its appendages like lacrimal glands, ocular surface, crystalline lens and retinochoroid complexes.[2] Because of the action of sex hormones various physiological conditions such as age, menstrual cycle, pregnancy, and menopause or andropause, where the hormone milieu changes, affect vision. Sex steroid hormones (SSH) influence the ocular tissue through the sex hormone receptors present in ocular tissue.[2] Similar sex steroid hormone receptors are also found in bone and bone marrow.[3]

Corneal curvature and thickness change during pregnancy, lactation and pre menstrual phase. This leads to changes in vision during this period.[4] Sex hormone receptors are believed to be involved in the development of keratoconus as it is seen that there is reduction of progesterone receptor expression and increment of androgen receptor expression in keratoconus.[5] Intraocular pressure (IOP) values vary in females according to the menstrual cycle, thus indicating a role for SSH in the control of IOP. IOP seems to be increased in post menopausal age. IOP is reduced in pregnancy which is a high estrogenic condition.[6] The neural retina and the retinal pigmented epithelium directly respond to estrogens. Experimental animal model systems point to a direct involvement of estrogens in the function of retina.[2] Estrogen is believed to have a protective role in prevention of retinal changes by various types of genomic and non genomic effects.[7] Estrogen helps in the maintenance of the ionic composition and hydration status in the lens. Hence there is an increased incidence of cataract among the post menopausal females.[8] The incidence of inflammatory ocular diseases like uveitis are more common in women because of the presence of estrogen and androgen receptors found on lymphocytes and synovial macrophages.[9] Estrogen deficiency has a role in the development of Sjogren's syndrome.[10] Females have android deficiency. Hence there is increased association of dry eye during pregnancy and lactation as androgens control various biochemical and physiological aspects of the lacrimal apparatus.[11] Deficiency of androgen produces a comparative rise in the quantity of cholesterol value of secretion of meibomian gland. Enhanced cholesterol content in turn promotes tear film instability.[12]

Āyurvedic concepts

Netra is the most important sense organ in the body. Various permutations and combinations of tridoṣa and saptadhātu are present in different structures of netra. Any defect in this arrangement leads to netraroga. Medas in its non vitiated state is responsible for netra snigdhata.[13] Specific symptom related to dhātu vitiation and netra are obtained in majjavṛddhi-lakṣaṇa, majjakṣayalakṣaṇa and śukrakṣayalakṣaṇa. Majjavṛddhilakṣaṇa leads to netragaurava,[13a] majjakṣaya causes tamodarśana[13b] and śukrakṣaya causes timira darśana.[13c]

Discussion

Perceptions of ācāryas on netra, śukra, majja, medas, etc. corroborate well with the modern research findings. In its normalcy, medas is responsible for the snigdhata of netra. The decrease in snigdhabhāva leads to rūkṣata or dryness of netra. Androgens regulate the meibomian gland secretions which are oily in nature. Androgen deficiency has been proven to lead to dryness of eye. Thus the concept of netrasnigdhata being bestowed by medas can be explained with the action of sex hormones. Figure 1

Sex hormone receptors are present both in ocular tissues, bone and bone marrow (asthi and majja). Netra has a asthyāśrita paṭala.[14] Hence sex hormone receptors present in bone are present in eye also. An increase in majja, leads to an increase in the sex steroid

Figure 1

The role of medas and sex hormones in maintaining the netrasnigdhata

hormones receptors in the eye, thereby leading to netragaurava. In majjakshaya, there is a decrese in sex hormone receptors. Hence, there the sex hormones are unable to influence the eye properly leading to various eye diseases like cataract, retinal diseases, etc. All these diseases can lead to blindness. Hence, ācārya have specifically said that majjakshaya leads to tamodarśana. Figure 2

Figure 2

The role of majja in tamodarśana and netragaurava

In śukrakṣaya, there is decrease in circulating sex hormones. This inturn leads to various ocular pathologies that can end up in blindness and so timiradarśana has been explained as being caused by śukrakṣaya. Figure 3

Figure 3

Showing how śukrakṣaya cause timiradarśana

Scope

The link between śukra and netra opens up new avenues in the treatment of netraroga. Concept of vājīkaraṇa, and the modes to execute it through medicine, thoughts and actions have been elaborately explained by ācārya. At present, the utility of vājīkaraṇa is limited to infertility and diseases of reproductive organs alone. As sex hormones and vision are linked, medicines having the properties of vṛṣya, bṛmhaṇa and vājīkara can be utilised in the treatment of netrarogas especially those that affect elderly women. Newer treatment modalities can be developed based on this concept for age related macular degeneration, dry eye, cataract, etc. For example, testosterone eye drops are used in dry eye. This can be replaced by āścotanadravya prepared from drugs having vṛṣya and bṛmhaṇa properties. Judicial blending of principles of modern pathology and pharmacology with āyurvedic concepts is the need of the hour.

Conclusion

Sex hormones play an important role in the ocular physiology and pathology. Sex hormones influence the ocular structure through sex steroid hormone receptors present in the ocular tissue. Various research findings support the role of sex hormones in influencing the ocular pathology. Ācārya have explained tamodarśana and timiradarśana as a consequence of majjakṣaya and śukrakṣaya respectievely. The modern research findings corroborate the views of ācāryas.

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CASE REPORT

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An āyurvedic approach to Guillain-Barre syndrome in children: a case report

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ABSTRACT: Guillain-Barre Syndrome (GBS) is classically defined as an acute acquired sensitive motor polyradiculopathy post infectious, immunologically mediated, usually demyelinating in nature. The recent data regarding the pathophysiology of GBS indicated towards the role of infection in generating antiganglioside antibodies (GM1 in AIDP, GQ1 b in MFS and GD1 a in AMAN), which damage myelin in Acute inflammatory demyelinating polyneuropathy and Miller Fisher syndrome and axons in Acute motor axonal neuropathy. Since vaccines have an effect on the immune system, it is biologically plausible that immunization may be associated with subsequent GBS, especially in Pediatrics. This article represents a case report of GBS, followed by detailed discussion on pathophysiology, differential diagnosis and management through an āyurvedic intervention.

Key words: Guillain-Barre syndrome, Acute motor axonal neuropathy, Āyurveda, Intervention

Introduction

Guillain-Barre syndrome is the most frequent cause of acute or subacute flaccid paralysis after the eradication of poliomyelitis in developed countries.[1] The first case was described by Landry in 1859, who noted that the disease could produce motor and sensory involvement, starting from the distal portion of the extremities.[2] GBS progresses in caudocephalic, i.e. ascending direction to generalized involvement. It can occur in any age group, from the time of infant to old age, but is less common in children and affects both sexes in the ratio of M/F (1.5:1).[1] GBS is relatively rare disorder, with an incidence of 0.5-1.5 cases/ 100,000 individuals.[3]

For many years GBS was considered as the pathological condition involving the immunological attack over the myelin sheath producing inflammatory changes along with demyelination as in case of AIDP (Acute inflammatory demyelinating polyneuropathy) and CIBP (Chronic inflammatory demyelinating polyneuropathy). There are other two subtypes of GBS described decades ago as Acute motor sensitive axonal neuropathy (AMSAN) and Miller Fisher syndrome (MFS). At a very later stage, Acute motor axonal neuropathy (AMAN) was added and is different from AIDP in having immunological attack at the axons, whereas myelin sheath remains intact along with the normal functioning of cranial nerves and sensory system. It is most prevalent in the pediatric age group.[4] Although, the underlying etiology and pathophysiology of GBS is not completely understood, it is broadly believed that immune stimulation plays a major role in its pathogenesis. Therefore, since vaccines have an effect on the immune system, it is biologically plausible that immunization may be associated with the subsequent GBS.[5] The diagnosis relies heavily on the clinical picture obtained after a detailed history and examination, although CSF analysis and electro-diagnostic testing usually provide evidence supportive of the diagnosis.

In pediatrics, it may be considered as Phakkaroga explained by ācārya Kaśyapa, where he describes the involvement of external factor as well as bodily factor (nija and āgantuja) to cause the symptoms of a child not able to walk even at the age of one year. He has explained a detailed picture of a child with symptoms

as like of the GBS features with vātakapha- hara line of treatment with pañcakarma procedures and internal medications. It has been clinically observed that āyurveda helps in the management of GBS by correcting the altered immune system and effective in improving the symptoms of loss of movement in all extremities and power in the limbs.

Case report

A 3 year old male child was brought by his parents to the Out Patient Department of Kaumarabhritya at SDM Ayurveda Hospital, Udupi, Karnataka, with complaints of inability to stand and walk since appropriate for the age, having a progressive involvement of the lower extremities ascending upwards involving upper limbs.

Detailed history of present illness revealed that the child was affected to this condition from the age of 4 months. The child is the first child of third degree consanguineous marriage. He was delivered out of a full term normal vaginal delivery with no complications during antenatal, natal and postnatal period with birth weight of 2.5 kg and was found to be 13 kg at the time of admission. Child was normal upto the age of 4 months. He had attained all the developmental milestones appropriate for the age and was administered with the scheduled vaccinations. At the age of 4 months, as per the information from his parents, he was vaccinated with the 3rd dose of pentavalent and OPV. After vaccination, the child developed mild fever followed by cough and cold for a period of 15 days. For this, the child was given with some medicines and got symptomatic relief. On the 20th day after vaccination, parents noticed the child to have loss of strength. So, he was taken to a hospital at Mangalore, where he was diagnosed with GBS and was treated with intravenous immunoglobulin, 2 times with an interval of 3 months, after which the parents noticed mild improvement. But later, the child developed weakness of upperlimbs too (as noticed by the parents). So, he was brought to SDM Ayurveda Hospital, Udupi, and was admitted in the In Patient Department of Kaumarabhritya. (Table 1)

Table 1
Developmental history

Sl. No.	Motor and Adaptive	Appropriate Age	Attained Age
1.	Head control	3 months	3 months
2.	Rolling over	4 months	3 months 15 days
3.	Sitting with support	6 months	1 year
4.	Sitting without support	7 months	2 year 6 months
5.	Stands with support	9 months	Not attained
6.	Crawls	10 months	Not attained
7.	Stands without support	10 months	Not attained
8.	Walks with support	11 months	Not attained
9.	Walks without support	13 months	Not attained
10.	Ulnar grasp	6 months	6 months
11.	Radial grasp	7 months	7 months
12.	Transfers object	7 months	8 months
13.	Pincer grasp	9 months	9 months
14.	Scribbles circle	15 months	18 months
15.	Balances one cube over another	15 months	2 years
16.	Vertical strokes	18 months	18 months
17.	Draws a circle	3 years	Not attained

Language and Social behavior milestones were attained appropriate for the age.

Personal history

Appetite: Anorexia was present

Micturition: 3-4 times/day

Bowel: Once a day, usually hard stools

Sleep: Sound sleep

General examination

Appearance: Normosthenic

Built: Ectomorphic

Nourishment: Moderate

Pallor: Present

Icterus, cyanosis, clubbing, lymphadenopathy and edema was not observed.

Table 2 shows the Anthropometry measurement on the day of admission.

Table 2
Anthropometry measurement

Sl. No.	Variables	Values
1.	Height	91cms
2.	Weight	13Kg
3.	HC (Head circumference)	50.5cms
4.	CC (Chest circumference)	53.5cms
5.	MAC (Mid arm circumference Right and Left)	14.5cms
6.	MTC (Mid thigh circumference Right and Left)	24cms
7.	Calf circumference	16cms

CNS examination

Mental status: Conscious. Oriented to time, place and person. Speech and language intact. Memory intact. Higher intellectual functions like general knowledge, judgement, reasoning were absent. Cranial nerves were normal for their function and intact. Sensation to pain and temperature was normal. Co-ordination and Gait findings are shown in Table 3.

Diagnosis

Guillain-Barre Syndrome with Acute motor axonal neuropathy . This can be correlated with Vyādhija Phakka.

Interention

Bāhyacikitsa and Pañcakarma:

1. Abhyaṅga with Aśvagandhabalālākṣādi Taila
2. Ṣāṣṭikaśālipiṅḍasveda
3. Mātrāvasti with Samvardhana ghṛta

Ābhyantara/Śamanacikitsa (Internal medications):

1. Tab. Kumārakalyāṇaka rasa: ½ OD with honey
2. Kṣīrabala tailam (101) āvartti: 5 drops BD with milk.
3. Syp. Māhiṣadrāvaka: 1 tsp BD
4. Svāmalā compound: ½ tsp BD with milk

Observations and result

Table 4 and 5.

Table 3
Findings of co-ordination and gait

Sl. No.	Features	Findings
1.	Co-ordination: Truncal stability	Present
	Fine finger movements	Able to touch tips of the finger slowly
	Toe tapping	Not followed by the child
	Finger nose finger	Not followed by the child
	Heel knee shin	Not followed by the child
2.	Gait: Rise from seated position	Present (able to stand with support)
	Walking on toes / heels	Absent (can not perform the task)
3.	Meningeal signsabsent	

Table 4
Improvements achieved by the patient in motor system

Sl. No.	Features	Findings	
		BT	AT
1.	Visual inspection:		
	Muscle bulk	UL - Mild wasting LL - Mild wasting	Slightly improved Slightly improved
	Tremors/Fasciculations	Absent	
	Speed of movement	UL - Bradykinesia LL - Bradykinesia	Improved Improved
2.	Tone -		
	Resistance during movement of wrist, elbow, ankle and knee	UL - Hypotonic LL- Hypotonic	Normal Normal

Sl. No.	Features	BT	AT1	AT2
3.	Power:			
	Deltoid (Abduction of upper arm; C5,6; Axillary nerve)	4/5	4/5	4/5
	Biceps (Flexion of forearm at elbow; C5,6; Musculocutaneous nerve)	4/5	4/5	4/5
	Triceps (Extension of forearm at elbow; C5,6,8;Radial nerve)	4/5	4/5	4/5
	Ext. Carpiiradialis (Dorsiflexion of hand at wrist;C5,6; Radial nerve)	3/5	3/5	4/5
	Interossei (Finger abduction and adduction; C8,T1;Ulnar nerve)	4/5	4/5	4/5
	Iliopsoas (Hip flexion; L1,3; Femoral nerve)	2/5	3/5	4/5
	Quadriceps (Knee extension; L2-4; Femoral nerve)	2/5	3/5	4/5
	Hamstrings (Knee flexion; L5s2; Sciatic nerve)	2/5	3/5	4/5
	Gastrocnemius (Foot plantar flexion; S1,2; Tibial nerve)	2/5	3/5	4/5

Gradation for muscle power
0 = No contraction 1 = Active movements with gravity eliminated 2 = Active movements against gravity
3 = Active movements against gravity and moderate resistance 4 = Active movements against gravity and full resistance (normal power)

Table 5
Improvements achieved by the patient in Deep tendon reflexes

Sl. No.	Reflexes	Findings		
		BT	AT1	AT2
1.	Muscle Stretch Reflexes			
	Biceps (C5,6; Musculocutaneous nerve)	0 Absent	+1	+1
	Triceps (C6,7; Radial nerve)	0 Absen t	+1	+1
	Knee (L2,3,4; Femoral nerve)	0 Absent	+1	+1
	Ankle (S1,2; Tibial nerve)	0 Absent	0	+1
2.	Clonus	Absent		
3.	Plantar response	Normal response		

Sl. No.	Reflexes	BT	AT1	AT2
4.	Superficial reflexes			
	Corneal reflex	+2	+2	+2
	Glabellar blink reflex	+2	+2	+2
	Abdominal reflex	+2	+2	+2
	Plantar reflex	+2	+2	+2

Grading for reflexes: 0 = Absent, +1= Diminished, +2 = Normal, +3 = Brisk, +4 = Clonus, BT - Before treatment, AT1-1st follow up after 2 months, AT2 - 2nd follow up after 2 months

Discussion

Discussion on pathophysiology

In the demyelinating form of GBS, the cause for flaccid paralysis is the blockage in the conduction of nerves. Here in AIDP, the axonal connections are preserved and therefore the treatment principle is towards the re-myelination of neurons. Whereas, in case of AMAN, the antigen leads to the activation of the auto-immune system due to the similarity in the structure of the antigen and the nerve gangliosides. Therefore, the antibodies (GD1 a) cross react to the axonal gangliosides leading to the axonal injury. Hence, sensory and autonomic functions are preserved in the AMAN unlike AIDP.[6] There is ascending paralysis seen in case of GBS, weakness beginning from the lower extremities to upwards involving the upper extremities too.[7]

Discussion on āyurvedic correlation of GBS

There is no direct reference of GBS in āyurveda classics, but based on the prodromal symptoms and features of the child, it can be correlated to Vyādhija phakka explained by Kaśyapa in Kāśyapasamhita. Ācārya Kaśyapa says if a child is not able to walk even after the age of 1 year, the child is supposed to be suffering from Phakkaroga.[8] He has explained in detail regarding the causative factors as nija and āgantuja (internal and external factors) which, in this case can be taken as the vaccination being an external source causing production of antibodies into the body system and hence affects the immune system and in turn the balance between the tridoṣas. He further explains the symptoms as, reduced strength and muscle weakness with atrophy of muscles of hands, thigh and waist, loss of movement in the lower limbs along with weakness and reduced activity.

Discussion on the rationality behind the selection of treatment

Relating all the above mentioned features, it seems to have the predominance of vāta and kaphadoṣa. Vātadoṣa has the function of gati (motor) and gandhana (sensory).[9] Kaphadoṣa has the property of stambhana, therefore, causing blockage in the nerve conduction. Here, pittadoṣa by its tīkṣṇaguṇa (sharpness) causes inflammatory changes at the level of axons leading to the axonal injury.[10] Therefore, vātahara line of treatment is the principle for the management of GBS. Abhyaṅga with Aśvagandha-balālākṣādi taila helps in increasing the blood circulation and also innervates the nerve fibers present at the periphery. Aśvagandha [*Withania somnifera* (L.) Dunal], balā (*Sida cordifolia*) and lākṣa (Lac) have vātahara property and thus it acts as an anti-oxidant, immunity booster[11] and is a proven herb to increase muscle bulk and strength. Ṣāṣṭikaśālīpiṇḍasveda helps in removing srotorodha (obstruction of channels). It is bṛmhaṇa (nourishes), balya (strengthens) and vātahara. Ṣāṣṭikaśāli contains amino acids methionine, tyrosine, Vit. B, manganese, anti-oxidant property and improves muscle bulk and strength. Vasti (enema) is the major treatment principle for the vātavyādhi as it alleviates vātadoṣa.[12] Mātrāvasti is described by ācāryas to be administered to sukumāras (who are delicate) and can be given on daily basis without any complications. Its role in regeneration of the lost/ injured axons can be expected. Doṣa involved is vāta and the disease is caused due to the reduction in its calaguṇa causing inability to transmit nerve impulses, mātrāvasti helps in opening up of blocks in nerve conduction and facilitates remyelination of nerves; thereby helps to transmit nerve impulses.[13]

Also, the doṣas are brought back to their normalcy with the help of internal medications having ingredients like, Māhiṣadrāvaka containing aśvagandha, eraṇḍa (*Ricinus communis* L.), rāsna [*Alpinia galanga* (L.) Willd.], kaṇṭakāri (*Solanum virginianum* L.) having vātahara property, guḍūci [*Tinospora cordifolia* (Willd.) Miers] having tridoṣahara property, vaca (*Acorus calamus* L.) having kaphahara property and śuṇṭhi (*Zingiber officinale* Roscoe) acts as dīpaka and pācaka (digestive and carminative). Māhiṣamāmsa acts as balya, bṛmhaṇa and māmsavardhaka. Thus, provides strength and immunity[14] in GB Syndrome. Kṣīrabalā taila (101) āvartti contains balā processed with milk and taila, acts as anti-inflammatory, improves strength and is vātahara. Kumārakalyāṇaka rasa contains Svarṇabhasma (gold), Abhrakabhasma, Svarṇa-

mākṣikabhasma processed with kanyārasa which by its sūkṣmaguṇa (minuteness) reaches to the deepest level of the tissues and acts as nervine tonic, anti-oxidant and anti-inflammatory.[15] Svāmalā compound acts as a regenerative and rejuvenate the body tissues which potentially recovers the axonal injury and also improves the immunity.[16]

Conclusion

GBS is classically defined as an acute autoimmune polyradiculopathy clinically characterized by the presence of flaccid paralysis and areflexia, which may be correlated to vyādhijaphakka. The treatment protocol adopted in this case shows a very effective approach in improving the quality of life of the child. Hence, the same treatment plan can be adopted for similar diagnosed cases.

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ANALYTICAL STUDY

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A study on the effect of śodhana on toxic principles of guñjābīja with reference to protein assay

Nilima Wadnerwar, Shriramji Jyotishi and Dhiraj Singh Rajput

ABSTRACT: Viṣadravya possess both therapeutic as well as toxic properties. Toxic chemical constituent known as active principle is responsible for hazardous effects. Āyurveda describes various pharmaceutical processes; one of them is śodhanasamskāra to remove the harmful part of the drug and to retain the therapeutic and nutritional properties of the toxic substances. In this process, various liquid media like water, herbal juices, godugdha (cow's milk), ghee, urine, kāñji (sour gruel), etc are used. The techniques used for śodhana are boiling, cooking, soaking, roasting, frying, washing, etc. This particular process affects the morphological as well as active part of the crude drug. Hence it becomes necessary to study these changes systematically and scientifically with the help of modern methods, so as to give a scientific base to this process. To understand the difference caused by śodhana, this study has been conducted with the help of protein assay of guñja (*Abrus precatorius* L.) which is an irritant vegetative poison. It contains abrin as an active principle which is a toxic protein. In the present study, śodhana of both red and white variety of guñjābīja was performed in different media (godugdha, kāñji and distilled water) by svedana in ḍoḷāyantra. Protein assay was conducted with raw and purified samples of guñja. The quantitative data of protein assay concludes that the total protein content of the śveta and rakta guñjābīja has decreased after śodhana process.

Key words: *Abrus precatorius* L., Guñjābīja, Protein assay, Śodhanasamskāra, Toxic principle, Viṣadravya

Introduction

The excellence of āyurvedic pharmacology is glorified with the use of viṣadravya for medicament. Viṣadravya is used as a single remedy or in combination with other drugs to increase the efficacy and potency of the main drug. Such viṣadravya are absorbed readily without their digestion and spreads in the body quickly to show the desired effect.

Śodhanasamskāra described in āyurveda is for the utilization of drugs in medicine, which are known to have some toxic properties.[1] Though poisons are harmful and dangerous to life, they are used therapeutically as they have the quick spreading action.[2] Hence, they are very useful in acute conditions. It is stated that strong poisons can be best medicine when used properly in correct therapeutic dose and formulation while a good medicine can also affect adversely if not used for proper person in proper doses.[2a] Śodhanasamskāra is useful to remove the harmful part of the drug and to retain the therapeutic and nutritional properties of the toxic substances. This particular process affects the morphology as well as an active part of the crude drug. Śodhana procedure not only purifies the drug, but also minimizes its untoward effects. These procedures have been used since ancient times, but it is not known how it is affecting the drug. A study conducted by soaking, roasting, autoclaving and cooking Abrus seeds, indicated that the autoclaving treatment was suitable and more effective in reducing various anti-nutritional compounds of *Abrus precatorius* seeds without affecting the nutritional quality.[3] But the mechanism of changes occurring in the drug is unknown. Hence, it becomes necessary to study these changes systematically and scientifically with the help of contemporary methods which may give a scientific base to these processes.

Guñja is classified under Upaviṣa.[4] In India, it is commonly known as ratti or guñci. 'Ratti' is refered

to a single ratti seed. This seed was the standard weight in the ancient Indian system of measurement, because the seed is fairly constant in weight. It was used to measure gold and 1tola (11.6 gm)=1māṣa; (1māṣa= 8 ratti). It is called as Kudrimaṇi in Tamil and Guru giñja in Telugu. It has been used in Siddha medicine for centuries. They knew about the toxic effect of the plant and suggested various methods which are called as 'suttiseyyal' or purification. The seeds are much valued in native jewelry for their bright coloration.

Both red and white types of guñja are beneficial for hairs, cures diseases due to vitiation of vāta and pitta, fever, dryness of mouth, giddiness, difficulty in breathing, thirst, excitement, diseases of eyes, improve sex vigour and bodily strength and is useful in pruritus, ulcer, destruction of worms and similar parasites, alopecia and other skin diseases.[5] Various other texts explain its use in atrophied ear lobule, dandruff, sciatica, erysipelas and few other dermatoses, blindness, diseases of head, dental caries, as well as rakṣograhaviṣa.[6]

If the powdered seeds are consumed in their original form and in excess quantity, vomiting and severe form of diarrhea occurs. The symptoms resemble exactly to those of cholera and hence to exclude or to avoid these hazardous effects, śodhana of the seeds has been advised in the literatures of āyurveda before it is been internally used.[4a] For śodhana, the guñja seeds are tied in a poṭṭali, followed by svedana in godugdha for a period of 2 yāma (6 hours)[4b] or in kāñji for 1 yāma[4c] in ḍoḷāyantra (a specially designed earthen pot).

Although there are so many potent and quick reacting drugs made from toxic herbs, physicians are not prescribing them in regular practice considering their poisonous effects. But these poisonous effects can be conquered by certain precautions and śodhana of the drug. For the last few years people are commenting that āyurvedic drugs have adverse reactions or side effects. Hence, like metals and minerals, viṣadravya also need to be studied for their toxicity, on the basis of modern parameters so that they can be used by the practioners without any doubt or fear of toxicity.

A study was conducted on śodhana of red guñja seeds with kāñji, godugdha, nimbūsvarasa (lime juice) and water as media revealed that purified samples in presence of kāñji and water showed changes in physico-chemical parameters in comparison to raw drugs. In HPTLC analysis, different Rf values were detected before and after the purification indicating change in the nature of the purified drugs.[7]

But, a study reporting the quantitative loss in the toxic content (abrin) of guñja seeds is not been conducted yet. Hence, this study was carried out to observe the changes taking place in the effect of toxic principle after the śodhanasamskāra of vanaspati viṣa[1a] and to develop a laboratory test that differentiates śuddha and aśuddha (purified and non purified) medicinal drug so as to standardize the āyurvedic drugs.

Materials and methods

The present study was conducted at Central Research Laboratory, Shri Ayurved Mahavidyalaya, Nagpur.

It involved śodhana of guñja seeds and protein assay. In āyurvedic classics medias like godugdha, goghṛta, gomūtra, kāñji, water, etc. are mentioned to be used for śodhana of drugs while conducting various methods like svedana, dhāvana, bharjana, etc.

Pharmacological study

Selection of the drug (guñja): Abrin, a highly toxic protein which is responsible for agglutination of blood, is present in guñja seeds. Hence, fully developed seeds of rakta guñja with black spot and śveta guñja were selected for the complete course of the study. The sample was collected from Shaila pharma, Nagpur on 17.01.2009 and authentification was done from the Department of Dravyaguna, Shri Ayurved Mahavidyalaya, Nagpur. Physical impurity was removed. Both types of 500 gm guñja seeds were grouped into four groups each weighing 125 gm.

Śodhana of guñja seeds: Among eight groups, one group each of śveta and rakta guñja seeds was kept untreated as aśuddha sample. Aśuddha samples of both varieties were powdered. Remaining six groups of sample were tied in cotton cloth to form six different poṭṭali (bolus). Svedana was done separately with godugdha for 2 yāma and in kāñji for one yāma as mentioned in literature and in distilled water for 3 hours for shodhana using ḍoḷāyantra. Śodhana with distilled water was performed for a comparison with godugdha and kāñji as abrin gets destroyed by boiling in water.[8] All the śodhita samples were dried in shade and then powder was prepared.

Samples

I - Aśuddha rakta guñja powder (ARG).

II - Distilled water śodhita rakta guñja powder (D/w SRG).

III - Kāñji śodhita rakta guñja powder (Kāñji SRG).

IV- Godugdha śodhita rakta guñja powder (Godugdha SRG).

V - Aśuddha śveta guñja powder (ASG).

VI - Distilled water śodhita śveta guñja powder (D/w SSG).

VII - Kāñji śodhita śveta guñja powder (Kāñji SSG).

VIII -Godugdha śodhita śveta guñja powder (Godugdha SSG).

Protein assay: Guñjābīja contains abrin which is an organic irritant protein and toxic principle. Hence, protein assay was done to estimate the percentage of protein contained in unpurified and purified samples of guñjābīja using the following reagents:

Requirements[8a]

1) Tris HCI Buffer.

2) 2 % Sodium Carbonate in 0.1 N NaOH.

3) 0.5 % Copper Sulphate in 1 % Potassium Sodium Tartrate.

4) Folin Ciocalteu's reagent.

5) Stock Standard (Protein solution): 50 mg Bovine Serum Albumin in Distilled water made upto 50 ml.

6) Working Standard: Dilute 5 ml of Stalk solution with 25 ml of Distilled water.

Procedure: 100 mg of aśuddha rakta and śveta guñja (unpurified red and white variety of *Abrus precatorius* L.) and 100 mg of śodhita guñjābīja (purified seeds) powder was taken and triturated with 10 ml Tris HCI buffer solution. Centrifusion was done and supernatant was separated. 5 ml supernatant was taken and 1rnl Trichloroacetic acid (TCA) was added, then centrifuged and collected the precipitate. 2 ml NaOH was added into the precipitate, then centrifuged and supernatant was collected. Pipetted out 0.2 ml of extracted sample I and V and 0.5 ml each for other samples. 0.1, 0.2, 0.4, 0.6 ml of working standard was pipette out. The volume of all the samples was made to 1 ml by adding distilled water.

Blank solution was prepared by adding 1 ml distilled water in a test tube. 5 ml Reagent C was added in all the extracted samples, working standard and blank sample. After 10 minutes, 0.5 ml Reagent D was added in all samples and placed in a dark place for half an hour. Spectrophotometer was set at 660 nm with Blank sample and optical density of all the samples was measured. Observations were noted and calculation was done.

Formula

Total Protein % (For Aśuddha rakta and śveta guñja samples) $= \frac{OD \times 462.5712 \times 4 \times 2}{0.2 \times 0.1 \times 10^4}$

Total Protein % (For Śodhita / purified samples) $= \frac{OD \times 462.5712 \times 2}{0.5 \times 0.5 \times 10^4}$

$= \frac{OD \times 462.5712 \times 2}{1250}$

Where,

OD = Optical density measured with spectrophotometer.

462.5712 = Value calculated from standard graph.

0.2 = Quantity of extracted sample in ml.

Others are constants obtained during procedure.

$$\% \text{ Loss in protein Content} = \frac{\text{Total protein in Aśuddha sample} - \text{Total protein in Śuddha sample}}{\text{Total protein in Aśuddha sample}} \times 100$$

Qualitative test for the presence of amino acids[8a]

The seeds also contain an amino acid known as abrine (N-methyl-L-tryptophan), glycyrrhizin and a lipolytic enzyme. This test was done to detect the presence of amino acids in the extracted samples of aśuddha and śodhita rakta and śveta guñjābīja.

Procedure: 0.1ml extract of the sample prepared for protein assay was taken. 1ml Ninhydrin reagent (Ninhydrin 15 mg, n-Butanol 5 ml and acetic acid 0.15 ml) was mixed. After heating for 2 seconds, blue colour developed in all samples with varying intensity except in extract of Distilled water śodhita śveta guñjābīja.

Observation and result

Observations of śodhana and protein assay: Table 1 and Graph 1.

Observations of Qualitative test for presence of Amino acids: Table 2.

This observation shows that amino acids are present in less quantity in purified samples as compared to unpurified samples of guñja seeds.

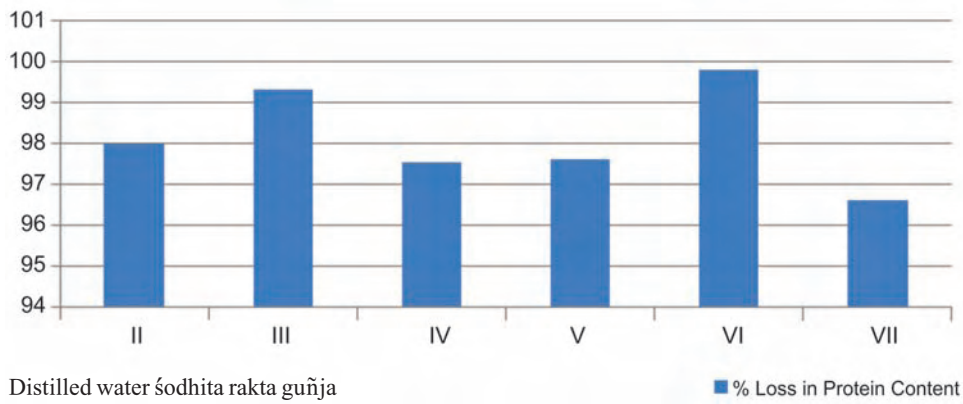
Discussion

Guñja (*Abrus precatorius* L.) is an organic irritant poison. It is undoubtedly accepted amongst 'upaviṣa'. In various āyurvedic texts, Rasataraṅgiṇi has specifically described the toxic symptoms produced by consumption of crude drug. By the influence of

Table 1
Observations and result of śodhana and protein assay

Sample	Name of samples	Media of śodhana	Quantity of guñjābīja	Quantity of liquid media	Duration of śodhana	% Weight loss after śodhana	Total protein (%)	% Loss in protein content
I	Aśuddha rakta guñja	-	125gm	-	-	-	4.760	-
II	Distilled water śodhita rakta guñja	Distilled water	125gm	2 litres	3 hrs	16	0.097	97.96
III	Kāñji śodhita rakta guñja	Kāñji	125gm	2 litres	3 hrs	16	0.033	99.31
IV	Godugdha śodhita rakta guñja	Godugdha	125gm	2 litres	6 hrs	00	0.119	97.50
V	Aśuddha śveta guñja	-	125gm	-	-	-	5.070	-
VI	Distilled water śodhita śveta guñja	Distilled water	125gm	2 litres	3 hrs	15	0.121	97.61
VII	Kāñji śodhita śveta guñja	Kāñji	125gm	2 litres	3 hrs	15	0.011	99.78
VIII	Godugdha śodhita śveta guñja	Godugdha	125gm	2 litres	6 hrs	00	0.173	96.59

Graph 1
Showing % Loss in protein content after śodhana process



II Distilled water śodhita rakta guñja
III Kāñji śodhita rakta guñja
IV Godugdha śodhita rakta guñja
V Distilled water śodhita śveta guñja
VI Kāñji śodhita śveta guñja
VII Godugdha śodhita śveta guñja

Table 2
Showing the colours observed in samples after Amino acid assay

Sample	Sample Name	Colour changes
I	Aśuddha rakta guñja	Dark blue
II	Distilled water śodhita rakta guñja	Colourless
III	Kāñji śodhita rakta guñja	Very faint blue
IV	Godugdha śodhita rakta guñja	Faint blue
V	Aśuddha śveta guñja	Dark blue
VI	Distilled water śodhita śveta guñja	Colourless
VII	Kāñji śodhita śveta guñja	Very faint blue
VIII	Godugdha śodhita śveta guñja	Faint blue

kaṭu-tikta-kaṣāya rasa, uṣṇa vīrya and rūkṣa-tikṣṇa guṇa, guñjābīja acts as a viṣadravya. It vitiates kapha and pittadoṣa, thereby causing vomiting, diarrhoea and other irritating symptoms as described to be produced after consumption of seeds. Though, guñja was accepted as a mono-drug therapy for various diseased conditions and also utilized in different formulations eg. Guñjābhadra Rasa, it is advisable to use guñjābīja only after proper śodhana.[4d]

All the parts of guñja are poisonous. But seeds are more poisonous which contain a variety of poisonous proteins. The most important one is abrin,[9] the active principle of guñja is highly toxic thermo labile protein (toxalbumin LD 50= 0.029 mg/kg body weight of mice)[10] present to the extent of 0.15 % in the seed.[8b]

Lethal dose after oral consumption by humans is approximately 0.005-0.007mg/kg.[8b]

It is very similar to viperine snake venom in their physiological and toxic properties. Its toxic manifestations include abdominal pain, nausea, vomitting, diarrhoea, weakness, sunken eyes, cold, perspiration, trembling of the hands, dysponea, weak, rapid and irregular pulse, vertigo, faintness, rectal bleeding, oligourea and features of uremia. If it is

injected subcutaneously, causes painful swelling and ecchymosis develops with the inflammation and necrosis. It can cause generalized septicemia, haemolysis, convulsions and death may occur due to from cardiac failure within 3-5 days.

Abrin exerts its toxic action by attaching itself to the cell membrane. Its toxic effect is due to its direct action on the parenchymal cells and RBCs.[11] Necrotizing action of toxin causes liver damage. At the cellular level abrin inhibits protein synthesis, thereby causing cell death. Many of the features observed in abrin poisoning can be explained by abrin induced endothelial cell damage which causes an increase in capillary permeability with consequent fluid and protein leakage and tissue oedema (Vascular leak syndrome).[12] While observing the toxic effects produced by guñja seeds, abrin is considered as a potent active principle. The animal studies have explored the antitumour activity of abrin.[13] When abrin comes in contact with red blood cells, it inhibits protein synthesis. The unpurified guñja seed extract if administered into the vein, it causes agglutination of blood.[14]Agglutination in blood occurs when the red blood cells clog together in the blood vessels; it stops the circulation of blood to various organs of the body resulting to their failure. Death occus due to organ failure. It is very fatal.[12]

Hence, śodhana of guñja seeds was conducted. The quantity of drug used for śodhana for each sample was same ie. 125 mg. The quantity of liquid media used for each sample is also same ie. 2 litres. The time allotted for śodhana of godugdha was more (6 hrs) than that of kāñji (3 hrs) (Table no 1).This difference may be due to acidic and tīkṣṇa nature of kāñji. Godugdha, kāñji and distilled water have attributes of removing toxic principle of guñja. Reduction of values was observed in weight of samples treated with kāñji and distilled water. The weight of samples treated with godugdha increased to some extent because of the moisture and fat content due to boiling with cow milk.

Protein assay of guñjābīja before and after śodhana exposed that the loss in total protein content of the sample ranges from 96.59 % to 99.78 % which is maximum in kāñji śodhita rakta and śveta guñjābīja as compared to distilled water and godugdha śodhita śveta and rakta guñjābīja samples (Table no 1). Water was used as media in comparison with godugdha and kāñji for śodhana to observe the effect of boiling on abrin. Abrin is soluble in water.[15] It is soluble in sodium chloride solution with turbidity[16] and is destroyed by boiling. Pure abrin is heat-stable to incubation at 60°C for 30 minutes. At 80°C most of the toxicity is lost in 30 minutes.[10]

The qualitative test for amino acids showed the presence of amino acids in all the samples except sample treated with distilled water śodhita rakta and śveta guñjābīja. The concentration of amino acids has reduced in śodhita samples as compared with aśuddha samples.

A study conducted by śodhana of red guñja seeds with kāñji, godugdha, nimbu svarasa and water as media reveals that the aqueous extracts of raw seeds of guñja exerts its antibacterial effect on gram positive as well as gram negative bacteria but none of śodhita guñja showed any bactericidal effect on any bacterial strain used in the study.[17]

Śodhana is meant for removing the toxic constituents and their effects upto some extent. The protein assay reveals that the toxic principle is reduced by śodhana. Hence, it can be easily used for therapeautic purposes after śodhanasamskāra as the untoward effect is destroyed.

Though, guñja was accepted as a single drug therapy for various diseased conditions and was included in different formulations, it is advised to be used after proper śodhana prakriya.

Further analysis with advanced sophisticated methods will precisely conclude the contribution of this

purification process to detoxify guñja seeds. Further study should also focus on procuring pure abrin sample and standardize these findings.

Conclusion

Śodhanasamskāra of guñjābīja removes its toxicity. Hence, guñja should be used only after proper śodhana. Godugdha, kāñji and distilled water have attributes of removing toxic principle of guñja. The quantitative data of protein assay concludes that the total protein content of the śveta and rakta guñjābīja has decreased after śodhana process. Loss in total protein content is more in kāñji śodhita rakta and śveta guñja samples. Hence, kāñji is more suitable media of guñja śodhana. This process has contributed as a unique feature of pharmacotherapeutics in āyurveda. Further studies are needed to evaluate the role of specific media in enhancing safety profile and therapeutic potential of guñjābīja.

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EXPERIMENTAL STUDY

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An experimental study on the antidote effect of cāṅgerī (*Oxalis corniculata* L.) svarasa in dattūra (*Datura metel* L.) induced toxicity

Ranjana K., Sudheendra Honwad and Shrinidhi R.

ABSTRACT: Upaviṣas are the group of potentially less toxic drugs and dattūra is one among them. Dattūra is a deliriant type of cerebral poison and main toxic principles are hyoscyamine, hyoscine and atropine. The substance which are counteracting or neutralizing the effect of poison are considered as antidotes, in āyurveda pratyauṣadha concept can be compared with this. Cāṅgerī svarasa is mentioned as an effective antidote for dattūra poisoning in Kriyākaumudi, a Viṣacikitsa treatise in Malayalam. Parameters like ponderal changes, biochemical, locomotory and histopathology were compared. The parameters showed mild to moderate toxicity on jejunum, liver and kidney in dattūra treated group. In cāṅgerī svarasa treated group it was noted that cāṅgerī svarasa had shown mild to moderate antidote effect against dattūra poisoning.

Key words: Dattūra, Cāṅgerī svarasa, Antidote effect

Introduction

Upaviṣas mentioned in āyurvedic literatures are the group of potentially less toxic drugs, which were utilized in the preparation of many formulations after proper śodhana (purification). Rasataraṅgiṇī a text book on Rasaśāstra included nine[1] drugs under the classification of upaviṣa, dattūra is one among them.

Dattūra is kaṭu in rasa and it helps to pacify the conditions like kṛmi (worm infestation), kuṣṭha (skin ailments), jvara (fever) etc., and if taken internally in excessive quantity, it may cause malaise.[1a] It is coming under deliriant type of cerebral poison and main toxic principles are hyoscyamine, hyoscine and atropine,[2] the most toxic part of the drug is seed. Dattūra is used in the preparation of many important formulations, such as Kanakāsava[3], Sūtaśekhara rasa[4] and Mahāviṣagarbhataila[3a]. Improper or inadequate śodhana (purification) of dattūra can give rise to toxic symptoms like dryness of mouth, excessive thirst, nausea, vomiting and giddiness.[5]

Antidote is a substance or agent which counteracts or neutralizes the effect of poison without causing appreciable harm to the body.[2a]

Cāṅgerī is amḷarasa pradhāna dravya with madhura vipāka and uṣṇavīrya.[6] Cāṅgerī svarasa is mentioned as an effective antidote for dattūra poisoning.[7] This study was undertaken to scientifically assess the antidote effect of cāṅgerī svarasa in dattūra poisoning.

Materials and methodes

All the required raw materials such as dattūra and cāṅgerī were procured from SDM Ayurveda Pharmacy, after proper authentication. Cāṅgerī svarasa[8] was prepared at Rasasastra and Bhaishajya kalpana practical hall of SDM College of Ayurveda Udupi, following the standard operative procedure.

Animals: In bread wistar strain albino rats of either sex of body wt. ranging from 150-250 gms. were obtained from central animal house of the SDM Centre for Research in Ayurveda and Allied sciences, Udupi. They were maintained at standard housing conditions and fed with standard animal pellet and provided with tap water and libitum during the experiment. The Institutional animal ethical committee (SDMCRA/IAEC/AG-01) permitted the study.

Assessment antidote effect of cāṅgerī svarasa on dattūra induced poisoining

Study determines the acute toxicity of dattūra prepared in suspension form by using test drug (powder of dattūra bīja) and CMC (carboxymethyl cellulose) in wistar strain albino rats. It was assessed for single dose acute toxicity by employing OECD guidelines 425 using AOT software. 5 healthy rats of either sex were selected and dosed (up-down as per requirement) and were observed for 14 days, for general appearance, cage side behaviour, including increased or decreased motor activity, convulsions, Straub's reaction, catatonia, muscle spasm, spasticity, ophisthotonus, hyperesthesia, muscle relaxation, anaesthesia, arching and rolling, lacrimation, salivation, diarrheal writhing movement, mode of respiration and changes in skin colour, etc., with mortality and autopsy findings in case of dead animal.

The maximum tolerated dose (MTD) of dattūra obtained from AOT study was utilized by reducing $1/5^{th}$ for the study.

Study Groups

Group I - Normal Control - fed with CMC solutions.

Group II - Dattūra bīja $1/5^{th}$ of LD50 + CMC solution.

Group III - Dattūra bīja $1/5^{th}$ of LD50 + CMC solution + Cāṅgerī svarasa in TED.

The dose of cāṅgerī svarasa was calculated by using Paget and Barnes formula[9] by considering human dose.[8a]

Assessment of antidote activity

Assessment of antidote activity was made on the basis of:

a. Assessment of gross behaviour includes CNS depression, CNS stimulation, salivation, diarrhea, changes in skin color, hypo activity, passivity, muscle relaxation, muscle spasm, Straub's reaction, catatonia, spasticity, opisthotonus, anesthesia, arching and rolling, lacrimation, mode of respiration, convulsion, hyperesthesia and open field test.

b. Biochemical parameters as liver function tests, kidney function tests and serum electrolytes.

c. Locomotor activity was assessed by Infrared actimeter. It is used to measure the spontaneous activity by means of infrared beams. Infrared (IR) actimeter represent an ideal tool for assessing locomotor activity and exploration in rodents. The system represents a reliable system for easy and rapid drug screening and phenotype characterization in both day and night light condition. The system may be used for evaluation of locomotors and stereo typed movements and exploration/curiosity (Nose-spoke detection in hole-board option)

d. Histopathological examinations of heart, small intestine, kidney, liver and brain tissue materials were done. After noting the weight of the organ they were transferred to 10% formaldehyde solution for fixation and sent to a commercial laboratory for preparation of slides. The slides with sections obtained were scanned in Trinocular Carl Zeiss's microscope (Germany) under different magnifications. Changes, if any in the cytoarchitecture were noted down.

Statistical analysis

The data generated was mentioned as Mean ± SEM. Difference among the groups was assessed by employing one way ANOVA with Dunnett's multiple't' test for determining the level of significance of the observed effects, as Post-HOC test if 'p' value of less than 0.05 was considered as statistically significant.

Observations and results

Effect of dattūra seed and antidote effect of cāṅgerī svarasa in dattūra poisoning on brain, heart, liver, jejunum and kidney weight, biochemical parameters and locomotory activities are given in Table 1, 2 and 3. Figure 1, 2 and 3 are showing the photomicrograph of albino rats of Normal control group, Dattūra treated group and Dattūra + Cāṅgerī treated group.

Table 1
Effect of dattūra seed and antidote effect of cāṅgerī svarasa in dattūra poisoning on brain, heart, liver, jejunum and kidney weight

Sl. No.	Organs	Normal control	Dattūra	Dattūra+ Cāṅgeri svarasa TED
1.	Brain	1.73 ± 0.069	1.768 ± 0.039	1.756 ± 0.053
2.	Heart	0.802 ± 0.034	0.758 ± 0.061	0.628 ± 0.095
3.	Liver	8.02 ± 0.452	8.05 ± 0.642	8.232 ± 0.558
4.	Jejunum	0.606 ± 0.036	0.52 ± 0.032	0.426 ± 0.066
5.	Kidney	1.646 ± 0.076	1.338 ± 0.086*	1.374 ± 0.062
Data: MEAN ± SEM ,*P<0.05				

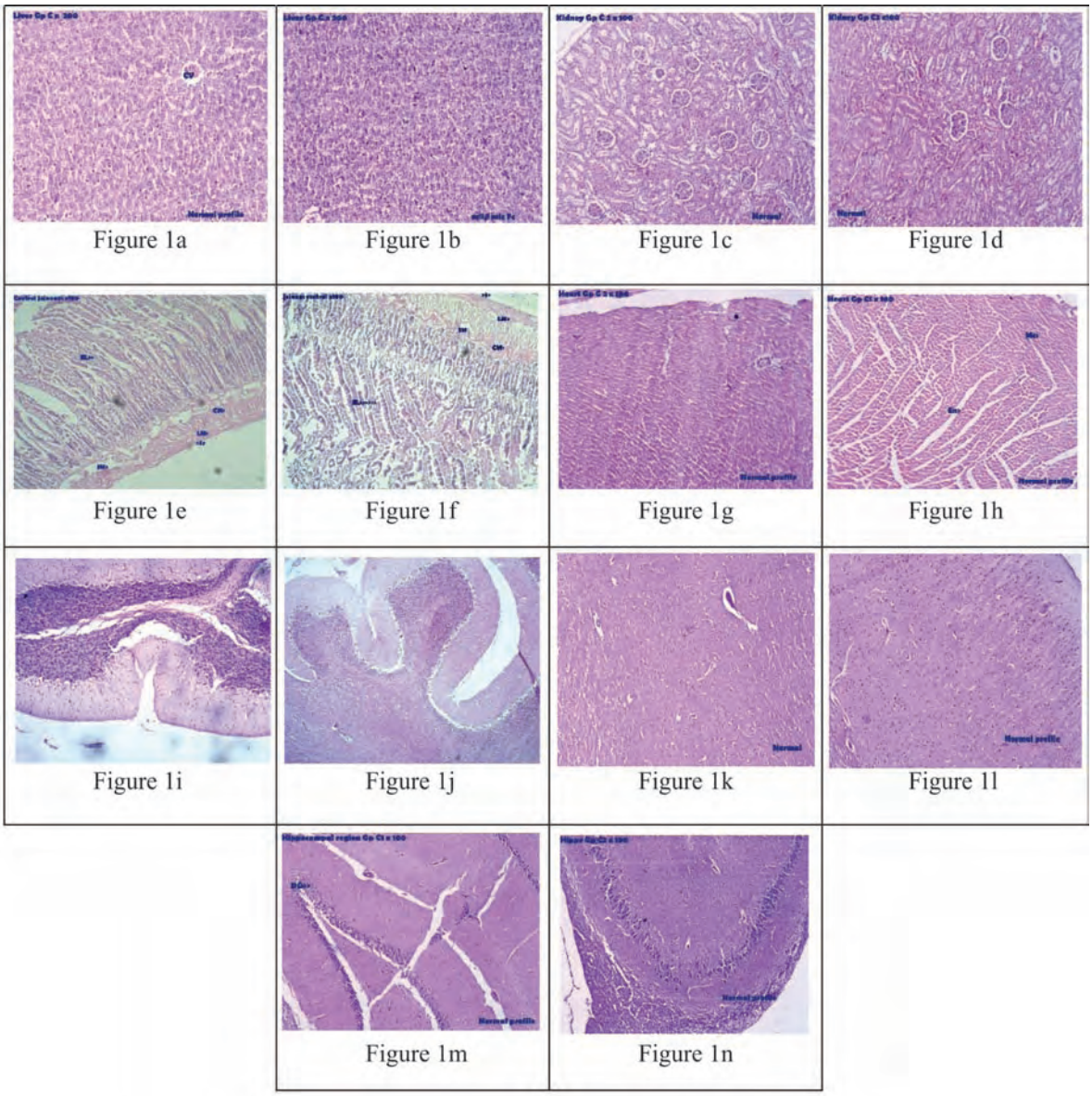
Table 2
Effect of dattūra seed and antidote effect of cāṅgerī svarasa in dattūra poisoning on biochemical parameters

Sl. No.	Parameters	Normal control	Dattūra	Dattūra + Cāṅgeri svarasa (TED)
1.	SGOT	144.0 ± 7.55	159.0 ± 7.86	145.6 ± 4.13
2.	SGPT	82.8 ± 2.71	74.67 ± 4.85	93 ± 3.130**
3.	ALP	635.6 ± 62.84	259.17 ± 28.53	1608.8 ± 130.67
4.	Total Protein	6.0 ± 0.083	6.98 ± 0.158**	6.54 ± 0.191
5.	Albumin	3.08 ± 0.198	3.85 ± 0.11**	3.22 ± 0.02**
6.	Globulin	2.92 ± 0.235	3.18 ± 0.172	3.32 ± 0.177
7.	Total Bilirubin	0.138 ± 0.023	0.127 ± 0.02	0.164 ± 0.15
8.	Direct Bilirubin	0.072 ± 0.014	0.09 ± 0.018	0.088 ± 0.17
9.	Urea	36.6 ± 1.33	37.3 ± 1.054	31.2 ± 2.107*
10.	Creatinine	0.26 ± 0.04	0.55 ± 0.43**	0.66 ± 0.50
11.	Na+	141.6 ± 0.509	137.83 ± 0.98*	140.6 ± 1.08
12.	K+	4.62 ± 0.073	3.8 ± 0.222**	3.94 ± 0.103
Data: MEAN ± SEM ,*P<0.05, **P<0.01				

Table 3
Effect of dattūra seed and antidote effect of cāṅgerī svarasa in dattūra poisoning on locomotory activity

Sl. No.	Parameters	Normal control	Dattūra	Dattūra+ Cāṅgeri svarasa TED
1.	Horizontal movement in 1st week	159.83 ± 24.4	82.57 ± 30.84	613.16 ± 52.7**
2.	Vertical movement in 1st week	168.66 ± 30.58	21.714 ± 3.35*	479.66 ± 64.87**
3.	Total movement in 1st week	328.5 ± 53.19	107.14 ± 32.29	1092.83 ± 102.95**
4.	Horizontal movement in last week	159.58 ± 24.41	286 ± 73.201	292.2 ± 41.95
5.	Vertical movement in last week	168.67 ± 30.59	11.67 ± 4.46**	238.2 ± 14.827**
6.	Total movement in last week	328.5 ± 53.19	297.67 ± 74.7	468 ± 59.183
Data: MEAN±SEM,*P<0.05,**P<0.01				

Figure 1
Photomicrograph of albino rats of Normal control group (1×100 magnifications)

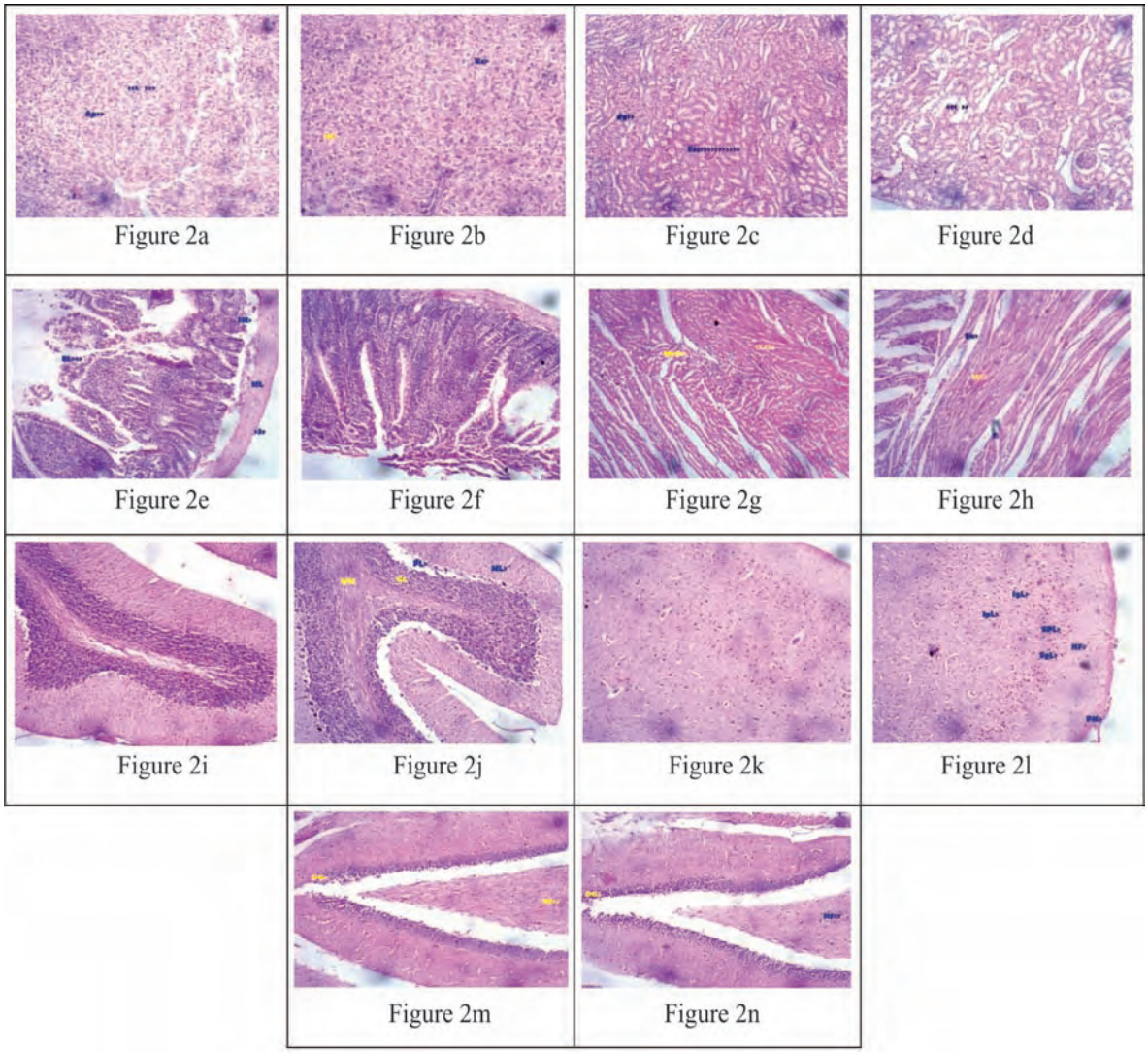


Remarks

Figure 1a and 1b: Sections of liver of Normal control group
Figure 1c and 1d: Sections of kidney of Normal control group
Figure 1e and 1f: Sections of jejunum of Normal control group
Figure 1g and 1h: Sections of heart of Normal control group
Figure 1i and 1j: Sections of brain-cerebellum of Normal control group
Figure 1k and 1l: Sections of brain-cerebrum of Normal control group
Figure 1m and 1n: Sections of brain- hippocampus and mid-brain of Normal control group
All the organs have shown normal cytoarchitecture.

Figure 2

Photomicrograph of albino rats of Dattūra treated group (1×100 magnifications)



Remarks

Figure 2a and 2b: Sections of liver of Group II shows marked cell depletion, appearance of apoptotic cells, fatty degenerative changes, extensive micro fatty changes, sinusoidal dilatation and diffused degenerative changes

Figure 2c and 2d: Sections of kidney of Group II shows mild to moderate but extensive degenerative changes in the tubular epithelium along with eosinophilic changes and tubular dilatation, degeneration in tubular epithelium

Figure 2e and 2f: Sections of jejunum of Group II shows mild epithelial erosion with cell infiltration

Figure 2g and 2h: Sections of heart of Group II shows mild myocarditis and moderate oedema

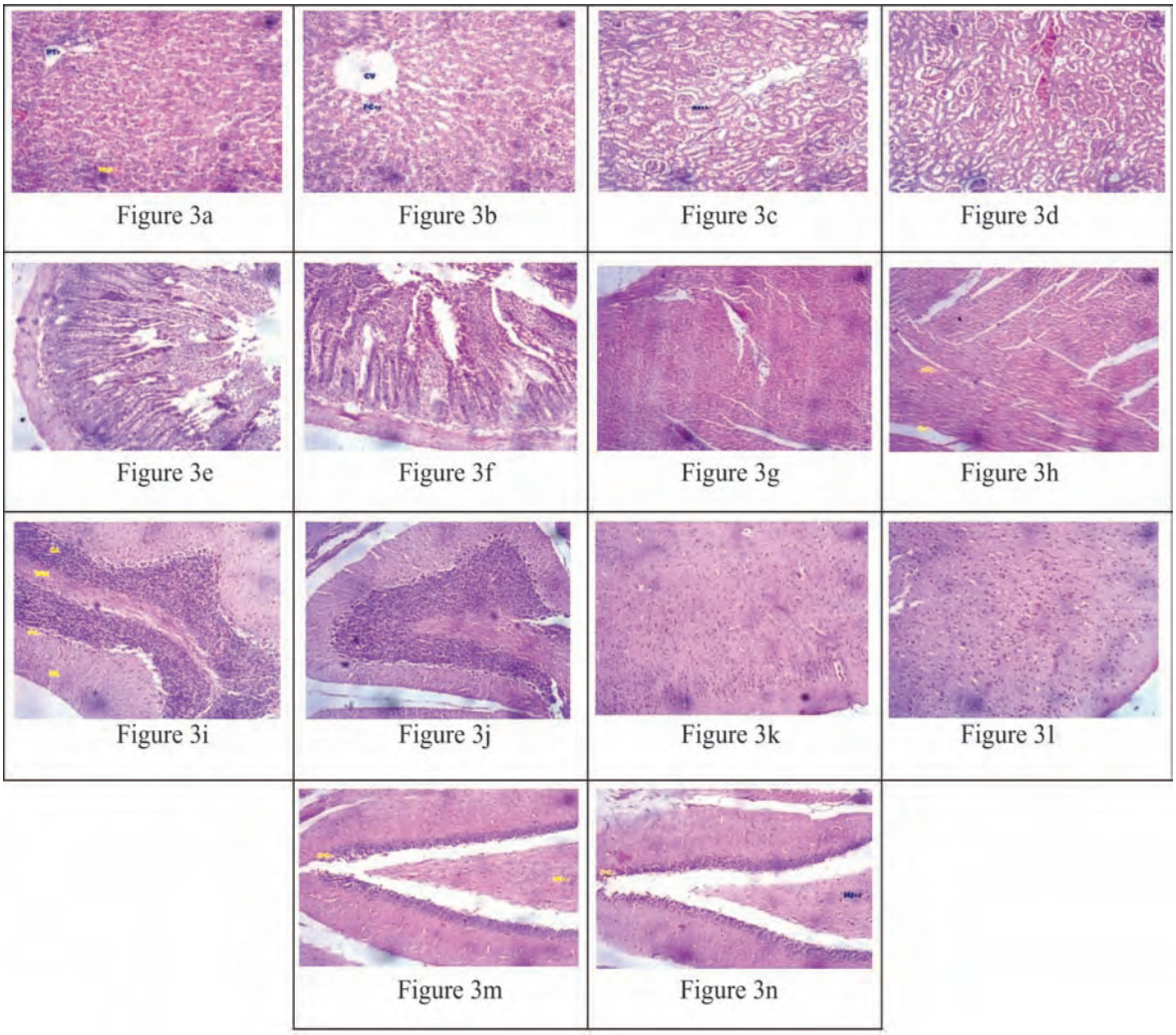
Figure 2i and 2j: Sections of brain-cerebellum of Group II shows normal cytoarchitecure

Figure 2k and 2l: Sections of brain-cerebrum of Group II shows normal cytoarchitecure

Figure 2m and 2n: Sections of brain- hippocampus and mid-brain of dattūra group shows dentate gyrus and different CA areas normal: moderate ventricular dilatation

Figure 3

Photomicrograph of albino rats of Dattūra + Cāṅgeri treated group (1×100 magnifications)



Remarks

Figure 3a and 3b: Sections of liver of Group III dose shows almost normal only mild fatty changes at few places

Figure 3c and 3d: Sections of kidney of Group III shows normal profile of both cortical and medullary regions

Figure 3e and 3f: Sections of jejunum of Group III shows normal cytoarchitecture

Figure 3g and 3h: Sections of heart of Group III in shows normal cytoarchitecture

Figure 3i and 3j: Sections of brain-cerebellum of Group III shows normal cytoarchitecure in all the three cellular layers and white matter

Figure 3k and 3l: Sections of brain-cerebrum of Group III shows normal cytoarchitecure

Figure 3m and 3n: Sections of brain-hippocampus and mid-brain of Group III shows dentate gyrus and different CA areas normal- moderate ventricular dilatation.

Discussion

The experimental study on albino rats was conducted to assess the antidote effect cāṅgerī svarasa on dattūra induced toxicity based on the LD_{50} value of dattūra.

Ponderal changes: Five organs weight parameters were recorded during the study. Administration of dattūra seed in the 2nd group leads to mild increase in the brain weight which got reversed in the 3rd group. There was a significant decrease in kidney weight in the 2nd group which may be due to moderate renal toxicity and oxidative stress, no change was observed in other organs weight in all the groups.

Biochemical parameters: Biochemical parameters suggest that; the SGOT level was increased in dattūra treated group and SGPT level was reduced, these values were reversed in cāṅgerī treated along with dattūra of the 3rd group, i.e. decrease in SGOT level and increase SGPT level. The decrease in SGPT may be due to less production of SGPT enzymes owing to the cell injury or cell destruction in the liver, here the drug cāṅgerī may prevented the further destruction as the drug contains enough vitamin C which is already proved as hepatoprotective.

The alkaline phosphate level was significantly decreased in dattūra treated 2nd group and which was significantly reversed in the 3rd group. Since the variation in the values of ALP cannot be only due to liver abnormalities but also due to bone turn over. Vitamin C exerts a positive effect on trabecular bone formation by influencing expression of bone matrix genes in osteoblasts, so in this study Vitamin C may be contributed to reverse the changes in ALP.

Protein in the serum is made up of albumin and globulin, protein level was found to be significantly increased in the 2nd group and mild decrease was found in the 3rd group. When compared to the 1st group i.e. control group serum total protein commonly elevates in dehydration or any other condition causing an increase in immunoglobulin. The observed increase in protein may be indicative induction of its production in the liver, this has occurred without any significant elevation of transaminases. The increase in total protein may be due to the dehydration effect of dattūra by stimulating heat regulating centres and by inhibitory action of secretion of sweat and saliva.

The direct bilirubin was increased in the 2nd group when compared to the control. This may be due to the obstruction of biliary duct. Non-significant reversal of increased bilirubin in the 3rd group suggests the antidote effect of cāṅgerī. Serum urea level was increased in the 2nd group, which was reduced in the 3rd group suggestive of the effect of cāṅgerī. The Serum creatinine level was significantly increased in the 2nd group which may marginally reduce in the 3rd group, again suggests the effect of cāṅgerī. Pathological elevation in blood urea level suggests diseases of kidney and increase in creatinine level may suggests interference with renal glomerular function. Here in this study variations in urea and creatinine in the 2nd group suggests moderate impairment of kidney functions due to dattūra poisoning and which were reversed moderately by the antidote effect of cāṅgerī svarasa in the 3rd group.

Electrolyte analysis suggests that there was significant decrease in serum potassium and serum sodium level in dattūra treated 2nd group, when compared to normal control. Potassium reduction suggests impaired cellular process and sodium reduction was due to water-sodium imbalance. Previous studies have already proved that atropine (main chemical constituent of dattūra) inhibits the electrolyte in the body and electrolyte imbalance was also noted in deliriant state or confused state, which were the common symptoms of dattūra poisoning. The significant decrease in the electrolyte levels were mildly reversed in the 3rd group treated with cāṅgerī suggests strong proof for antidote effect.

Locomotors activity: When locomotor activity was observed it was noted that moderate decrease was

observed in horizontal movement of rats in the first week of dattūra administration and the same decrease movement were significantly reversed by the antidote cāṅgerī which was noted in the rats of Group III. The important components of dattūra such as atropine, hyoscyamine and hyoscine may contributed in stimulating the higher centres of the brain and then motor centres resulting in decrease of horizontal movements. The reverse action in Group III treated with cāṅgerī svarasa suggests reversal effect of dattūra by significantly increasing vertical, horizontal and total movements which strongly proves the antidote effect of cāṅgerī svarasa on dattūra induced toxicity.

Histopathological observations: Histological examination revealed moderate degenerative changes in liver and jejunum and mild to moderate changes in kidney in dattūra treated group. Heart and brain were not affected. The toxicant induced degenerative changes in the above three organs were found to be reversed in cāṅgerī svarasa treated group. This clearly shows that cāṅgerī svarasa has protective effect on dattūra induced changes.

Thus based on the results obtained it can be inferred that administration of dattūra causes behavioural, biochemical, ponderal and structural changes in some of the organs. The behavioural and structural changes induced by the toxicant were significantly attenuated by co-administration of cāṅgerī svarasa the data generated during this study provideed clear evidence for the antidote efficacy of the cāṅgerī svarasa.

Conclusion

Dattūra administered group had shown mild to moderate toxic effect on liver, when compared with normal control, mild to moderate toxicity was even noted on kidney function test and the parameters are suggestive of moderate renal toxicity. The cāṅgerī svarasa treated group had shown reversal of the toxicity. This may be considered as an evidence of antidote effect of cāṅgerī svarasa in dattūra poisoning. Administration of dattūra results in statistically significant decrease of electrolytes like sodium and potassium which were increased after the administration of cāṅgerī svarasa, suggests mild to moderate recovery from toxicity. The main observation found in this study on the locomotors activity shows marked effect of dattūra toxicity which was significantly reversed in antidote group treated with cāṅgerī svarasa. In the histopathological study also liver and jejunum had shown moderate degenerative changes and in the kidney mild to moderate changes in dattūra treated group, which had been reversed by the cāṅgerī svarasa treated group. However, the overall inference is that the antidote was effective in reversing the moderate changes observed in jejunum, liver and kidney as a result of dattūra poisoning. Hence, from an experimental study on the antidote effect of cāṅgerī svarasa in dattūra poisoning, it is very clear that the cāṅgerī svarasa shown mild to moderate antidote effect against dattūra poisoning.

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CASE STUDY

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Effect of a herbomineral combination in Benign prostatic hyperplasia - a case study

Salil kumar Jain, Swati Jain, Nitin Ujjaliya and Vajhallya D. C.

ABSTRACT: Benign prostatic hyperplasia (BPH), also called as prostate enlargement, is a non-cancerous increase in size of the prostate gland. Symptoms may include frequent urination, trouble starting to urinate, weak stream, inability to urinate or loss of bladder control etc. Complications may be urinary tract infection, bladder stone and chronic kidney problems. The cause of BPH is still unknown but the risk factors includes family history, obesity, type-2 diabetes, lack of exercise and erectile dysfunction. Medications like pseudoephedrine, anticholinergic drugs and calcium channel blockers may worsen the symptoms. The underlying mechanism involves the prostate gland pressing the urethra thereby making it difficult to pass out urine. Diagnosis is typically based on symptoms and examination, after ruling out the other possible causes. Although prostate specific antigen (PSA) levels may be elevated in males with BPH, the condition does not increase the risk of prostate cancer. In this study anubhūta yoga of Harītakī cūrṇa and purified sasyaka made into tablet form along with kvātha (decoction) prepared out of varuṇa, śigru, kāñcanāra and punarnava was given to the patients for 60 days. It was found effective in relieving the symptoms.

Key words: Benign Prostatic Hyperplasia, Anubhūta yoga

Introduction

Benign prostatic hyperplasia (BPH) refers to the non malignant growth of the prostate observed very commonly in aging men. It is the actual hyperplasia of the prostate gland develops as a strictly age-related phenomenon in nearly all men, starting at approximately 40 years of age. According to histological studies, more than 50% of men will face this diagnosis by the age of 60 years[1, 2] and 90% of males suffer from BPH at the age of 80. Globally, around 105 million people are affected by BPH. In fact, the histological prevalence of BPH, which has been examined in several autopsy studies around the world, is approximately 10% for men in their 30s, 20% for men in their 40s, reaches 50% to 60% for men in their 60s, and is 80% to 90% for men in their 70s and 80s. No doubt, when living long enough, most men will develop some histological features consistent with BPH.[3]

Histological BPH, although identified by the International Classification of Diseases (ICD) code 600, does not necessarily constitute a problem to the patient. In fact, many men with histological BPH will never see a doctor for this condition nor do they ever need any treatment for it. The condition becomes a clinical entity if and when it is associated with subjective symptoms, the most common manifestation being lower urinary tract symptoms (LUTS). It must be recognized that not all men with histological BPH will develop significant LUTS, although other men who do not have histological BPH will develop LUTS.[3] Such men might have other conditions of the prostate (prostatitis or prostate cancer), other causes for sub vesicle outlet obstruction (urethral stricture, bladder neck sclerosis), conditions of the bladder (carcinoma *in situ*, inflammation, stones) or other conditions leading to the rather non-specific constellation of symptoms commonly labelled as 'LUTS'.

The LUTS symptom complex can be conveniently divided into obstructive and irritative symptoms. The symptoms among the obstructive includes hesitancy,

straining and weak flow, prolonged voiding, partial or complete urinary retention and overflow incontinence. This often more bothersome irritative symptoms consists of frequency, urgency with urge incontinence, nocturia and painful urination, as well as small voided volumes.[4] The symptoms of BPH can be grouped in two main categories: storage and voiding. Men may have few of these symptoms initially, but with the increasing age and disease progression, symptoms can become more prevalent. Patients with BPH often report that the symptoms are distressing and inconvenient which impairs their quality of life.[5]

Case - 1

A 64 year old male presented with the symptoms of obstructed urination, frequent urgency of micturition (around 10 times at night) and inability to urinate or partial urination for more than a year. There was no pain during micturition. No history of diabetes or any other major illness was present. After a detailed general examination he was advised to go for a prostatic ultrasound. Simultaneously medicines were started for a period of 60 days regularly, with a follow-up in every 15 days.

Case - 2

A 72 year old male presented with the similar above mentioned symptoms and in addition he was having pain during micturition. There was an increase in the frequency of urination especially in the night (around 8 times). No history of diabetes, renal disorders or any other major illness was observed. After completing the general examinations, he was advised for a lower abdomen and prostatic ultrasound. At the same time medicines were started for a period of 60 days regularly, with a follow-up in every 15 days.

Treatment advised

Composition of Harītakīcūrṇa and sasyaka (purified) in the ratio of 20:1, processed with lemon juice for 7 days and made into tablet each weighing 250 mg. The same was given in the dosage of 500 mg twice a day with anupāana of tvakkvātha of varuṇa (*Crateva religiosa* G. Forst.), kāncanāra (*Bauhinia variegata* L.) and śigru (*Moringa oleifera* Lam.) and punarnava (*Boerhavia diffusa* L.) together.

Patient was also advised to drink plenty of water and avoid curd, butter, chocolate and sour food materials.

Prostatic ultrasound: Trans-abdominal or trans-rectal prostatic ultrasound is performed to accurately evaluate the size, shape, anatomy, and potential pathology of the prostate in a minimally invasive, cost-effective and reproducible way. A trans-abdominal ultrasound also assess the bladder and post void residual urine which may be contributing to the patient's symptoms.[6] Both patients were advised to undergo this examination.

Results and discussion

A significant improvement was observed in subjective parameters of BPH in both the cases. Frequency of micturation reduced by 50% as well as obstruction or partial urination showed a marked improvement. Prostatic ultrasound reveals noteworthy reduction in size of prostate there by symptoms get relieved. Table 1

Table 1
Reports of patients before and after treatment

Case	Reports before treatment	Reports after treatment
Case-1	Prostate measures 5.52 x 4.48 x 4.07 cm in size. Approximate weight 52.73 gms. Residual urine volume 67 ml. Grade IV Prostate enlargement	Prostate measures 5.51 x 4.31 x 4.19 cm in size. Approximate weight 52.05 gms. Residual urine volume 19.64 ml.
Case-2	Prostate measures 3.73 x 4.20 x 4.44 cm in size. Approximate weight 36 gms. Residual urine volume 20 ml.	Prostate measures 3.30 x 3.86 x 3.66 cm in size. Approximate weight 24 gms. Residual urine volume 15 ml.

Considering prostate as a granthi the mode of action of drugs used can be explained. Being laghu-rūkṣa guṇa, harītaki absorbs the kḷeda that causes excessive urination.[7] It also might have acts as lekhana dravya along with sasyaka which is having kṣāra[8] property attributed to the reduction of glandular mass. Varuṇa, kāncanāra and śigru having the kapha-medohara[9] property, is found much effective in granthi.[10] Mūtraḷa and rejuvinative effect of punarnava credited to the reduction of size and good flow of urine.[11] In a nut shell the overall effect of the therapy in reducing the size of the gland by their lekhana and kaphahara property and effect on mūtravahasrotas attributed the symptom of frequency of micturition.

Conclusion

From the above discussion it can be concluded that the herbomineral combination was found effective and safe in the cases of BPH. Significant relief in frequency of urination, nocturia, incomplete urination and a good flow of urine was observed. The overall effect of combination can be attributed to lekhana, mūtraḷa, kaphahara, śothahara properties and granthikārmukatva. However further studies with larger sample size should be carried out at advanced level.

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CLINICAL STUDY

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A comparative clinical study to evaluate the efficacy of Mustādi kvātha in dyslipidemia *vis- a-vis* medoduṣṭi

Jayshree Pandey, Singh O. P., Sujatha N. and Shweta Shukla

ABSTRACT: Dyslipidemia has been closely linked to the pathophysiology of Cardio Vascular Disease (CVD), the foremost cause for the death rates globally. Dyslipidemia is an independent modifiable key risk factor. Asian Indians have been found to develop CVD at a younger age than other populations. The likely causes for the increase in the CVD rates includes lifestyle changes associated with urbanization and nutritional transitions that accompany economic development.[1] This study was intended to study the āyurvedic correlation of dyslipidemia and to compare the efficacy of Mustādi kvātha with the standard control drug, Atorvastatin. In āyurveda, his condition can be better correlated with medoduṣṭi which is a functional condition and is just a precursor stage of medoroga which can be easily reversible by effective regimen. A total of 40 patients from both IPD and OPD of the Department of Kayachikitsa, Rishikul Campus, UAU, Haridwar were registered for the trial and randomly divided into two Groups of 20 patients each. The study was Randomized, Open label, Single blind Contolled Clinical trial. Group-I was treated with Mustādi kvātha, 40 ml twice a day and Group-II (control) was treated with Atorvastatin 10 mg once daily for a duration of 90 days. In intergroup comparison, there was almost similar kind of effect on Lipid profile parameters in both the groups while a significant reduction was seen BS-F was more in Group-I. Thus it was found that Mustādi kvātha can be a drug of choice in dyslipidemia in both diabetic and non-diabetic patients.

Key words: Dyslipidemia, Medoduṣṭi, Āyurveda, Lipids, Mustādi kvātha

Introduction

Today, a major portion of the population is following inappropriate fatty diet regimen and sedentary life style, which may lead to a state of dyslipidemia. The term 'dyslipidemia' denotes disordered lipid metabolism. All the components of dyslipidemia i.e. increase in the value of serum cholesterol, serum triglycerides, serum LDL, serum VLDL and decrease in HDL levels get most of the attention because of the link between cholesterol and pathogenesis of CAD and CVD. The raised level of cholesterol in dyslipidemia leads to deposition of lipids on the walls of arteries further leading to atherosclerosis. It is also responsible for many lifethreatening conditions like coronary artery disease (CAD), ischemic heart disease, hypertension and stroke. Epidemiological studies predict that for each 1% reduction in lipid level, the risk of the heart diseases reduces by 2.5%.[2] In modern system of medicine, we have a wide range of drugs like statins, resins, fibric acid derivatives, nicotinic acid, etc. which are quite effective in normalizing the lipid levels. But they may cause some side effects like headache, nausea, bowel upset, rashes, sleep disturbances, myalgia, liver damage, etc.[3] A recent research on atorvastatin has proved that intake of it in high dose for longer durations makes the patients susceptive to development of diabetes.[4] Though few studies have been carried out for these burning problems, there is still a need for an effective and safe treatment.

In āyurveda there are scattered references of ailments which resemble dyslipidemia. But a direct correlation with any of the disease mentioned classics is not possible. The concept of abaddha medaḥ expounded by ācārya Cakrapāṇi[5] has some similarities with the condition of dyslipidemia described in modern literature. Lipid explained in modern sciences has close resemblance to snehadravya in āyurveda, i.e.

lipid can be correlated to medodhātu. Abnormal accumulation of medodhātu in the body can be termed as medoduṣṭi.

Medasaऽऽvṛtamārgatvāt puṣyantyanyena dhātavaḥ[6]

The symptoms of dyslipidemia described in modern texts show resemblance with āma and with many of rasaduṣṭi and medoduṣṭi janya symptoms. Being a disorder of medodhātu, we have correlated it with 'medoduṣṭi' ie. āmadūṣita medodhetu. Dyslipidemia is a disorder of agnimāndya and the sāmarasa thus formed leads to the obstruction of channels. Hence, to manage this condition the drugs selected should have dīpana, pācana, kaphanāśaka, medhoghna, lekhana, karṣaṇa and srotośodhaka properties.

Mustādi kvātha[7] contains musta (*Cyperus rotundus* L.), āragvadha (*Cassia fistula* L.), pāṭha [*Cyclea peltata* (Lam.) Hook.f. & Thomson], triphala [*Terminalia chebula* Retz., *Terminalia bellerica* (Gaertn.) Roxb. and *Phyllanthus emblica* L.], devadāru [*Cedrus deodara* (Roxb. ex D.Don) G.Don], śvadamṣṭra (*Tribulus terrestris* L.), khadira [*Acacia catechu* (L.f.) Willd.], nimba (*Azadirachta indica* A.Juss.), haridrā (*Curcuma longa* L.), dāruharidrā (*Berberis aristata* DC.), tvak (*Cinnamomum verum* J.Presl) and kuṭaja [*Holarrhena antidysenterica* (Roth) Wall. ex A.DC.] in the form of decoction was selected as the internal medication. Most of these contents have a tridoṣaśāmaka (haridra, harītakī and āragvadha), medohara (musta, haridrā, dāruharidrā and devadāru), agnidīpaka-āmapācaka (musta, pāṭha, tvak, devadāru and vibhītakī) and yakṛduttejaka (nimba and tvak) properties.[8]

Keeping all these factors in mind, this study was planned to compare the efficacy of Atorvastatin and Mustādi kvātha in the management of dyslipidemia.

Aims and objectives

- To work out with the āyurvedic correlations of dyslipidemia with medoduṣṭi.
- To evaluate and compare the efficacy of Mustādi kvātha in the management of dyslipidemia with the standard control drug Atorvastatin, using various scientific parameters.
- To provide a reliable, cost effective āyurvedic treatment for dyslipidemia.

Hypothesis

- H_0 - Mustādi kvātha has no effect in dyslipidemia.
- H_1 - Mustādi kvātha has some effect in dyslipidemia.

Ethical Committee approval number - UAU/R/C/IEC/2016-17/2

Materials and methodes

Selection of patients: Patients diagnosed with abnormal lipid profile willing to participate in the clinical trial were selected. A total of 40 patients, randomly divided in two groups, each containing 20, were selected from the OPD and IPD, P.G. Department of Kayachikitsa, Rishikul campus, Haridwar. A detailed proforma was prepared incorporating all the points of history taking, physical examination, assessment of treatment, etc. A written informed consent was taken from the patients before including them in the study.

Type of sampling: Randomized sampling

Inclusion criteria

- Diagnosed and confirmed cases of dyslipidemia on the basis of investigation.
- Patient between the age group of 20-60 years of either sex who fulfilled the objective and subjective parameters.
- A few newly diagnosed cases of NIDDM with optimal control diabetes were also considered under the study. (As the number of patients attending Rishikul OPD is meagre, I was compromised to register NIDDM cases).

Exclusion criteria

- Patients with age below 20 years and above 60 years.
- Patients suffering from type-1 diabetes mellitus and uncontrolled diabetes mellitus or uncontrolled hypertension.
- Patient having systemic illness like tuberculosis, carcinoma and endocrine disorders or major illness like renal or liver disorder.
- Patient having the past history of myocardial infarction and unstable angina and CHF.

Assessment criteria

The assessment was done on the basis of following subjective and objective parameters:

1. Subjective parameters

The subjective assessment was done on the basis of improvement in following signs and symptoms[7a,7b,9]: Aṅgagaurava (feeling of heaviness in body), aruci (reduced appetite), kṣudraśvāsa (dyspnoea), aṅgamarda (pain and intermittent claudication), atisveda (excessive sweating), daurgandhya (unpleasant body odour), karpādadāha (burning sensation in hands and feet), javoparodha (inability to do physical exercise) and nidrātiyoga (excessive sleep).

2. Objective criteria (Diagnostic criteria):

The assessment was done on the basis of the change in relevant laboratory investigative parameters, body weight and BMI before, during and at the end of the trial.

Investigations: Patients were diagnosed on the basis of laboratory investigations mainly;

Lipid profile: S. Cholesterol (>200mg/dl), S. Triglycerides (>150mg/dl), S. LDL (>130 mg/dl), S. VLDL (>40 mg/dl) and S. HDL (<40 mg/dl). Also Hb%, TLC, DLC, ESR, Blood sugar (fasting and post prandial), KFT and ECG (if needed) was done.

Body weight and Body Mass Index(BMI) was also recorded.

All the symptoms were graded on the basis of their severity and were given scores ranging between 0-3. No symptoms-0, Mild symptoms-1, Moderate symptoms-2 and Severe symptoms-3.

Trial drugs and their dosages:

1. Mustādi kvātha- 40 ml BD

Method of preparation of Mustādi kvātha as yavakūṭa cūrṇa: All the raw drugs were collected from the a local pharmacy, Prem Nagar Ashram, Haridwar and were identified and verified by Dept. of Dravyaguna, Rishikul campus, Haridwar. These raw drugs were washed, dried. They were taken in equal proportion and powdered into yavakūṭa cūrṇa form and packed into 300 gm each.

20 gms of yavakūṭa cūrṇa was boiled in 16 times of water (320 ml) and was reduced to 1/4 i.e. 80 ml approximately and was given in two divided doses of 40 ml each. (As recommended by our Rasasashtra Department).

A visiting expert panel of five doctors from modern medicine were appointed by the Rishikul Campus, UAU, Haridwar. With their consent the drug Atorvastatin was prescribed.

Duration of the study: 90 days

Type of study: Single blind, Open label controlled.

Assessment and follow up: The assessment of the patient was done for three times at the interval of 30 days and follow up was done 30 days after completion of the treatment.

Time of administration of drug

Group-I: The 20 patients were administered with 40 ml Mustādi kvātha after breakfast and dinner.

Group-II: 20 patients were given Tab. Atorvastatin 10 mg once daily, with luke warm water before meals.

Results

Group- I: Statistically highly significant result was found in subjective parameters like aṅgagaurava, kṣudraśvāsa, aṅgmarda and javoparodha.

Statistically significant result was found in subjective parameters like aruci, atisveda, karapādadāha and nidrātiyoga. Statistically non-significant result was obtained with the symptom daurgandhya. Table 1.

In biochemical parameters, Statistically significant result ($p<0.05$) was found in S. cholesterol, S. triglycerides, S. LDL, and S. VLDL, where as statistically non-significant result ($p>0.05$) was found in S. HDL. Table 3.

Group-II: When the study population was treated with Atorvastatin Statistically Highly Significant (<0.001) result was found in subjective parameters like aṅgagaurava, kṣudraśvāsa, aṅgmarda and javoparodha. Statistically significant result was found in subjective parameters like aruci, atisveda, karapādadāha, nidrātiyoga and daurgandhya. Table 2.

In biochemical parameters, Statistically significant result ($p<0.05$) was found in S. Cholesterol, S. triglycerides, S. LDL, and S. VLDL, while statistically non-significant result ($p>0.05$) was found in S. HDL. Table 4.

Inter group comparison: In subjective symptoms statistically non-significant ($p>0.05$) value was obtained on comparing Group-I vs Group-II. Hence, we conclude that there is no significant difference in the result between Group-I and Group-II.

Table 1
Effect of Mustādi kvātha on the subjective symptoms in Group-I

Sl. No.	Symptoms	Median		Wilcoxon Signed Rank W	P-Value	% Effect	Result
		BT	AT				
1.	Aṅgagaurava	2	1	-3.866[a]	<0.001	67.6	HS
2.	Aruci	1	0	-3.051[a]	<0.005	78.6	Sig
3.	Kṣudraśvāsa	1	0	-3.317[a]	<0.001	57.9	HS
4.	Aṅgamarda	1	0	-3.448[a]	<0.001	72.0	HS
5.	Atisveda	0.5	0	-2.333[a]	<0.005	41.2	Sig
6.	Daurgandhya	0	0	-1.000[a]	>0.05	33.3	NS
7.	Karpādadāha	0.5	0	-2.919[a]	<0.005	76.5	Sig
8.	Javoparodha	2	1	-3.234[a]	<0.001	48.5	HS
9.	Nidrātiyoga	0	0	-2.530[a]	<0.005	57.1	Sig

Table 2
Effect of Atorvastatin on the subjective symptoms in Group-II

Sl. No.	Symptoms	Median		Wilcoxon Signed Rank W	P-Value	% Effect	Result
		BT	AT				
1.	Aṅgagaurava	2	1	-3.938[a]	<0.001	70.0	HS
2.	Aruci	0	0	-2.640[a]	<0.05	76.9	Sig
3.	Kṣudraśvāsa	1	0	-3.557[a]	<0.001	76.2	HS
4.	Aṅgamarda	1	0	-3.416[a]	<0.001	76.0	HS
5.	Atisveda	0	0	-2.828[a]	<0.05	47.1	Sig
6.	Daurgandhya	0	0	-2.000[a]	>0.05	66.7	Sig
7.	Karpādadāha	1	0	-3.071[a]	<0.05	70.0	Sig
8.	Javoparodha	2	0.5	-3.704[a]	<0.001	64.5	HS
9.	Nidrātiyoga	0	0	-2.000[a]	<0.05	57.1	Sig

Table 3
Effect of Mustadi kwatha on Lipid profile in Group-I

Sl.No.	Biochemical value		Mean	N	SD	SE	t-Value	P-Value	% Effect	Result
1.	S. Cholesterol	BT	234.3	20	30.6	6.8	8.845	<0.05	26.3	Sig
		AT	172.7	20	17.9	4.0				
2.	S. Triglycerides	BT	222.2	20	92.9	20.8	5.388	<0.05	39.4	Sig
		AT	134.6	20	32.9	7.4				
3.	S. LDL	BT	142.3	20	31.9	7.1	4.638	<0.05	19.4	Sig
		AT	114.7	20	12.1	2.7				
4.	S. VLDL	BT	43.2	20	21.6	4.8	3.829	<0.05	30.7	Sig
		AT	29.9	20	10.2	2.3				
5.	S. HDL	BT	38.8	20	7.3	1.6	0.239	>0.05	0.7	NS
		AT	38.5	20	6.0	1.3				
		AT	32.6	20	4.8	1.1				

Table 5
Comparative assessment of % relief on Lipid profile

Sl. No.	Symptoms	% Relief in Group I	% Relief in Group II
1.	Cholesterol	26.3%	33.7%
2.	Triglycerides	39.4%	39.6%
3.	HDL	0.7%	4.9%
4.	LDL	19.4%	22.4%
5.	VLDL	30.7%	18%

In objective parameter (Lipid profile), statistically non-significant (p>0.05) value was obtained on comparing Group-I and Group-II, hence we conclude that there is no significant difference in result between Group-I and Group-II. Table 5

While observing other biochemical parameters of Group-I, Statistically non-significant result (p>0.1

Table 4
Effect of Atorvastatin on Lipid profile in Group-II

Sl.No.	Biochemical value		Mean	N	SD	SE	t-Value	P-Value	% Effect	Result
1.	S. Cholesterol	BT	247.3	20	30.9	6.9	8.709	<0.05	33.7	Sig
		AT	164.0	20	20.1	4.5				
2.	S. Triglycerides	BT	204.8	20	62.9	14.1	6.410	<0.05	39.6	Sig
		AT	123.7	20	20.0	4.5				
3.	S. LDL	BT	147.2	20	30.4	6.8	3.886	<0.05	22.4	Sig
		AT	114.2	20	16.9	3.8				
4.	S. VLDL	BT	36.2	20	23.0	5.1	2.235	<0.05	18.0	Sig
		AT	29.6	20	12.1	2.7				
5.	S. HDL	BT	36.4	20	6.7	1.5	-1.772	>0.05	4.9	NS
		AT	38.3	20	6.3	1.4				

NS) was found in Hb%, Blood urea and Serum protein where as Significant result was found in TLC, ESR, Fasting blood sugar, Serum creatinine and Serum uric acid. Table 6.

While observing other biochemical parameters of Group-II, No Significant result (p>0.1 NS) was found in TLC, Fasting blood sugar, Serum protien, Serum uric acid and Blood urea, while Significant result was found in Hb%, ESR and Serum creatinine. Table 7.

When intergroup comparison was done with different biochemical parameters, significant (<0.01) lowering in FBS was found in the trial drug droup.

Table 6
Effect of Mustādi kvātha on other boichemical values in Group-I

Biochemical value		Mean	N	SD	SE	t-Value	P-Value	% Effect	Result
Hb%	BT	13.0	20	1.4	0.3	-1.272	>0.05	2.3	NS
	AT	13.3	20	1.5	0.3				
Total Leucocyte Count	BT	6660.0	20	1555.8	347.9	2.382	<0.05	5.7	Sig
	AT	6282.0	20	1225.0	273.9				
Polymorphs	BT	57.5	20	6.8	1.5	2.351	<0.05	7.3	Sig
	AT	53.3	20	10.1	2.3				
Lymphocytes	BT	30.8	20	4.7	1.0	3.439	<0.05	11.5	Sig
	AT	27.3	20	4.2	0.9				
Eosinophils	BT	3.1	20	0.8	0.2	1.756	>0.05	14.8	NS
	AT	2.6	20	0.8	0.2				
Monocytes	BT	1.6	20	0.6	0.1	2.373	<0.05	25.8	Sig
	AT	1.2	20	0.7	0.2				
Basophils	BT	0.2	20	0.5	0.1	0.567	>0.05	33.3	NS
	AT	0.1	20	0.3	0.1				
ESR (Erythrocyte Sedimentation Rate)	BT	29.0	20	22.2	5.0	2.810	<0.05	31.6	Sig
	AT	19.9	20	11.2	2.5				
Fasting Blood Sugar	BT	104.7	20	16.0	3.6	3.047	<0.05	9.6	Sig
	AT	94.6	20	8.8	2.0				
Serum Protein	BT	6.8	20	0.5	0.1	0.179	>0.05	0.5	NS
	AT	6.7	20	0.5	0.1				
Serum Creatinine	BT	0.8	20	0.1	0.0	3.019	<0.05	7.4	Sig
	AT	0.7	20	0.1	0.0				
Serum Uric acid	BT	5.3	20	1.0	0.2	2.567	<0.05	7.2	Sig
	AT	4.9	20	0.9	0.2				

Table 7
Effect of Atorvastatin on other boichemical values in Group-II

Biochemical value		Mean	N	SD	SE	t-Value	P-Value	% Effect	Result
Hb%	BT	12.3	20	1.8	0.4	-3.899	<0.05	5.6	Sig
	AT	13.0	20	1.6	0.3				
Total Leucocyte Count	BT	6415.0	20	1399.7	313.0	2.004	>0.05	5.8	NS
	AT	6045.0	20	1113.0	248.9				
Polymorphs	BT	59.8	20	8.7	1.9	2.034	>0.05	5.4	NS
	AT	56.6	20	10.9	2.4				
Lymphocytes	BT	33.3	20	5.3	1.2	4.216	<0.05	12.6	Sig
	AT	29.1	20	4.5	1.0				
Eosinophils	BT	2.7	20	0.8	0.2	1.453	>0.05	14.8	NS
	AT	2.3	20	1.0	0.2				
Monocytes	BT	1.6	20	1.0	0.2	2.703	<0.05	31.3	Sig
	AT	1.1	20	0.8	0.2				
Basophils	BT	0.1	20	0.2	0.1	1.000	>0.05	100.0	NS
	AT	0.0	20	0.0	0.0				
ESR (Erythrocyte Sedimentation Rate)	BT	26.5	20	13.3	3.0	3.224	<0.05	24.0	Sig
	AT	20.1	20	9.0	2.0				
Fasting Blood Sugar	BT	102.1	20	10.7	2.4	2.095	>0.05	5.0	NS
	AT	97.0	20	6.8	1.5				
Serum Protein	BT	6.9	20	0.6	0.1	0.463	>0.05	1.3	NS
	AT	6.8	20	0.6	0.1				
Serum Creatinine	BT	0.7	20	0.1	0.0	4.510	<0.05	8.6	Sig
	AT	0.7	20	0.1	0.0				
Serum Uric acid	BT	0.7	20	0.1	0.0	1.382	>0.05	3.9	NS
	AT	5.0	20	0.1	0.0				

The percentage relief in aruci (78.6%) was better in Group-I than Group-II (76.9%).

For intergroup comparison between Group-I and Group-II, we have used Mann Whitney U test in subjective parameters and unpaired t-test in objective parameters.

The overall effect of therapy was assessed by improvement in all subjective and objective parameters of individual patients. Marked improvement was in 12 patients (60%) of Group-I while in Group-II, 13 patients showed marked improvement.

Discussion

Probable mode of action of Mustādi kvātha[8]:

Generally Mustādi kvātha does tridoṣaśamana, especially kaphavātaśamana. It pacifies the vitiated kaphadoṣa which is dominant in the pathogenesis of dyslipidemia as well as depletes the excessively produced rasa, māmsa, meda, vasā, sveda and kḷeda which are all similar in attributes to kaphadoṣa.

Āragvadha and triphala have mild purgative action which causes vātānulomana and further corrects all the five types vāta bringing an end to the vātapradhāna samprāpti. Drugs like pāṭha and gokṣura are mūtravirecaka that brings about diuresis relieving the body from the excess kḷedāmśa. Āragvadha, kuṭaja, pāṭha, nimba, khadira, haridrā and dāruharidrā are known for its action on medodhātu and allied dhātus and are indicated in diseases like kuṣṭha, medoroga and prameha.

Drugs like musta, devdāru, tvak, kuṭaja, nimba, pāṭha and triphala does agnidīpana leading to proper formation of the rasādi dhātus.

Pāṭha, musta, triphala, haridrā, dāruharidrā digests the āmadoṣa present at the jaṭharāgni level as well as the medodhātvagni level.

Hence, due to the similarity of doṣa and dūṣya, it can be successfully used in dyslipidemia. Thus we can

say that the contents of Mustādi kvātha exhibit hypolipidemic and hypoglycemic actions thereby normalizing the lipid profile and reducing insulin intolerance and increasing the sensitivity of insulin receotors to glucose by virtue of its tikta-kaṣāya rasa and lekhana-karṣaṇa properties. It is an antioxidant and anti-inflammatory thereby reducing atherogenesis phenomenon by virtue of its śothahara, chedana, anulomana and dhātu upaśoṣaka properties. It is hepatoprotective and improves the glycogenesis and reduces excess lipogenesis and glycogenolysis by the dīpana, pācana and yakṛduttejaka properties. This helps in improving the carbohydrate and fat metabolism in liver.

Conclusion

Dyslipidemia can be better correlated as a medoduṣṭi vikāra in āyurveda. Medoduṣṭi is a functional condition and just a precursor stage of medoroga that can be easily reversed by effective treatment. Contrary to the previous belief of it's increased incidence in middle aged patients, it has been studied that it is significantly prevalent in young ones also.

Mustādi kvātha showed almost equal effect on lipid profile parameters. A statistically significant response was seen in fasting blood sugar levels in Group-I but no change was noticed in Atorvastatin group.

A recent research on Atorvastatin has proved that a high dose of Atorvastatin for longer duration make the patients prone for development of diabetes. Here the ideal is that which cure the disease and also not causes any other disease, so treatment of dyslipidemia with Mustādi kvātha may be a better choice as it not only normalizes the lipid profile values but also reduces the chance of development of metabolic syndrome by reducing weight and diabetes.

The present study also proved that there is a major role of agni and āma in the pathogenesis of dyslipidemia where the ingredients of Mustādi kvātha gives promising result.

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LITERARY STUDY

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Understanding sukha and duḥkha from āyurvedic perspective

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ABSTRACT: The emotions of life are not easy to understand and they continue to intrigue the medical professionals and all others who are interested to investigate it. Sukha (happiness/pleasure) and duḥkha (unhappiness/displeasure) are such emotional experiences which play an important role in our day to day life. Modern science is trying to understand these by studying the brain functions and bio-chemical changes that occur during these feelings, whereas āyurveda has a unique view to define and explain it. The term sukha and duḥkha are included in the definition of āyurveda itself, which generally indicate wellness and miseries respectively. The present study is intended to explore the concept of sukha and duḥkha as explained in classical texts, correlating it with the idea of happiness and unhappiness deliberated in philosophy and psychology. A thorough study of āyurveda classics mainly Bṛhattrayī (Carakasamhita, Suśrutasamhita and Aṣṭāṅgahṛdayam) was done to understand the the concept of sukha and duḥkha in depth, along with the research article published in reputed journals. Āyurveda has explained the concept of sukha and duḥkha from both the aspect of health and philosophy. From the Indian philosophical point of view all types of emotions basically arise from our desires. From the perspective of health the sukha is considered as ārogya (health), which is the state of dhātusāmya (homeostasis of fundamental tissues) and duḥkha as the state of disease which is due to imbalance of dhātus.

Key words: Sukha, Duḥkha, Ārogya, Happiness, Miseries, Wellbeing

Introduction

Āyurveda literarily means 'the science of life'. It is a science which deals with four types of life. Sukha and duḥkha are two among them.[1] Every human being experiences sukha and duḥkha in life. 'Sukha' is the feeling of something which is agreeable to living being[2] and is considered as the feeling of happiness. It is the attribute which causes comfort to the whole world. All the activities of living beings are meant for happiness and such pleasure is based on dharma only. Dharma is to perform one's duty in a right way. Sukha is the net result of satvaguṇa that provides clarity and enlightens the mind. Sukha is produced by the purity of mind. It provides purity to sense organs, lightness, love, satisfaction, compassion, tendereness, forgiveness, absence of pride, simplicity, mildness, etc. All these good qualities are the forms of happiness and pleasure. Sukha is considered as 'icchārūpa tṛṣṇa'.[1ae] Tṛṣṇa is nothing but desire which is responsible for both sukha and duḥkha.[1a] Iccha means kāma.[2a] It is of two types: phaleccha and upāyeccha. Among this phaleccha is responsible for sukharūpa result.[2a] In Aṣāṅgahṛdayam it is mentioned that sukha is both kāma and mokṣa.[3] Carakācārya had said that one who adopt the activities which do not clash dharma, and follows the path of peace and engage himself in studies, he can attain sukha.[1b] The dictionaries give the meaning of sukha as happy, delighted, joyful, pleased, agreeable, gentle, mild and comfortable.[4,5]

'Duḥkha' is the feeling of something disagreeable to living being.[2b] It creates discomfort due to the influence of rajoguṇa. Rajoguṇa will act as a preraka and masks the satvaguṇa and cause duḥkha. Pride, jealousy, enmity, anger, unhappiness, sorrow, etc. are the various forms of duḥkha. Duḥkha is considered as 'dveṣarūpa tṛṣṇa', the feeling which is originated from the desire which is dveṣarūpa. Dveṣa is nothing but krodha. Rajoguṇa is responsible for krodha which leads to duḥkha. Due to the lack of satvaguṇa and increase of rajoguṇa people are tend to do the unrighteous activities leading to disagreeable results, that is not been liked by the mind and causes duḥkha. The dictionaries give the meaning of duḥkha as

painful, disagreeable, unpleasant, uneasy, uncomfortable, difficult, sorrow, trouble, etc.

The term sukha and duḥkha has various meaning according to different contexts. Āyurveda accepts sukha as the basic essential factor for svāsthya/ārogya and duḥkha is the absence of svāsthya i.e. vikāra.[1c] Our ācāryas have given the convincing answer to understand these fundamental aspects of life. The fact is that none other than our own karma brings happiness and miseries in our life. So understanding ourselves is the true step towards achieving the ultimate knowledge of life.

Objectives of the study

The present review is intended to give the in-depth view of the concept of sukha and duḥkha from the perspective of health as per āyurvedic classics and correlating them with the terms happiness and unhappiness what we use as synonyms to them.

Methodology

In this review a thorough perusal of the classics mainly Bṛhattrayī was done. Relevant Sanskrit literatures were also reviewed for better understanding. Published books and the research articles from reputed journals were reviewed to explore the subject. Main emphasis was given to explain the concept of sukha and duḥkha from a medical point of view. A comparative knowledge of both ancient and modern science was utilized for this.

Reason for sukha and duḥkha

Desire (tṛṣṇa) is the root cause for sukha and duḥkha.[1d] How a seed gets transformed and becomes a tree likewise sukha and duḥkha originates from tṛṣṇa.[6] If tṛṣṇa is icchārūpa it makes sukha and if it is dveṣarūpa it makes duḥkha. Rajaḥ and tamoguṇas are responsible for attachment.[1e] So we can say these two guṇas are causing tṛṣṇa. Tṛṣṇa is the root cause for janma (birth).[6a] After birth, due to cetanatva everyone will experience sukha and duḥkha. If the rajaḥ and tamo guṇas are totally absent and the mind is filled with satvaguṇa, there is no chance of getting tṛṣṇa, also sukha and duḥkha as well. As a result he attains mokṣa (salvation).[6b]

Upadhā is the root cause for both mānasika and śārīrika duḥkha.[1f] It is nothing but rāga, dveṣa, moha, etc. These factors are resisting a person to be engaged with laukika type of life.[6c] Upadhā may lead to impaired dhī, dhṛti and smṛti. A man having impaired dhī, dhṛti and smṛti along with ahaṅkāra, saṅga, sañcaya, abhipḷuta buddhi will go through the wrong path, vitiating both śārīrika and mānasika doṣas and attains all forms of duḥkha.[6d] For example how the silk produced from a silk worm is leading it to death, similarly upadhā which brings attachment among people will also makes them suffer from duḥkha always.[1g] Dharma and adharma emerging from the karma are the basic factors responsible for the production of sukha and duḥkha respectively.[6e]

Types of sukha and duḥkha

Sukha is classified as śārīrika (physical) and mānasika (mental).[1g,1h] Carakācārya[1i] had clearly explained that the cause for sukha is due to wholesome contact of senses with their objects. The wholesome contact will produce sense of pleasure and gives happiness, which is nothing but the state of ārogya (good health). The sense of happiness is mainly of two types, one is śārīrika and the other is mānasika. Śārīrikasukha is due to 'śarīra sparśa pravartana'[1j] (pleasant contact with physical factors) such as pleasant contact of senses with their objects and mānasikasukha is due to 'mānasika sparśa pravartana' (pleasant contact with mental factors) such as sense of satisfaction, love, hope, joy, etc. Sukha is again classified into kāma and mokṣa. Kāma can be considered as tadātvikasukha and mokṣa as ātyantika sukha.[3] Tādātvikasukha (worldly happiness) is momentary and ātyantika sukha (happiness beyond the worldly desire) is permanent in nature unaffected by worldly loss or gain.[3] Tādātvika sukha will originate as a result of the worldly desire and it is temporary in nature. Kāma is also called as iccha.

The desire originated from iccha is producing kāma that makes to experience sukha which is momentary. As the situations of life go on changing, the pursuit of happiness will also shift from one point to another. It is just a pseudo feeling of happiness which is not permanent. Ātyantikasukha is achieving the state of mokṣa. When there is no desire there will not be any actions of body and mind due to absence of jñānotpatti. So no sukha and duḥkha will be there. This is nothing but mokṣa. Mokṣa is the ultimate sukha where all types of vedana get vanished. Due to complete eradication of rajas and tamas and with the increase of satvaguṇa one will get tatvajñāna and attains complete detachment from all worldly activities. Mokṣa is the moment where a living being experiences the ultimate sukha which is permanent.

Duḥkha is considered as a synonym of vyādhi[3a] as it causes discomfort to physical, mental and verbal activities.[7] Different types of duḥkha are experienced due to vyādhi.[7] Duḥkha can be divided mainly into three: Ādhyātmika, Ādibhautika and Ādidaivika.[7a] In ādhyātmika, the term 'ātma' indicates both body and mind.[7b] Thus the entire diseases related to body and mind produces śārīrika and mānasika duḥkha respectively. All the vyādhi originated from the external factors can be considered under ādibhautika. Diseases that originate naturally by the influence of god is the third category. Among all the above categories of diseases the common feature is duḥkha. Based on śārīrika sparśa pravartana and mānasika sparśa pravartana duḥkha can also be classified as śārīrika and mānasika.[1k]

Due to the ādhāra-ādheya (support-supported) bhāva of body and mind, sukha or duḥkha affecting the body will also affect the mind and vice versa.

Unique view of sukha and duḥkha in āyurvedic literatures

The meaning of the term sukha differs according to context. As per Carakasamhita the originator of both sukha and duḥkha is Dakṣaprajāpati.[1af] According to 'Loka puruṣa sāmya siddhānta', Dakṣaprajāpati can be correlated with manas in human.[1l] Dakṣaprajāpati is doing the activities according to the instruction of Lord Brahma. similarly, as per the instruction of ātma, mind helps in the formation of jñāna along with indriya and indriyārthās. From that jñāna only qualities of sukha and duḥkha are originating. Sukha is nothing but the cause which are responsible for production of any type of happiness.[8] Likewise, duḥkha is the cause which produces different types of miseries.[1m] Based on this concept we can say that all the nidānas comes under the category of duḥkha and all the bheṣaja-prayogas come under the category of sukha.[1n] Thus āyurveda forms the best remedy for the eradication of all types of miseries.

A. Sukha and duḥkha as nidāna (etiology) of diseases

In the context of nidāna the term sukha is mentioned which denotes either the food intake or the activities like sitting, lying, sleeping, etc. If a person indulges in excess intake of food which he or she likes the most can also cause some kind of imbalance in tridoṣa level leading to disease manifestation. For example, svapnasukha and nidrāsukha is the excessive indulgence in sleep. Long term indulgence in such inactiveness vitiates the doṣas and may lead to diseases. Sukhaśayana indicates the nature of seat a person is using to lie-down. If it is so soft it may cause localized vitiation of doṣa leading to disease manifestation.

The above said features are not unwholesome in normal usage, but when they are used in excess, they also act as the etiological factors for one or more disease. In short, the concept of sukha is a subjective character, irrational usage of which will also act as etiological factor in disease manifestation.

Duḥkha is the main feature of all tyes of vyādhi. For some diseases duḥkha itself acts as the nidāna. In āmapradoṣajavyādhi,[1ag] duḥkha is one of the main cause. Here the psychological factors like depression/

sadness for a prolonged period affects the digestive functions and acts as an etiological factor of āmapradoṣajavikāra. In the context of Vātavyādhi and Yonīvyāpat, inappropriate seating, resting, etc. act as the etiological factors for its manifestation. (Sukha and duḥkha as nidāna is depicted in Table 1).

Table 1
Showing sukha and duḥkha as nidāna of diseases

Sukha as nidāna	Āsyasukha and svapnasukha are important nidāna[1o]	Prameha
	Nidrāsukha[1p]	Kaphaja hṛdroga
	Sukhaśayanāsana[1q]	Arśa
	Mṛṣṭānna sukhabhojana[1r]	Vātaśonita
	Āsyasukha, svapnasukha[1s]	Kaphaja śiroroga
Duḥkha as nidaāna	Duḥkhaśayyāsana[1t]	Vātavyādhi
	Duḥkhaśayya[1u]	Yonīvyāpat
	Duḥkha[1ag]	Āmapradoṣajavyādhi

B. Sukha and duḥkha as cikitsa

Sukha is an experience of happiness[3b] which can be attained through cikitsa. In some cases sukha itself acts as a treatment. In the context of treatment of vāta, 'sukhaśīlata' is mentioned.[3c] Here the term 'sukhaśīlata' means indulgence of activities which give comfort to both body and mind. This will help in the alleviation of vātadoṣa. In case of vājīkaraṇa cikitsa the main aim is to make a man capable to produce good progeny, for which both physical and mental pleasance is essential. Whatever a person sees, hear, touch or experience should be pleasant for both body and mind. All these pleasant feelings are responsible for the proper production and ejaculation of sperm which empower a man to produce good progeny.[3d]

In case of unmāda the procedures which create duḥkha to the body is considered as śamana type of treatment which include beating with rods, applying powder like kapikacchu [*Mucuna pruriens* (L.) DC.], etc.[1ah] Even though it helps to reduce the symptoms of the disease, all these activities gives discomfort and an unpleasant feeling to the individual. By performing such procedures vātadoṣa and rajoguṇa gets aggravated and reduces the covering of tamoguṇa over manovahasrotas and causes an alleviation in the symptoms of unmāda.

C. Sukha and duḥkha in relation with prognosis

Based on the degree of curability, diseases are classified into four. Among them one is sukhasādhya vyādhi or the easily curable disease. Here the term sukha indicates 'without any difficulties one can cure the disease'.[3e] We can also say that sukhasādhya vyādhi can be cured with minimum efforts and procedures.[1v]

All the diseases which cause difficulties in curing will produce duḥkha. For example, vātikajvara in varṣaṛtu is prākṛtajvara. All the prākṛtajvara except vātikajvara is difficult to cure due to its contradictory treatment principles with respect to the season. So it is considered as duḥkha.[1w]

D. Sukha and duḥkha in relation with garbha

Sukhaprasava and duḥkhaprasava are the two words explained randomly in our samhitas. In sukhaprasava, the term sukha indicates that the mother can deliver the foetus without any difficulties, diseases, complications, etc. If all the five garbhotpādaka bhāvas are full of good quality and if the mother is indulging in wholesome food and activities then sukhaprasava occurs. If all the above said qualities are opposite then there will be a chance of duḥkhaprasava.

The path to achieve sukha (happiness) in life

All the efforts of human beings are intended to achieve happiness in life, which is possible only by the true knowledge and righteous act.[3f] When unrighteous actions are performed in ignorance, it may lead to miseries in life. Carakācārya has said that one should adopt the activities which do not clash with dharma (righteousness) and follow the path of peace. One should constantly engage himself in learning scriptures to attain sukha in the life.[1x]

Ways for the permanent cessation of miseries

The absolute eradication of sensation of happiness and miseries are achieved only through the realisation of mokṣa. The knowledge of yoga is a mean to attain mokṣa.[1y] Happiness and miseries both are felt due the contact of the soul, the sense organs, the mind and the objects of senses. Both these types of sensations disappear when the mind is concentrated and contained in the soul and the super natural powers in the mind and body are attained. All types of vedana (sensations) will be completely vanished by the attainment of the state of mokṣa. It happens with the complete eradication of rajas (attachment) and tamas (ignorance) and with the increase of satvaguṇa.[1z] This state is known as yoga according to sages well versed in this science.[1aa]

Discussion

From the Indian philosophical point of view, all types of emotions basically arise from our desires. Emotions in turn are viewed as springs of our actions and are bi-polar in nature ie. sukha and duḥkha.[9] These sukha and duḥkha brings about the lust in the form of likes and dislikes respectively. Then again this lust becomes the cause for happiness and miseries and this cycle continues in life. It is the lust which gathers factors, which serve as substrata for the feeling of happiness and miseries in life. Scriptures teach us that the feeling of happiness and pain both come from inside and not from the things or events outside. If one is reliant on the external factors to achieve happiness in life, there would be no limit of hankering, as whatever we acquire there will be still something better available in the materialistic world.[10] From the health point of view sukha can be considered as good health, which is the condition of dhātusāmya (homeostasis of fundamental tissues) and duḥkha as the state of imbalance of dhātu (fundamental tissues) which is considered as vikāra (diseases). The onslaught of miseries in life is due to our own unwholesome actions performed in ignorance. It is recommended that one should strive for discarding the harmful or unwholesome regimens and adopt the wholesome ones in regard to virtue (dharma), wealth (artha) and desire (kāma) as no sukha or duḥkha can occur in this world without these three elements.[1ab] The complete eradication from the cycle of sukha and duḥkha is possible by the attainment of mokṣa or final emancipation which is known as the state of Yoga.[1ac] Carakācārya has mentioned that an absolute detachment from the worldly actions is the best for providing sukha.[1ad]

The efforts of modern science to explore the fundamental human emotions through the biochemical changes and brain activities have not given much clarity on it. Even such approach of understanding may not be sufficient. Though sukha and duḥkha are common in our day to day life it involves several dimensions of human existence, which āyurveda and ancient Indian science had understood thoroughly. This can help the modern science to re-think and modify their approach in exploring the human behavior.

Conclusion

The fundamental aspects of life are not easy to define and investigate. One such aspect of human life is sukha and duḥkha. Sukha and duḥkha both are the integral part of human life. Āyurveda has explained the concept of sukha and duḥkha from the aspect of both health and philosophy. From the perspective of health, sukha can be considered as ārogya or dhātusāmyata and duḥkha as the state of disease due

to imbalance of dhātus. Experiencing and accepting that none other than our own actions are responsible for all the sukha and duḥkha, opens a new dimension for our life which takes us towards achieving the higher goals of life. Seeking the happiness in the materialistic world will only bring the momentary pleasure and it may further create an endless desire which when unfulfilled becomes the cause for miseries in life. Only Carakācārya has mentioned that 'sarva sanyāsa' (absolute detachment from the action) is the best way to bring sukha. In a nut shell we can say that āyurveda, with its deeper sense of understanding the fundamentals of life and the spiritual wisdom of our ācāryas have given more clarity to the concept of sukha and duḥkha in various contexts of life.

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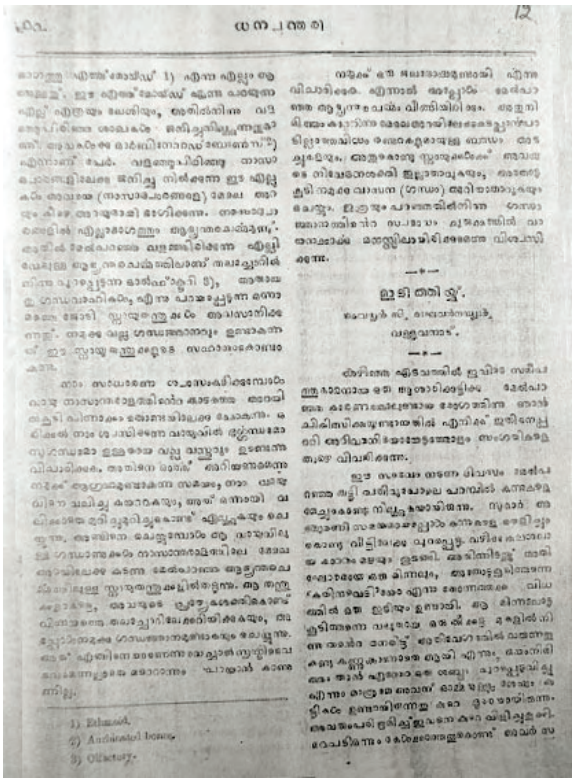
A case of lightning strike

Vaidyan C. Govindan Eledam, Pallurutti

Dhanvantari is the first medical journal in Malayalam published every month by Vaidyaratnam P. S. Varier from Arya Vaidya Sala uninterruptedly for 23 years from 1903 to 1926 . This clinical note was published in its column on Book No. 5, 1083 Cingam Malayalam Era (1908 CE), Article No. 6, Page 12.



I happened to treat a boy suffering from the aforementioned disease. I am giving an account of the little I could gather. He was gracing the cattle as usual. While he was about to return around five in the evening it started raining heavily and a clap of thunder struck him. His friends were quite far away from him. By the time they arrived he lay still as if dead and I was summoned. His eyes were shut and the mouth was opened a little and I was unable to feel the breath. A feeble pulse could be felt. The body heat was steady and there were no any notable gestures. There was a slight discolouration below the front of the left knee. These symptoms were enough to certify that he was alive. He was around 12 years old.

Vāgdeha manasām ceṣṭāmākṣipyātibalā malāḥ
sannyāsam sannipatitāḥ prāṇāyatanasamśrayāḥ
Kurvanti, tena puruṣaḥ kāṣṭhībhūto mṛtopamaḥ
mriyeta śīghram śīghram ceccikitsā na prayujyate
(Aṣṭāṅgahṛdayam Nidānasthānam 6/37-38)

I doubted it to be sannyāsaroga and treated accordingly. I applied ground trikaṭu [pippali (*Piper longum* L.), marica (*Piper nigrum* L.) and śuṇṭhi (*Zingiber officinale* Roscae)] mixed with breast milk in the eyes. It was not effective enough. So I did nasya with the same mixture. He started to sneeze, to cough, to blow the nose and above all, opened his eyes, moved his extremities and attempted to converse. This was a relief for everyone. I immediately gave him Kastūryādi guḷika and Gorocanādi guḷika, one each, mixed in breast milk thrice in small intervals. He regained most of his consciousness and started conversing in near normalcy. He even had some gruel. I asked them to apply the mixture of equal quantities of oil and clarified butter along with powdered and fried rock salt and madhūka (*Glycyrrhyza glabra* L.) on the discolouration. I asked them to notify me if needed and left.

The next time when I visited him, the discoloration was clearly visible. But there was not any discomfort. Raktamokṣaṇa (leech therapy) was done and the aforementioned paste was applied. He was completely cured of it. While referring for the symptoms and treatment of the strike of a lightening, I could gather the under mentioned śl̤oka.

Vaidyutānaladagdhasya lepasekādiyojayet
satailamamḷalavaṇaprāyam tāpañcavahninā
Cutthadagdhavadāhāram madhurasnigdhaśītaḷam
sekañca sajñāyuktasya kurvītendriyavedinaḥ

Āgneyairauṣadairlepam sekamikṣutuṣodakaiḥ
sarpissiddhairamḷayuktairvasātailayutairapi |

The vitiation of doṣas, signs and symptoms and the treatment modalities are not mentioned though. According to the science, agni is classified into four. bhauma, divya, audarya and āgaraja. I earnestly request the readers, especially the physicians to clarify my doubts as I am confused because it is said that water increases the intensity of divyāgni then how can the same principle be applied to bhaumāgni and what would the end result be.

Translated by: Rati Vijayan, Publication Department, Arya Vaidya Sala, Kottakkal, Kerala, India.

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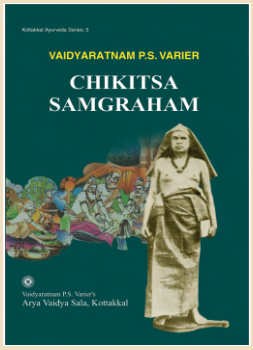

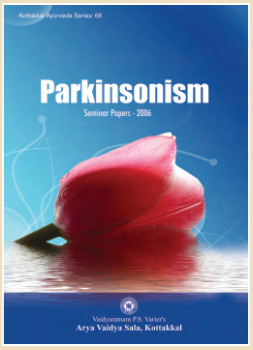

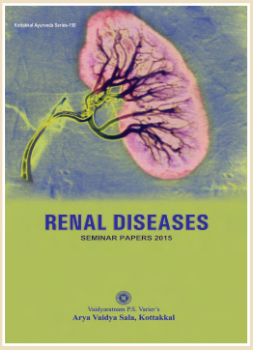

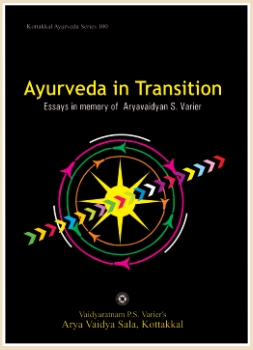

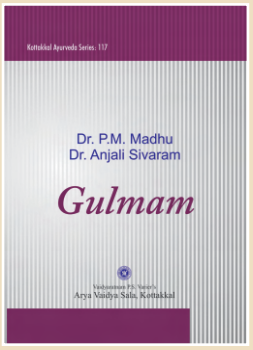

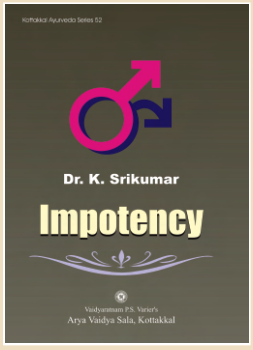

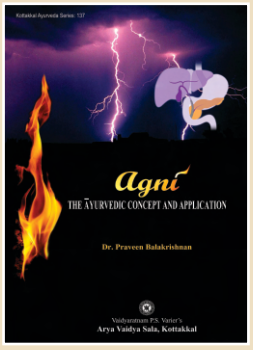

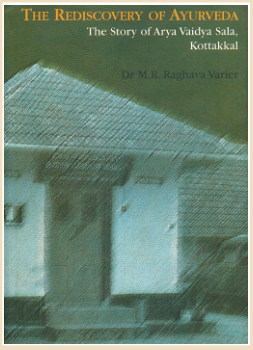

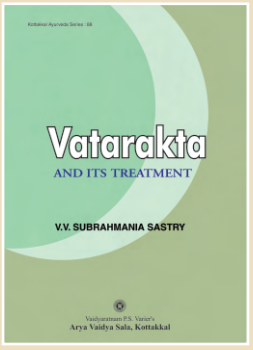

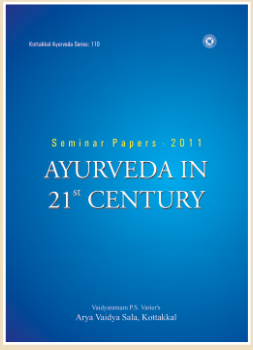

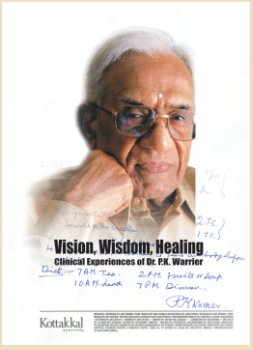

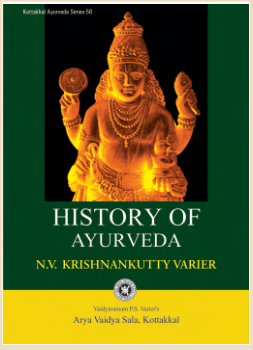

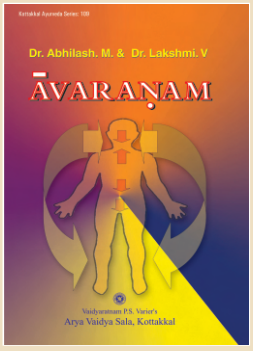

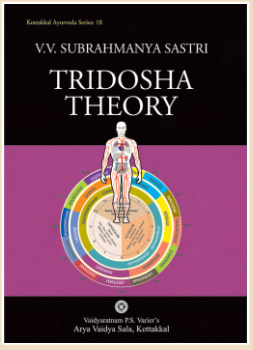

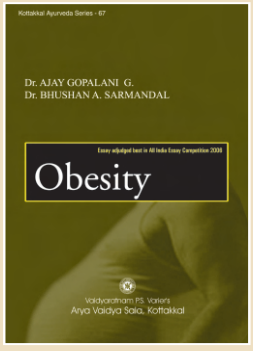

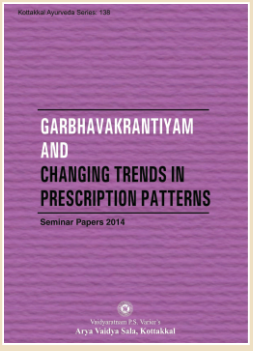

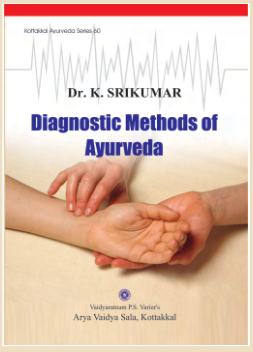

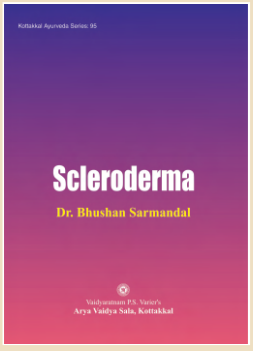

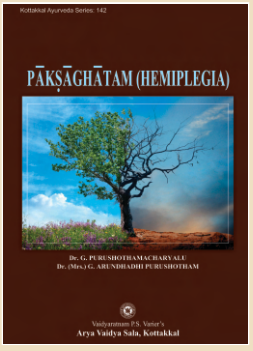

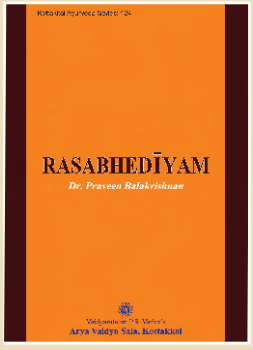

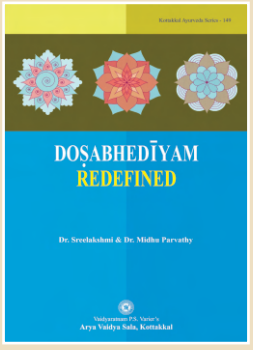

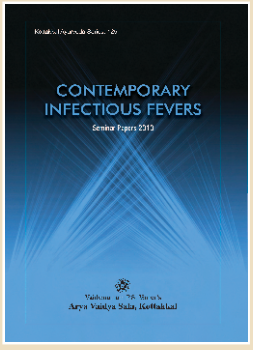

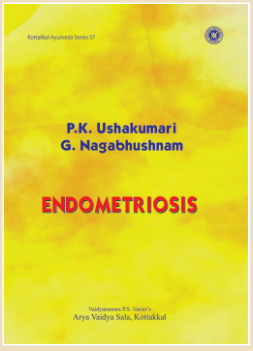

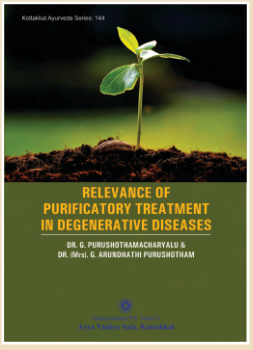

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